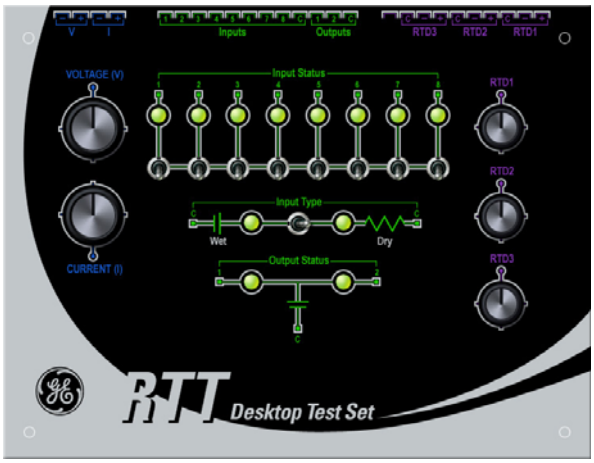
GE
Digital Energy

RELAY TEST TOOL

Instruction Manual



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GE Digital Energy's Quality Management System is registered to ISO9001:2000
QMI # 005094

These instructions do not purport to cover all details or variations in equipment nor provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purpose, the matter should be referred to the General Electric Company.

To the extent required the products described herein meet applicable ANSI, IEEE, and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

GE Digital Energy Relay Test Tool instruction manual version A3.

Part number: 1601-9021-A3 (September 2012)

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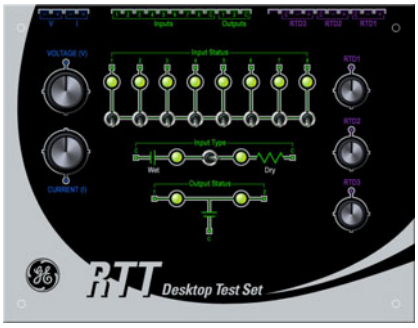


RTT Desktop Test Set

Chapter 1: Getting Started

1.1 Ordering

1.1.1 Ordering the RTT

Select the basic model and the desired features from the selection guide below:

Table 1–1: Ordering Codes

RTT	*	*
RTT-Cable		

1.2 About Your New RTT Unit

1.2.1 Cautions and Warnings

Before attempting to install or use the RTT unit, it is important that all DANGER and CAUTION indicators in this manual are reviewed in order to prevent personal injury, equipment damage and/or downtime. The above icons are used to indicate dangers, cautions and notes.

The standard **note** icon emphasizes a specific point or indicates minor problems that may occur if instructions are not properly followed.

The **caution** icon indicates that there may be possible damage to equipment or data if instructions are not properly followed.

The **danger** icon provides users with a warning about the possibility of serious or fatal injury to themselves or others.

1.2.2 Check the Contents of the Box

When you open the RTT box, you should find:

- one RTT unit
- one power cord
- one RTT-to-product connecting cable
- manual

If there is any noticeable physical damage, or if any of the contents of the box are missing, please contact GE Multilin immediately.

1.2.3 Using this Manual

This manual is designed with the assumption that you may or may not know about the principles of RTT usage. If you know little about RTT usage, please read carefully what is written below, bearing in mind that GE Multilin is available to fully support your questions about any aspect of the product.

If this is **not** the case, simply ignore those sections of the manual with which you are familiar.

The manual is structured to guide you through the entire installation and configuration process, from opening the box, to:

- physically connecting the associated relays
- setting up the associated relays for use with the RTT

- creating RTT outputs for each type of relay
- viewing information about your relays based on inputs from your RTT.

Any actions you have to undertake during any part of the installation and configuration processes, are indicated in the manual as follows:

▷ Open the box.

This makes it easier to separate what you must physically **do**, from the surrounding product and process descriptions and explanations.

1.2.4 About the RTT

The RTT is a device that allows simple testing of electronic relays, by essentially simulating input conditions to the relay in question.

It includes a single phase supply, where both volts and amperes are adjustable via rotary knobs. It also includes eight circuits to drive the contact inputs of modern relays, as well as 2 contact outputs both monitored via LEDs. The RTT also has 3 channels of RTD resistance simulators.

The features of the RTT allow you to test several functions of the relay, such as overcurrent, overvoltage, directional units using the single phase source in a very easy and convenient way. The main application is rough testing of relays in the laboratory or the field. It may also be used for technicians and crew training purposes in a very cost effective way.

The unit is self powered from the mains and is able to work either at 50 or 60 Hz and all common voltage ranges, 110, 120, 230, 240 Vac. When it is used with a modern multimeter, it allows precise testing of relays and meters based on the comparison principle.

The equipment may be used with all modern digital relays that have low burden in their current and voltage inputs as well as low consumption digital inputs.

The figure below shows the RTT box and describes all its features..

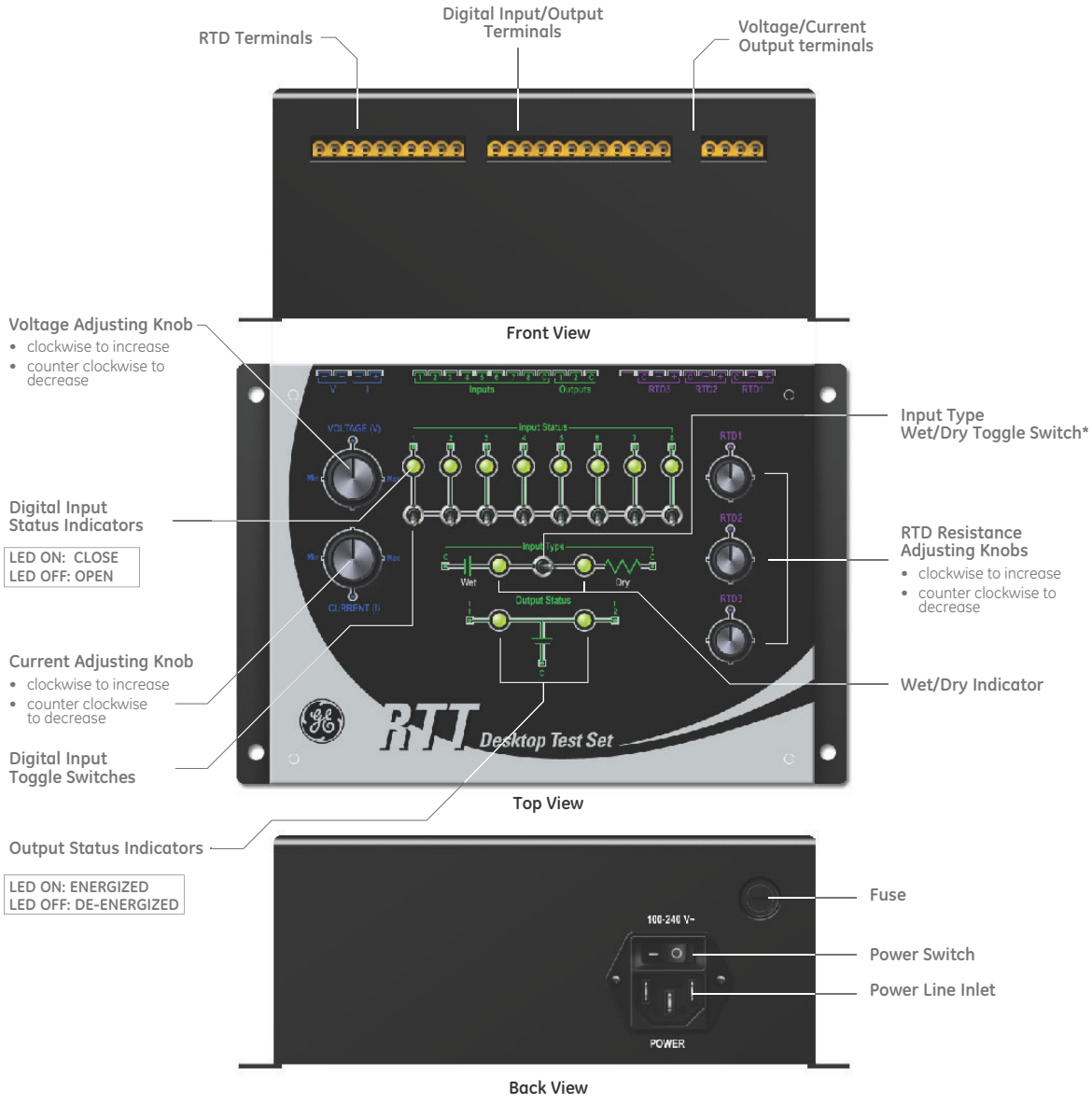


FIGURE 1–1: RTT Details

* In order to prevent accidental movement of the Wet/Dry toggle switch, the switch comes with a locking feature: you must pull it upward in order to toggle the RTT between "Wet" and "Dry" input.

The figure below shows the cable provided with the RTT. This cable is used to connect to all relays, although for some, it may have to be slightly modified. See the appropriate chapter for details.

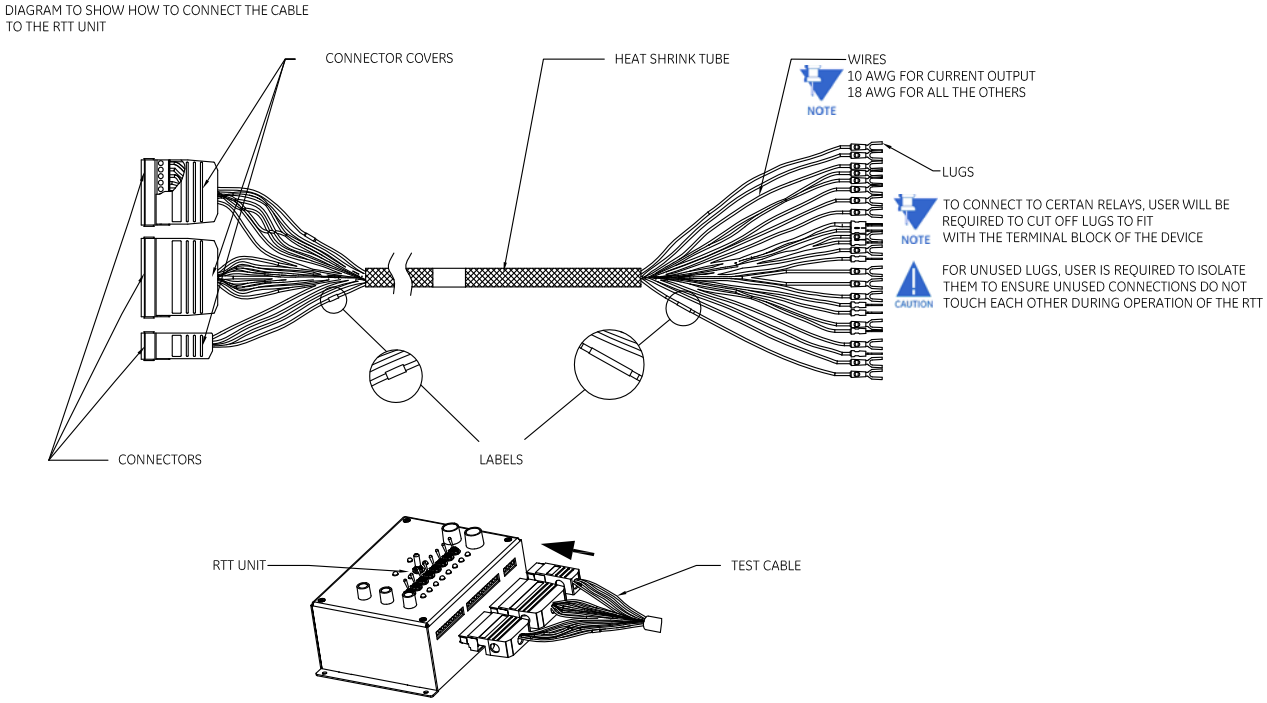
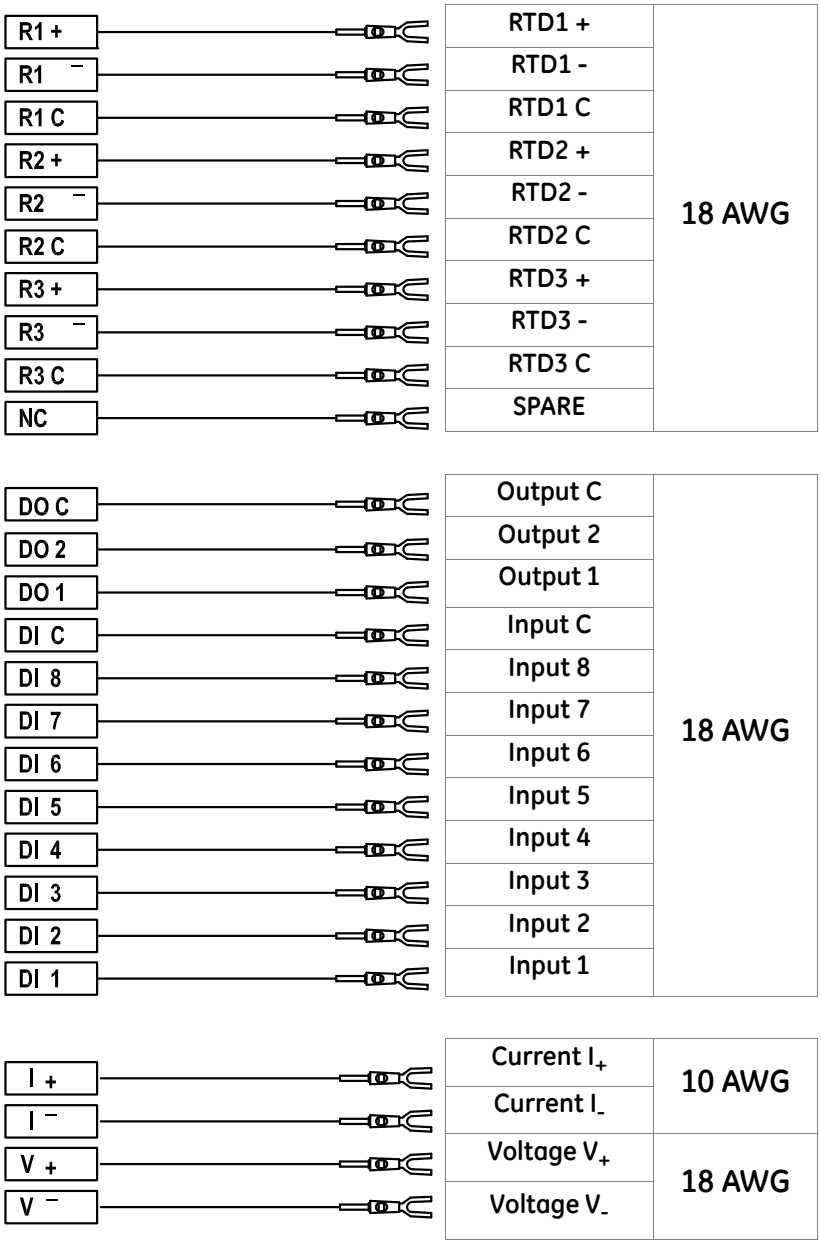


FIGURE 1–2: Connecting the Cable to the RTT Unit

The figure below shows the **wire labels** (see figure 1-2, above), that correspond to the RTT terminals..



1.2.5 RTT Unit Specifications

LED INDICATOR LIGHTS

A single green LED is provided for each digital input from and output to the relay under test.

CONTROL POWER

RANGE:
Nominal AC Voltage: ..... 100 V to 240 V AC at 50/60 Hz
Min/Max AC Voltage: ..... 85 V / 250 V AC at 47 to 63 Hz, 70 mA max.
AT 120 VAC INPUT
Nominal: ..... 3 VA
Maximum: ..... 5 VA
AT 240 VAC INPUT
Nominal: ..... 6 VA
Maximum: ..... 14 VA

FUSE[1]

5 × 20mm, 80 mA, 250V
Time-lag fuse
Manufacturer and part number: ..... LITTELFUSE: 218.080

CURRENT OUTPUT

AT 120 VAC INPUT
Range: ..... 0 to 3 A AC at 0.08 Ω CT Relay Burden
AT 240 VAC INPUT
Range: ..... 0 to 6 A AC at 0.08 Ω CT Relay Burden
Tolerance: ..... ±10%

VOLTAGE OUTPUT

AT 120 VAC INPUT
Range: ..... 0 to 40.0 VAC
AT 240 VAC INPUT
Range: ..... 0 to 80.0 VAC
Tolerance: ..... ±10%

RTD OUTPUT (NON-LINEAR)

For Wire Type: ..... 3 wires
For Sensor Type: ..... 100 Ω platinum, 100 Ω nickel, 120 Ω nickel
Resistance: ..... 110 to 160 Ω
Tolerance: ..... ±5%

DIGITAL INPUTS

DRY:
Contact Resistance: ..... < 10 mΩ
Insulation Resistance: ..... > 1000 MΩ
WET:
DC Voltage: ..... 23.4 VDC @ 200mA
Tolerance: ..... ±5%

1. Fuse Replacement:
   - Disconnect Power Supply and remove fuse from its holder.
   - Replace with a 80 mA, 250 V, time-lag fuse. Use ONLY fuses indicated in above specifications.

AMBIENT TEMPERATURE
Operating Range: .....5ºC to 40ºC
Storage Range: .....-20ºC to 70ºC

PHYSICAL
Size: 7.5" L × 5.75" W × 3.25" D / 187 mm L × 145 mm W × 81 mm D
Weight: 4.95 lb / 2.26 Kg

INTERNATIONAL STANDARDS COMPLIANT
When used with advanced protection relays such as the GE Multilin Universal Relay family, the RTT complies with most international standards requirements for test and measuring equipment:
EN61326:1997
EN/IEC 61010-1:2001
cULus 61010-1

ENVIRONMENTAL
Indoor use
Altitude: .....Up to 2000 m
Recommended operating
ambient temperature (T_{mra}).....5°C to 40°C
Relative Humidity: .....0 to 90%, non-condensing
Mains supply voltage fluctuations: .....up to 10% of nominal voltage
Installation Category: II
Max. Branch circuit: .....20 A
Pollution Degree: 2

RTT TYPE TESTS

EMC TEST	STANDARD	CRITERIA
Electrostatic Discharge: Air and Direct	IEC 60255-22-2 / IEC 10004-2	4 KV Contact and 8 KV Air
Electrical Fast Transient/Burst Immunity-Capacitive Clamp	IEC 60255-22-4 / IEC 10004-4	2 KV, 5 KHz (Power), 1 KV 2.5 KHz (I/O)
Surge Immunity	IEC 60255-22-5 / IEC 10004-5	0.5 KV diff, 1 KV com
Voltage Dip; 2. Voltage Interruption	IEC 61000-4-11	0.5 cycle each polarity & 100%
RF Immunity 80 to 1000 MHz	IEC 60255-22-3 / IEC 61004-3 & ETP 5.2	10 V/m
Conducted RF Immunity 150 KHz to 80 MHz	IEC 60255-22-6 / IEC 10004-6	10 Vrms Am 80% mod
Power Frequency Magnetic Field Immunity	IEC 61000-4-8	30 A/m
Pulse Magnetic Field Immunity	EN/IEC 61000-4-9:1994, 2001	1000 A/m
Conducted Emissions EN61000-6-4:2001	IEC 60255-25 / CISPR22	Class A

EMC TEST	STANDARD	CRITERIA
Radiated Emissions EN61000-6-4:2001	IEC 60255-25 / CISPR22	Class A & B
ENVIRONMENTAL TESTS		
Relative Humidity Cyclic	EN/IEC 60068-2-30:2005	55°C, 93% RH, 6 days
Cold Temperature	IEC 60068-2-1	-40°C, 16 hours
Dry Heat Temperature	IEC 60068-2-2	+85°C, 16 hours
Sinusoidal Vibration	IEC 60255-21:1996, 1988; IEEE C37.1	10 Hz - 150 Hz, 1G, Z-axis
SAFETY TESTS		
Dielectric Strength	Per EN/IEC 61010-1	Up to 1700 VAC, 1 min
ISM-Safety	EN/IEC 61010-1	
ISM-Safety	UL/ULC 61010-1	

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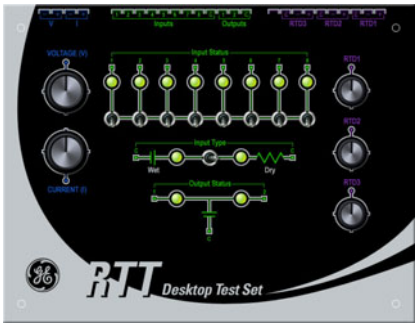


RTT Desktop Test Set

Chapter 2: Using the RTT on SR Series Relays

2.1 The 469 Motor Management Relay

2.1.1 Overview

The SR469 Relay has 3-phase current inputs with CT burden less than 0.2VA at rated load, 3 differential current inputs with the same CT burden and 3-phase voltage inputs with greater than 500KOHM VT burden. There are also 9 digital inputs designed for Dry contact connection only, and 6 Form-C output relays. The SR469 Relay monitors up to 12 RTD inputs, each RTD being field programmable as a 3-wire type of 100 Platinum, 100 Nickel and 120 Nickel.

All features of RTT can be applied to the SR469 Relay. Although there are no unused terminals on the RTT product cable, a modification to the cable is required in order to fit it to the SR469 terminals.

Modification of the Product Cable

For the wires related to contact inputs and RTDs (18 in total), cut the lugs off the wire, strip wire to make them fit to the SR469 terminals.

The lugs to be cut are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DIC, DI8, DI7, DI6, DI5, DI4, DI3, DI2 and DI1.

2.1.2 SR469 Motor Management Relay Terminal Layout

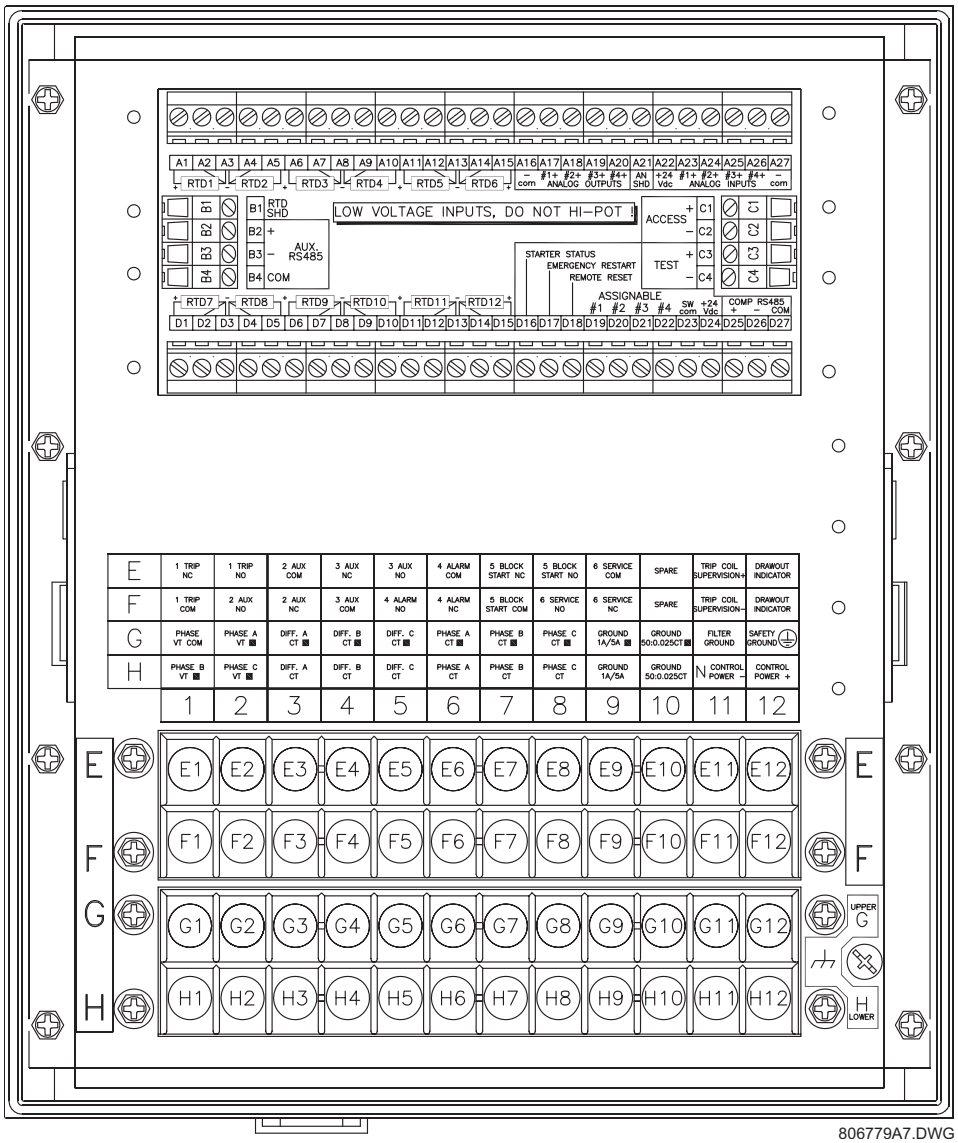


FIGURE 2–1: SR469 Terminal Layout

2.1.3 SR469 Motor Management Terminal Functions

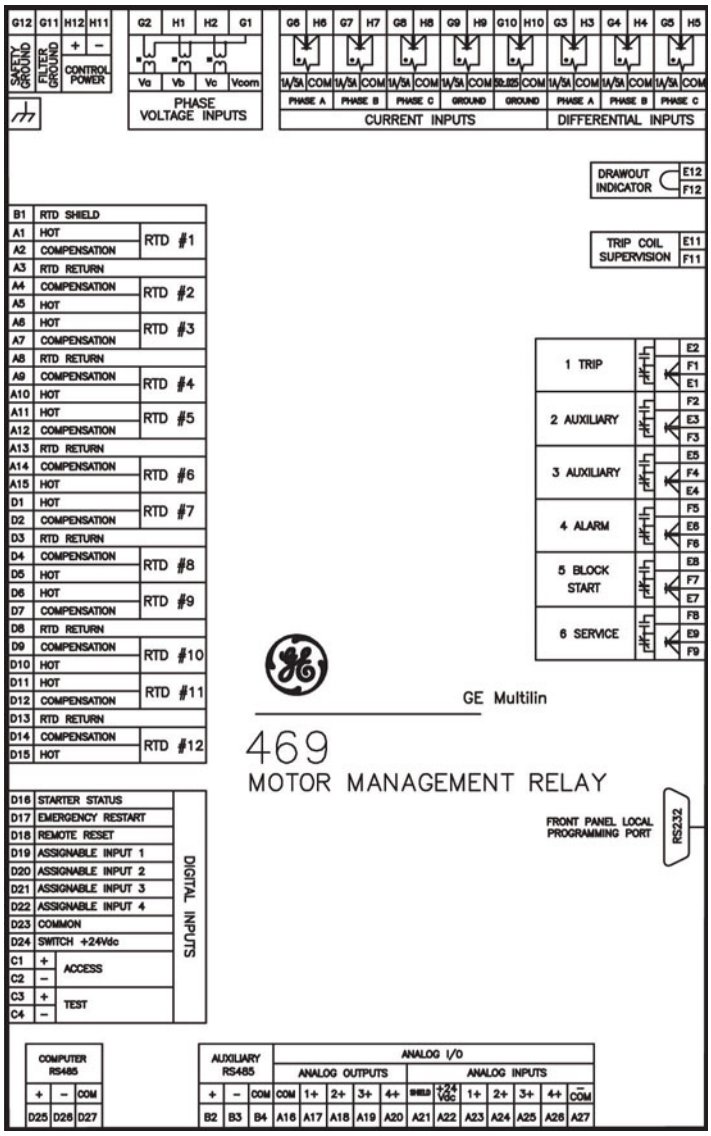


FIGURE 2–2: SR469 Terminal Functions Schematic

2.1.4 RTT to SR469 Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The SR469 Relay accepts only **DRY** contact connections from the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 2–1: SR469 with RTT Set to Dry

RTDs	RTD 3 +	A6	----------	RTD3 +	
	RTD 3 -	A8	----------	RTD3 -	
	RTD 3 COM	A7	----------	RTD3 C	
	RTD 2 +	A5	----------	RTD2 +	
	RTD 2 -	A3	----------	RTD2 -	
	RTD 2 COM	A4	----------	RTD2 C	
	RTD 1 +	A1	----------	RTD1 +	
	RTD 1 -	A3	----------	RTD1 -	
	RTD 1 COM	A2	----------	RTD1 C	
				SPARE	
Contact Outputs*	AUX 3 COMMON	F4	----------		RTT
	TRIP COMMON	F1	----------	OUTPUT C	
	AUX 3 NO	E5	----------	OUTPUT 2	
	TRIP NO	E2	----------	OUTPUT 1	
Contact Inputs	Switch Common	D23	----------	INPUT C	
	Access	C1	----------	INPUT 8	
	Assignable #4	D22	----------	INPUT 7	
	Assignable #3	D21	----------	INPUT 6	
	Assignable #2	D20	----------	INPUT 5	
	Assignable #1	D19	----------	INPUT 4	
	Remote Reset	D18	----------	INPUT 3	
	Emergency Restart	D17	----------	INPUT 2	
	Starter Status	D16	----------	INPUT 1	
CTs	Ia +	G6	----------	I_+	
	Ia COM	H6	----------	I_-	
VTs	VA	G2	----------	V_+	
	Vn	G1	----------	V_-	

NOTE

*Trip and Alarm Common terminals (F1 and F4) must be hardwired together.

2.1.5 Interfacing to the RTT through the EnerVista 469 Setup Program

The following information describes how to configure the SR469 relays and how to monitor voltage and current inputs using the 469 Setup Software and the RTT.

2.1.5.1 Current

▷ **Setup**: Enter the Phase CT Primary, then press Save.

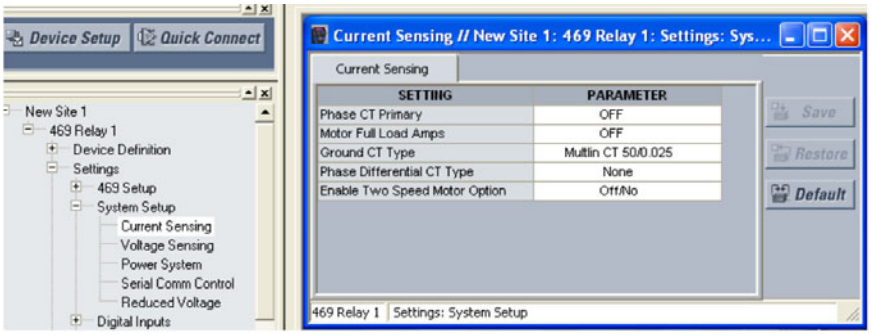


FIGURE 2–3: Current Setup

▷ **Metering**: The current values measuerd by the relay can be viewed on the following screen in real-time.

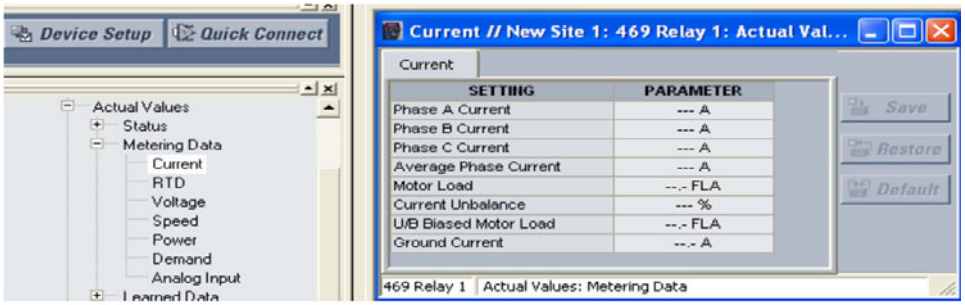


FIGURE 2–4: Current Metering

2.1.5.2 Voltage

▷ **Setup**: Configure the Voltage Connection Type, enter the Voltage Ratio, then press Save.

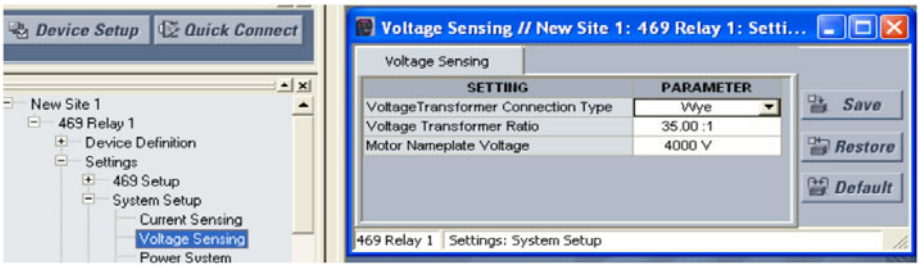


FIGURE 2–5: Voltage Setup

▷ **Metering**: The voltage values measured by the relay can be viewed on the following screen in real-time.

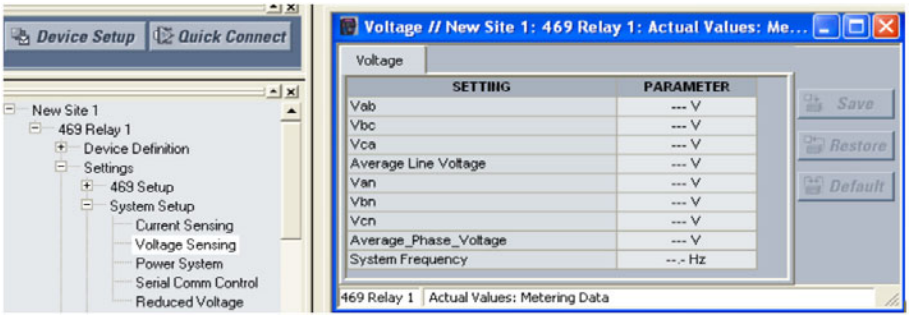


FIGURE 2–6: Voltage Metering

2.1.5.3 RTDs

▷ **Setup**: Configure the RTD type and choose the application for each RTD.

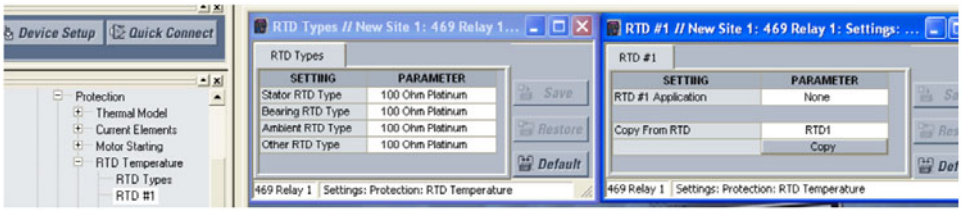


FIGURE 2–7: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, using the following screen in real-time.

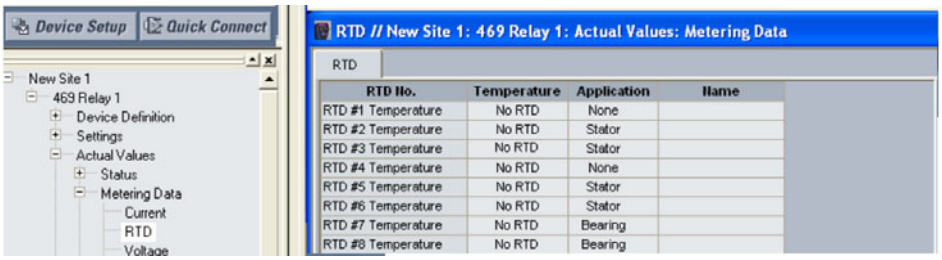


FIGURE 2–8: RTD Metering

2.1.5.4 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

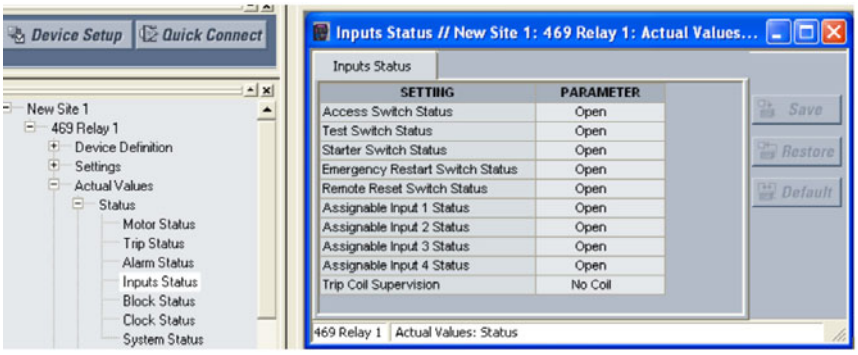


FIGURE 2–9: Contact Inputs Status

2.1.5.5 Contact Outputs Testing

The two contact outputs monitored by the RTT shold match the status shown in the EnerVista 469 Setup.

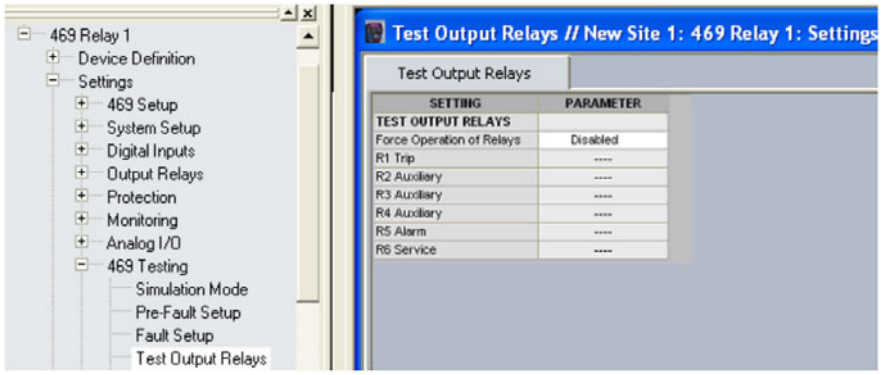


FIGURE 2–10: Contact Outputs Testing

2.2 The SR750/760 Feeder Management Relay

2.2.1 Overview

The SR750/760 Relay has 3-phase current inputs with a CT burden less than 0.2 VA at rated load, and 3-phase voltage inputs with a greater than 576 KW VT burden. External contacts can be connected to the Relay's 14 logic inputs. These contacts can be either Dry or Wet (which requires external source voltage greater than 30VDC). The SR750/760 Relay is equipped with 8 output relays: three special purpose and five general purpose.

As the DC voltage of RTT Wet doesn't meet SR750/760 requirement, only the Dry connection is applicable. As there is no RTD feature in SR750/760, no modification of the Test Cable is required.

Unused Wires

For the unused wires (9 in total), it is recommended that the user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3- and R3C.

2.2.2 SR750/760 Feeder Management Relay Terminal Layout

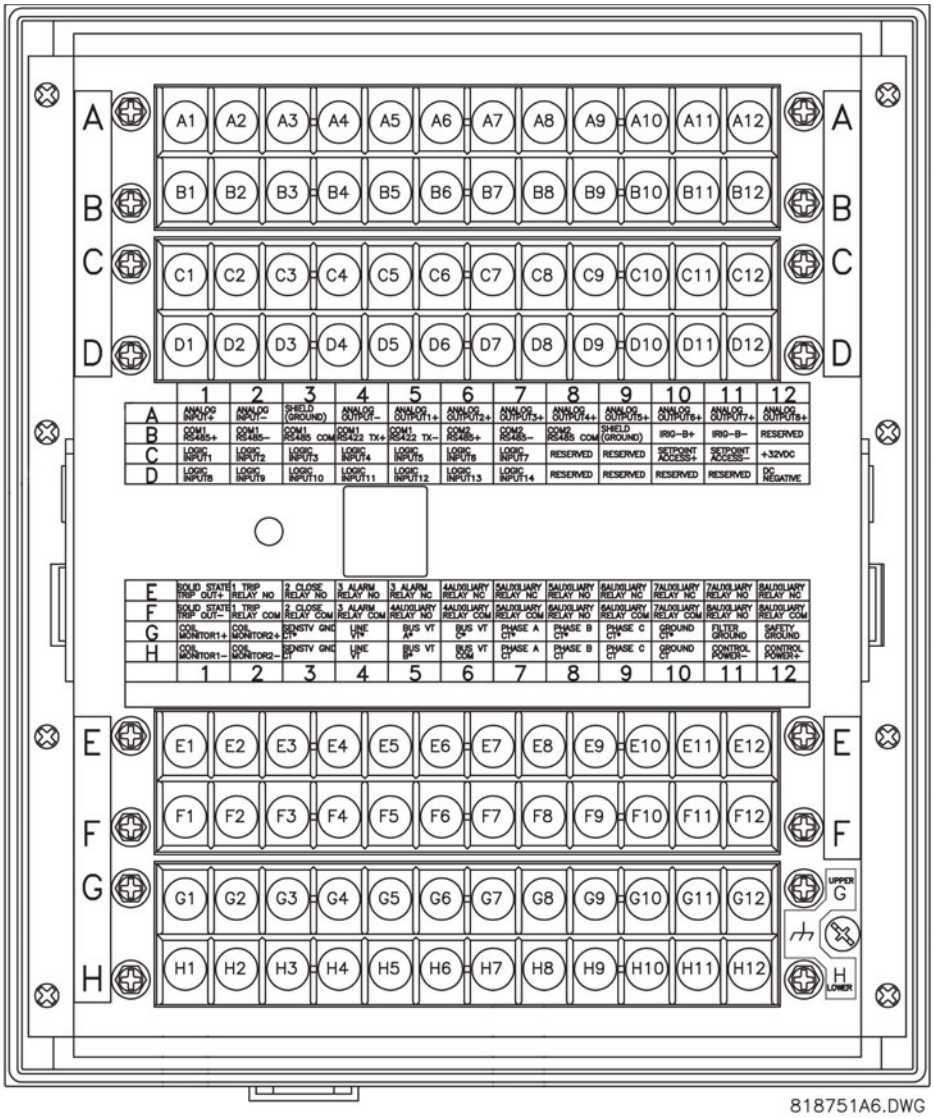


FIGURE 2–11: SR750/760 Terminal Layout

2.2.3 SR750/760 Feeder Management Relay Terminal Functions

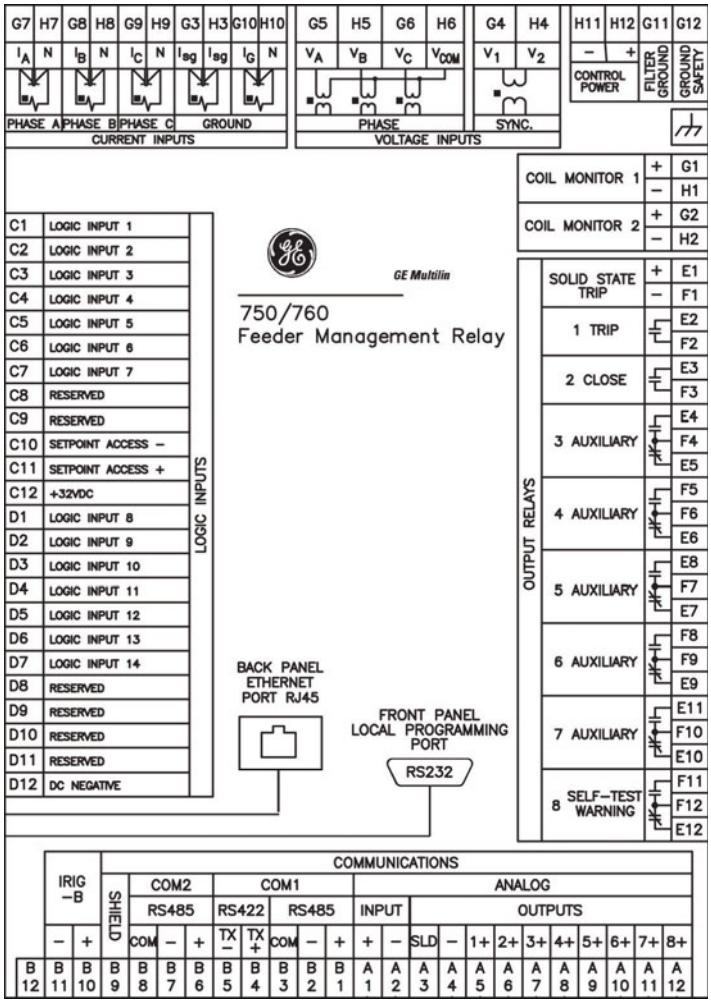


FIGURE 2–12: SR750/760 Terminal Functions Schematic

2.2.4 RTT to SR750/760 Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The SR750 Relay accepts only **DRY** contact connections from the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 2–2: SR750/760 with RTT Set to Dry

RTDs*				RTD3 +	
				RTD3 -	
				RTD3 C	
				RTD2 +	
				RTD2 -	
				RTD2 C	
				RTD1 +	
				RTD1 -	
				RTD1 C	
				SPARE	
Contact Outputs**	CLOSE COMMON	F3			RTT
	TRIP COMMON	F2	----------	OUTPUT C	
	CLOSE NO	E3	----------	OUTPUT 2	
	TRIP NO	E2	----------	OUTPUT 1	
Contact Inputs	+32 V DC	C11	----------	INPUT C	
	Logic Input 7	C7	----------	INPUT 8	
	Logic Input 6	C6	----------	INPUT 7	
	Logic Input 5	C5	----------	INPUT 6	
	Logic Input 4	C4	----------	INPUT 5	
	Logic Input 3	C3	----------	INPUT 4	
	Logic Input 2	C2	----------	INPUT 3	
	Logic Input 1	C1	----------	INPUT 2	
	Access	C10	----------	INPUT 1	
CTs	Ia (5A)	G7	----------	I_+	
	Ia COM	H7	----------	I_-	
VTs	VA	H6	----------	V_+	
	Vn	G5	----------	V_-	

NOTE

*750/760 doesn't have RTD function.

**Trip and Alarm Common terminals (F2 and F3) must be hardwired together.

2.2.5 Interfacing to the RTT through the EnerVista 750/760 Setup Program

The following information describes how to configure the SR750/760 relays and how to monitor voltage and current inputs using the 750_760 Setup Software and the RTT.

2.2.5.1 Current

▷ **Setup**: Enter the Phase CT Primary then Save

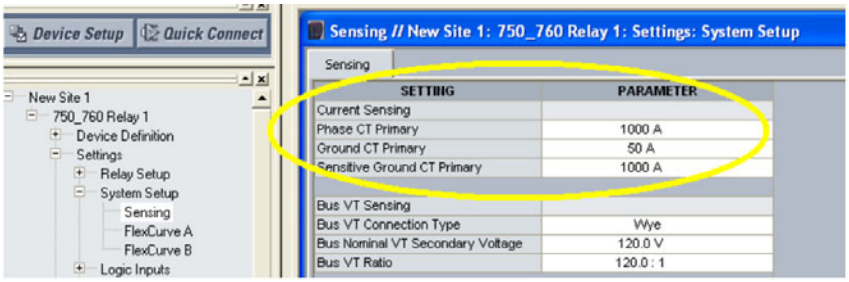


FIGURE 2–13: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

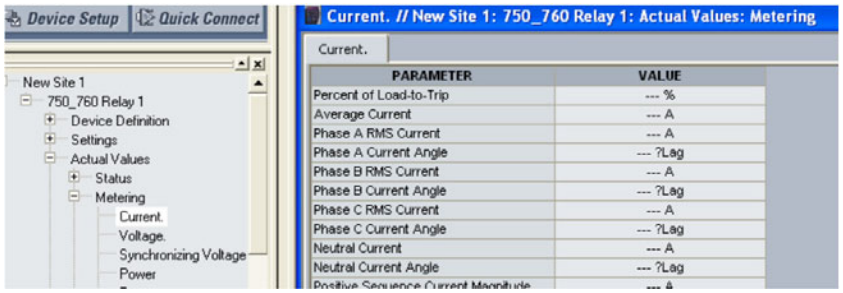


FIGURE 2–14: Current Metering

2.2.5.2 Voltage

▷ **Setup**: Configure the Bus VT Connection Type, enter the the Bus VT Ratio, then Save.

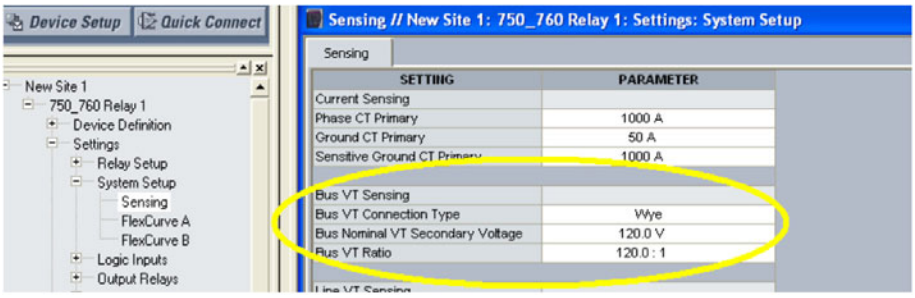


FIGURE 2–15: Voltage Setup

▷ **Metering**: View the voltage values measured by the relay, in real-time

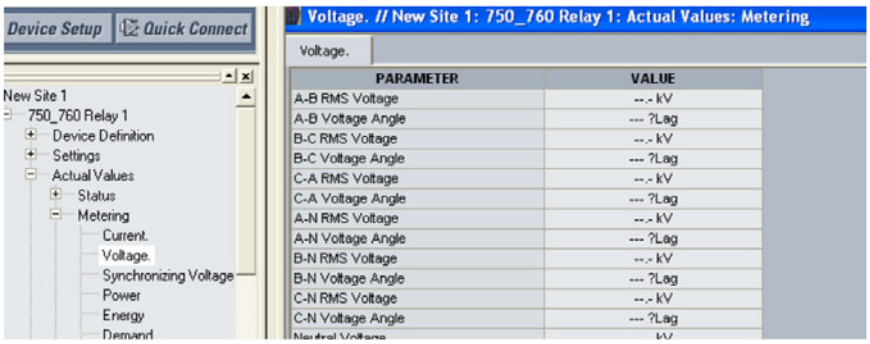


FIGURE 2–16: Voltage Metering

2.2.5.3 Logic Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

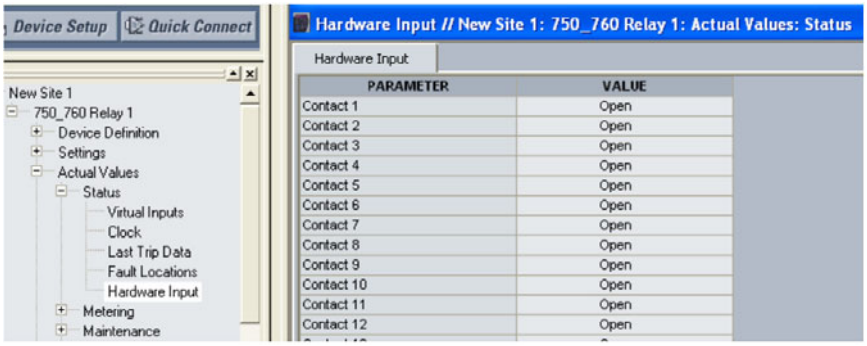


FIGURE 2–17: Logic Inputs Status

2.2.5.4 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnverVista 750/760 Setup.

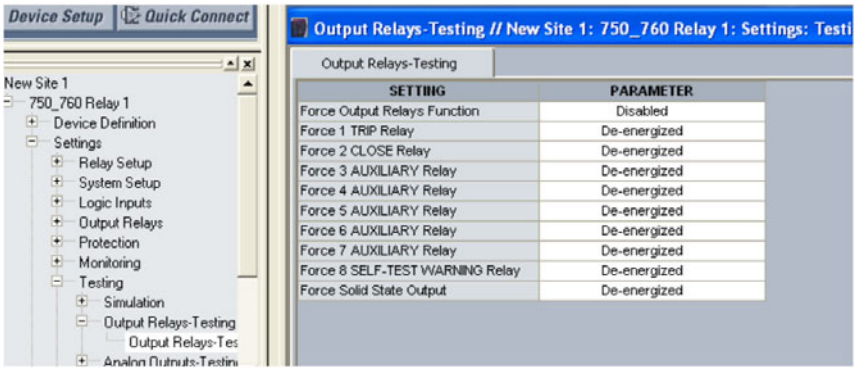


FIGURE 2–18: Contact Outputs Testing

2.3 The SR489 Generator Management Relay

2.3.1 Overview

The SR489 Relay has 3-phase current inputs with CT burden less than 0.2 VA at rated load, 3 differential current inputs with the same CT burden and 3-phase voltage inputs with greater than 500 KOHM VT burden. There are also 9 digital inputs designed for Dry contact connection only, and 6 Form-C output relays. The SR489 Relay monitors up to 12 RTD inputs, each RTD being field programmable as a 3-wire type of 100 Platinum, 100 Nickel and 120 Nickel.

All features of RTT can be applied to the SR489 Relay. There are no unused terminals on the RTT product cable. However a modification is required to the cable to fit to the SR489 terminals.

Modification of the Product Cable

For the wires related to contact inputs and RTDs (18 in total), cut the lugs off the wire, strip wire to make them fit the SR489 terminals.

The lugs to be cut are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DIC, DI8, DI7, DI6, DI5, DI4, DI3, DI2 and DI1.

2.3.2 SR489 Generator Management Relay Terminal Layout

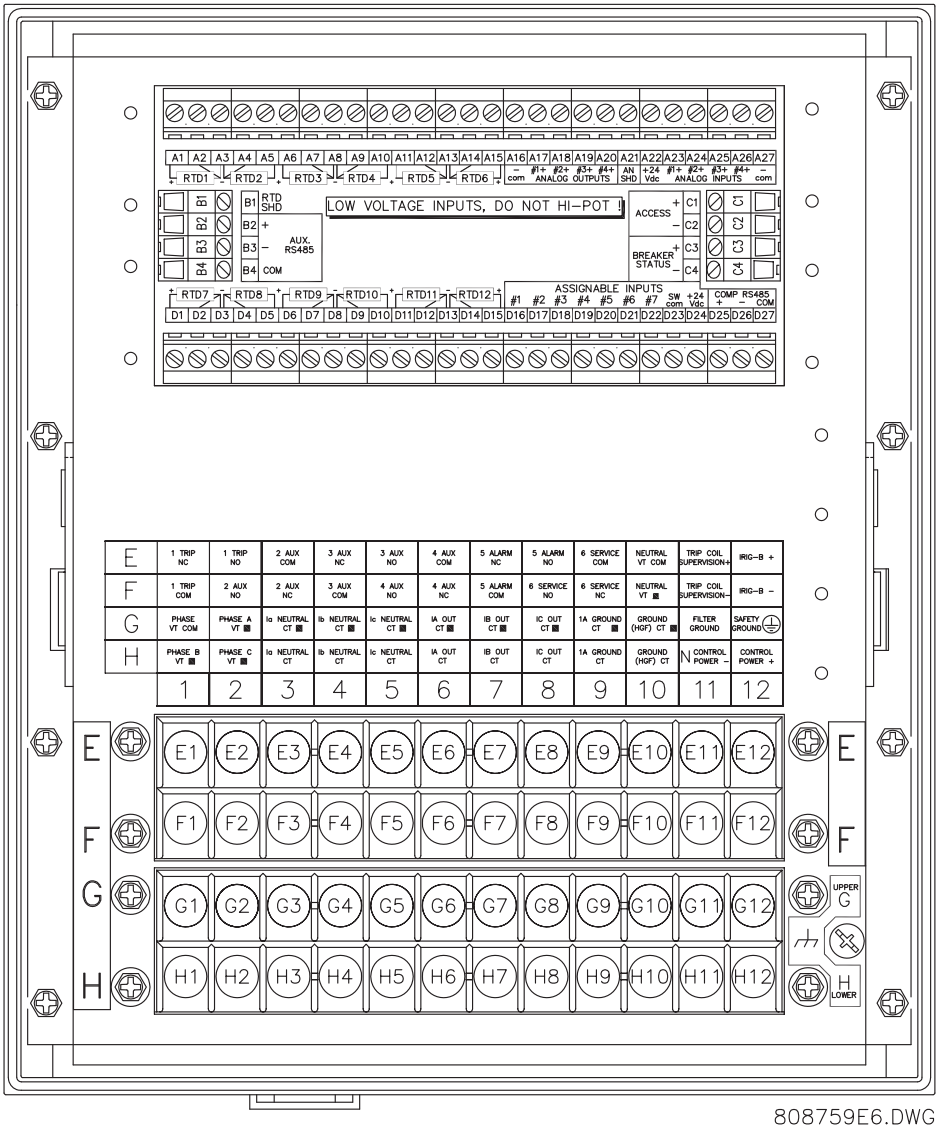


FIGURE 2–19: SR489 Relay Terminal Layout

2.3.3 SR489 Generator Management Relay Terminal Functions

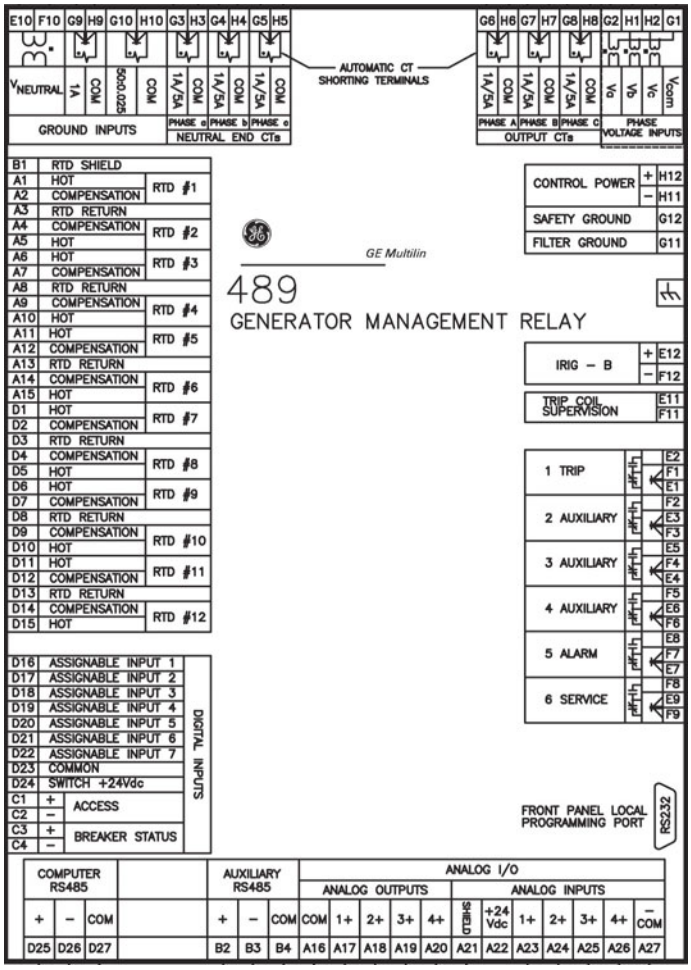


FIGURE 2–20: SR489 Relay Terminal Functions Schematic

2.3.4 RTT to SR489 Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The SR489 Relay accepts only **DRY** contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 2–3: SR489 with RTT Set to Dry

RTDs	RTD 3 +	A6	----------	RTD3 +	
	RTD 3 -	A8	----------	RTD3 -	
	RTD 3 COM	A7	----------	RTD3 C	
	RTD 2 +	A5	----------	RTD2 +	
	RTD 2 -	A3	----------	RTD2 -	
	RTD 2 COM	A4	----------	RTD2 C	
	RTD 1 +	A1	----------	RTD1 +	
	RTD 1 -	A3	----------	RTD1 -	
	RTD 1 COM	A2	----------	RTD1 C	
				SPARE	
Contact Outputs*	ALARM COMMON	F7	----------		RTT
	TRIP COMMON	F1	----------	OUTPUT C	
	ALARM NO	E8	----------	OUTPUT 2	
	TRIP NO	E2	----------	OUTPUT 1	
Contact Inputs	Switch Common	D23	----------	INPUT C	
	Assignable #6	D21	----------	INPUT 8	
	Assignable #5	D20	----------	INPUT 7	
	Assignable #4	D19	----------	INPUT 6	
	Assignable #3	D18	----------	INPUT 5	
	Assignable #2	D17	----------	INPUT 4	
	Assignable #1	D16	----------	INPUT 3	
	Access	C1	----------	INPUT 2	
	Breaker Status	C3	----------	INPUT 1	
CTs	Ia +	G6		I_+	
	Ia COM	H6		I_-	
VTs	VA	G2		V_+	
	Vn	G1		V_-	

NOTE

*Trip and Alarm Common terminals (F1 and F7) must be hardwired together.

2.3.5 Interfacing to the RTT through the EnerVista 489 Setup Program

The following sections demonstrate how to navigate, configure, and monitor the operation of the SR489 throught EnerVista 489 Setup.

2.3.5.1 Current

▷ **Setup**: Enter the Phase CT Primary, then Save

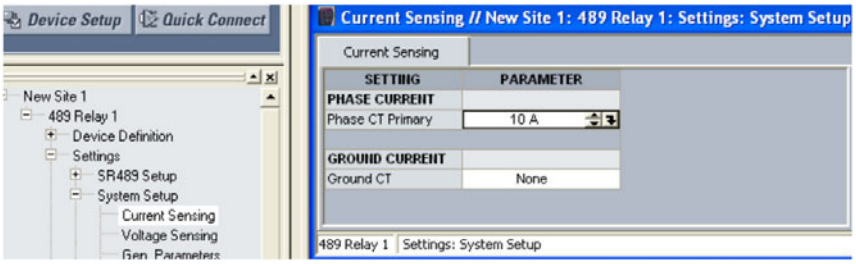


FIGURE 2–21: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

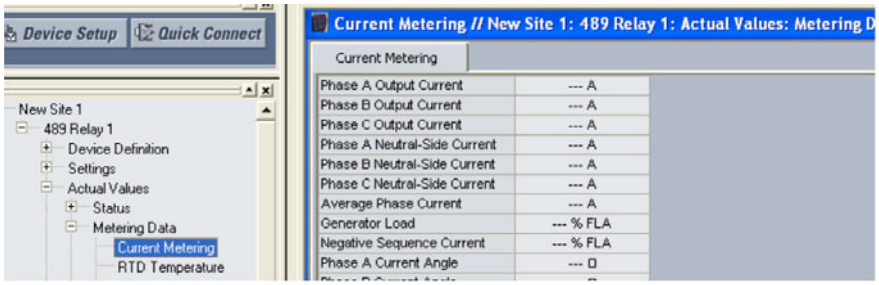


FIGURE 2–22: Current Metering

2.3.5.2 Voltage

▷ **Setup**: Configure the Voltage Connection Type, enter the Transformer Ratio, then Save

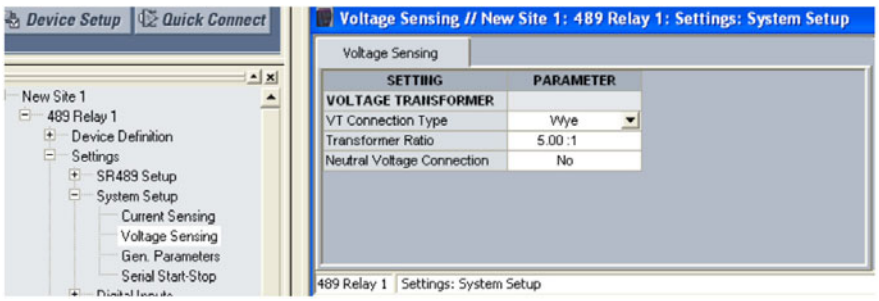


FIGURE 2–23: Voltage Setup

▷ **Metering**: View the volatage values measured by the relay, in real-time.

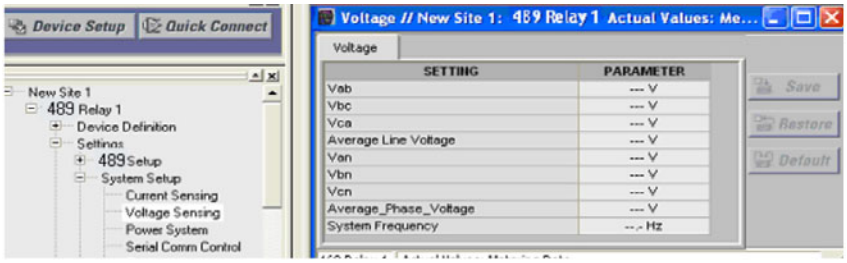


FIGURE 2–24: Voltage Metering

2.3.5.3 RTDs

▷ **Setup**: Configure the RTD type and the application for each RTD

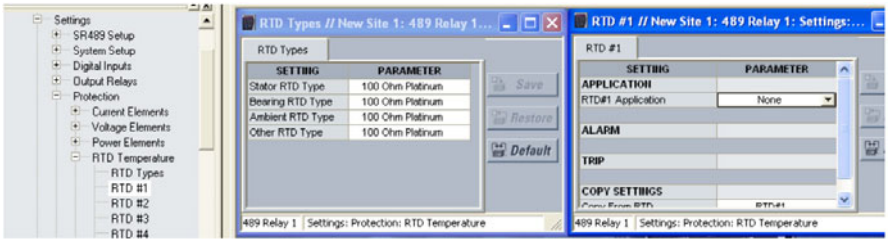


FIGURE 2–25: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, in real-time.

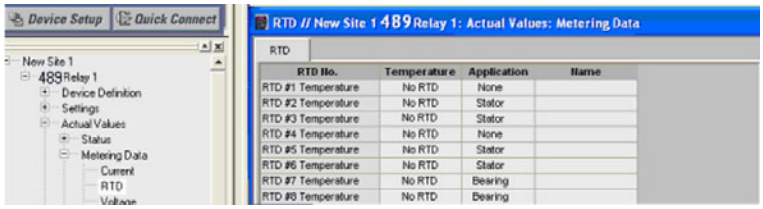


FIGURE 2–26: RTD Metering

2.3.5.4 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

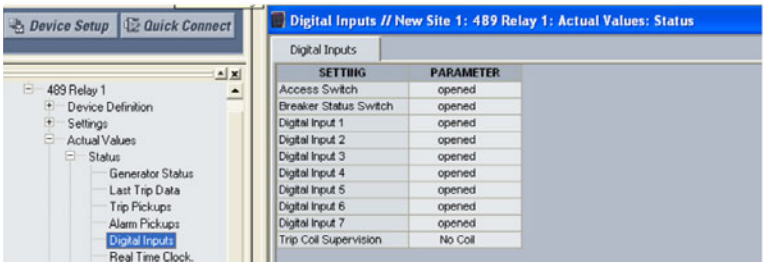


FIGURE 2–27: Contacts Inputs Status

2.3.5.5 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnerVista 489 Setup.

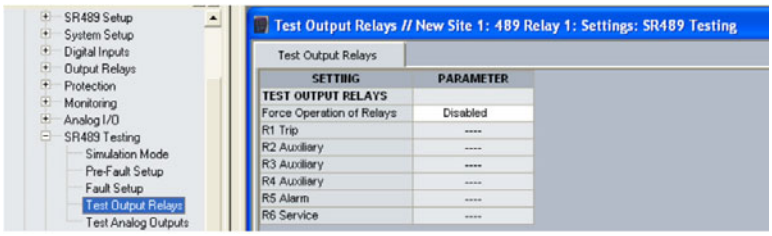


FIGURE 2–28: Contact Outputs Testing

2.4 The SR745 Transformer Management Relay

2.4.1 Overview

The SR745 Relay has three groups of 3-phase current inputs with CT burden less than 0.2 VA at rated load and has one voltage input with VT burden less than 0.025 VA at rated 120 V. External contacts can be connected to the relay's 16 logic inputs. These contacts can be either Dry or Wet (which requires an external source voltage greater than 30 VDC). The SR745 Relay is equipped with 8 output relays. The SR745 Relay provides one 3-wire RTD input which can be field programmable as a 3-wire type of 100 Platinum, 100 Nickel and 120 Nickel.

All features of RTT can be applied to the SR745 Relay, but only one RTD is used. No modification to the Test Cable is required.

Unused Wires

For the unused wires (6 in total), it is recommended that user tape the lugs to ensure isolation of the contacts and so that no problems are caused by wires touching.

The unused wires are: R2+, R2-, R2C, R3+, R3- and R3C.

2.4.2 SR745 Transformer Management Relay Terminal Layout

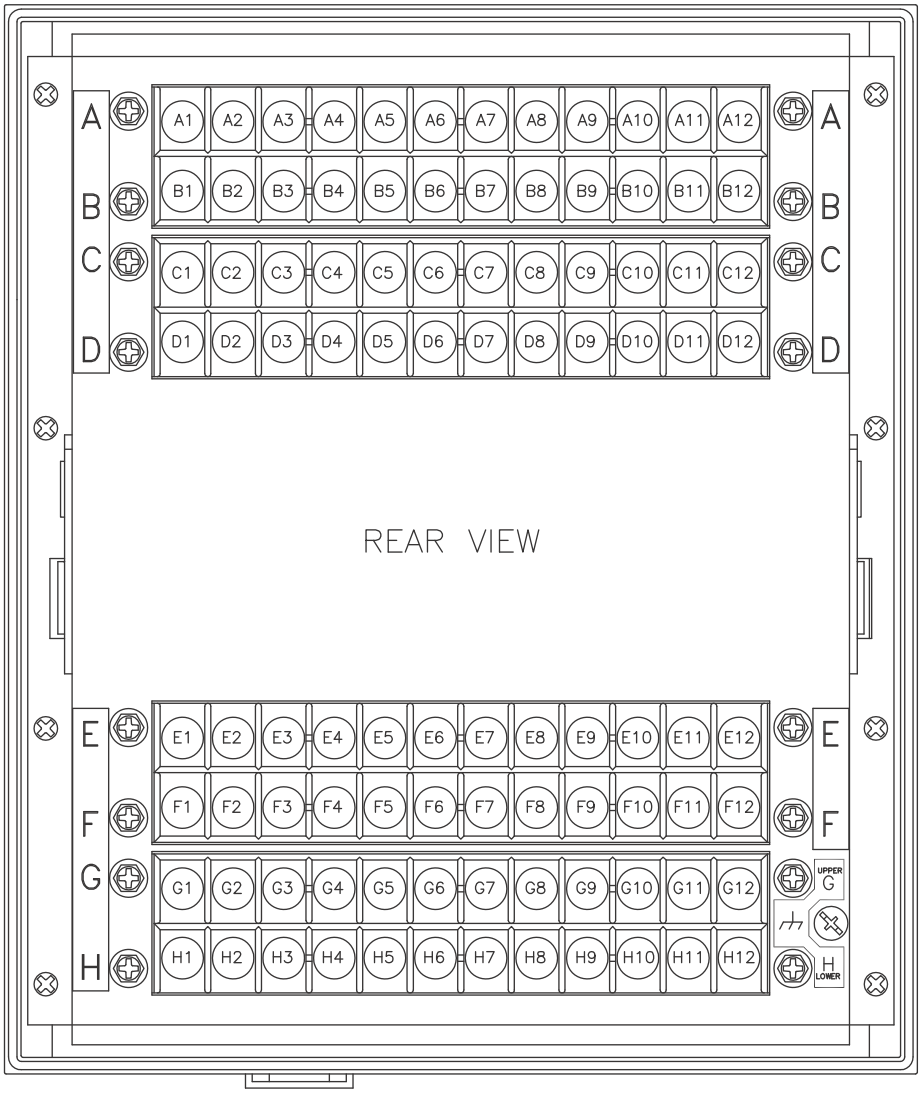


FIGURE 2–29: SR745 Relay Terminal Layout

2.4.3 SR745 Transformer Management Relay Terminal Functions

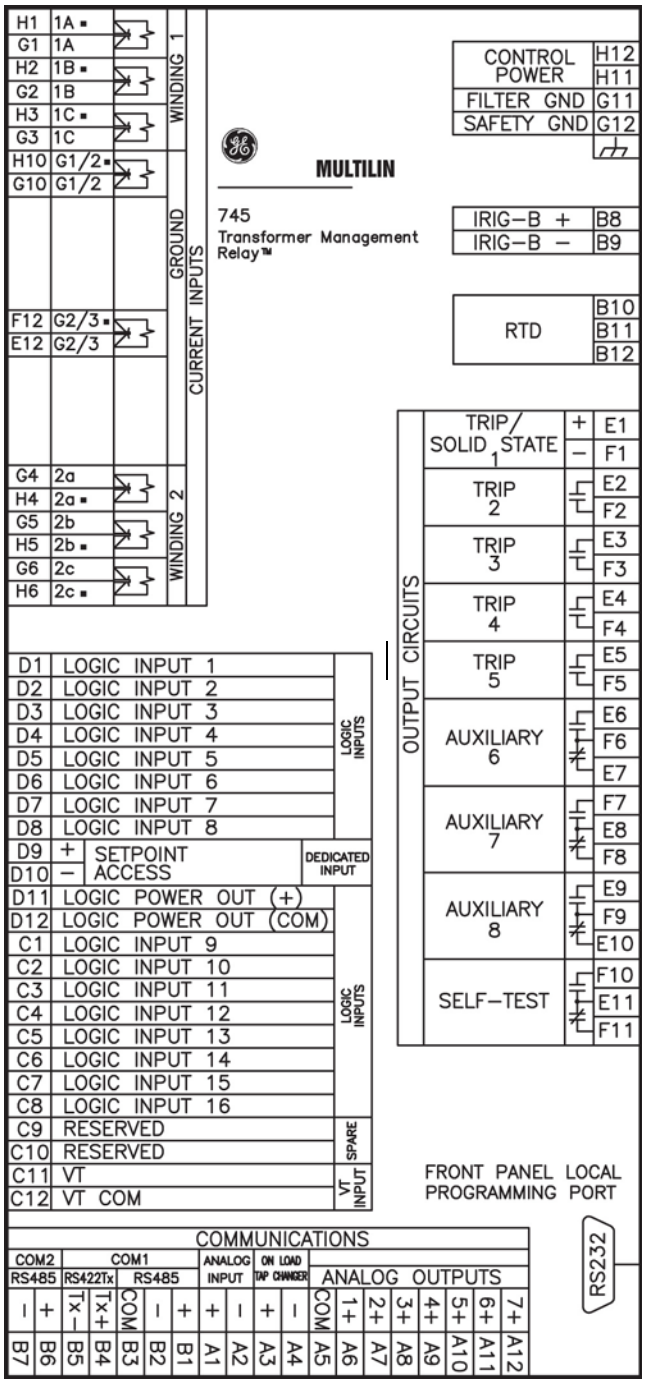


FIGURE 2–30: SR745 Relay Terminal Functions Schematic

2.4.4 RTT to SR745 Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The SR745 Relay accepts only dry contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 2–4: SR745 with RTT Set to Dry

RTDs*				RTD3 +	
				RTD3 -	
				RTD3 C	
				RTD2 +	
				RTD2 -	
				RTD2 C	
	RTD RTD HOT	B10	----------	RTD1 +	
	RTD RETURN	B12	----------	RTD1 -	
	RTD COMP	B11	----------	RTD1 C	
				SPARE	
Contact Outputs**	TRIP 3 COMMON	F3	----------		RTT
	TRIP 2 COMMON	F2	----------	OUTPUT C	
	TRIP 3 NO	E3	----------	OUTPUT 2	
	TRIP 2 NO	E2	----------	OUTPUT 1	
Contact Inputs	Logic Power Out +	D11	----------	INPUT C	
	Logic Input 7	D7	----------	INPUT 8	
	Logic Input 6	D6	----------	INPUT 7	
	Logic Input 5	D5	----------	INPUT 6	
	Logic Input 4	D4	----------	INPUT 5	
	Logic Input 3	D3	----------	INPUT 4	
	Logic Input 2	D2	----------	INPUT 3	
	Logic Input 1	D1	----------	INPUT 2	
	Assess -	D10	----------	INPUT 1	
CTs	Winding 1 I_a +	H1	----------	I_+	
	Winding 1 I_a -	G1	----------	I_-	
VTs	VT	C11	----------	V_+	
	VT COM	C12	----------	V_-	

NOTE

*The 745 Relay has only one channel of RTD input.

**Trip 2 and Trip 3 Common terminals must be hardwired together.

2.4.5 Interfacing to the RTT through the EnerVista 745 Setup Program

The following sections demonstrate how to navigate, configure and monitor the operation of the SR745 using the EnerVista 745 Setup program.

2.4.5.1 Current

▷ **Setup**: Enter the W1 Phase CT Primary, then Save.

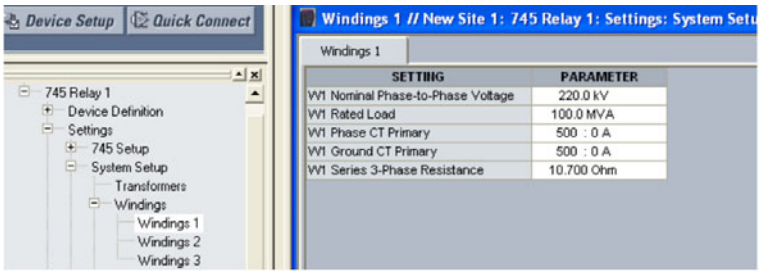


FIGURE 2–31: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

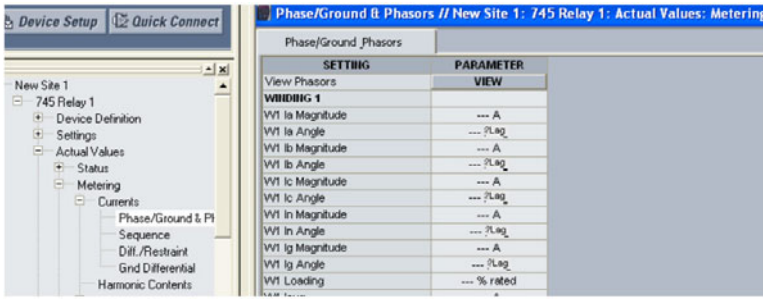


FIGURE 2–32: Current Metering

2.4.5.2 Voltage

▷ **Setup**: Enable the Voltage Sensing, enter the VT ratio, then Save.

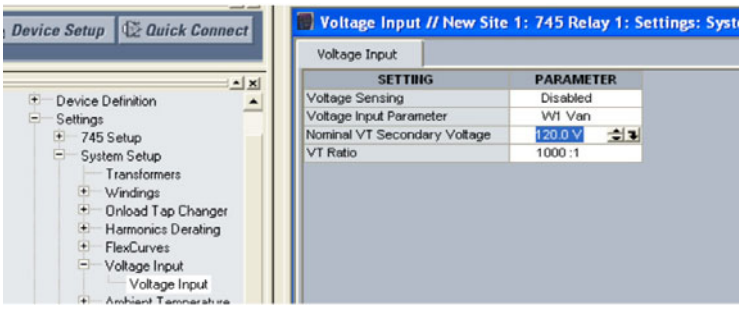


FIGURE 2–33: Voltage Setup

▷ **Metering**: View the voltage values measured by the relay, in real-time

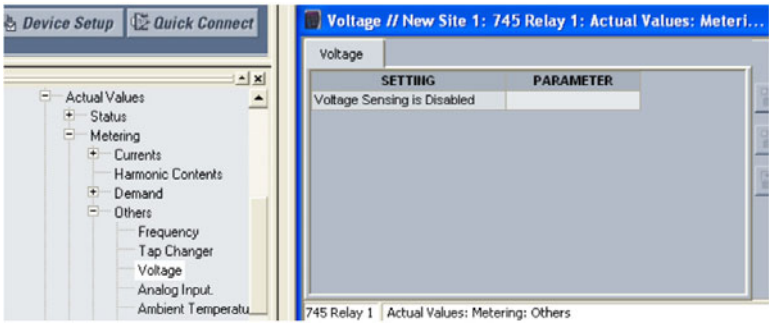


FIGURE 2–34: Voltage Metering

2.4.5.3 RTDs

▷ **Setup**: Enable the Ambient Temperature Sensing, and configure the RTD type.

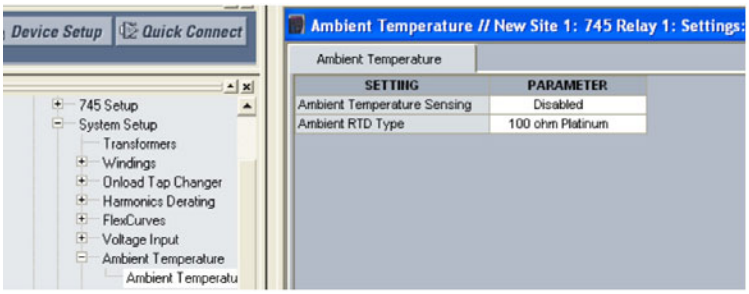


FIGURE 2–35: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, in real-time.

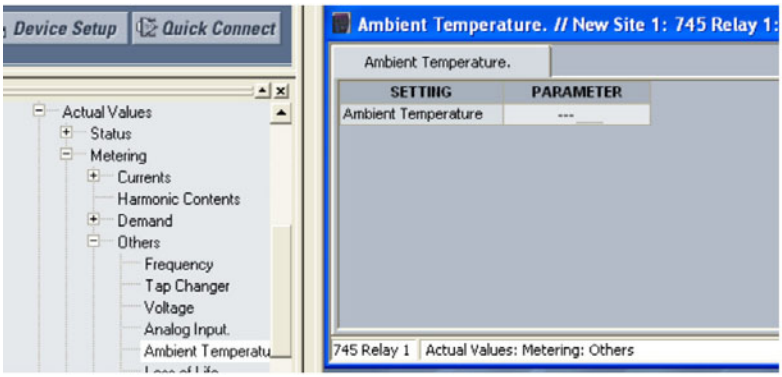


FIGURE 2–36: RTD Metering

2.4.5.4 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

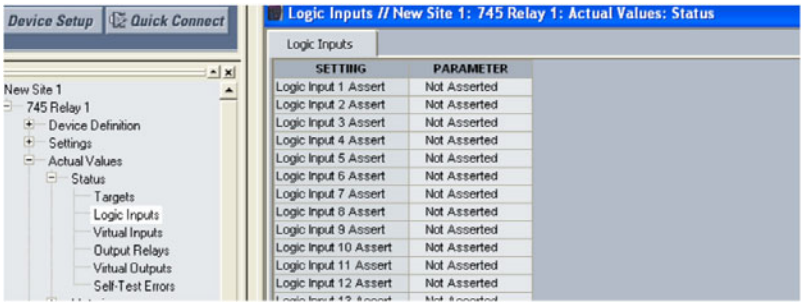


FIGURE 2–37: Contact Inputs Status

2.4.5.5 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnerVista 745 Setup.

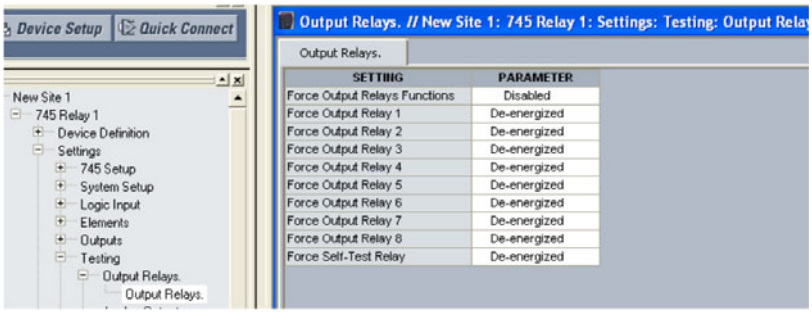


FIGURE 2–38: Contact Outputs Testing

2.5 The SR735/737 Feeder Protection Relay

2.5.1 Overview

The SR735/737 Relay has 3-phase current inputs with a CT burden 0.02 VA at rated load. The SR745 Relay is equipped with three separate dry contact relays - TRIP, AUX and SERVICE. TRIP and AUX are identical non-fail-safe Form A contacts, both of which close whenever the unit trips. The SERVICE relay is in failsafe mode.

As the SR735/737 Relay doesn't have Voltage Input, Contact Input and RTD features, no modification to the Test Cable is required.

Unused Wires

For the unused wires (20 in total), it is recommended that user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DIC, DI8, DI7, DI6, DI5, DI4, DI3, DI2, DI1, V+ and V-.

2.5.2 SR735/737 Feeder Protection Relay Terminal Functions

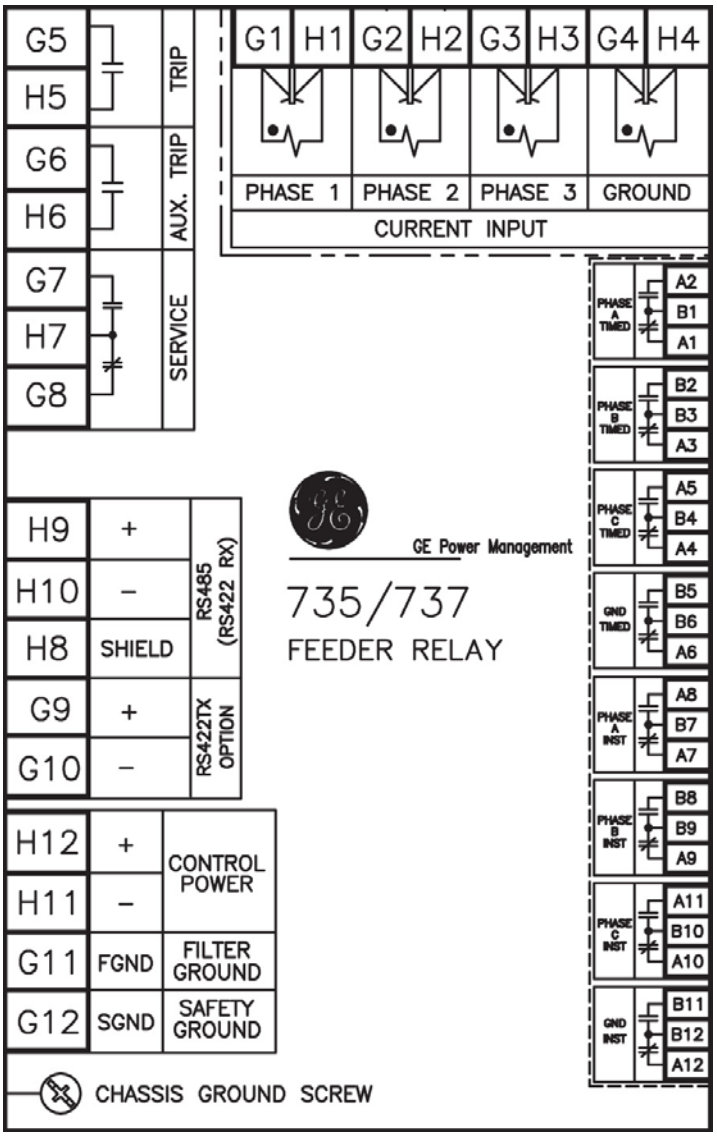


FIGURE 2–39: SR735/737 Relay Terminal Functions Schematic

2.5.3 RTT to SR735/737 Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The SR735/737 Relay accepts only **DRY** contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 2–5: SR735/737 with RTT Set to Dry

RTDs*				RTD3 +	
				RTD3 -	
				RTD3 C	
				RTD2 +	
				RTD2 -	
				RTD2 C	
				RTD1 +	
				RTD1 -	
				RTD1 C	
				SPARE	
Contact Outputs**	AUX COMMON	H6	----------		RTT
	TRIP COMMON	H5	----------	OUTPUT C	
	AUX NO	G6	----------	OUTPUT 2	
	TRIP NO	G5	----------	OUTPUT 1	
Contact Inputs*				INPUT C	
				INPUT 8	
				INPUT 7	
				INPUT 6	
				INPUT 5	
				INPUT 4	
				INPUT 3	
				INPUT 2	
				INPUT 1	
CTs	Phase 1 +	G1	----------	I_+	
	Phase 1 COM	H1	----------	I_-	
VTs*				V_+	
				V_-	

NOTE

*The 735/737 Relay doesn't have Voltage Input, Switch Input and RTD Input features.

**Trip and Aux Common terminals (H5 and H6) must be hardwired together.

2.5.4 Interfacing to the RTT through the EnerVista 735/737 Setup Program

The following section demonstrates how to navigate, configure, and monitor the operation of the SR735/737 Relay using the EnerVista 735/737 Setup program.

2.5.4.1 Current

▷ **Setup**: Enter the Phase Current (simulation), then Save.

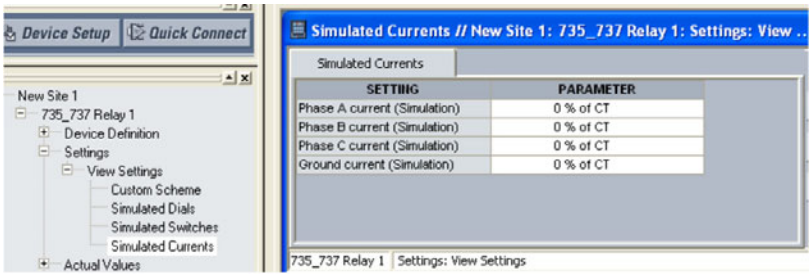


FIGURE 2–40: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

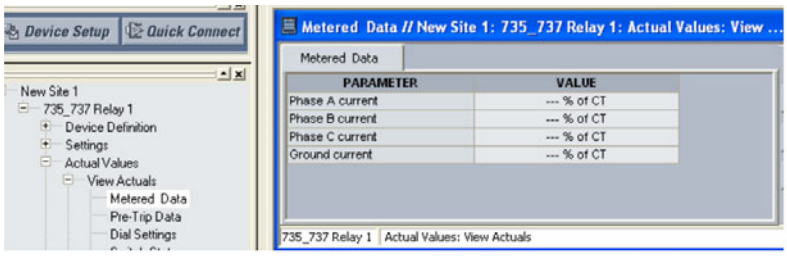


FIGURE 2–41: Current Metering

2.5.4.2 Contact Outputs Testing

The two contact ouputs monitored by the RTT should match the status shown in the EnerVista 735/737 Setup.

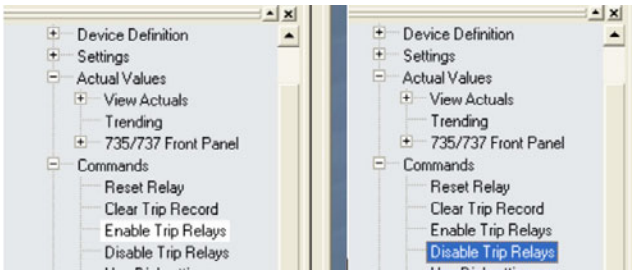
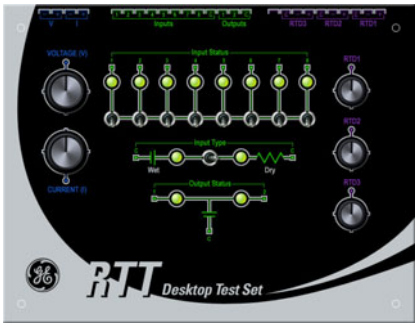


FIGURE 2–42: Contact Outputs Testing

GE
Digital Energy



RTT Desktop Test Set

Chapter 3: Using the RTT on UR Series Relays

3.1 Configuration Options

3.1.1 Overview

UR functions vary according to the different order codes.

- Figure 3-2 shows the various types of CT/VT modules related to current and voltage inputs function.
- Figure 3-3 shows the transducer I/O modules related to RTD functions.
- Figure 3-4, 3-5, 3-6, 3-7 show the Digital I/O modules related to contact input and output function.

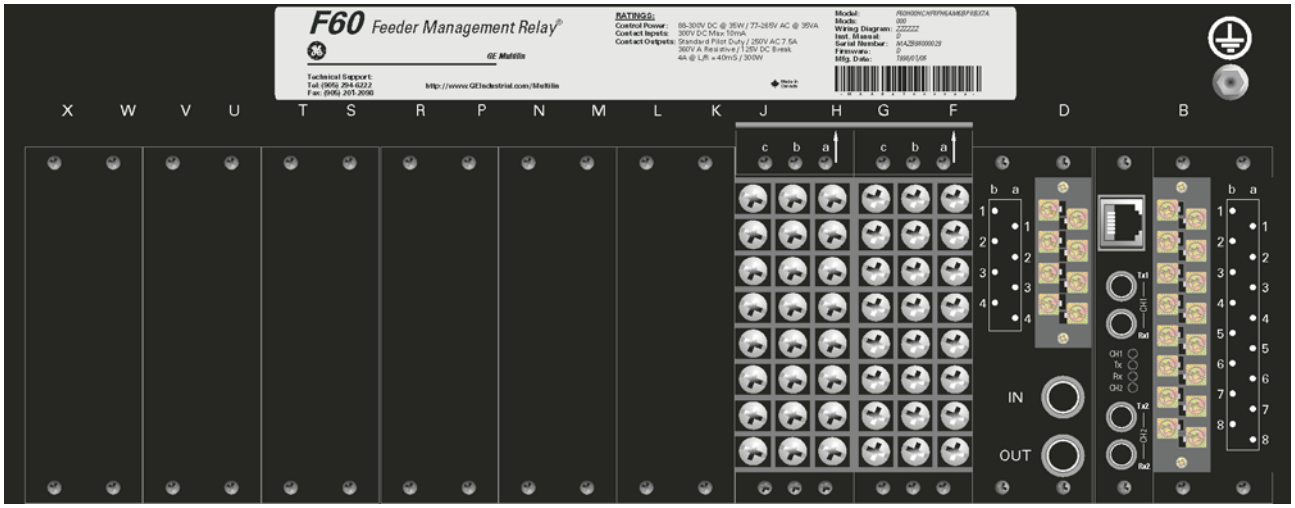
All features of the RTT can be applied to the UR Series Relay, where applicable. No modification to the Test Cable is required.

CAUTION

Unused Wires

For the unused wires if applicable, it is recommended that the user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

3.1.2 UR Series Relays Rear Terminal Layout



832768A1.CDR

FIGURE 3–1: UR Series Terminal Layout - General Rear View

3.1.3 UR Series Relays CT/VT Module - Terminal Functions

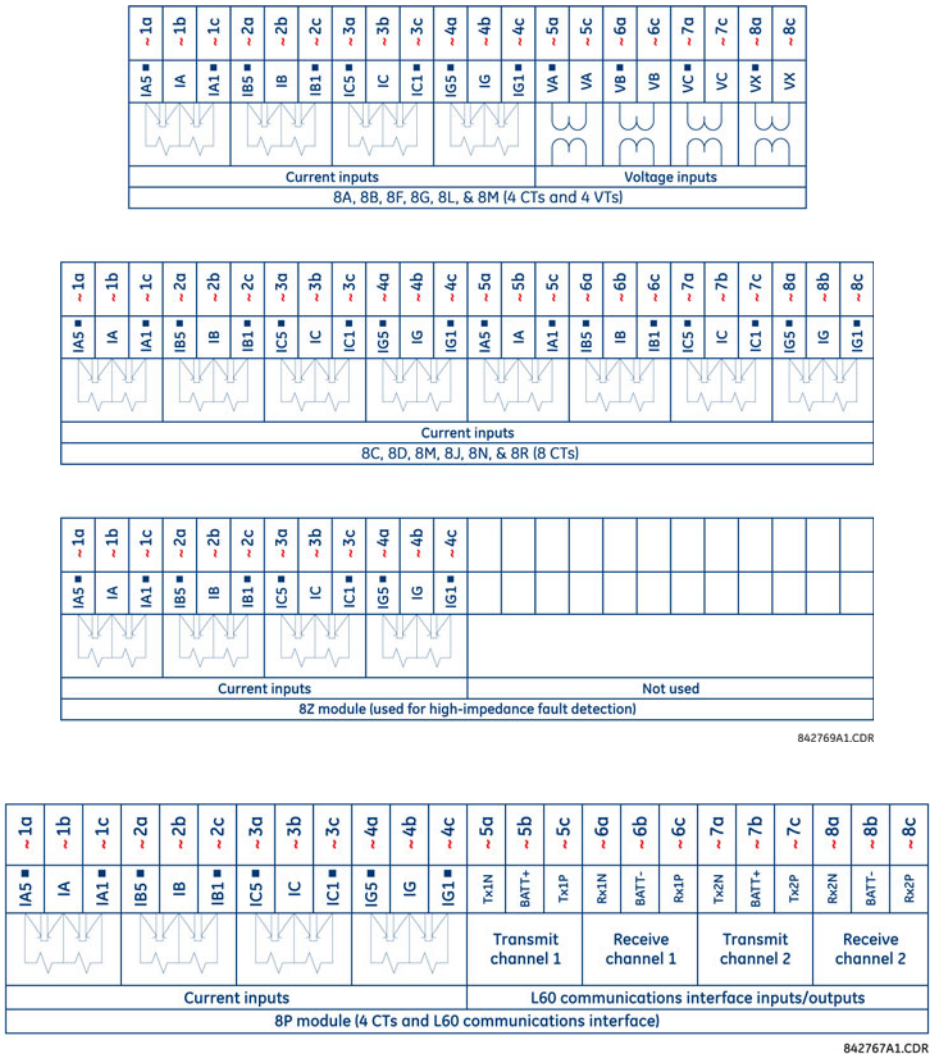


FIGURE 3–2: UR Series - CT/VT Modules - Terminal Functions Schematics

3.1.4 UR Series Relays Transducer and Digital I/O Modules - Terminal Functions

Below are the terminal functions schematics for the UR Transducer Module. The module code shown in the upper right corner of each schematic, indicates the wiring terminal layouts for the various modules you may be using.

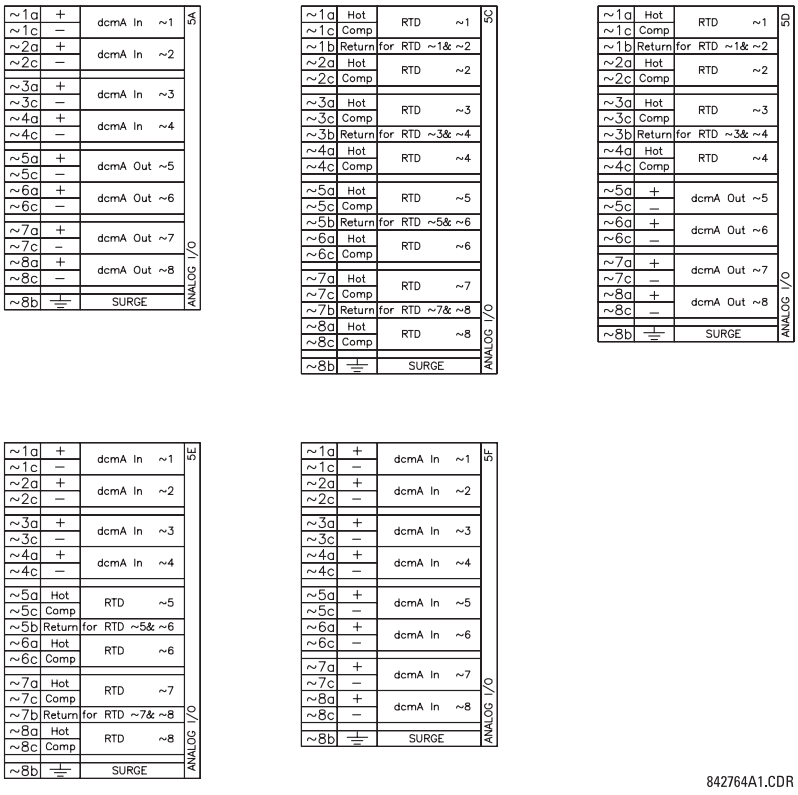


FIGURE 3–3: UR Series - Transducer I/O Modules - Terminal Functions Schematics

Below are the terminal functions schematics for the UR Digital I/O Module.

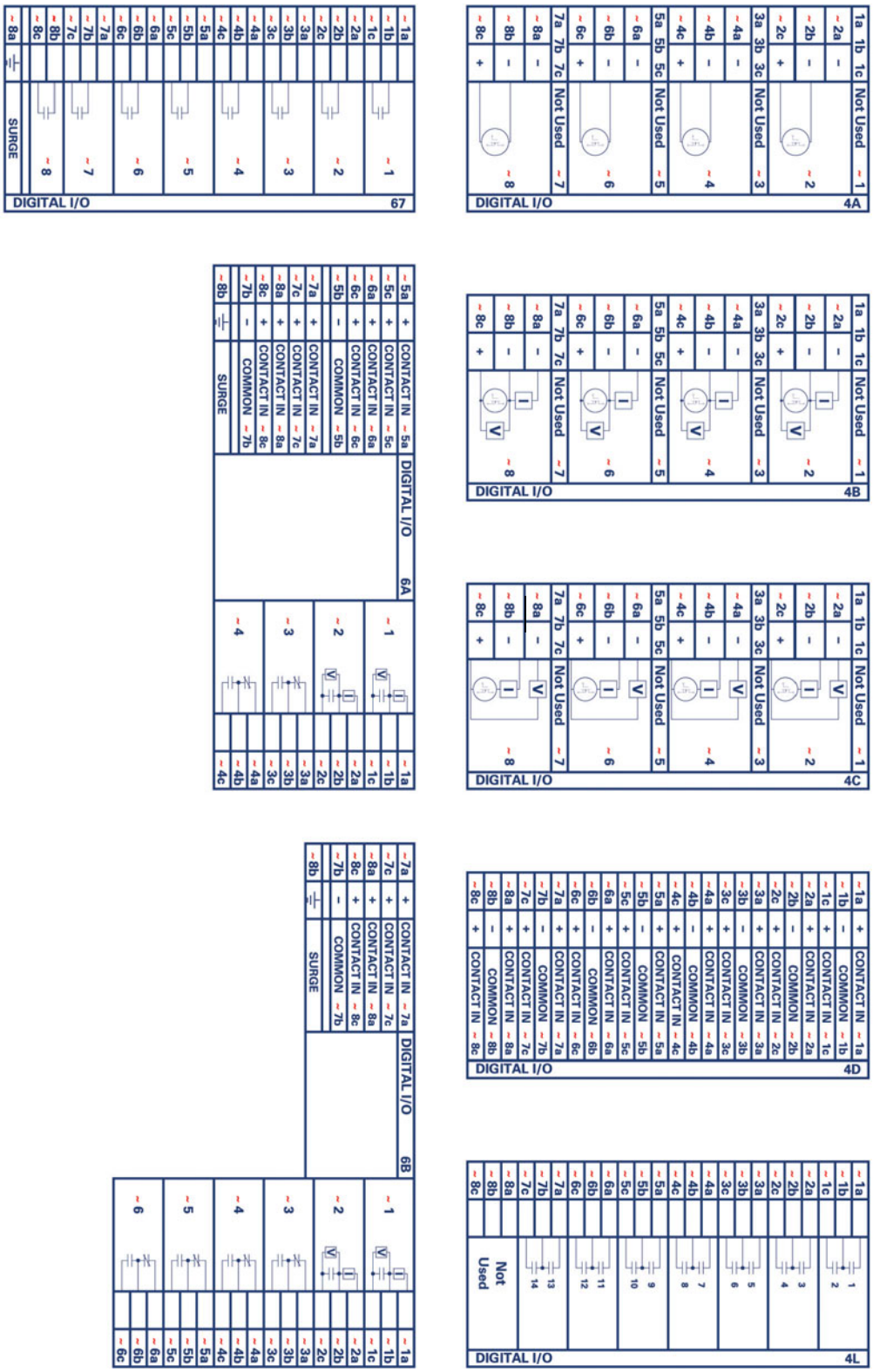


FIGURE 3–4: UR Series - Digital I/O Modules - Terminal Functions Schematics - 1 of 4

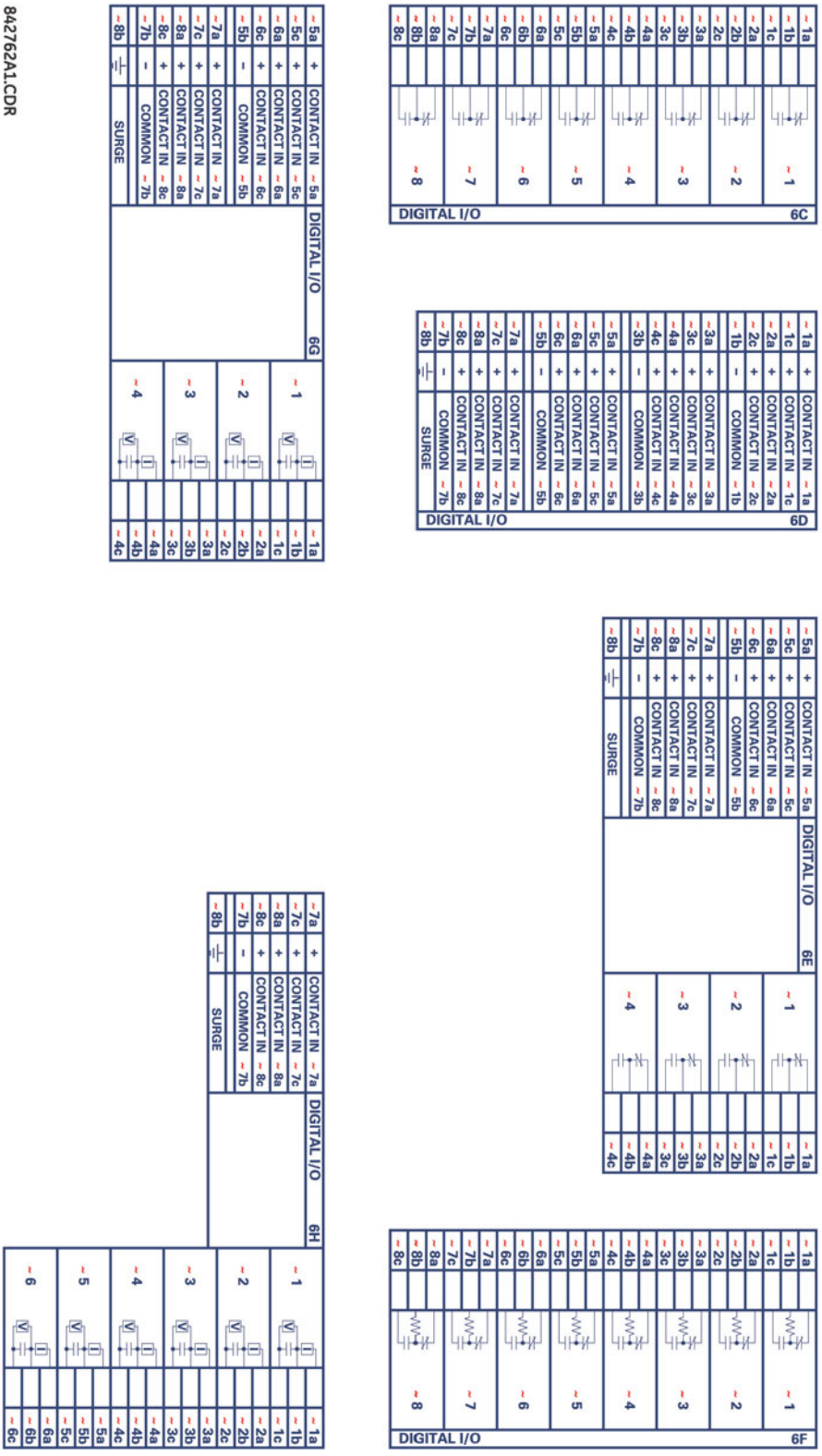


FIGURE 3–5: UR Series - Digital I/O Modules - Terminal Functions Schematic - 2 of 4

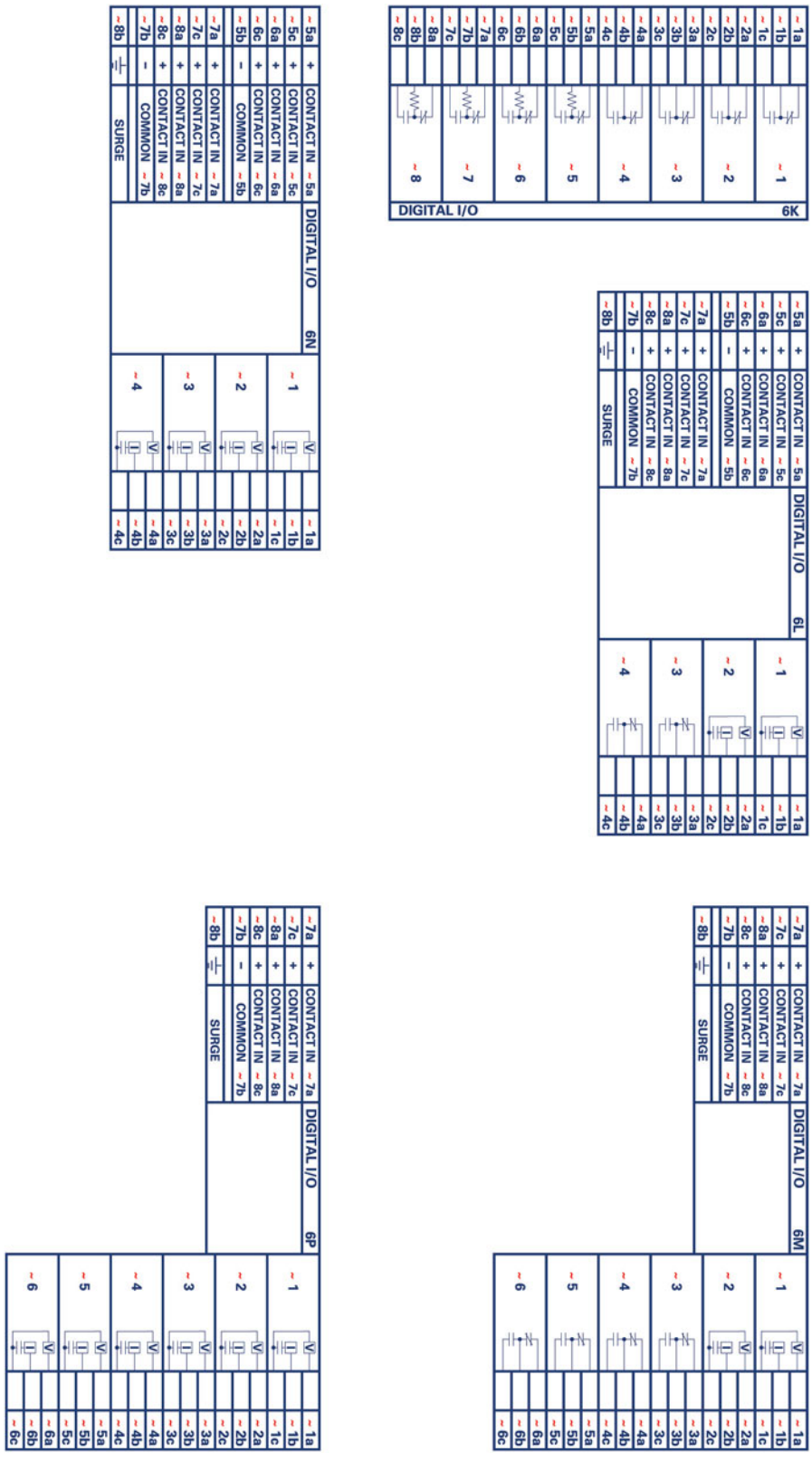


FIGURE 3–6: UR Series - Digital I/O Modules - Terminal Functions Schematics - 3 of 4

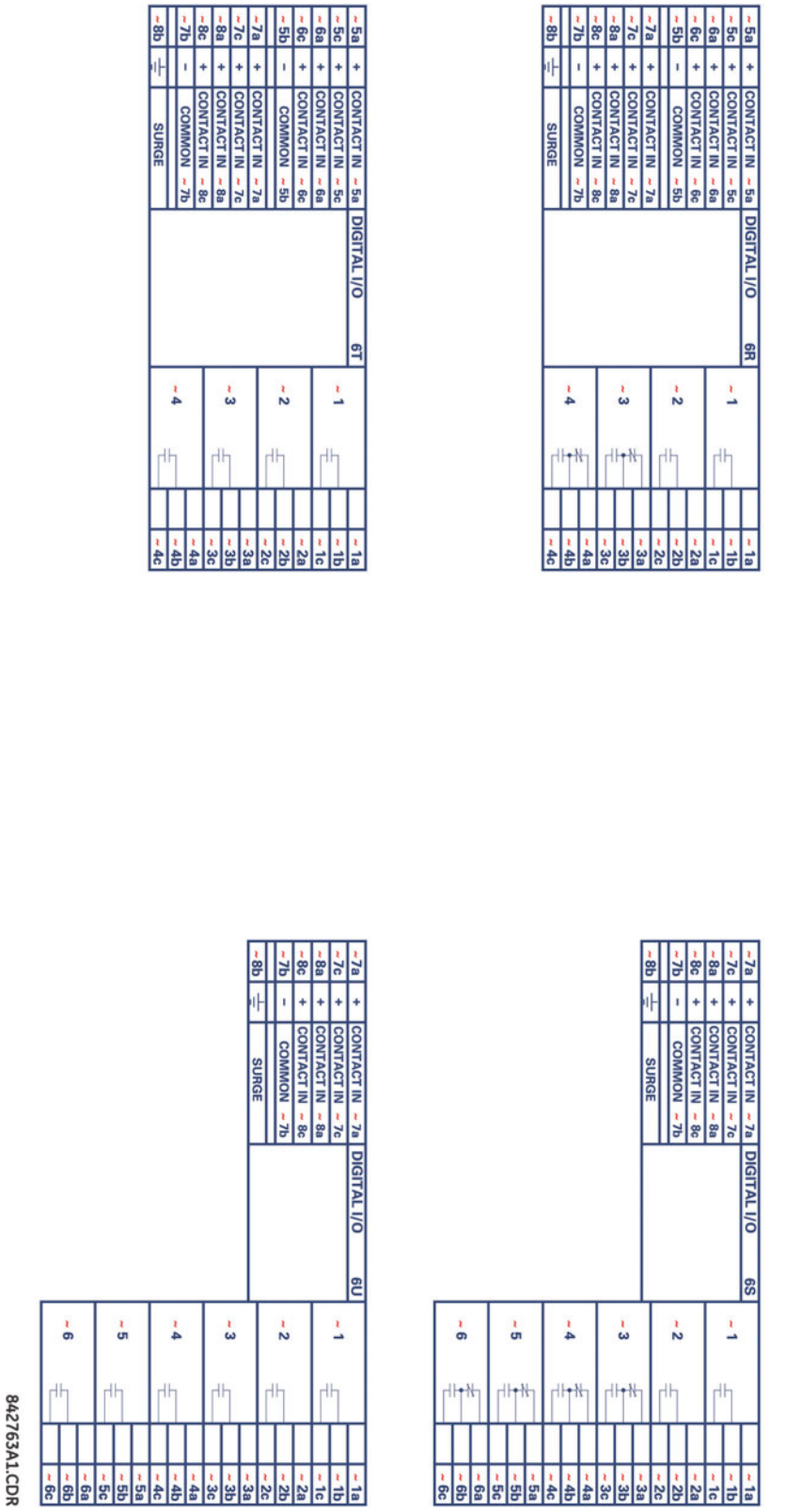


FIGURE 3–7: UR Series - Digital I/O Modules - Terminal Functions Schematics - 4 of 4

3.1.5 RTT to UR Relay Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit.
   After connections are made, switch to **WET**
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 3–1: UR Series with RTT Set to Wet (Fig 3-3)

RTDs 5C/5D	RTD3+	~3a	----------	RTD3 +	
	RTD3-	~ 3b	----------	RTD3 -	
	RTD3 COMP	~3c	----------	RTD3 C	
	RTD2+	~2a	----------	RTD2 +	
	RTD2-	~2b	----------	RTD2 -	
	RTD2 COMP	~2c	----------	RTD2 C	
	RTD1+	~1a	----------	RTD1 +	
	RTD1-	~1b	----------	RTD1 -	
	RTD1 COMP	~1c	----------	RTD1 C	
				SPARE	
Contact Outputs* 6E/6A/6L	Contact Out 4 Common	~4b	----------		RTT
	Contact Out 3 Common	~3b	----------	OUTPUT C	
	Contact Out 4 NO	~4c	----------	OUTPUT 2	
	Contact Out 3 NO	~3c	----------	OUTPUT 1	
Contact Inputs** 6E/6A/6L	Contact In Common	~7b	----------		
	Contact In Common	~5b	----------	INPUT C	
	Contact In 8	~8c	----------	INPUT 8	
	Contact In 7	~8a	----------	INPUT 7	
	Contact In 6	~7c	----------	INPUT 6	
	Contact In 5	~7a	----------	INPUT 5	
	Contact In 4	~6c	----------	INPUT 4	
	Contact In 3	~6a	----------	INPUT 3	
	Contact In 2	~5c	----------	INPUT 2	
	Contact In 1	~5a	----------	INPUT 1	
CTs 8F/8L	1a (1A)	~1b	----------	I_+	
	1a (COM)	~1c	----------	I_-	
VTs 8F/8L	VA	~5a	----------	V_+	
	Vn	~5c	----------	V_-	

NOTE

Wherever a "tilde" (~) symbol appears, substitute the slot position of the module.

*Contact Output Common terminals (~3b and ~4b) must be hardwired together.

**The voltage threshold of Contact Input should be programmed as 17 VDC.

**Contact Input Common terminals (~5b and ~7b) must be hardwired together.

3.1.6 Interfacing to the RTT through the EnerVista UR Setup Program

The following information describes how to configure the UR relays and how to monitor voltage and current inputs using the UR Setup Software and the RTT.

3.1.6.1 Current

▷ **Setup 1**: Enter the CT Primary ratio, and Phase CT secondary, then Save.

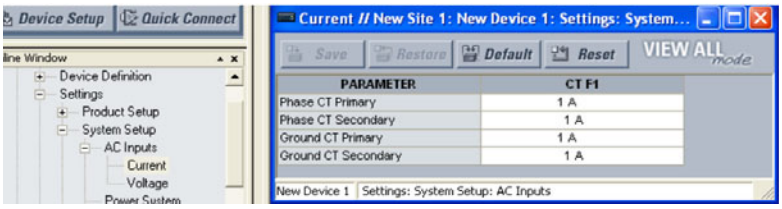


FIGURE 3–8: Current Setup 1

▷ **Setup 2**: Select the Phase CT group to which current is being applied.

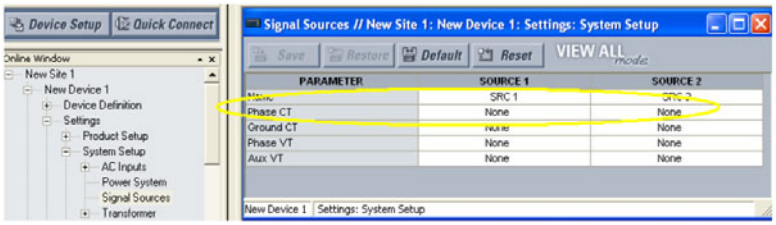


FIGURE 3–9: Current Setup 2

▷ **Metering**: View the current values measured by the relay, in real-time.

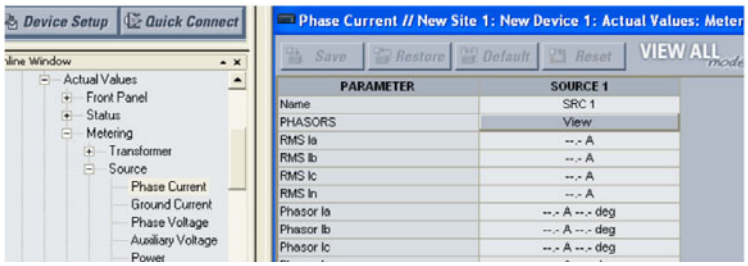


FIGURE 3–10: Current Metering

3.1.6.2 Voltage

▷ **Setup 1**: Enter the Phase VT Ratio, then Save.

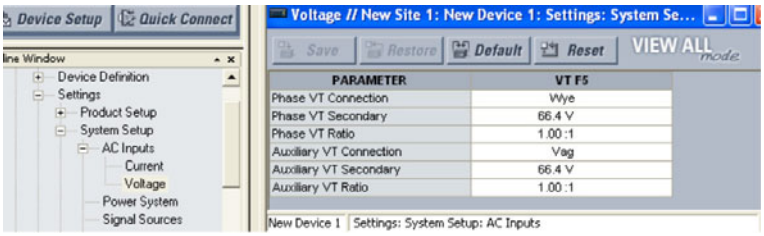


FIGURE 3–11: Voltage Setup 1

▷ **Setup 2**: Select the Phase VT group to which current is being applied.

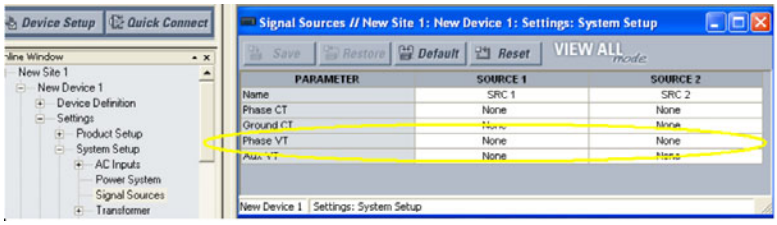


FIGURE 3–12: Voltage Setup 2

▷ **Metering**: View the voltage values measured by the relay, in real-time.

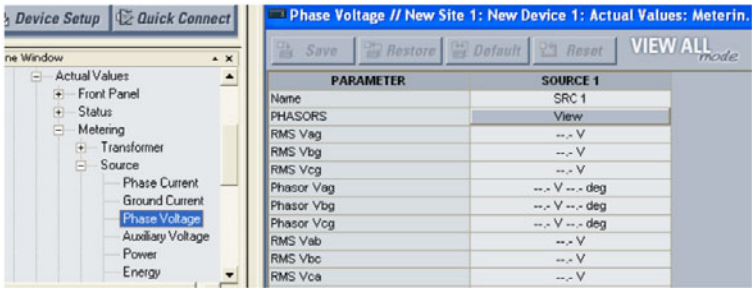


FIGURE 3–13: Voltage Metering

3.1.6.3 RTDs

▷ **Setup 1**: Enable each RTD input function.

▷ **Setup 2**: For each RTD input, configure the type of RTD that will be connected to the relay.

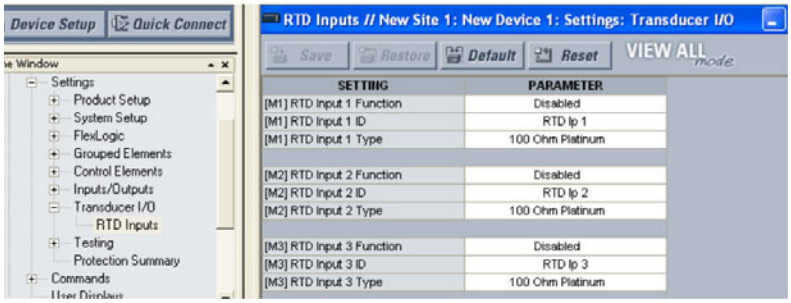


FIGURE 3–14: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, in real-time.

NOTE

10 Ohm RTD input cannot be read using the range of RTD input applied by the RTT.

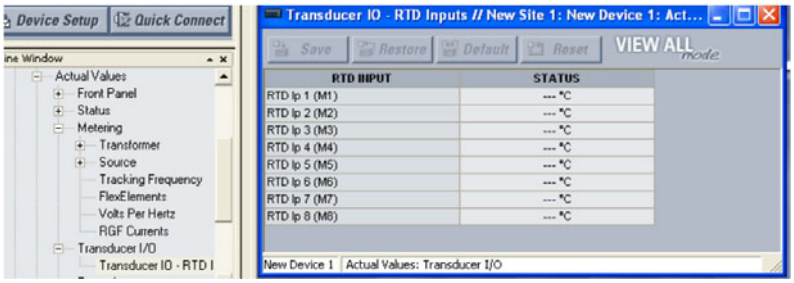


FIGURE 3–15: RTD Metering

3.1.6.4 Contacts Inputs Status

▷ If using the "Wet" type of contact input applied by the RTT, select 17 VDC as the threshold voltage. Ensure the Input Type on the RTT is set to match this.

FIGURE 3–16: Threshold Setup

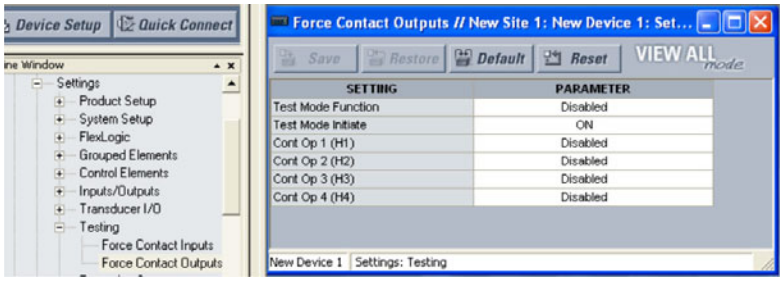
▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

FIGURE 3–17: Status

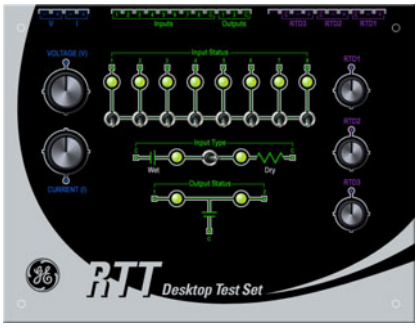
▷ Use the following screen to monitor the status of the Contact Inputs as you manipulate the Contact Input switches on the RTT.

3.1.6.5 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnerVista UR Setup.



GE
Digital Energy



RTT Desktop Test Set

Chapter 4: Motor Management & Metering

4.1 The 369 Motor Management Relay

4.1.1 Overview

The 369 Relay has 3-phase current inputs and 3-phase voltage inputs with greater than 200 KOhm VT burden. There are also 5 programmable digital inputs other than ACCESS switch input designed for Dry contact connection only and 4 Form-C output relays. The 369 Relay monitors up to 12 RTD inputs, each RTD being field programmable as a 3-wire type of 100 Platinum, 100 Nickel and 120 Nickel.

All features of the RTT can be applied to the 369 Relay. However (a) there are 2 unused input terminal wires, and (b) a modification is required to the cable to fit the 369 terminals.

Modification of the Product Cable

For the wires related to contact inputs and RTDs (16 in total), cut the lugs off the wire and strip the wires to make them fit the 369 terminals.

The lugs to be cut are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DIC, DI6, DI5, DI4, DI3, DI2 and DI1.

Unused Wires

For the unused wires (2 in total), it is recommended that user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: DI8 and DI7.

4.1.2 369 Motor Management Relay Terminal Layout

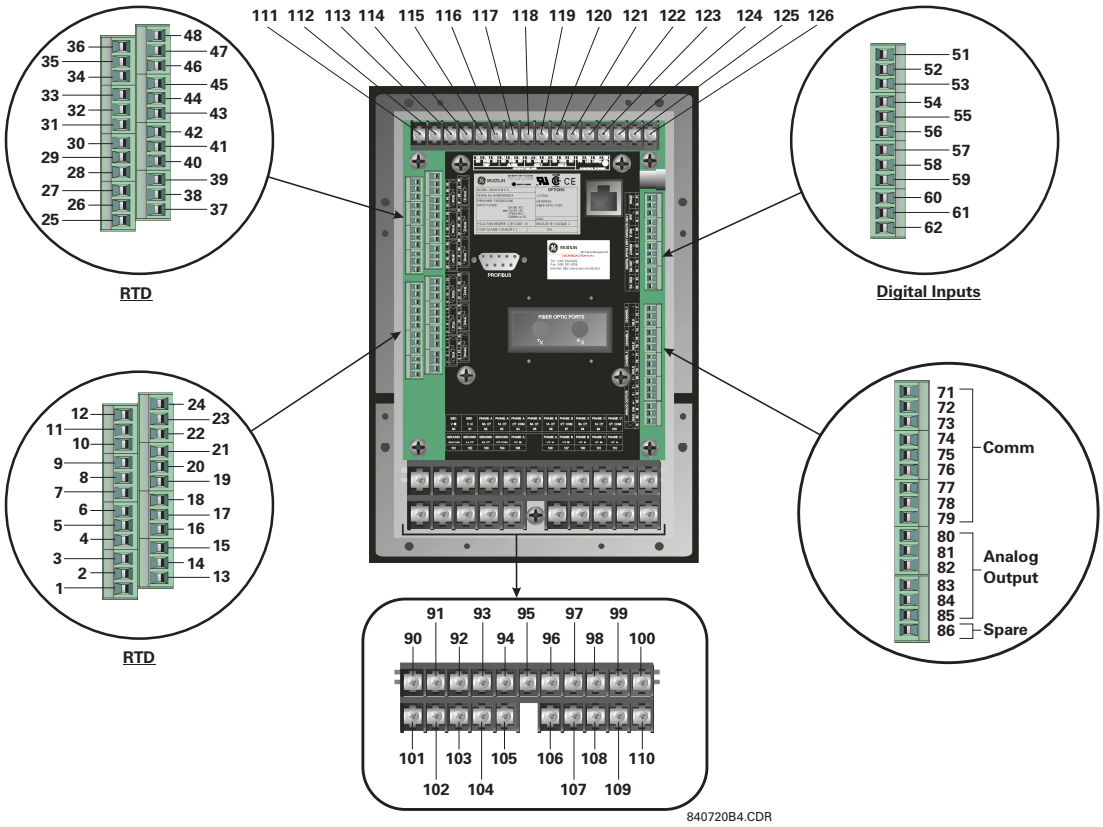


FIGURE 4–1: 369 Motor Management Relay Terminal Layout

4.1.3 RTT to 369 Relay Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The 369 Relay accepts only **DRY** contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 4–1: 369 Relay with RTT Set to Dry

RTDs	RTD3+	9	----------	RTD3 +	
	RTD3-	10	----------	RTD3 -	
	RTD3 COM	11	----------	RTD3 C	
	RTD2+	5	----------	RTD2 +	
	RTD2-	6	----------	RTD2 -	
	RTD2 COM	7	----------	RTD2 C	
	RTD1+	1	----------	RTD1 +	
	RTD1-	2	----------	RTD1 -	
	RTD1 COM	3	----------	RTD1 C	
				SPARE	
Contact Outputs*	ALARM COMMON	115	----------		RTT
	TRIP COMMON	112	----------	OUTPUT C	
	ALARM NO	116	----------	OUTPUT 2	
	TRIP NO	113	----------	OUTPUT 1	
Contact (Digital) Inputs	Spare Input Common	52	----------	INPUT C	
				INPUT 8	
				INPUT 7	
	External Reset	61	----------	INPUT 6	
	Emergency Restart	59	----------	INPUT 5	
	Access	57	----------	INPUT 4	
	Speed Switch	55	----------	INPUT 3	
	Differential Input	53	----------	INPUT 2	
	Spare Input	51	----------	INPUT 1	
CTs	Ia (1A)	93	----------	I_+	
	Ia COM	94	----------	I_-	
VTs	VA	105	----------	V_+	
	Vn	106	----------	V_-	

NOTE

*Trip and Alarm Common terminals (112 and 115) must be hardwired together.

4.1.4 Interfacing to the RTT through the EnverVista 369 Setup Program

The following section demonstrates how to navigate, configure, and monitor the operation of the 369 Relay using the EnerVista 369 Setup program.

4.1.4.1 Current

▷ **Setup**: Enter the Phase CT Primary, then Save.

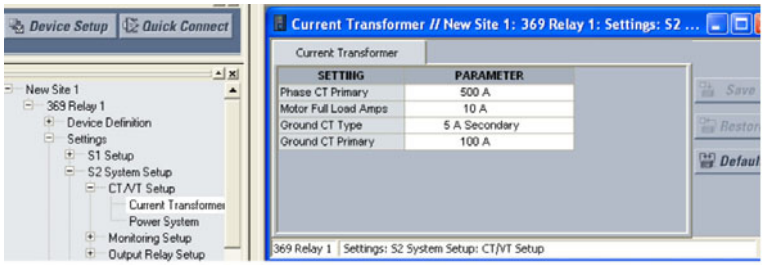


FIGURE 4–2: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

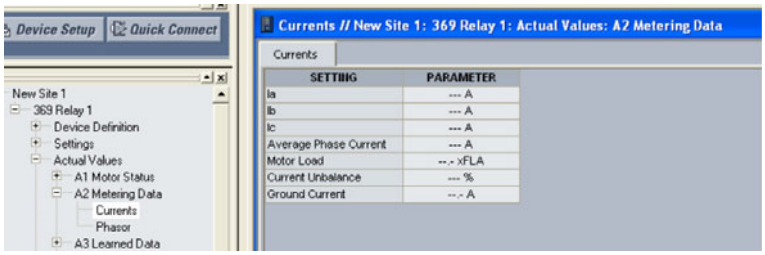


FIGURE 4–3: Current Metering

4.1.4.2 Voltage

▷ **Setup**: Configure the VT Connection Type, enter the VT Ratio, then Save.

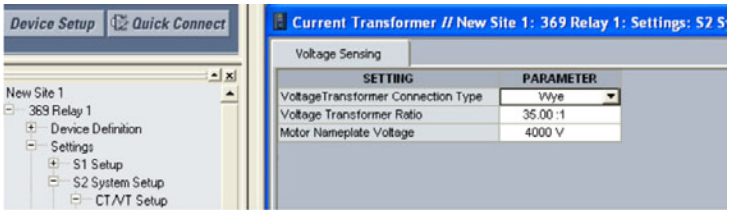


FIGURE 4–4: Voltage Setup

▷ **Metering**: View the voltage values measured by the relay, in real-time.

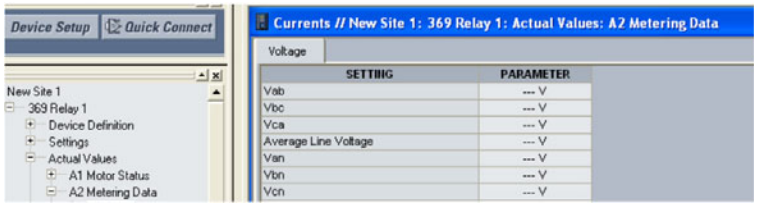


FIGURE 4–5: Voltage Metering

4.1.4.3 RTDs

▷ **Setup**: Configure the RTD type and the Application for each RTD.

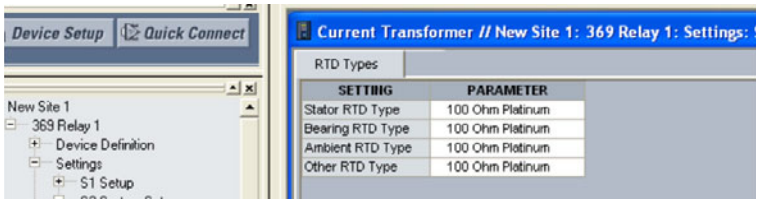


FIGURE 4–6: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, in real-time.

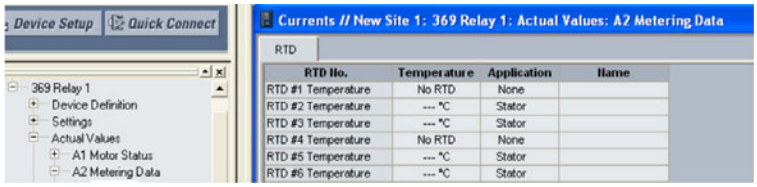


FIGURE 4–7: RTD Metering

4.1.4.4 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

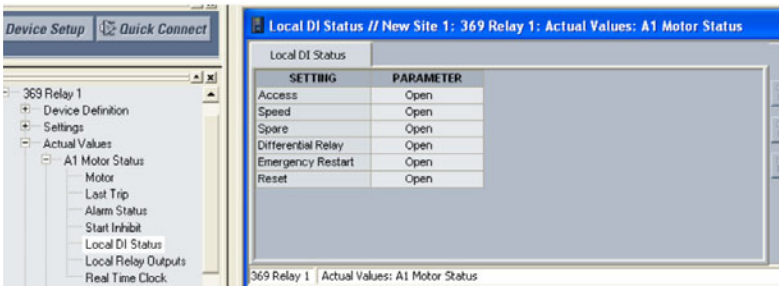


FIGURE 4–8: Contact Inputs Status

4.1.4.5 Contact Outputs Testing

The two contact outputs monitored by the RTT shold match the status shown in the EnerVista 369 Setup.

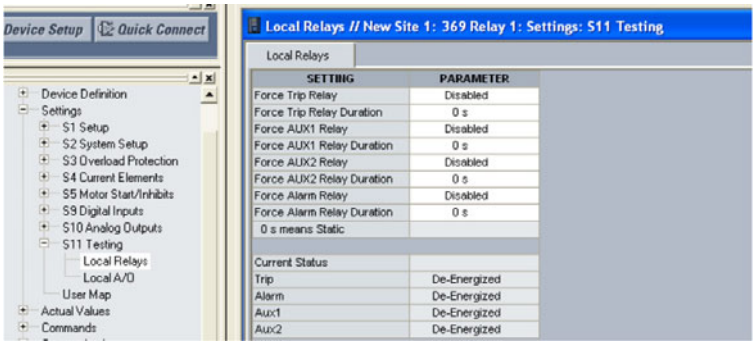


FIGURE 4–9: Contact Outputs Testing

4.2 The 239 Motor Management Relay

4.2.1 Overview

The 239 Relay has 3-phase current inputs but no voltage inputs feature. The 239 Relay provides 2 programmable and 3 dedicated switch inputs designed for Dry contact connection only, and 4 Form-C output relays. The 239 Relay monitors up to 3 RTD inputs, each RTD being field programmable as a 3-wire type of 100 Platinum, 100 Nickel and 120 Nickel.

All features of RTT, other than VT, can be applied to the 239 Relay. However there are 5 unused input terminal wires, and a modification is required to the cable to fit the 239 terminals.

Modification of the Product Cable

For the wires related to contact inputs/outputs and RTDs (18 in total), cut the lugs off the wire, and strip the wires to make them fit the 239 terminals.

The lugs to be cut are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DOC, DO2, DO1, DIC, DI5, DI4, DI3, DI2 and DI1.

Unused Wires

For the unused wires (5 in total), it is recommended that user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: DI8, DI7, DI6, V+, and V-.

4.2.2 239 Motor Management Relay Terminal Layout

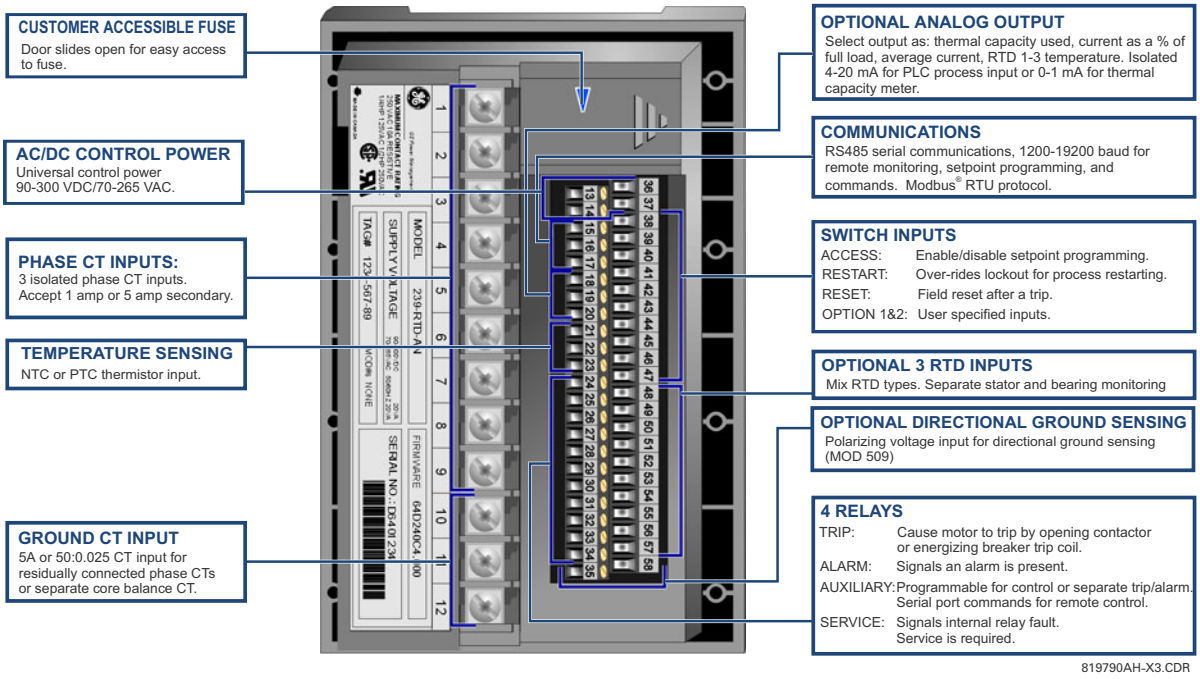


FIGURE 4–10: SR239 Relay - Rear View - Terminal Layout

4.2.3 239 Motor Management Relay Terminal Functions

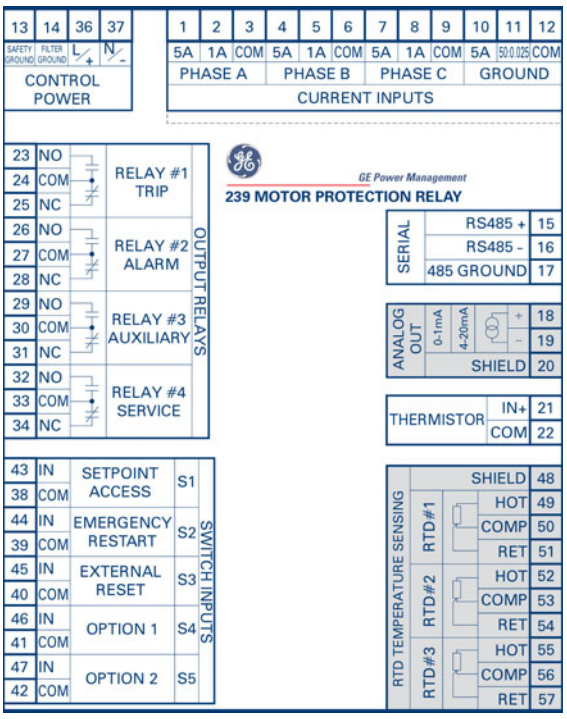


FIGURE 4–11: SR239 Relay - Terminal Functions Schematic

4.2.4 RTT to 239 Relay Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The 239 Relay accepts only **DRY** contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 4–2: 239 Relay with RTT Set to Dry

RTDs	RTD3+	55	----------	RTD3 +	
	RTD3-	57	----------	RTD3 -	
	RTD3 COM	56	----------	RTD3 C	
	RTD2+	52	----------	RTD2 +	
	RTD2-	54	----------	RTD2 -	
	RTD2 COM	53	----------	RTD2 C	
	RTD1+	49	----------	RTD1 +	
	RTD1-	51	----------	RTD1 -	
	RTD1 COM	50	----------	RTD1 C	
				SPARE	
Contact Outputs*	ALARM COMMON	27	----------		RTT
	TRIP COMMON	24	----------	OUTPUT C	
	ALARM NO	26	----------	OUTPUT 2	
	TRIP NO	23	----------	OUTPUT 1	
Contact (Digital) Inputs	Switch Common	38	----------	INPUT C	
				INPUT 8	
				INPUT 7	
				INPUT 6	
	Option 2	47	----------	INPUT 5	
	Option 1	46	----------	INPUT 4	
	External Reset	45	----------	INPUT 3	
	Emergency Restart	44	----------	INPUT 2	
	Setpoint Access	43	----------	INPUT 1	
CTs	Ia (1A)	2	----------	I_+	
	Ia COM	3	----------	I_-	
VTs**				V_+	
				V_-	

NOTE

*Trip and Alarm Common terminals (24 and 27) must be hardwired together.

**The 239 Relay doesn't have Voltage Input function.

4.2.5 Interfacing to the RTT through the EnverVista 239 Setup Program

The following section demonstrates how to navigate, configure, and monitor the operation of the 239 Relay using the EnerVista 239 Setup program.

4.2.5.1 Current

▷ **Setup**: Enter the Phase CT Primary, then Save.

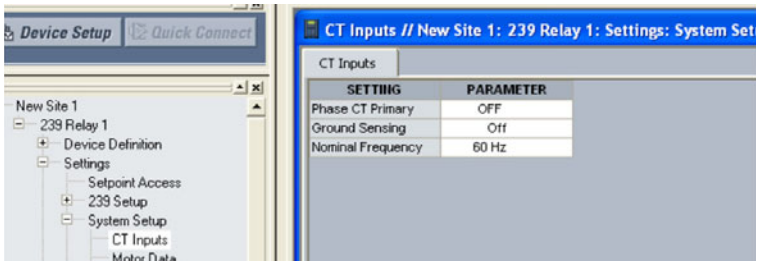


FIGURE 4–12: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

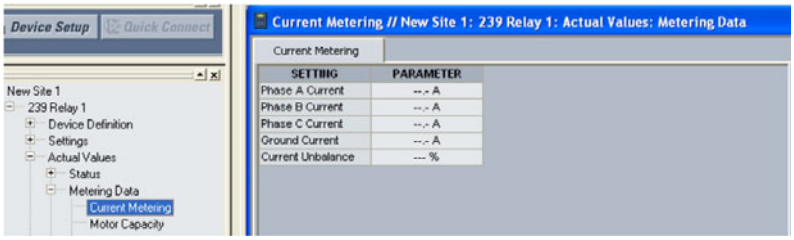


FIGURE 4–13: Current Metering

4.2.5.2 RTDs

▷ **Setup**: Configure the RTD Type and the application, for each RTD.

FIGURE 4–14: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, in real-time.

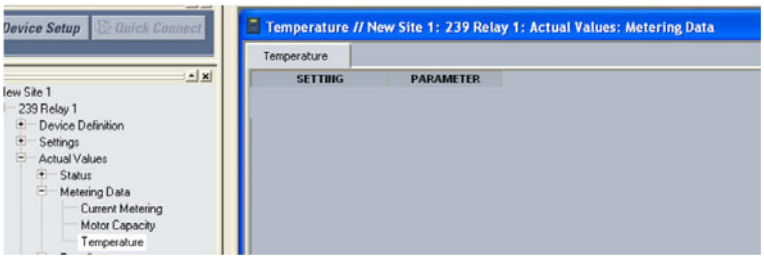


FIGURE 4–15: RTD Metering

4.2.5.3 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

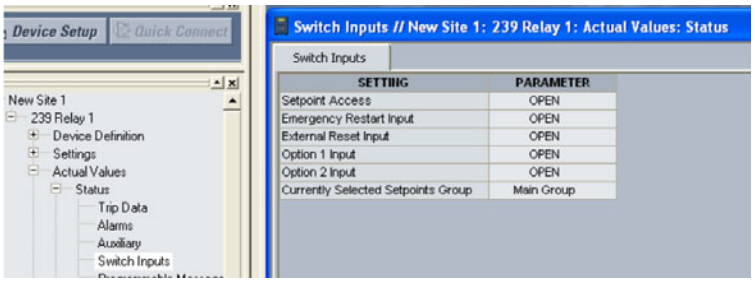


FIGURE 4–16: Contact Inputs Status

4.2.5.4 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnerVista 239 Setup.

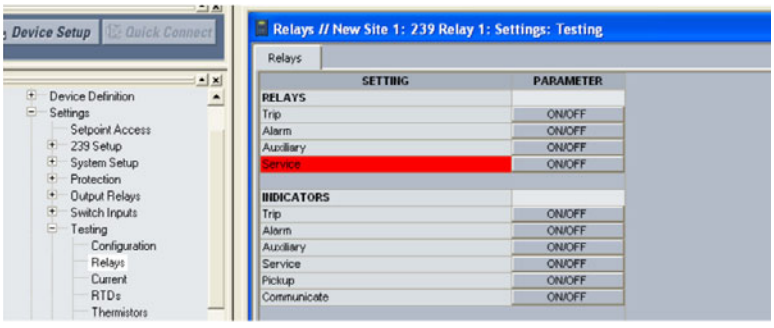


FIGURE 4–17: Contact Outputs Testing

4.3 The 269/269 Plus Motor Management Relay

4.3.1 Overview

The 269/269Plus Relay has 3-phase current inputs but no voltage inputs feature. The Relay provides 6 dedicated switch inputs designed for Dry contact connection only, and 4 output relays. The 269/269Plus Relay monitors up to 10 RTD inputs, each RTD being field programmable as a 3-wire type of 100 Platinum, 100 Nickel and 120 Nickel.

All features of the RTT, other than VT, can be applied to the 269/269Plus Relay. However there are 4 unused input terminal wires, and a modification is required to the cable to fit the 269/269Plus terminals.

Modification of the Product Cable

For the wires related to contact inputs and RTDs (16 in total), cut the wire lugs, and strip the wire to make them fit the 269/269Plus terminals.

The wires to be cut are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DIC, DI6, DI5, DI4, DI3, DI2 and DI1.

Unused Wires

For the unused wires (4 in total), it is recommended that user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: DI8, DI7, V+, and V-.

4.3.2 269/269 Plus Motor Management Relay Terminal Layout

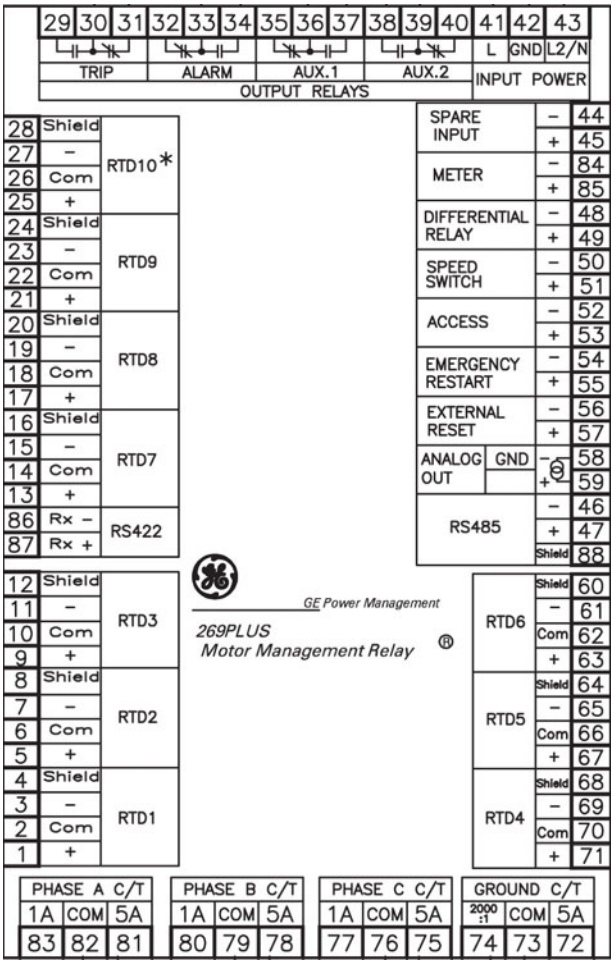


FIGURE 4–18: SR269 Relay Terminal Layoutr

4.3.3 RTT to 269 Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The 269/269 Plus Relay accepts only **DRY** contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 4–3: 269/269 Plus Relay with RTT Set to Dry

RTDs	RTD3+	9	----------	RTD3 +	
	RTD3-	11	----------	RTD3 -	
	RTD3 COM	10	----------	RTD3 C	
	RTD2+	5	----------	RTD2 +	
	RTD2-	7	----------	RTD2 -	
	RTD2 COM	6	----------	RTD2 C	
	RTD1+	1	----------	RTD1 +	
	RTD1-	3	----------	RTD1 -	
	RTD1 COM	2	----------	RTD1 C	
				SPARE	
Contact Outputs*	ALARM COMMON	33	----------		RTT
	TRIP COMMON	30	----------	OUTPUT C	
	ALARM NO	34	----------	OUTPUT 2	
	TRIP NO	29	----------	OUTPUT 1	
Contact (Digital) Inputs	Input Common	44	----------	INPUT C	
				INPUT 8	
				INPUT 7	
	External Reset	57	----------	INPUT 6	
	Emergency Restart	55	----------	INPUT 5	
	Access	53	----------	INPUT 4	
	Speed Switch	51	----------	INPUT 3	
	Differential Input	49	----------	INPUT 2	
	Spare Input	45	----------	INPUT 1	
CTs	Phase A (1A)	83	----------	I_+	
	Phase A COM	82	----------	I_-	
VTs**				V_+	
				V_-	

NOTE

*Trip and Alarm Common terminals (30 and 33) must be hardwired together.

**The 269/269 Plus Relay doesn't have Voltage Input function.

4.3.4 Interfacing to the RTT through the 269PC Program

The following section demonstrates how to navigate, configure, and monitor the operation of the 269/269Plus Relay using the EnerVista 269 Setup program.

4.3.4.1 Current

▷ **Setup**: Configure the Phase CT Ratio Secondary, enter the Phase CT Ratio, then Store.

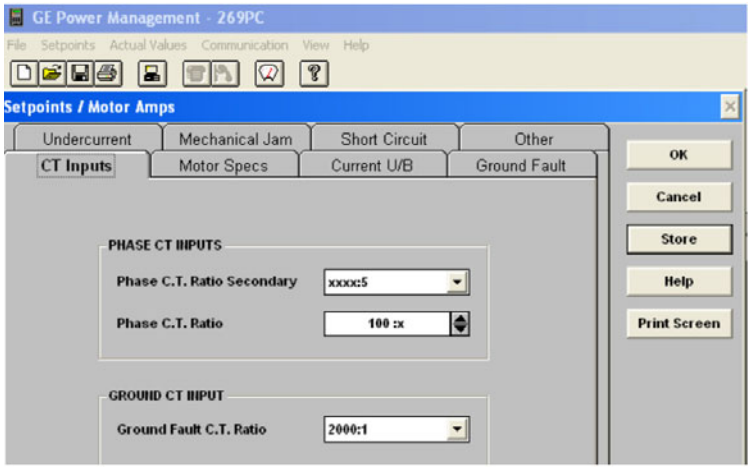


FIGURE 4–19: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

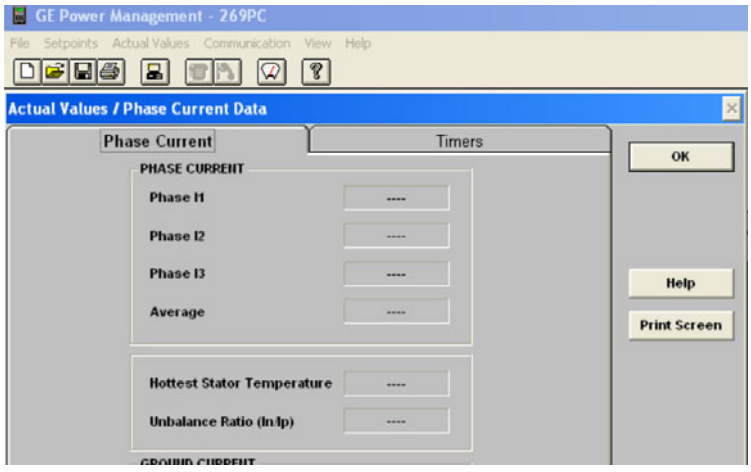


FIGURE 4–20: Current Metering

4.3.4.2 RTDs

▷ **Setup**: Configure the RTD type and the application for each RTD.

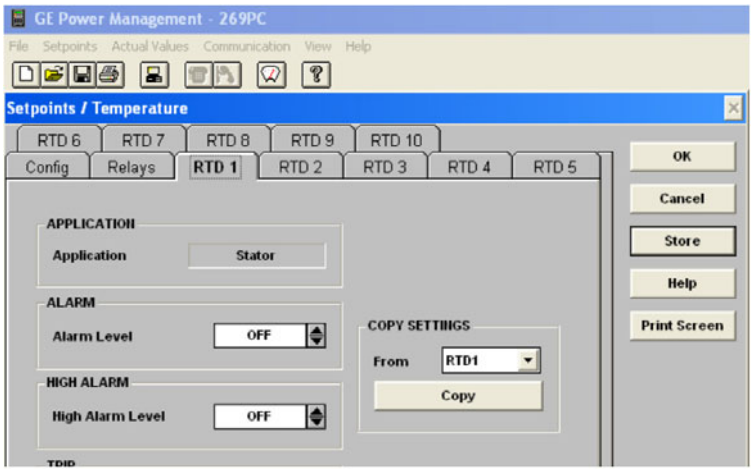


FIGURE 4–21: RTD Setup

▷ **Metering**: Monitor the RTD temperature measured by the relay, in real-time.

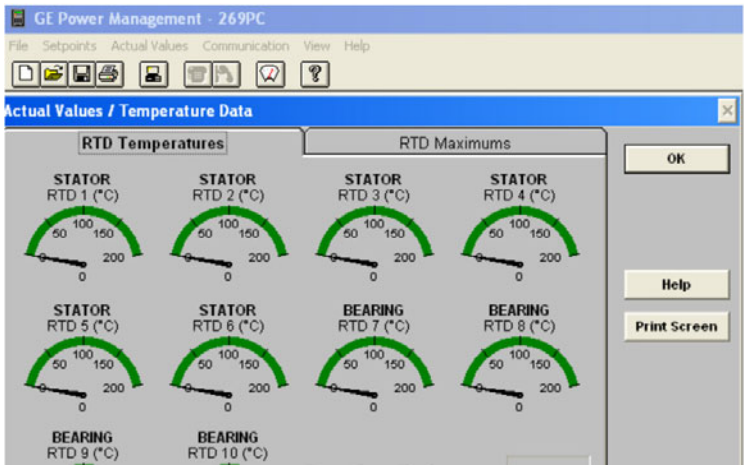
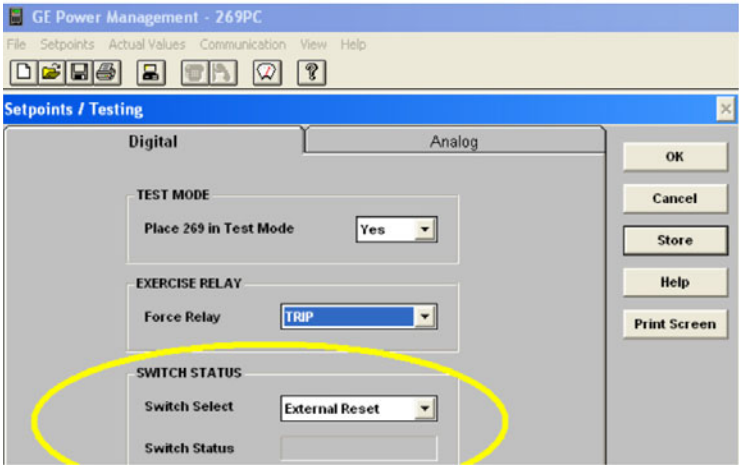


FIGURE 4–22: RTD Metering

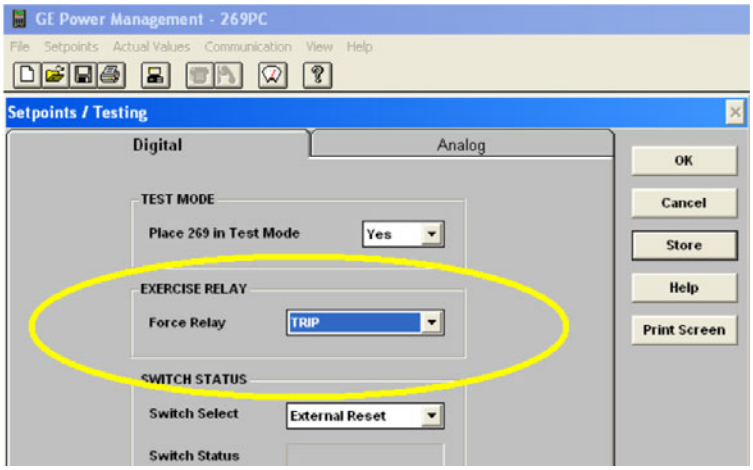
4.3.4.3 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.



4.3.4.4 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnerVista 269/269Plus Setup.



4.4 The PQM and PQMII Power Quality Metering Systems

4.4.1 Overview

The PQM/PQMII has 3-phase current inputs with less than 0.2 VA CT Burden and 3-phase voltage inputs with greater than 2.2 MOhm VT burden. The PQM/PQMII has four programmable switch inputs designed for Dry contact connection only, and 4 Form-C output relays.

All features of RTT, other than RTDs, can be applied to the PQM/PQMII. However there are 13 unused input terminal wires, a modification is required to the cable to fit the PQM/PQMII terminals.

Modification of the Product Cable

For the wires related to contact inputs and contact outputs (8 in total), cut lugs off the and strip the wires to make them fit the PQM/PQMII terminals.

The wires to be cut are: DOC, DO2, DO1, DIC, DI4, DI3, DI2 and DI1.

Unused Wires

For the unused wires (13 in total), it is recommended that user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3-, R3C, DI8, DI7, DI6 and DI5.

4.4.2 PQM/PQMII Power Quality Metering Systems Terminal Layout

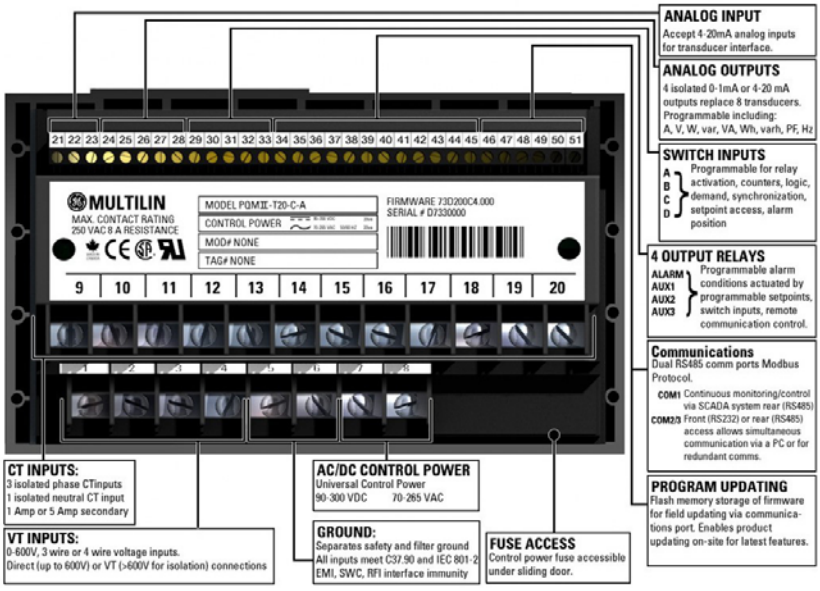


FIGURE 4–23: PQM/PQMII Relay - Rear View - Terminal Layout

4.4.3 PQM/PQMII Power Quality Metering Systems Terminal Functions

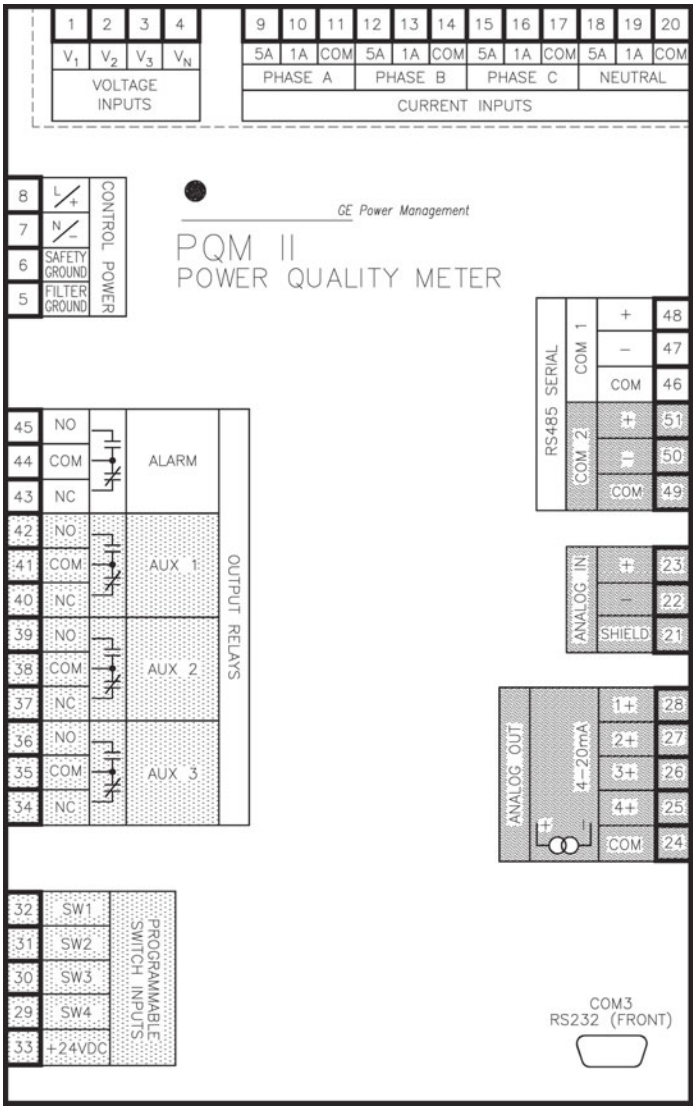


FIGURE 4–24: PQM/PQMII Relay - Terminal Functions Schematic

4.4.4 RTT to PQM/PQMII Relay Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **DRY** before applying power to the RTT unit. The PQM/PQMII Relay accepts only dry contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 4–4: PQM/PQMII Relay with RTT Set to Dry

RTDs**				RTD3 +	
				RTD3 -	
				RTD3 C	
				RTD2 +	
				RTD2 -	
				RTD2 C	
				RTD1 +	
				RTD1 -	
				RTD1 C	
				SPARE	
Contact Outputs*	AUX 1 COMMON	41	----------		RTT
	ALARM COMMON	44	----------	OUTPUT C	
	AUX 1 NO	42	----------	OUTPUT 2	
	ALARM NO	45	----------	OUTPUT 1	
Contact (Digital) Inputs	Switch Common	33	----------	INPUT C	
				INPUT 8	
				INPUT 7	
				INPUT 6	
				INPUT 5	
	Switch 4	29	----------	INPUT 4	
	Switch 3	30	----------	INPUT 3	
	Switch 2	31	----------	INPUT 2	
	Switch 1	32	----------	INPUT 1	
CTs	IA (1A)	10	----------	I_+	
	Ia COM	11	----------	I_-	
VTs	V1	1	----------	V_+	
	Vn	4	----------	V_-	

NOTE

*Alarm and Aux1 Common terminals (44 and 41) must be hardwired together..

**The PQM/PQMII Relay doesn't have RTD function.

4.4.5 Interfacing to the RTT through the EnverVista PQM Setup Program

The following section demonstrates how to navigate, configure, and monitor the operation of the PQM and PQMII Relays using the EnerVista PQM Setup program.

4.4.5.1 Current

▷ **Setup**: Enter the Phase CT Primary, then Save.

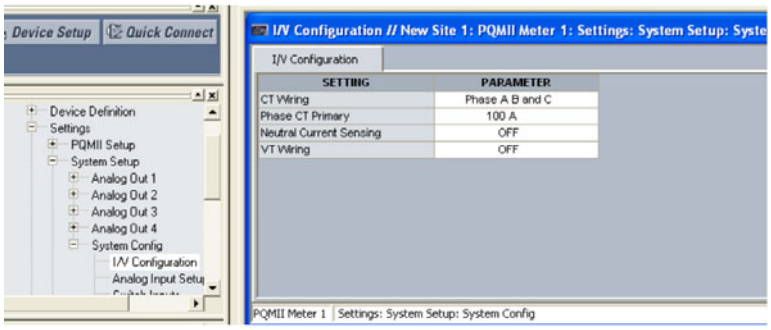


FIGURE 4–25: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

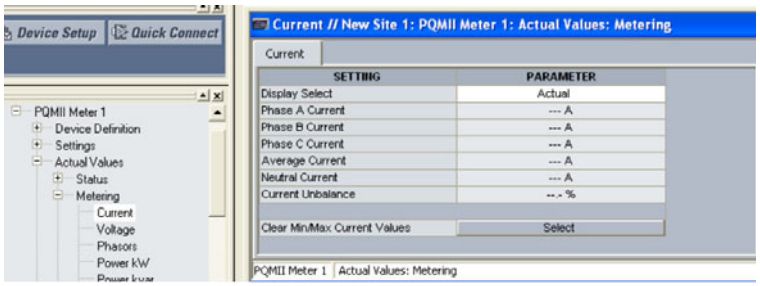


FIGURE 4–26: Current Metering

4.4.5.2 Voltage

▷ **Setup**: Configure the VT Connection Type, enter the VT Ratio, then Save.

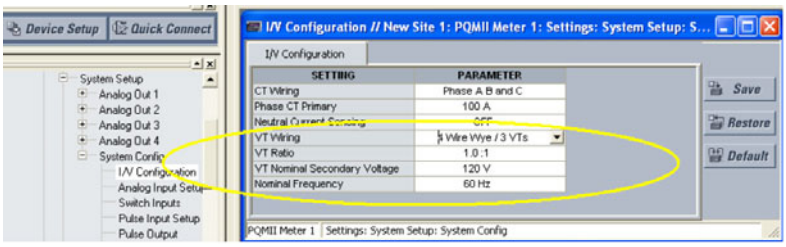


FIGURE 4–27: Voltage Setup

▷ **Metering**: View the voltage values measured by the relay, in real-time.

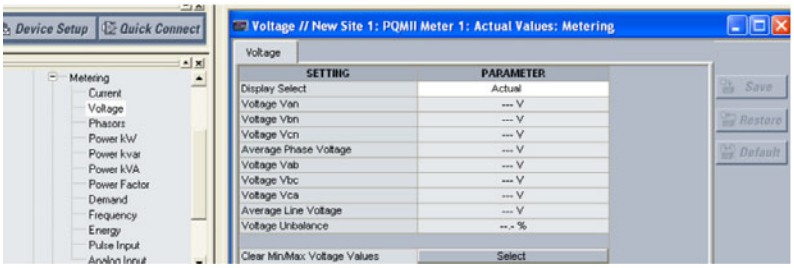


FIGURE 4–28: Voltage Metering

4.4.5.3 Contact Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.

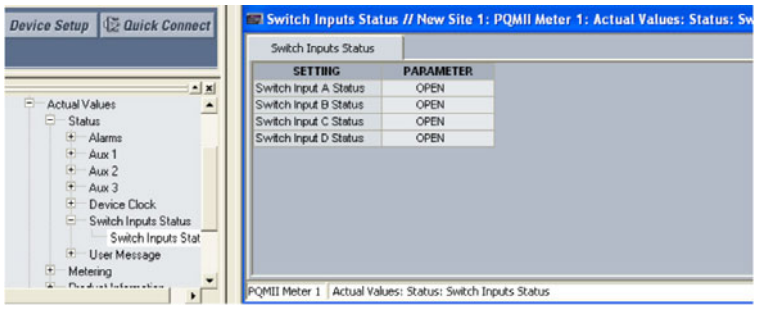


FIGURE 4–29: Contact Inputs Status

4.4.5.4 Contact Outputs Testing

The two contact outputs monitored by the RTT should match the status shown on the EnerVista PQM Setup.

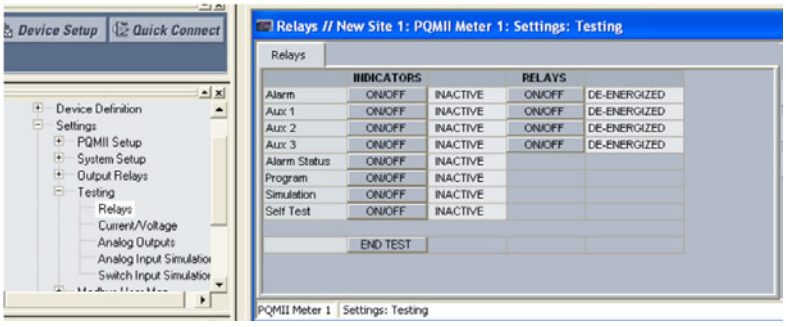
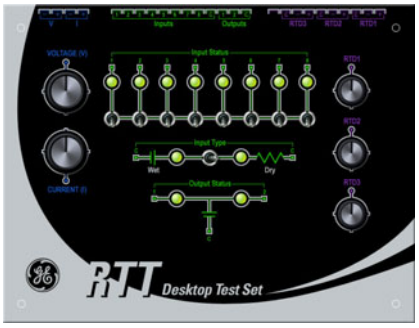


FIGURE 4–30: Contact Outputs Testing



RTT Desktop Test Set

Chapter 5: F650 Feeder/Bay Protection Relay

5.1 The F650 Feeder/Bay Protection Relay

5.1.1 Overview

F650 functions vary with different order codes. Figure 5-1 shows input/output configurations for boards F1 and F2.

All features of RTT, other than RTDs, can be applied to the F650 Relay, where applicable. No modification of the Test Cable is required.

CAUTION

Unused Wires

For the unused wires (9 in total), it is recommended that user tape the lugs to ensure isolation of the contacts so that no problems are caused by wires touching.

The unused wires are: R1+, R1-, R1C, R2+, R2-, R2C, R3+, R3- and R3C.

5.1.2 F650 Feeder/Bay Protection Relay Terminal Layout

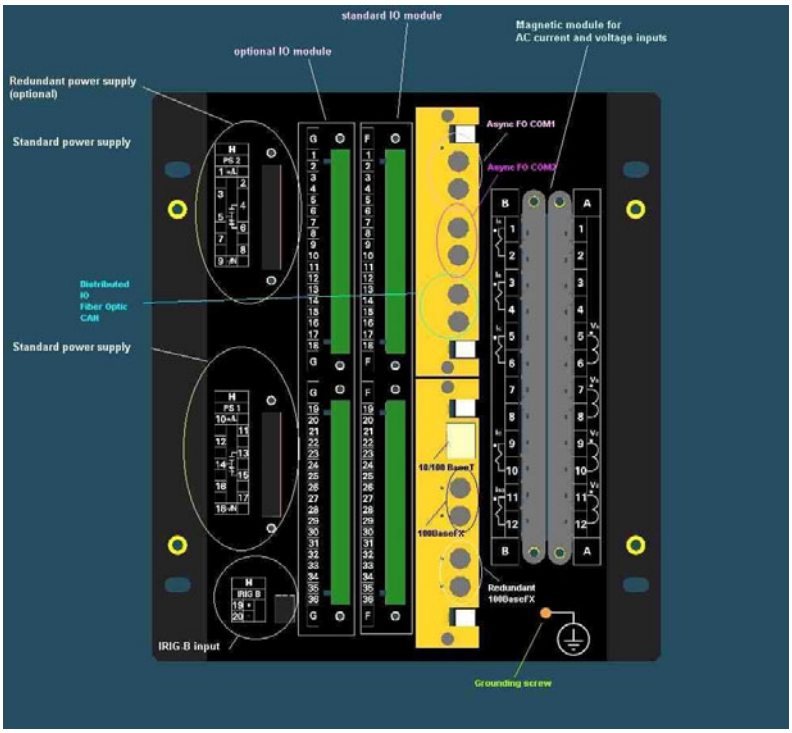


FIGURE 5–1: F650 Feeder/Bay Protection Relay Terminal Layout

5.1.3 RTT to F650 Relay Wiring Diagram

CAUTION

1. Ensure that Wet/Dry Input Type switch is set to **WET** before applying power to the RTT unit. The F650 Relay accepts only **WET** contact connections to the RTT.
2. Ensure that current and voltage knobs are turned fully counter-clockwise before applying power to the RTT unit.

Table 5–1: F650 Relay with RTT Set to Dry

RTDs**				RTD3 +	
				RTD3 -	
				RTD3 C	
				RTD2 +	
				RTD2 -	
				RTD2 C	
				RTD1 +	
				RTD1 -	
				RTD1 C	
				SPARE	
Contact Outputs*	O2 COMMON	~24	----------		RTT
	O1 COMMON	~21	----------	OUTPUT C	
	O2	~22	----------	OUTPUT 2	
	O1	~19	----------	OUTPUT 1	
Contact (Digital) Inputs	COMMON 1 - 8	~9	----------	INPUT C	
	CC8	~8	----------	INPUT 8	
	CC7	~7	----------	INPUT 7	
	CC6	~6	----------	INPUT 6	
	CC5	~5	----------	INPUT 5	
	CC4	~4	----------	INPUT 4	
	CC3	~3	----------	INPUT 3	
	CC2	~2	----------	INPUT 2	
	CC1	~1	----------	INPUT 1	
CTs	Ia +	B1	----------	I_+	
	Ia COM	B2	----------	I_-	
VTs	VA	A5	----------	V_+	
	Vn	A6	----------	V_-	

NOTE

*O1 and O2 Common terminals (~21 and ~24) must be hardwired together.

**The F650 Relay doesn't have RTD function.

5.1.4 Interfacing to the RTT through the EnerVista F650 Setup Program

The following section demonstrates how to navigate, configure, and monitor the operation of the F650 Relay using the EnerVista F650 Setup program.

5.1.4.1 Current

▷ **Setup**: Enter the Phase CT Ratio, then Save.

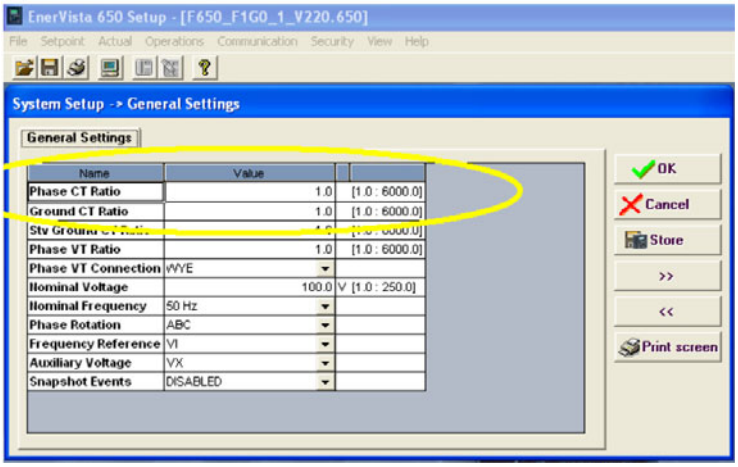


FIGURE 5–2: Current Setup

▷ **Metering**: View the current values measured by the relay, in real-time.

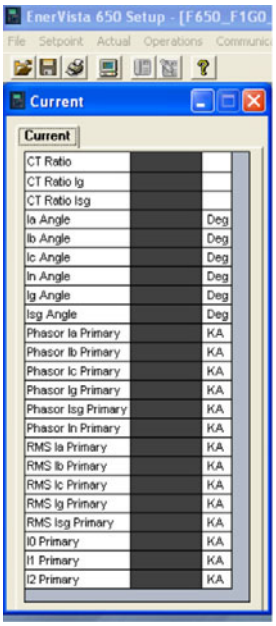


FIGURE 5–3: Current Metering

5.1.4.2 Voltage

▷ **Setup**: Configure the VT Connection Type, enter the VT Ratio, then Save.

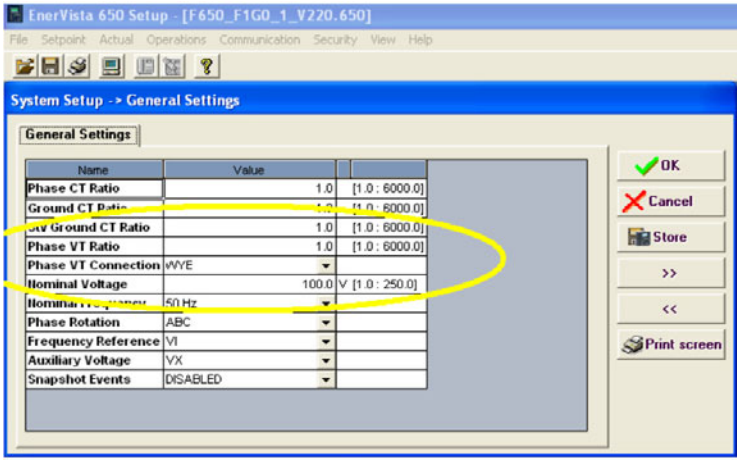


FIGURE 5–4: Voltage Setup

▷ **Metering**: View the voltage values measured by the relay, in real-time.

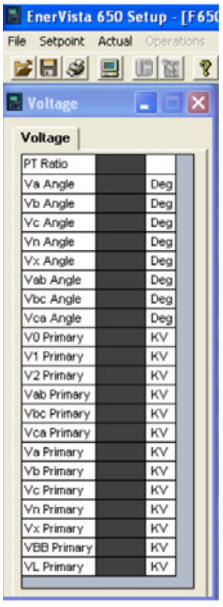
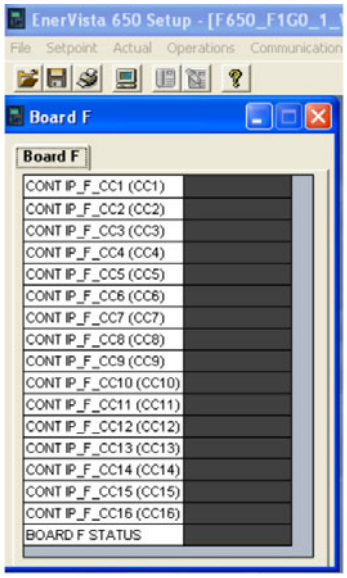


FIGURE 5–5: Voltage Metering

5.1.4.3 Contacts Inputs Status

▷ Use the following screen to monitor the status of the contact inputs as you manipulate the Contact Input Switch on the RTT.



5.1.4.4 Contacts Outputs Testing

The two contact outputs monitored by the RTT should match the status shown in the EnerVista F650 Setup.