



AC Current interface Unit (VIU) for the Galaxy/Millennium Controller

With L60 – L69 Interface Units

WP-93497

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WARNING
 OPENING ENCLOSURES EXPOSE HAZARDOUS VOLTAGES.
 ALWAYS REFER SERVICE TO QUALIFIED PERSONNEL ONLY.

WARNING
 THE TRANSDUCER UNIT IS INTENDED FOR CONNECTION TO BUILDING ENTRANCE PANELBOARDS PROTECTED BY A SECONDARY SURGE ARRESTOR INTENDED FOR LOCATION CATEGORY “B” OR “C” AS DEFINED IN ANSI/IEEE C62.41-1991. THESE ARRESTORS SHOULD BE RATED FOR A MINIMUM OF 50 KA PER PHASE, WITH A CLAMPING VOLTAGE OF 1500V MAXIMUM AT 20 KA. THE ARRESTOR MUST BE CONNECTED TO ALL PHASES OF THE AC LINE AND THE NEUTRAL CONDUCTOR. THE SURGE ARRESTOR IS TO BE GROUNDED WITH THE SHORTEST AND THICKEST WIRE POSSIBLE PER APPLICABLE CODES.

WARNING
 THE TRANSDUCER UNIT IS NOT INTENDED FOR USE IN OUTDOOR APPLICATIONS.

NOTE 1: The CIU is not intended to be a Power Quality Analyzer. It is intended only to provide a “snapshot” view of AC current peak amplitude scaled to a sinusoidal RMS-equivalent (e.g. I_{peak} X 0.707) DC voltage value. The user should be aware that true RMS values of non-sinusoidal waveforms are not calculated by this unit, and that no phase, harmonic, or conduction angle information is provided. The Galaxy or Millennium controller can be programmed to provide a history of the AC current monitored by the transducer, but the sampling interval is not “real time” and events of short duration (between sampling intervals) may not be captured.

1. GENERAL

The Self-Powered Current Interface Unit transducer kit is designed to provide a simple to install, pre-packaged solution for AC current monitoring applications using external monitoring systems such as the GE Critical Power Galaxy based products. The CIU is designed to provide a flexible solution for applications that require single or three phase current monitoring. The CIU converts AC current signals from a single or three phase current source to accurate, low voltage DC outputs which can be transmitted to monitoring systems. The CIU is equipped with all components factory mounted and pre-wired in a single enclosure. This greatly simplifies the installation process, since the installer only has to:

- Mount remote AC current transformers around AC line(s) to be monitored (usually in an AC panelboard).
- Connect AC Current measurement connections from remote current transformers to TB1.
- Remove Protective shorting jumper(s) from the remote current transformer(s) monitoring the AC mains (Rev. B and later units).
- Connect a monitoring system capable of measuring 0-3VDC to an easy access connection point on the CIU (Such as the Galaxy Remote Peripheral Monitoring System) to interface with the Galaxy or Millennium controller system.

1.1 Revision Status of Units

The Revision status of the CIU can be determined by looking at the front panel label. Units with no revision status are “Pre-rev. B” units. Units with a revision status are “Rev. B and later units”. Revision B was first shipped in May, 2000. Revision status is important as it determines accuracy and calibration of the unit.

2. INTRODUCTION

AC current transducers are used in applications where direct measurement of current by other monitoring equipment is not possible. The current transducer consists of a remote current transformer feeding a smaller current transformer containing additional circuitry which converts the measured waveform into a proportional 0-3 VDC signal that can be read by the RPM monitoring unit. The remote current transformer and the smaller current transformer in the upgraded unit are physically separate (the smaller transformer is in the metal enclosure), but function together to provide accurate current measurements down to 1% of full scale (Revision B and later units as indicated on the front panel label. Pre-Rev. B units can measure currents down to 10% of full scale). The CIU provides accurate and reliable AC current measurement over a 50 - 400 Hz frequency range. The monitored AC mains and DC output are also isolated by several barriers of isolation. No shunts are used to measure the current. A safety jumper is installed on the larger remote current transformer (Revision B and later units as indicated on the front panel label) to permit easy installation and removal without exposing the operator to hazardous voltages. This safety jumper is opened after the remote transformer is connected to the transducer TB1 terminals. Safety jumpers can be added to pre-Rev. B units if future removal of the remote current transformers is anticipated (see Parts List in Section 15.8).

WARNING
IT IS STRONGLY RECOMMENDED THAT THIS ENTIRE MANUAL BE READ BEFORE INSTALLING THIS
UNIT. OBSERVE ALL CAUTIONS AND WARNINGS TO AVOID PERSONAL INJURY OR EQUIPMENT
DAMAGE.

2.1 Standard Products

Check the model list number of your unit to make sure it is the type you need. Standard options are as follows.

WP-93497 AC Current Interface Unit (CIU) List Numbers and Comcodes: (See Notes A and B below)

List #	Comcode	Phase	Description	Min. Res.
WP-93497 L60	407 618 487	1	Single-phase current interface unit with one 300 ampere solid core current transformer	30A (pre-Rev. B), 3A (Rev. B and later units)
WP-93497 L61	407 618 461	1	Single-phase current interface unit with one 600 ampere split-core current transformer	60A (pre-Rev. B), 6A (Rev. B and later units)
WP-93497 L62	407 618 420	1	Single-phase current interface unit with one 600 ampere solid core current transformer	60A (pre-Rev. B), 6A (Rev. B and later units)
WP-93497 L63	407 618 412	1	Single-phase current interface unit with one 2000 ampere split-core current transformer	200A (pre-Rev. B), 20A (Rev. B and later units)
WP-93497 L64	407 618 453	3	Three-phase current interface unit with three 300 ampere solid core current transformers	30A (pre-Rev. B), 3A (Rev. B and later units)
WP-93497 L65	407 618 446	3	Three-phase current interface unit with three 600 ampere split-core current transformers	60A (pre-Rev. B), 6A (Rev. B and later units)
WP-93497 L66	407 618 404	3	Three-phase current interface unit with three 600 ampere, solid core current transformers	60A (pre-Rev. B), 6A (Rev. B and later units)
WP-93497 L67	407 618 396	3	Three-phase current interface unit with three 2000 ampere split-core current transformers	200A (pre-Rev. B), 20A (Rev. B and later units)
WP-93497 L68	407 664 051	1	Single-phase current interface unit without current transformers. SEE NOTE B.	10% of F.S. (pre-Rev. B), 1% of F.S. (Rev. B and later units)
WP-93497 L69	407 664 069	3	Three-phase current interface unit without current transformers. SEE NOTE B.	10% of F.S. (pre-Rev. B), 1% of F.S. (Rev. B and later units)

Note A: Each transducer requires either one or three channel connections from a 3VDC peripheral monitor module that is not furnished with the interface unit. If no spare monitor channel is available, a 3VDC peripheral monitor module should be ordered separately. See section 15.8.

Note B: Current Transformers must be provided separately. These units were specifically designed to interface with existing AC Current Transformers already connected. They may be connected to any current transformer with a secondary output current of 5Aac.

3. CIU KIT CONTENTS

The CIU kit consists of the following:

- 1 - Single or Three phase AC current transducer/transformer kit in a metal enclosure
- 2 – ½” Conduit Opening Grommets (See Section 7.1)
- 1 or 3 - Solid or split-core current transformers - Solid-core and Split-Core transformers are prewired with 24” of 16 gauge wire and safety jumper (Rev. B and later units) to prevent high voltage hazard during connection.
- 1 - Product Manual (Programming, Installation, Troubleshooting, etc.)
- 6 – 14-16 AWG Butt Splices for connection of Current Transformer Secondaries.

4. EQUIPMENT REQUIRED

For AC measurements with the Galaxy/Millennium Controller, and for installation, the following components are required:

- Galaxy Intelligent Option card
- Galaxy Remote Peripheral Monitoring Option Card
- Current limiting resistors for Remote Peripheral Monitor Module
- Butt splices to connect current limiting resistors to RPM module input
- Crimp tool for butt-splices (See crimp tool specification in plastic package with the connectors).
- 20 - 22 AWG twisted pair wire for connecting the CIU output to the Galaxy monitoring module.
- 0-3Volt DC Galaxy Remote Peripheral Monitoring Module, as required
- Remote monitoring module bus cable (Reference J85501G-1) as required
- Bus termination resistor (required only if the 0-3VDC module is the last device on the bus)
- Maximum 14 AWG diameter wire for connecting the AC remote current transformers to the CIU input, TB1 (Consult local codes).

NOTE 2: Unit Grounding may be provided through the grounded metallic conduit, or by a separate wire from the CO GRD Bar to the identified location on the CIU (per applicable local codes).

- 1 Small Jeweler’s Flathead Screwdriver and 1 Philips Screwdriver
- Digital Voltmeter

NOTE 3: For best results, use 14 AWG stranded , type THN insulation (600V rated for conduit use) for current monitoring leads.

5. APPLICATIONS

The CIU provides accurate monitoring of:

- Commercial AC Load Circuits (PDUs)
- Engine/Generator Outputs
- UPS Outputs
- Inverter Outputs
- General Purpose AC Monitoring

The Galaxy or Millennium controller can be programmed to provide accurate AC monitoring and alarm reporting. Examples are:

- UPS output Current too High/Low
- Inverter output Current too High/Low
- Commercial AC Failure
- Phase Current value
- Loss of Phase Current
- Transfer to Engine/Generator
- Engine/Generator Current too High/Low
- High/Low AC Current Alarms

6. SAFETY

6.1 Safety Statements

Please read and follow all safety instructions and warnings before installing, maintaining, or repairing the CIU.

The CIU is listed by Underwriters Laboratories Inc. to the requirements of UL Subject 1801, requirements for DC Power Distribution Centers for Communications Equipment, as a peripheral device for use with DC Power Distribution controllers. The Listing is based on the items noted below.

Install only in restricted access areas (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17, and 110-18 of the U.S. National Electric Code (NEC), ANSI/NFPA No. 70, and pursuant to applicable local codes.

UL Listing does not include evaluation of device performance (i.e. measuring functions or for use as any safety control/monitoring device).

This equipment is to be used in controlled environments (an area where the humidity is maintained at levels that can not cause condensation on the equipment, the contaminating dust is controlled, and the steady-state ambient temperature is within the range specified). It is not intended for use in outdoor environments.

This equipment has been evaluated for use in a continuous ambient temperature of up to 50 degrees Celsius (125 F).

NOTE 4: Unit Grounding may be provided through the grounded metallic conduit, or by a separate wire from the CO GRD Bar to the identified location on the CIU (per applicable local codes).

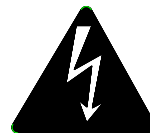
6.2 Warning Statements and Safety Symbols



The above symbol identifies the need to refer to the equipment instructions for important information.



This symbol (or equivalent) is used to identify the presence of hazardous AC mains voltages.

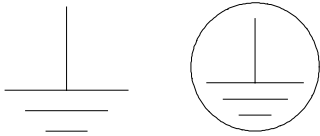


This symbol is used to identify the presence of hazardous AC or DC voltages. It may also be used to warn of hazardous energy levels.

The symbols may sometimes be accompanied by some type of statement - for example: "Hazardous voltage/energy inside. Risk of injury. This unit must be accessed only by qualified personnel."

When working on or using this type of equipment, the following precautions should be noted:

- This unit must be installed, serviced, and operated only by skilled and qualified personnel who have the necessary knowledge and practical experience with electrical equipment and who understand the hazards that can arise when working on this type of equipment.
- Hazardous energy and/or voltages may be present in the unit and on the interface cables that can shock or cause serious injury. Follow all safety warnings and practices when servicing this equipment.
- Even though the current transformer connections on TB-1 are normally at low voltage, use extreme caution when working on these circuits. The wiring for these circuits are normally run with hazardous AC circuits, therefore, the potential exists for these wires to become electrically energized with hazardous voltage levels. Also, CT leads that are at open circuit (i.e. not connected) may contain hazardous voltages. Avoid contact with bare conductors. Check for hazardous voltage levels before accessing these points on the connector. Disconnect power to all AC load conductors being monitored, or use the safety jumpers (Rev. B and later units) at the CTs to provide a short across the windings before connecting/disconnecting CT wiring.



The above symbols (or the “GND” symbol) are used to identify the safety earth ground or bonding point for the equipment.

7. MOUNTING

The CIU can be wall mounted on any flat, smooth surface using the 4 mounting holes (1/4” diam., use #12 or 3/16 hardware) provided in the rear of the unit. Correct securing hardware for the installation surface is to be used in mounting this product, and mounting is to be per appropriate industry practices. Securing hardware capable of supporting at least 4 times the weight of the product (40 lb) should be chosen to mount the product. Suitable fasteners or wall anchors should be used when mounting on masonry or drywall. The CIU weighs approximately 10 lbs.

7.1 Conduit Considerations

WARNING

Use the bottom Knockouts for all wiring and conduit entry. Keep wires from the remote current transformer separated from the wires to the Remote Peripheral Module (RPM). Either grommet(s) or conduit entry fittings must be used at these holes to avoid insulation chafing.

The Remote Current Transformer (CT) monitoring wires can be routed to the CIU via a single 1/2" conduit. The Data wires to the Galaxy Remote Peripheral Monitor must be routed through a separate conduit. There are 2 knockout holes (1/2") on the bottom of the unit. The wires must be routed either through the grommets included in the kit, or through the appropriate conduit fittings. For safety, the monitoring wires and the Current transformer wires should be kept separated from each other within the CIU box.

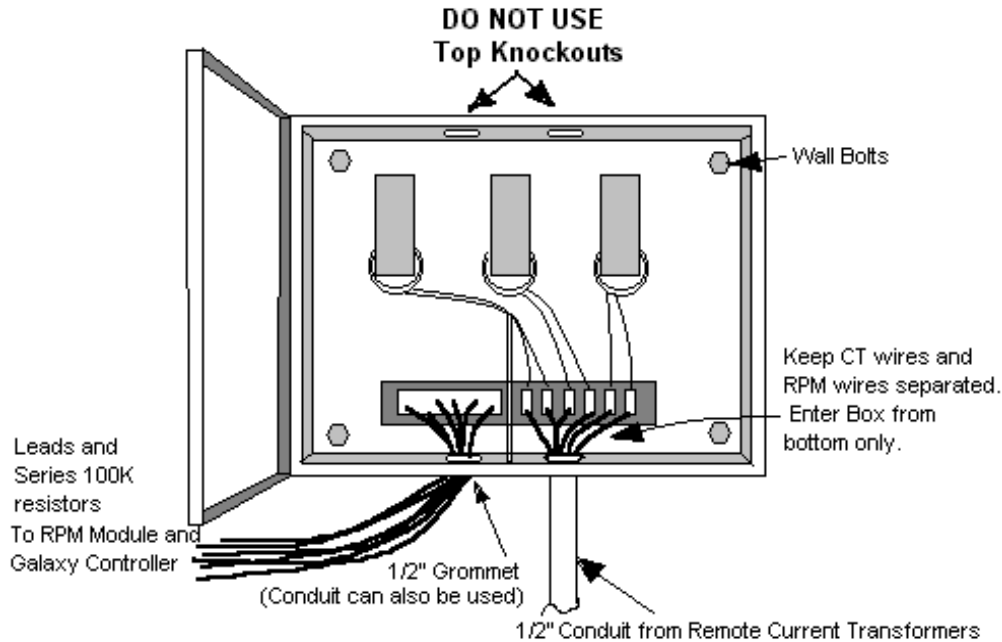


Figure 1 – Conduit and Wire Routing, Typical

8. WIRING

8.1 DC Input

These units are SELF POWERED and require no DC input power/wiring.

8.2 GE Critical Power Remote Peripheral Monitoring Module Bus

Before connecting the CIU to the Galaxy Remote Peripheral Monitoring Module, set the module address. Refer to the J85501G1 drawing and the Galaxy Product Manual.

Caution: *No two modules can have the same address. All addresses are valid except 00.*

Run the CT wires (14 AWG stranded conductors with insulation rated at 600V conduit usage per applicable code (such as THN, THHN, or THWN insulation)) from the measurement point through a conduit opening and connect to the labeled input terminal block, TB-1. Connection to the CT's own wires is via butt splices.

Connect the Galaxy Remote Peripheral Monitoring Module using 20-22 AWG twisted pair wire (stranded) and 100K current limiting resistors to TB1 (marked with DC output). The resistors may be mounted inside the CIU enclosure.

*Note: Current Limiting Resistors are not provided with the CIU. They are provided as part of the Remote Peripheral Monitoring Modules. See Section 15.8 below.

8.3 AC Current Measurement Points

Electrical knockouts are provided on the top and bottom of the CIU for conduit connections – However, only the bottom holes should be used, to promote isolation between the Input and Output conductors. The unit has separate high and low voltage terminal block connectors for connecting the units to the measurement point(s) and to the remote monitoring module channel inputs.

WARNING

Use the bottom Knockouts for all wiring and conduit entry. Keep wires from the remote current transformer separated from the wires to the Remote Peripheral Module (RPM). Grommet(s) or conduit entry fittings must be used at these holes to avoid insulation chafing.

The TB-1 terminal block can only accept wires up to 14 AWG solid or stranded wire (stranded is recommended) conductors, unless local codes allow for other sizes (Figure 2 and 3). Consult the National Electric Code for recommended wiring sizes and details on connections. Leads going to the remote current transformers must be 14AWG stranded conductors with insulation rated at 600V. These leads butt-splice onto the 16 AWG leads that are prewired to the remote current transformers. During installation of these current monitoring leads, the safety jumper (Rev. B and later units) should be in place at the current transformer. See Figs. 2-4 below.

**WARNING!!
RISK OF SHOCK**

Solid-core current transformers (CT) should be installed, if possible, with the monitored circuit AC power off (follow appropriate job safety procedures). After placing the wire to be monitored through the CT, connect the leads from the CT to the CIU prior to restoring power to the AC line circuit. Failure to do so could cause electric shock and possibly damage to the CT. Please refer to Safety Jumper procedure below.

Split-core current transformers can be installed with the monitored circuit AC power ON. Before opening the CT and placing it around the wire to be monitored, connect the leads from the CT to the CIU. Once the CT leads have been connected, place the CT around the wire to be monitored and secure. Failure to connect the leads from the CT to the CIU before placing the CT around a wire to be monitored could cause electric shock and possibly damage to the CT. See Warning Statements and Safety Symbols section for additional precautions. Also refer to Safety Jumper procedure below.

Safety Jumpers are provided with each CT on Rev. B and later units (either solid or split core), and are initially connected when shipped. These jumpers will prevent excessive AC voltages from developing on the CT's output winding while they are connected. During installation on either dead or live conductors, the jumpers should remain connected. They should only be disconnected after ALL CT monitoring leads are connected to TB1 on the transducer. A jumper kit can be ordered (see Replacement Parts list in Section 15.8) for pre-Rev. B units.

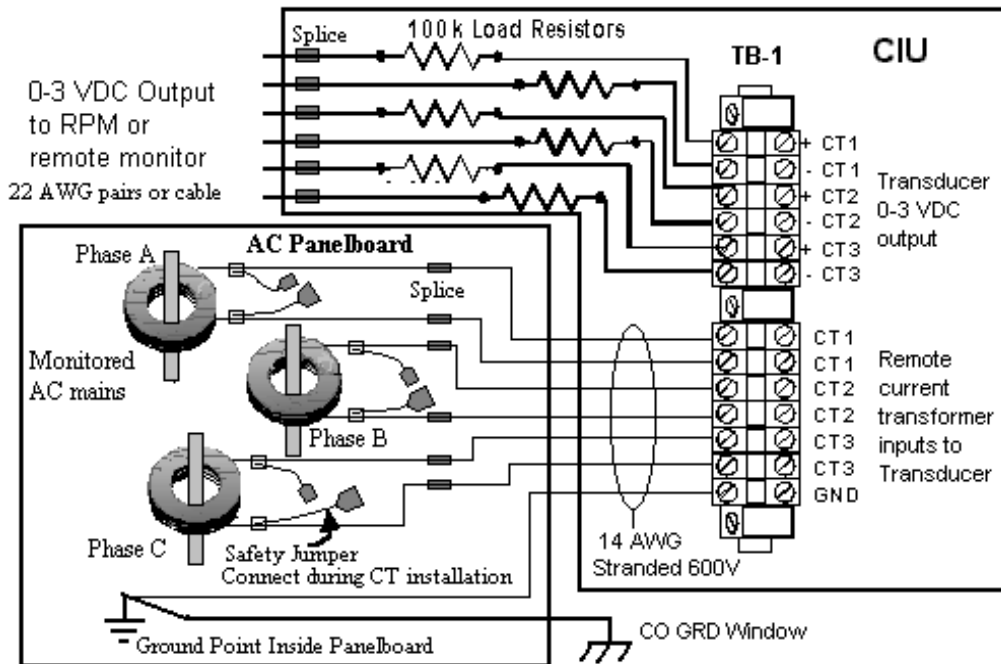


Figure 2 - Connecting the current transformers and DC Output to the 3 Phase CIU .

Caution: Check the CT current rating and the current rating of the AC circuit to be monitored prior to installation. The CT current rating should be equal to or above the AC circuit to be monitored. If the CT is below the current rating of the ac circuit do not install the CTs. Contact your supplier for instructions.

NOTE 5: All current transformers use a direction arrow to indicate appropriate phasing direction of the transformer. The CIU does not use the phasing information, so the direction of the arrow is not important.

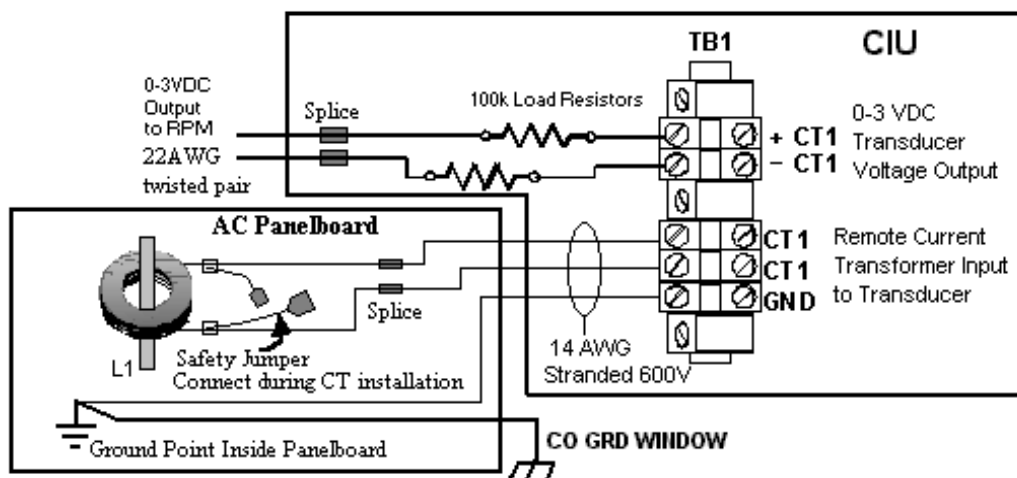


Figure 3 - Connecting the current transformers and DC Output to the Single Phase CIU Unit.

Note 6: The CIU requires no external DC power.

Typical Current Transformer Installation

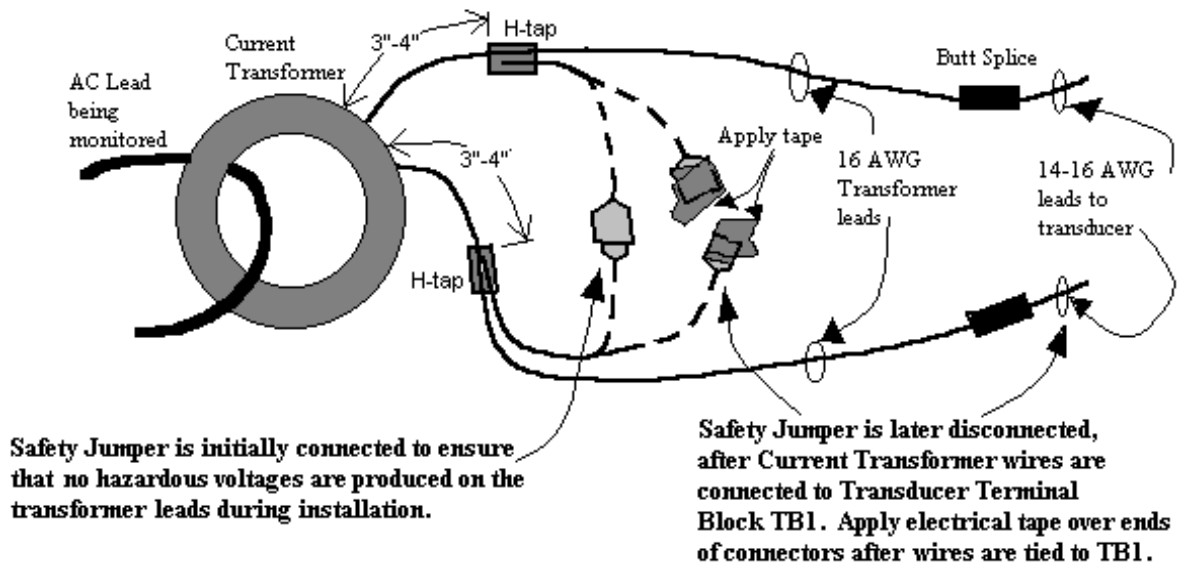


Figure 4. Current Transformer Installation

NOTE 7: FOR BEST RESULTS, THE WIRES TO THE REMOTE CURRENT TRANSFORMERS SHOULD BE 14 AWG STRANDED WITH 600V THHN, RHH, or RHW INSULATION. USING A WIRE GAUGE SMALLER IN DIAMETER THAN 14 AWG WILL REQUIRE THE MAXIMUM DISTANCE BETWEEN THE REMOTE CURRENT TRANSFORMERS AND THE TRANSDUCER TO BE LESS. SEE MAXIMUM LENGTH TABLE AND FORMULA (NOTE 8) BELOW.

Maximum Current rating of Remote Current Transformer	Allowable burden of Transformer	Maximum Pair Distance (14 AWG/60 Hz) between Remote Current Transformer and Transducer TB1
50A	1 VA	8'
100A	2 VA	16'
300A	12.5 VA	100'
600A	30 VA	240'
(split core) 600A	2.5 VA	20'
(split core) 2000A	30 VA	240'

NOTE 8: FOR LONGER DISTANCES THAN THOSE SHOWN IN THE TABLE, LARGER GAUGE WIRES CAN BE SPLICED TO 14 AWG WIRES (SOLDERING IS PREFERABLE). A WIRE RESISTIVITY TABLE SHOULD BE CONSULTED TO ENSURE THAT THE ALLOWABLE BURDEN OF THE REMOTE CURRENT TRANSFORMER IS NOT EXCEEDED FOR THE LOOP RESISTANCE.

FORMULA: Max. Distance = (Allowable Burden / (25 * Ohms per foot)) / 2

PLEASE ALSO NOTE THAT GOING TO LARGER GAUGE WIRES MAY REQUIRE THE CONDUIT DIAMETER TO INCREASE, AND MAY REQUIRE THE TRANSDUCER BOX CONDUIT KNOCKOUT TO BE ENLARGED.

9. TECHNICAL SPECIFICATIONS

CIU SPECIFICATIONS

Model Number	WP-93497
Configurations	
CURRENT Monitoring	AC current monitoring options. Solid-Core or Split-Core Transformers are available. 1 or 3 phase monitoring 300 A; 600 A ;2000 A or existing CTs may be used (5A max. secondary)
Accuracy	Transformer: Solid-Core: 1% ; Split-Core: 2% (Full Scale); Transducer: 2%. Pre Rev. B units can only read current down to 10% of full scale.
Output Signal Voltage	Max 3 @ 0-3Vdc - Proportional to AC Current
Environmental	
Temperature	0-125 °F (-17 °C to 51 °C)
Humidity	5 - 95 % RH Non-Condensing
Size	10.25"W x 10.25" H x 4.0"D
Weight	10 lbs.
Safety Agency	Underwriters Laboratories (UL) Listed

10. PROGRAMMING THE GALAXY CONTROLLER

Before beginning, if you are an experienced Easy-View programmer, you may want to bypass this detailed section, and go to the EasyView Quick Configuration Table.

10.1 EasyView Graphical User Interface (GUI) (Microsoft Windows® Based)

The address MUST BE SET by the user, using the rotary hex switches on each remote monitoring module.

Procedure

1. Verify that the CIU unit is connected to the Galaxy monitoring module.
2. Login to the Galaxy using the EasyView program.
3. Select **Configure** menu.
4. Under the **Configure** menu, select **Monitoring**.

ALL EASYVIEW ILLUSTRATIONS REFERENCED ARE FOUND IN APPENDIX 1

5. Under **Monitoring**, select **Voltage Channels**. Reference *Illustration A*.
6. A screen similar to *Illustration B* shall be shown.
7. Locate the address and channels of the transducer module used. Each channel must be modified.

Channel Configuration (Current) One or Three channels, depending on List Number

Click on the **Modify** button located in the lower left hand corner of the screen. A screen similar to *Illustration C* will now be displayed.

Description field

Type in a text description of the channel. (Note that the following fields are automatically configured by the Galaxy and can not be changed: *Value, Identifier, Type, Address, TLI, Status, Channel, and Voltage Range*)

Scale Factor, Offset, Units (Rev. B and later units)

Transformer Current Rating (Primary)	Scale Factor	Offset	Units
50A	16.6667	0	Aac
100A	33.3333	0	Aac
300A	100	0	Aac
600A	200	0	Aac
2000A	666.67	0	Aac

For other transformers not found in this table, the SCALE FACTOR = Transformer Rating divided by 3
Transformers used must have a secondary winding rated at 5Aac at Full Scale.

Scale Factor, Offset, Units (pre-Rev. B units)

Transformer Current Rating (Primary)	Scale Factor	Offset	Units
50A	15	-0.33333	Aac
100A	30	-0.33333	Aac
300A	90	-0.33333	Aac
600A	180	-0.33333	Aac
2000A	600	-0.33333	Aac

For other transformers not found in this table, the SCALE FACTOR = Transformer Rating divided by 3.3333
Transformers used must have a secondary winding rated at 5Aac at Full Scale.

Create User Defined Event for Alarming

For the Galaxy to generate an alarm when the monitored AC current above or below a threshold, a user defined event must be created. *Illustration C.*

For each channel, using the mouse, select the *Create New User Defined Event And Modify* button in the lower left corner of the screen.

Select **OK** to confirm changes. A screen similar to *Illustration D* will now be seen.

The *Description* field is used to define the alarm condition when the AC current increases or decreases from the desired value being measured. An example would be *AC Current 1 Out of Range*.

Select the *Severity* of the alarm. *Illustration D.*

(Optional Step) Select the *LED* to be illuminated on front panel of the controller when the AC current is out of range. *Illustration D.*

(Optional Step) Select the alarm *Relay* that will become active when the AC current is out of range. *Illustration D.*
Configuration of the *Callout on Alarm* fields is beyond the scope of this manual. Refer to the Galaxy Product Manual.
To configure this user defined event as a *Latched* alarm event, *Enable* the *Latched* field. (*Latched* implies that once the alarm condition retires, the alarm will remain active until it is cleared by the user)

The final step is the *Program Line* definition. The *Program Line* should be the following:
(C4XX > Upper Threshold) | (C4XX < Lower Threshold)

XX = Module Address

The “|” symbol is the symbol for **OR**. It is usually above the ENTER key on your keyboard.

For 3 current inputs, repeat this procedure for each channel.

This completes the CIU unit programming with EasyView. Galaxy is now ready to monitor AC current.

11. MAINTENANCE

The CIU should be checked on a semi-annual basis to ensure the transformers and current transducers are operating properly.

12. CALIBRATION

No calibration is required.

13. TROUBLESHOOTING

PROBLEM	Possible CAUSE	SOLUTION
No AC current Reading at the Galaxy/Millennium, but the ammeter has a reading.	There may be a bad connection from the transformer to the CIU input. Also one or more Safety jumpers may be connected at the remote current transformer.	Verify that a solid connection exists between the transformer output and the CIU input. Verify that all safety jumpers are open.
When a low current alarm is present, no LED on Galaxy/Millennium Front Panel.	The User Defined Event and/or severity LED for the current transducer is not configured.	Modify User Defined Event for the current channel. (See Galaxy/Millennium Product Manual)
The Alarm LEDs and conditions stay active after a low AC current condition is no longer present.	The channel is configured as a latched event.	Disable the Latched event feature under the modify screen.
The current values reported by Galaxy/Millennium are out of the specified accuracy range. This may include inability to accurately see currents near the maximum transformer rating, or inability to see currents less than 10% of transformer full scale.	The Scale Factor and Offset values may have been changed.	Change the Scale Factor and Offset values. Refer to tables in Section 10.1.
	The CIU unit is "older" (e.g. pre-Rev. B).	Rev. B and later units offer increased dynamic range down to 1% of full scale. An upgrade kit is available.
	The remote current transformer may have had turns added to the primary (e.g. transformer has been rescaled).	Rescaling of the transformer is done to allow more accurate measurement of currents much below full scale, which compresses the high end capability of the transformer. See Section 15.9.
	The remote current transformer may be undersized.	Order a larger transformer. See section 15.8 for part numbers.
	The remote current transformer is too far from the CIU, and/or the wires to the remote current transformer are of insufficient gauge.	Consult the Burden table in Section 8.3, and Notes 7 and 8. Maximum distance at 14 AWG is given.
	The remote current transformer is in close proximity to another high-current conductor and is receiving interference.	Relocate transformer and its monitored lead away from other high current carrying conductors (6" distance is typical good distance).
No alarms are generated when the alarm thresholds are exceeded.	The User Defined Event for AC current Reporting may have been changed.	Verify that the Alarm configuration for the User Defined Event is correct.

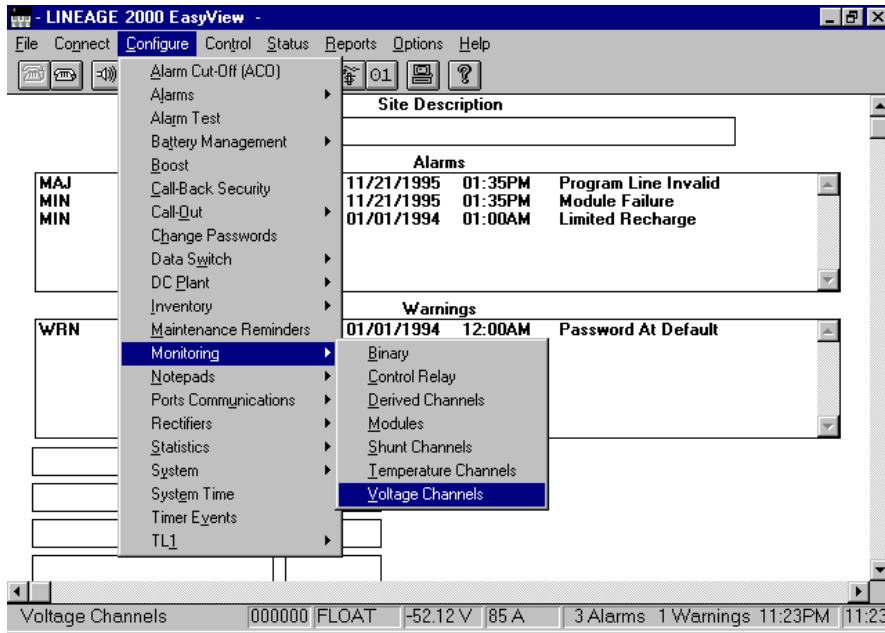
14. EASYVIEW QUICK CONFIGURATION TABLE (XX=MODULE ADDRESS)

	Required	Optional	Entry for Required Values; Example for Optional Values
Channel 1- Current #1			
Description		Yes	AC Current #1

Scale Factor	Yes		Rev. B and later units: Transformer Rating (Primary Side) divided by 3 Pre-Rev. B units: Transformer Rating (Primary Side) divided by 3.3333
Offset	Yes		Rev. B and later units: 0 Pre-Rev. B units: -0.33333
UDE Description		Yes	AC Current #1 Out of Range
Severity		Yes	Major
LED		Yes	AC
Alarm Relay		Yes	AC
Program Line	Yes		(C1XX > Upper Threshold) (C1XX < Lower Threshold)
Latched		Yes	Disabled
Channel 2- Current #2			
Description		Yes	AC Current #2
Scale Factor	Yes		Rev. B and later units: Transformer Rating (Primary Side) divided by 3 Pre-Rev. B units: Transformer Rating (Primary Side) divided by 3.3333
Offset	Yes		Rev. B and later units: 0 Pre-Rev. B units: -0.33333
UDE Description		Yes	AC Current #2 Out of Range
Severity		Yes	Major
LED		Yes	AC
Alarm Relay		Yes	AC
Program Line	Yes		(C2XX > Upper Threshold) (C2XX < Lower Threshold)
Latched		Yes	Disabled
Channel 3- Current #3			
Description		Yes	AC Current #3
Scale Factor	Yes		Rev. B and later units: Transformer Rating (Primary Side) divided by 3 Pre-Rev. B units: Transformer Rating (Primary Side) divided by 3.3333
Offset	Yes		Rev. B and later units: 0 Pre-Rev. B units: -0.33333
UDE Description		Yes	AC Current #3 Out of Range
Severity		Yes	Major
LED		Yes	AC
Alarm Relay		Yes	AC
Program Line	Yes		(C3XX > Upper Threshold) (C3XX < Lower Threshold)
Latched		Yes	Disabled

15. APPENDIX 1

15.1 Illustration A



15.2 Illustration B

The screenshot shows the Peripheral Monitors window in the LINEAGE 2000 software. It displays a table of monitoring channels with columns for IDE, Addr, Chan, Description, Range, Value, and State.

IDE	Addr	Chan	Description	Range	Value	State
C130	30	1	0mV-110mV Chan 1 Addr 30	-10.0mV - 110.0mV	-0.03 mV	OK
C230	30	2	0mV-110mV Chan 2 Addr 30	-10.0mV - 110.0mV	-0.01 mV	OK
C330	30	3	0mV-110mV Chan 3 Addr 30	-10.0mV - 110.0mV	-0.13 mV	OK
C430	30	4	0mV-110mV Chan 4 Addr 30	-10.0mV - 110.0mV	0.01 mV	OK
C530	30	5	0mV-110mV Chan 5 Addr 30	-10.0mV - 110.0mV	-0.02 mV	OK
C630	30	6	0mV-110mV Chan 6 Addr 30	-10.0mV - 110.0mV	-0.01 mV	OK
C135	35	1	0V-3V Chan 1 Addr 35	-0.0V - 3.0V	2.17 V	OK
C235	35	2	0V-3V Chan 2 Addr 35	-0.0V - 3.0V	-0.00 V	OK
C335	35	3	0V-3V Chan 3 Addr 35	-0.0V - 3.0V	-0.00 V	OK
C435	35	4	0V-3V Chan 4 Addr 35	-0.0V - 3.0V	-0.00 V	OK
C535	35	5	0V-3V Chan 5 Addr 35	-0.0V - 3.0V	-0.00 V	OK
C635	35	6	0V-3V Chan 6 Addr 35	-0.0V - 3.0V	-0.00 V	OK
C136	36	1	0V-3V Chan 1 Addr 36	-0.0V - 3.0V	2.17 V	OK
C236	36	2	0V-3V Chan 2 Addr 36	-0.0V - 3.0V	-0.00 V	OK
C336	36	3	0V-3V Chan 3 Addr 36	-0.0V - 3.0V	0.00 V	OK
C436	36	4	0V-3V Chan 4 Addr 36	-0.0V - 3.0V	-0.00 V	OK
C536	36	5	0V-3V Chan 5 Addr 36	-0.0V - 3.0V	-0.00 V	OK
C636	36	6	0V-3V Chan 6 Addr 36	-0.0V - 3.0V	-0.00 V	OK
C13A	3A	1	0V-16V Chan 1 Addr 3A	-0.1V - 16.0V	2.20 V	OK
C23A	3A	2	0V-16V Chan 2 Addr 3A	-0.1V - 16.0V	4.40 V	OK
C33A	3A	3	0V-16V Chan 3 Addr 3A	-0.1V - 16.0V	6.61 V	OK
C43A	3A	4	0V-16V Chan 4 Addr 3A	-0.1V - 16.0V	8.81 V	OK
C53A	3A	5	0V-16V Chan 5 Addr 3A	-0.1V - 16.0V	11.02 V	OK
C63A	3A	6	0V-16V Chan 6 Addr 3A	-0.1V - 16.0V	13.21 V	OK
C13C	3C	1	0V-70V Chan 1 Addr 3C	-0.5V - 70.0V	52.13 V	OK
C23C	3C	2	0V-70V Chan 2 Addr 3C	-0.5V - 70.0V	-0.00 V	OK
C33C	3C	3	0V-70V Chan 3 Addr 3C	-0.5V - 70.0V	-0.00 V	OK
C43C	3C	4	0V-70V Chan 4 Addr 3C	-0.5V - 70.0V	0.00 V	OK

Buttons at the bottom: Modify, Refresh, Write to File, Close

15.3 Illustration C

Peripheral Monitor [X]

Monitoring Channels (Voltage)

Description:

Value:

Identifier: Type: Address:

TL1: Status: Channel:

Units:

Offset:

Scale Factor:

Voltage Range:

(RAW - OFFSET) × (SCALE FACTOR) = Channel Value UNITS

15.4 Illustration D

Alarms [X]

Description:

Identifier: LED:

Severity: Relay:

TL1:

Call Out On Alarm

Notify On Occur:

Notify On Retire:

NAG On Occur:

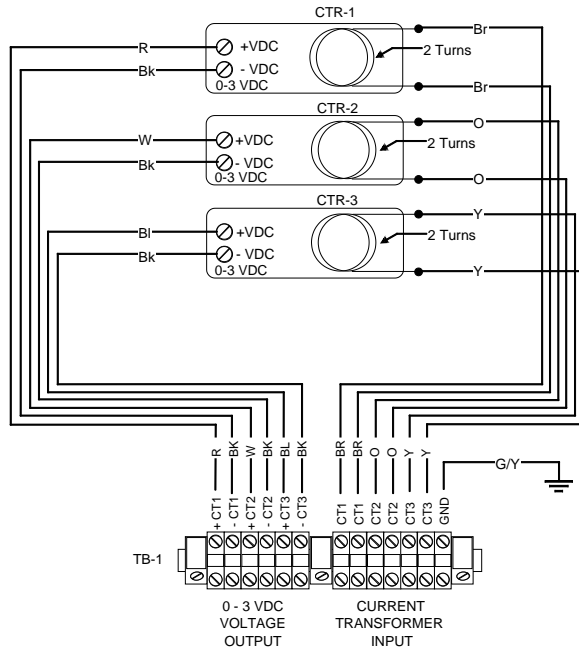
Notify Delay: 0-540 seconds

Notify Destination(s): P1 P2 P3 P4

Latched:

Program Line:

15.5 CIU 3 Phase Internal Wiring Diagram (WP-93497 L64-L67, L69)



Notes:

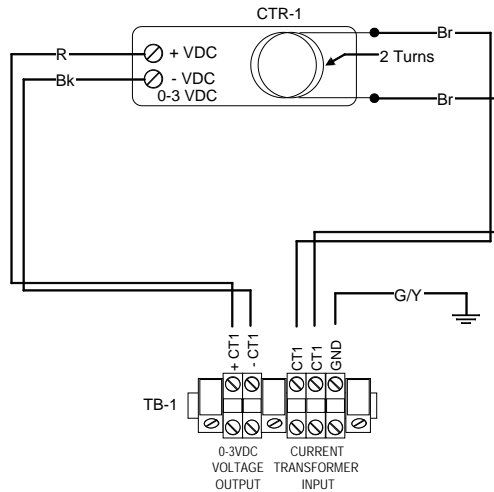
1. Mount the CIU on any suitable flat surface using the mounting holes provided in the back of the enclosure.
2. Connect the current CT output wiring to TB-1 before applying current to the monitored circuit. Failure to do so could damage the CTs.
3. All wiring to the CIU must meet all local and national electrical codes.

Install only in restricted areas (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17 and 110-18 of the U.S. National Electrical Code (NEC), ANSI/NFPA No. 70, and pursuant to applicable local codes.

This equipment is to be used in controlled environments.

⚠ Before making any connections to this equipment, refer to the product documentation for safety precautions, important connection and operating considerations and proper hardware (wire, lugs, and crimping tools).

15.6 CIU Single Phase Internal Wiring Diagram (WP-93497 L60-L63, L68)



Notes:

1. Mount the CIU on any suitable flat surface using the mounting holes provided in the back of the enclosure.
2. Connect the current CT output wiring to TB-1 before applying current to the monitored circuit. Failure to do so could damage the CTs.
3. All wiring to the CIU must meet all local and national electrical codes.

Install only in restricted areas (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17 and 110-18 of the U.S. National Electrical Code (NEC), ANSI/NFPA No. 70, and pursuant to applicable local codes.

This equipment is to be used in controlled environments.

⚠ Before making any connections to this equipment, refer to the product documentation for safety precautions, important connection and operating considerations and proper hardware (wire, lugs, and crimping tools).

15.7 CIU Dimensions

15.8 CIU Parts List

Comcode	Used On List #(s)	Part Number	Description	Qty
408280352	60	WP-93497-60-MA	Major Assembly - Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	60	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	1
408280436	60	WP-93497-60-TB1	Terminal Block (TB-1)	1
408280469	60	WP-93497-CT300	External Current Transformer - Solid Core - 300 AMP	1
408280477	61	WP-93497-61-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	61	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	1
408280436	61	WP-93497-60-TB1	Terminal Block (TB-1)	1
408280501	61	WP-93497-CTS600	External Current Transformer - Split Core - 600 AMP	1
408280527	62	WP-93497-62-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	62	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	1
408280436	62	WP-93497-60-TB1	Terminal Block (TB-1)	1
408280535	62	WP-93497-CT600	External Current Transformer - Solid Core - 600 AMP	1
408280550	63	WP-93497-63-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	63	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	1
408280436	63	WP-93497-60-TB1	Terminal Block (TB-1)	1
408280568	63	WP-93497-CTS2000	External Current Transformer - Split Core - 2,000 AMP	1
408280576	64	WP-93497-64-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	64	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	3
408280592	64	WP-93497-64-TB1	Terminal Block (TB-1)	1
408280469	64	WP-93497-CT300	External Current Transformer - Solid Core - 300 AMP	3
408280600	65	WP-93497-65-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	65	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	3
408280592	65	WP-93497-64-TB1	Terminal Block (TB-1)	1
408280501	65	WP-93497-CTS600	External Current Transformer - Split Core - 600 AMP	3
408280618	66	WP-93497-66-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	66	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	3
408280592	66	WP-93497-64-TB1	Terminal Block (TB-1)	1
408280535	66	WP-93497-CT600	External Current Transformer - Solid Core - 600 AMP	3
408280626	67	WP-93497-67-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	67	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	3
408280592	67	WP-93497-64-TB1	Terminal Block (TB-1)	1
408280568	67	WP-93497-CTS2000	External Current Transformer - Split Core - 2,000 AMP	3
408280352	68	WP-93497-60-MA	Major Assembly - Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	68	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	1
408280436	68	WP-93497-60-TB1	Terminal Block (TB-1)	1
408280576	69	WP-93497-64-MA	Major Assembly – Transducer section - includes backplate and all components (transformers, terminal blocks etc.)	1
408280410	69	WP-93497-CTR100	Internal Current Transducer 0-3VDC output (CTR-)	3
408280592	69	WP-93497-64-TB1	Terminal Block (TB-1)	1
408361426	As Needed	WP-93497-CT100	External Current Transformer - Solid Core – 100 AMP (listed for ordering purposes only, if req'd)	1 or 3
408361434	As Needed	WP-93497-CT50	External Current Transformer - Solid Core - 50 AMP (listed for ordering purposes only, if req'd)	1 or 3
108040890	As Needed	WP-93497-LUC221A	Galaxy Peripheral Monitoring Module (listed for ordering purposes only, if req'd)	1
848537130	As Needed	WP-93497-L90	Remote Current Transformer Safety Jumper (listed for ordering purposes only, if req'd)	1 or 3
847635851	As Needed	WP-93497-LUC221TB	Terminal Block – Monitoring Module (listed for ordering purposes only, if req'd)	1

15.9 Rescaling of Remote Current Transformers

A remote current transformer can be rescaled to read lower current values. Typically, this rescaling is done at sites operating much lower than 50A output current (AC inverters and UPS equipment 4 KVA and below in power rating). Rescaling is accomplished by adding turns to the primary by passing the monitored conductor through the hole in the transformer multiple times (if space permits). For example:

Inverter = 2 kVA, monitor the output current.

Inverter I_{out} max = 2000 / 120V = 16.67A

Transformer Max Current = 50A (using a 50A, 1 primary turn, full scale external current transformer).

Minimum readable current for this transformer (1 turn on primary) = 50A X 0.01 = 500mA
(for Rev. B and later units).

Rescaling - example:

$50A / 16.67 = 3.0 \rightarrow$ this implies that using 3 primary turns is the maximum number that will allow the transformer to operate over the full inverter output range. This lowers the minimum readable current to: $16.67 \times 0.01 = 166.7 \text{ mA}$ (vs 500mA without rescaling) for the Galaxy/Millennium, or other controller. However, the new Maximum current limit for the rescaled transformer is 16.67A, which is only 1/3 of the former 50A. Therefore, currents below 500 mA can now be accurately measured (down to 166.7 mA), but currents in excess of 16.67A may read back as a lesser amount. (e.g. reading = 17.0, actual current = 18.02A). The maximum load current must be less than or equal to the lower, rescaled limit of 16.67A.

Rescaling the remote current transformer(s) also requires modification of the Galaxy scaling factors. The transformer current rating in the table is divided by the number of primary turns, and then again by 3.0 (for Rev. B and later units) or 3.3333 (for pre-Rev. B units).

Rescaling of other, larger transformers follows the same principles. In all cases, it is recommended to note (on an adhesive label or other means) inside the VCIU enclosure that the remote current transformer has been rescaled, and the amount of primary turns. It may also be helpful to make notes in the Galaxy user's manual giving the same details. These notes may be helpful should a Galaxy module, a Transducer, or a remote current transformer need replacing, or if the AC load grows larger in the future.