Product Manual

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Lucent Technologies Ring Capacity Monitor (RCM) Upgrade Kit for Residual Ringing System (RRS)

Notice:
Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

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1 Introduction

About This Manual

This manual (select code 167-713-100) describes the features of your Ring Capacity Monitor (RCM), and provides unpacking and installation procedures for the RCM upgrade kit, interface to monitoring equipment, and interface to Lucent Technologies Residual Ringing System.

General Description

The Ring Capacity Monitor (Figure 1-1) has the ability to monitor one to four ring generators of 0.5 ampere each, summarize their loads and provide a visual display output in the form of a 10-segment LED bar graph.

The RCM also provides a dc output voltage scaled to the total loads on the ringing plant at any particular time. The dc voltage may be connected to existing alarm and trending systems such as the Lucent Technologies OMNIpulse, Lucent Technologies Remote Access System (RAS), or the ECS Controller. The OMNIpulse and RAS can then perform the following operations:

- Perform a trend study of the ringing plant loads.
- Report an alarm if the loads exceed a predetermined level.
- Allow for remote reporting of trend and a1arm information.

Two form C relay contact binary alarms are associated with the ring capacity monitor. These alarms make the RCM compatible with all alarm systems. The binary alarms are generated if the sum of the ringing plant loads exceed 100% of the plant's

capacity and this condition exists for more than one minute but less than three minutes. This time will be set during manufacture of the circuit pack.

Ring Generator Outputs

The RCM is capable of monitoring outputs from up to four independent 0.5 ampere ring generators (Figure 1-2). The ring generators provide an ac output voltage of 86 volts at 20 hertz. This ac voltage may or may not be superimposed on a positive or negative dc voltage. The outputs of each of the ring generators to be monitored are run through a 3288A Lucent Technologies current transformer with 5 turns. The 3288A is small in size and is shaped like a doughnut. Each ring generator has its own transformer. This is the technique used to interface the ring capacity monitor circuit pack with the ring generators. It also serves to isolate the RCM from the superimposed dc voltage.

Since all four input circuits operate in exactly the same way, only the first circuit will be discussed here. The output wires from the 3288A current transformer are connected to terminals "J" and "K" of connector J304. Connector J304 is a previously unused connector associated with the ring plant. The output from the 3288A transformer is a low-level 20 Hz voltage which is proportional to the amount of current going through the output wire of the ring generator. Potentiometer P1 is used to terminate the output of transformer and adjust the level of the ac signal being produced.

Technical Support

Technical support for Lucent Technologies equipment is available to customers around the world.

USA, Canada, Puerto Rico, and the US Virgin Islands

On a post-sale basis, **during the Product Warranty period,** our Technical Support telephone number 1-800-CAL RTAC (1-800-225-7822) provides coverage during normal business hours. Product Specialists are available to answer your technical questions and assist in troubleshooting problems. For out-of-hours EMERGENCIES, the 800 number will put you in touch with a Regional Technical Assistance Center Engineer via our 24 hour a day, 7 day per week Help Desk.

When Technical Support is required in **the Post-Warranty Period**, the service may be billable unless you hold an extended warranty or contractual agreement.

Central and South America

If you need product technical support, contact your local Field Support/Regional Technical Assistance Center or contact your sales representative who will be happy to discuss your specific needs.

Europe, Middle East, and Africa

If you need product technical support, contact your local Field Support/Regional Technical Assistance Center or contact your sales representative who will be happy to discuss your specific needs.

Asia Pacific Region

If you need product technical support, contact your local Field Support/Regional Technical Assistance Center or contact your sales representative who will be happy to discuss your specific needs.

Product Repair and Return

Repair and return service for Lucent Technologies equipment is available to customers around the world.

USA, Canada, Puerto Rico, and the US Virgin Islands

For information on returning of products for repair, customers may call 1-800-255-1402 for assistance.

Central and South America

If you need to return a product for repair, your sales representative will be happy to discuss your individual situation.

Europe, Middle East, and Africa

If you need to return a product for repair, your sales representative will be happy to discuss your individual situation.

Asia Pacific Region

If you need to return a product for repair, your sales representative will be happy to discuss your individual situation.

Customer Service

For customer service, any other product or service information, or for additional copies of this manual or other Lucent Technologies documents, call 1-800-THE-1PWR (1-800-843-1797). Specify the select code number for manuals,

or drawing number for drawings. Contact your regional customer service organization or sales representative for information regarding spare parts.

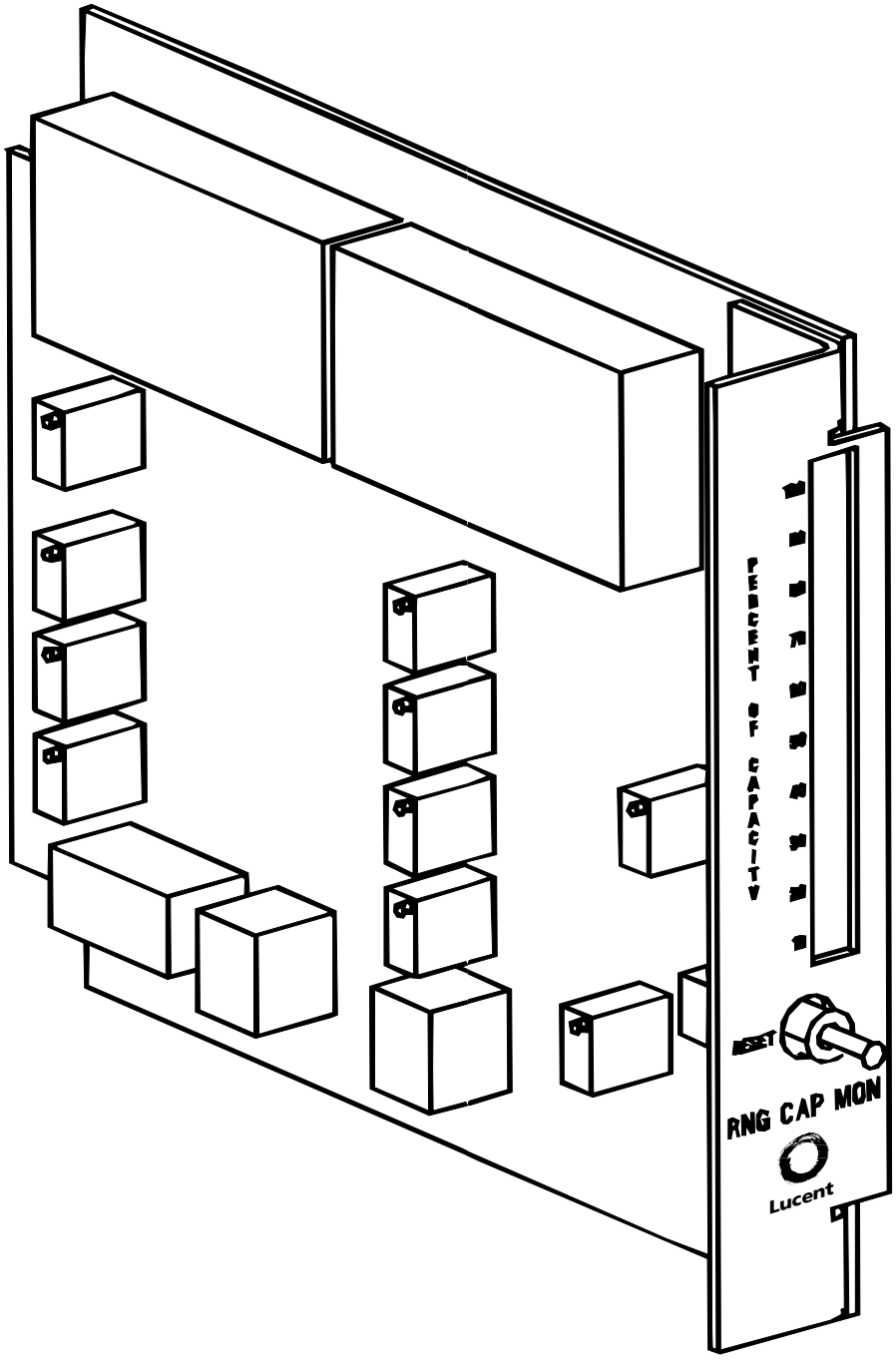


Figure 1-1: Ring Capacity Monitor (RCM)

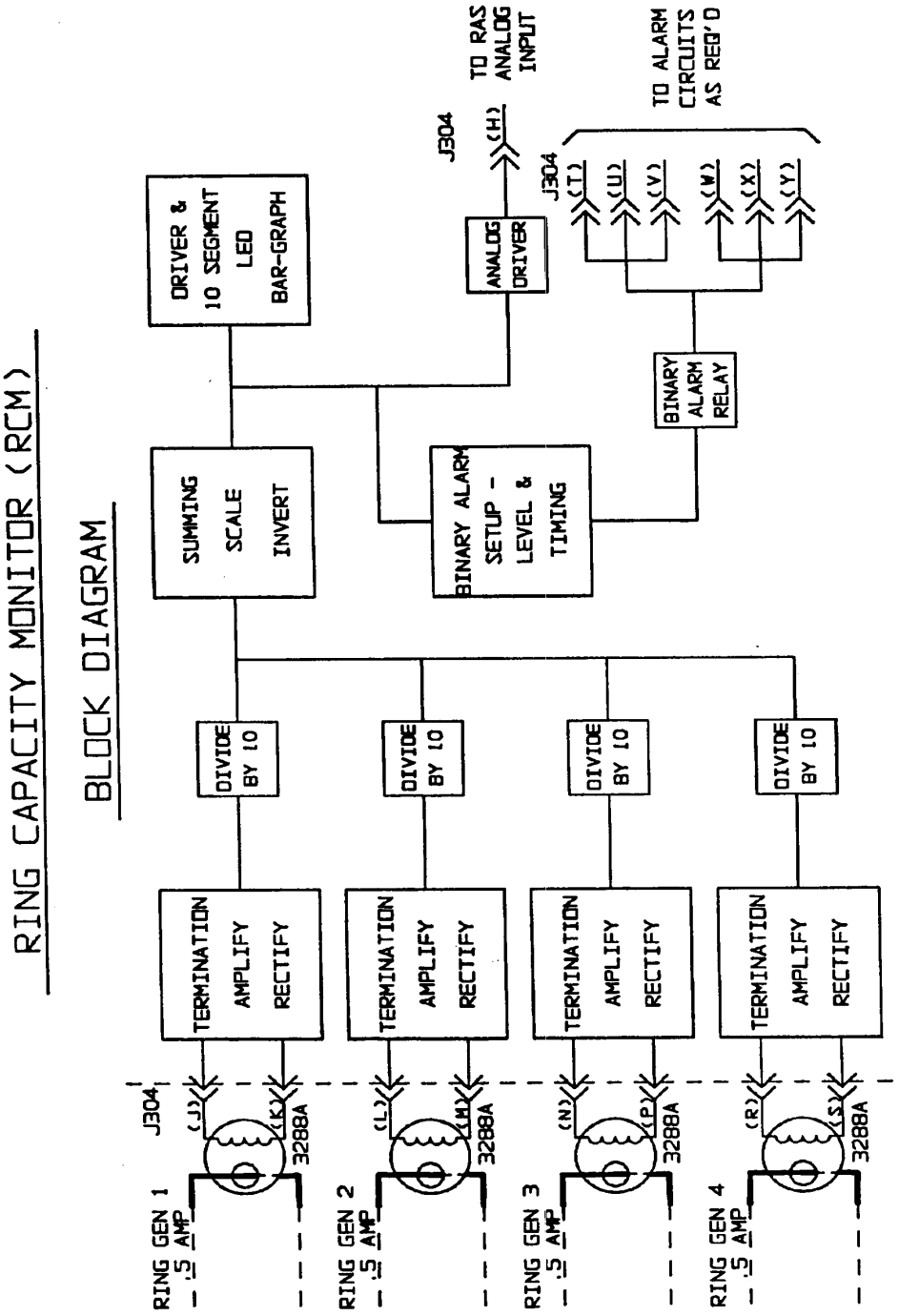


Figure 1-2: Ring Capacity Monitor (RCM) Block Diagram

2 Unpacking the RCM Upgrade Kit

Unpacking Procedure

The RCM Upgrade Kit is shipped in a protective container. Unpack and inspect the components as follows:

Warning

Observe the following ESD procedures:

- Wear grounded antistatic wrist straps when handling the RCM Circuit Pack.
- Connect the alligator clip connector of the wrist strap to a bare metal frame ground.
- The wrist strap must contact the skin and is not to be worn over clothing.

1. Place the shipping container on a clean work surface.
2. Open the container and remove the parts. Retain the shipping materials in case reshipping is necessary.
3. Inspect the circuit pack and other material for shipping damage. Return any damaged material in the shipping container.
4. Refer to the checklist in Table 2-A and verify that all materia1 has been received. The kit includes all necessary materials for a Ring Capacity Monitor installation. If additional material is required, individual items may be

ordered through your Lucent Technologies Account Executive using the 9-digit comcodes given in Table 2-A.

Table 2-A RCM Upgrade Kit Checklist

Item	Comcode	Description	Qty.
1	601363070	Ring Capacity Monitor Circuit Pack	1
2	104192943	3288A Transformer	1*
3	845424647	RCM Label	1
4	846866986	Installation Procedure, Issue 1	1
5	106715766	Product Manual, Issue 1	1
6	400681615	Tie Wraps	10
7	403607559	18 Gauge Wire (BK)	1
* More than one transformer may be included in non-synchronized RCM kit.			

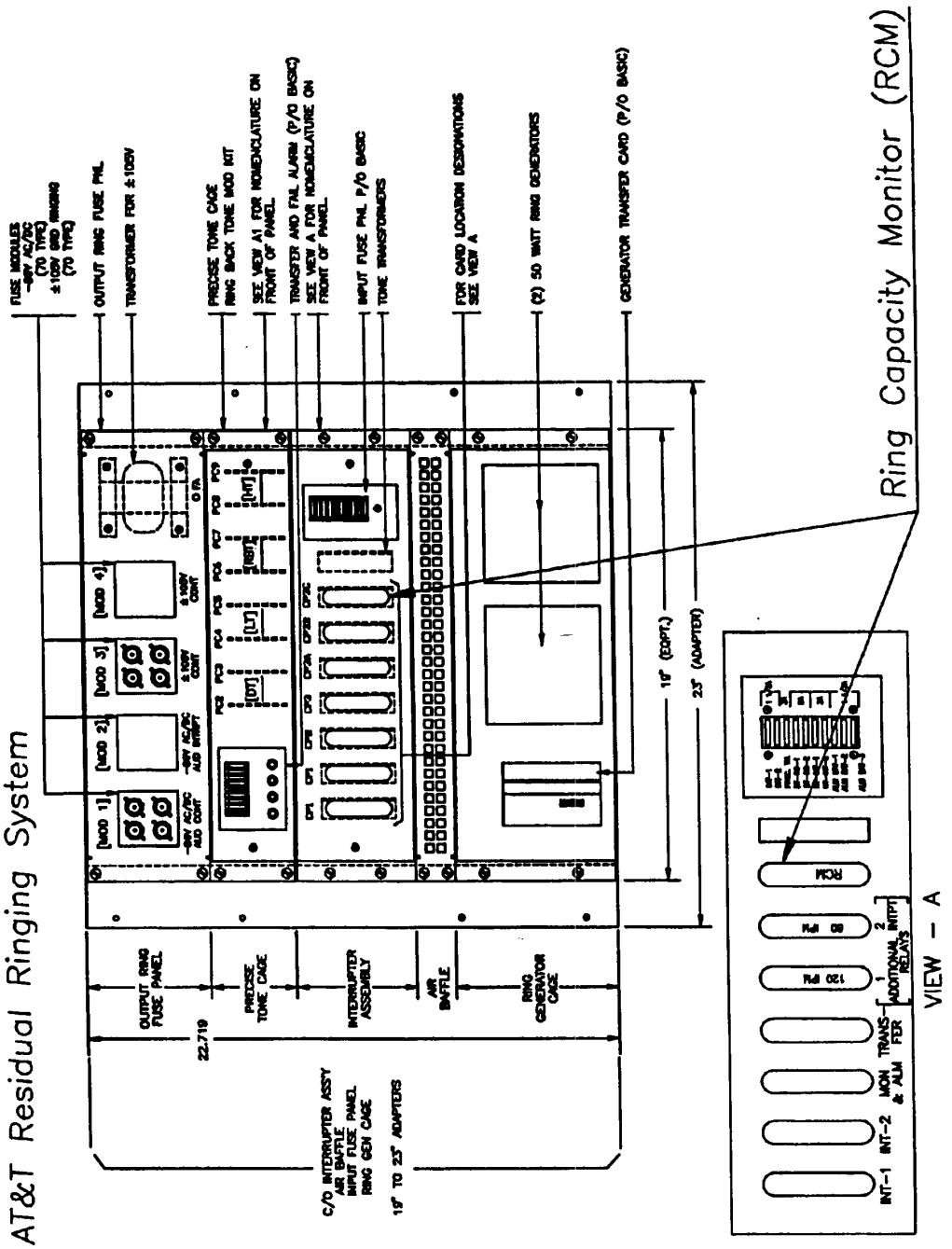


Figure 2-1: Ring Capacity Monitor and Lucent Technologies Residual Ringing System

3 Installation and ECP for Synchronized Output Plant

General

This section provides a detailed procedure for applying a Class B enhancement to the Residual Ringing System PEC 5880 during initial installation or in a working plant. The Class B enhancement involves adding a circuit pack, adding one current transformer to the ring generator unit, and associated wiring to the Interrupter unit.

Note

This section describes upgrading an Lucent Technologies 5880 Plant with a synchronized output. Synchronized output refers to a 5880 Plant which utilizes a master and slave type operation. The output frequency of the slave ring units are synchronized to the master. See Section 4 for the upgrade procedure for non-synchronized plants.

The Ring Capacity Monitor (RCM) has the ability to monitor 1 to 4 ring generators units, summarize their loads and provide a visual display output in the form of a 10-segment LED bar graph. The RCM also provides a DC signal scaled to the plant load and two form C alarm contacts.

All initial installations of the class B enhancement to a new RRS PEC 5880 are done before power is applied to the plant. See the appropriate section for installation instructions.

All working plant installations of the class B enhancement are done without interruption to service. See the appropriate section for installation instructions.

Installation Tools and Materials

Installation Tools

Quantity	Description
1 set	Electrician's Tools
1	Soldering Iron (ungrounded)
1	Digital Multimeter (Fluke or equivalent)
1 of each	GMT Type Fuses (5,3,2, 1-1/3, 1/2 Amp)
1 roll	Electrical Tape or equivalent

Installation Material

Note

Verify the contents of the enhancement kit before proceeding with the installation.

Comcode	Description
846846858	One Class B Enhancement Kit (RCM)
Enhancement Kit Contents	
Quantity	**Description**
1	Ring Capacity Monitor Circuit Pack
1	RCM label
1	3288A Current Transformer
1	Instructions (ECP)
10	Tie wrap
1	8 feet 22 gauge wire (slate)

Initial Installation Procedure

Preparation

- Install the class B enhancement before power is applied to the plant.
- All connections made to the Interrupter unit require soldering.
- The RCM circuit board requires two DIP switches to be set according to plant ring capacity as explained in "RCM Circuit Board Installation."
- One 3288A current transformer is required per ring generator plant.

Required Wiring

1. Locate the output terminal strip of the Ring Generator unit.
2. Remove the existing output lead(s) from TB1 pin A1.
3. Measure and cut a 12-inch strip of the 18 gauge wire provided in the kit.
4. Wrap the 12-inch piece of 18 gauge wire through the 3288A current transformer 5 complete turns. Use a tie wrap to secure the 5 turns on the current transformer as shown in Figure 3-1.
5. Connect one end of the 18 gauge wire to terminal strip TB1 pin A1 of the ring generator unit.
6. Solder the remaining end of the 18 gauge wire to the lead(s) removed in Step (2). Use electrical tape to insulate the soldered leads. Dress the leads to the existing cable form.
7. The RCM circuit board requires a ground lead to be routed to its associated connector. All three of the positions designated as INT Relay have -48 volts already present.
8. Wire system GRD from the Ring plant to Terminal 1 of the INT Relay 3 (J304) connector. Dress the wire run to the existing cable form. See Figure 3-3 for Interrupter Unit connector pin designation.
9. Solder the connection at the INT Relay 3 connector.

Note

All connections to the Interrupter unit must be soldered.

10. The red leads designated 1 and 2 from the 3288A current transformer require connections to the INT Relay 3 connector.
11. Wire the 3288A transformer lead 1 to INT Relay 3 connector terminal J. See Figure 3-3.
12. Wire the 3288A transformer lead 2 to INT Relay 3 connector terminal K. See Figure 3-3.

RCM Circuit Board Installation

The RCM circuit board requires two DIP switches to be set according to plant ring capacity. The DIP switches are SW2 (scale factor) and SW3 (ring generators). See the following table for the proper settings.

Scale Factor (SW2)		
Ring Bay Capacity	**Closed**	**Open**
2 Amp	Segment: 4	Segment: 1, 2, 3
1.5 Amp	Segment: 3	Segment: 1, 2, 4
1 Amp	Segment: 2	Segment: 1, 3, 4
0.5 Amp	Segment: 1	Segment: 2, 3, 4
Ring Generators (SW3)		
Ring Bay Capacity	**Closed**	**Open**
2 Amp	Segment: 1	Segment: 2, 3, 4
1.5 Amp	Segment: 1	Segment: 2, 3, 4
1 Amp	Segment: 1	Segment: 2, 3, 4
0.5 Amp	Segment: 1	Segment: 2, 3, 4

Install the RCM circuit board in the Interrupter Unit. The Interrupter Unit has three positions designated as INT Relay 3 (J304), INT Relay 2 (J303) and INT Relay 1 (J302). Install the RCM circuit board in the position designated INT Relay 3 (J304). If this position is occupied, use the next vacant position to the left of position INT Relay 3. See Figure 3-3.

Note

This Section will reference only the Interrupter unit position (INT Relay 3) as the location for the RCM circuit board. Pin designation for the INT relay 3 connector is identical to position INT Relay 1 and 2 connectors.

The upgrade kit provides an identification label for the RCM circuit board. Place this label over the existing INT Relay identification.

Remote Monitoring and Alarm Connections

The RCM provides a dc signal and alarm contacts for plant load monitoring and plant overload conditions. The dc signal is scaled to the total plant load.

Terminal H on the J304 connector of the Interrupter unit provides the remote monitoring dc signal. A 6.25 Vdc will represent a maximum capacity of 100%. See Figure 3-4.

Interfacing the RCM dc signal with monitoring units (OMNIpulse, RAS, etc.) will require configuring. Refer to the monitoring unit's Product Manual.

The RCM provides two alarm contacts which are generated when the sum of the ring plant loads exceed 100% of the ring capacity for longer than one minute.

A closed contact will be generated between terminals U and V and between terminals X and Y during an alarm condition. See Figure 3-4.

An open contact will be generated between terminals T and U and between terminals W and X during an alarm condition. See Figure 3-4.

Field Upgrade Installation

Precautions and General Notes

The implementation of the Class B enhancement to a working plant should be scheduled during periods of light service demand.

Note

The following precautions and general notes are intended for all field upgrade installations. All initial installations should be done before power is applied to the PEC 5880 Residual Ringing System.

A Method Of Procedure (MOP) should be written before installation of the Class B enhancement. **Before proceeding with the installation, the MOP should be reviewed, revised if necessary for local office conditions and approved by the local operating company representatives.**

During the procedure, monitor the outputs using a multimeter. If at any point during the procedure, the system or the multimeter indicates a loss of an output, retrace the last step taken in an attempt to regain ringing and tone plant operation. Do not continue with the installation until the cause of the failure is rectified.

Several steps in the procedure require the soldering of leads. **The soldering iron must be ungrounded at its ac connection. Failure to comply with this requirement can result in damaging equipment.** During the installation of the Class B enhancement, insulate all loose hanging wire ends to prevent any accidental shorting of bare wires to the equipment. Use electrician's tape or equivalent.

Warning

Always consider personal safety while working on live equipment. Remove all jewelry before beginning work.

Preparation

- All connections made to the Interrupter unit require soldering.
- The RCM circuit board requires two DIP switches to be set to correspond to plant capacity.
- One 3288A current transformer is required per ring generator unit.
- Load output voltage (ac) is monitored on the distribution panel of the plant.

Required Wiring

1. Measure and cut a 12-inch strip of the 18 gauge wire provided in the kit.
2. Wrap the 12-inch piece of 18 gauge wire through the 3288A current transformer 5 complete turns. Use a tie wrap to secure the 5 turns on the current transformer. See Figure 3-1.
3. Locate the output terminal strip TB1 on the Ring Generator unit.
4. Identify the existing output lead(s) from TB1 pin A1.

Caution

Take special care not to cut the output leads while removing the insulation sections.

5. The RCM circuit board requires the 3288A current transformer in series with the output lead(s). The following steps will achieve this requirement by installing the 3288A current transformer in parallel first.
6. Using wire strippers, remove a section of insulation from the output lead(s). **Take care not to cut the wire**. See Figure 3-5.
7. Use one end of the 18 gauge wire to wrap around the bare section(s) of the output lead(s). See Figure 3-5.
8. Use the other end of the 18 gauge wire to wrap around the output terminal A1. See Figure 3-5.

Caution

The soldering iron must not be grounded to ac ground. Failure to comply can result in an interruption to service.

9. Solder the connections made in Steps (7) and (8). See Figure 3-5.
10. At this time the current transformer is still in parallel. Cut the output lead(s) between the current transformer and the output terminal A1. See Figure 3-5.
11. Insulate both soldered connections using electrical tape.
12. The RCM circuit board requires a ground lead routed to its associated connector.
13. Wire system GRD from the ring plant to Terminal 1 of the INT Relay 3 (J304) connector. Dress the wire run to the

existing cable form. See Figure 3-3 for Interrupter Unit connector pin designation.

Caution

- Do not disconnect the existing GRD lead on TB1 punching 1 of the ring generator unit.
- The soldering iron must not be grounded to ac ground. Failure to comply can result in an interruption to service.

14. Solder the connection at the INT Relay 3 connector.
15. The red leads designated 1 and 2 from the 3288A current transformer require a solder connection to the INT Relay 3 connector.
16. The 3288A transformer lead 1 should be wired to INT Relay 3 connector terminal J. See Figure 3-4.
17. Wire the 3288A transformer lead 2 to INT Relay 3 connector terminal K. See Figure 3-4.

RCM Circuit Board Installation

The RCM circuit board requires two DIP switches to be set according to plant ring capacity. The DIP switches are SW2 (scale factor) and SW3 (ring generators). See the following table for the proper settings.

Scale Factor (SW2)		
Ring Bay Capacity	**Closed**	**Open**
2 Amp	Segment: 4	Segment: 1, 2, 3
1.5 Amp	Segment: 3	Segment: 1, 2, 4
1 Amp	Segment: 2	Segment: 1, 3, 4
0.5 Amp	Segment: 1	Segment: 2, 3, 4
Ring Generators (SW3)		
Ring Bay Capacity	**Closed**	**Open**
2 Amp	Segment: 1	Segment: 2, 3, 4
1.5 Amp	Segment: 1	Segment: 2, 3, 4
1 Amp	Segment: 1	Segment: 2, 3, 4
0.5 Amp	Segment: 1	Segment: 2, 3, 4

Install the RCM circuit board in the Interrupter Unit. The Interrupter Unit has three positions designated as INT Relay 3 (J304), INT Relay 2 (J303) and INT Relay 1 (J302). Install the RCM circuit board in the position designated INT Relay 3 (J304). If this position is occupied, use the next vacant position to the left of position INT Relay 3. See Figure 3-3.

Note

The ECP will reference only the Interrupter unit position (INT Relay 3) as the location for the RCM circuit board. Pin designation for the INT relay 3 connector is identical to position INT Relay 1 and 2 connectors.

The upgrade kit provides an identification label for the RCM circuit board. Place this label over the existing INT Relay identification.

Remote Monitoring and Alarm Connections

- The RCM provides a dc signal and alarm contacts for plant load monitoring and plant overload conditions.
- The dc signal is scaled to the total plant load.
- Terminal H on the J304 connector of the Interrupter unit provides the remote monitoring dc signal. A 6.25 Vdc represents a maximum capacity of 100%. See Figure 3-4.
- Interfacing the RCM dc signal with monitoring units (OMNIpulse, RAS etc.) requires configuring. Refer to the monitoring unit's Product Manual.
- The RCM provides two alarm contacts which are generated when the sum of the Ring Plant loads exceed 100% of the ring capacity for longer than one minute.
- A closed contact will be generated between terminals U and V and between terminals X and Y during an alarm condition. See Figure 3-4.
- An open contact will be generated between terminals T and U and between terminals W and X during an alarm condition. See Figure 3-4.
- This completes the installation.

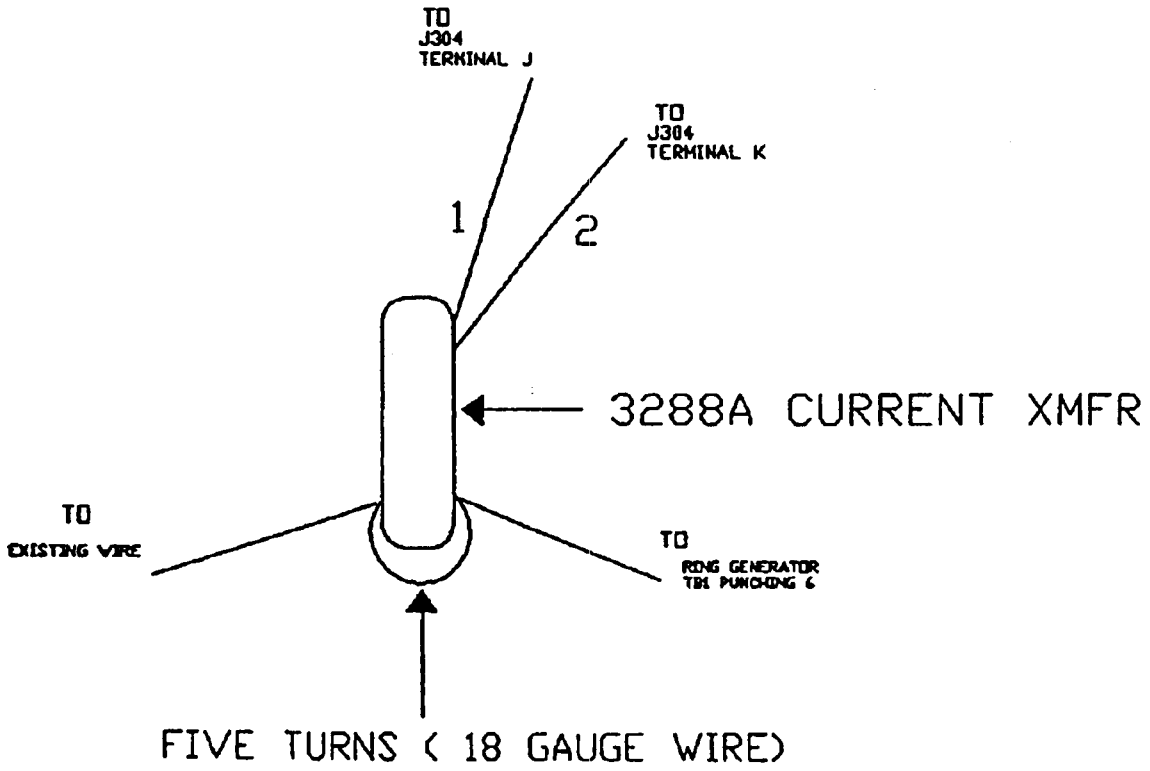
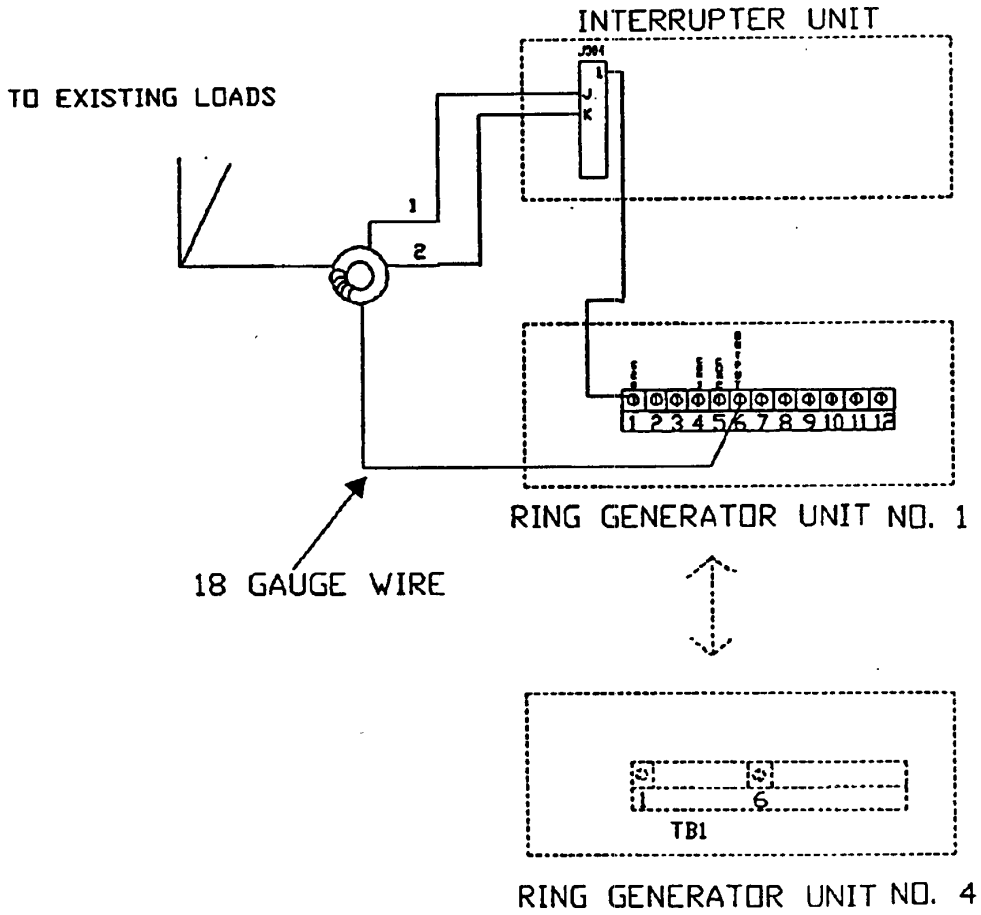
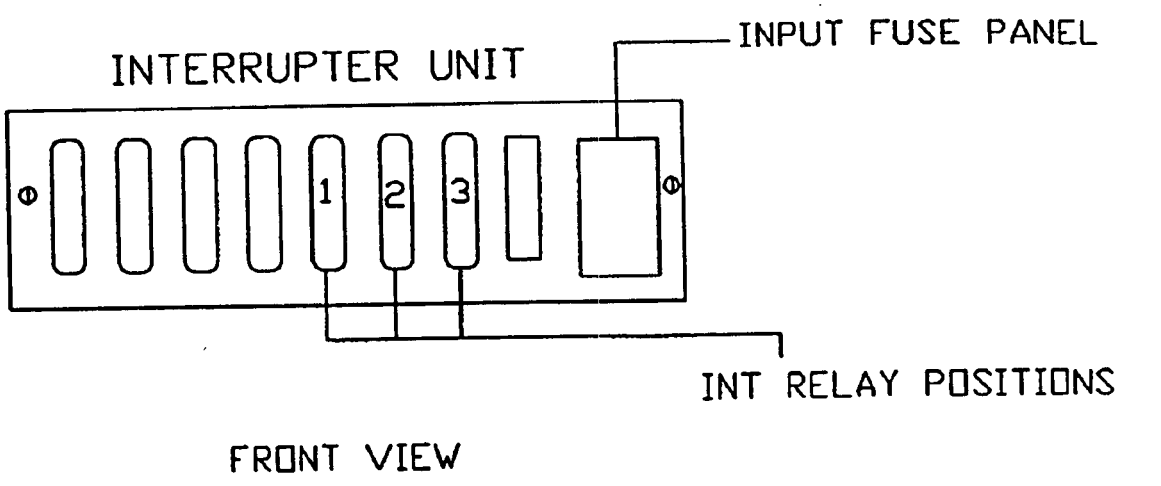


Figure 3-1: 3288A Current Transformer (Side View)



RING GEN. #	CKT. PACK TERM'S
1	J & K
2	L & M
3	N & P
4	R & S

Figure 3-2: Installation Overview



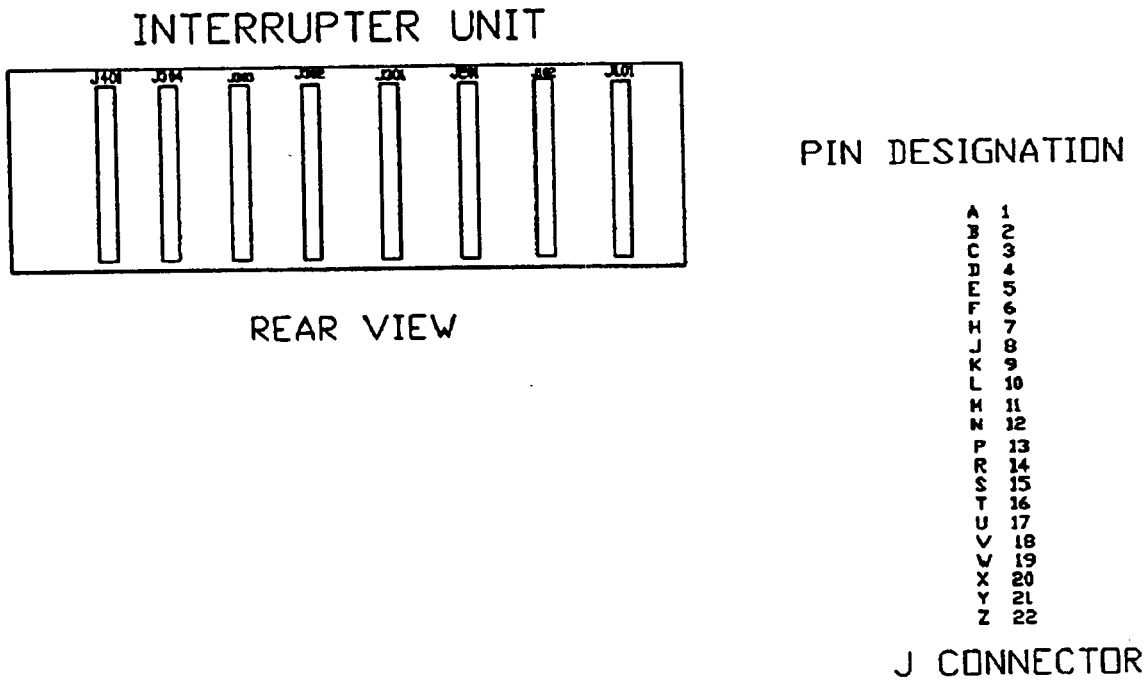


Figure 3-3: Interrupter Unit

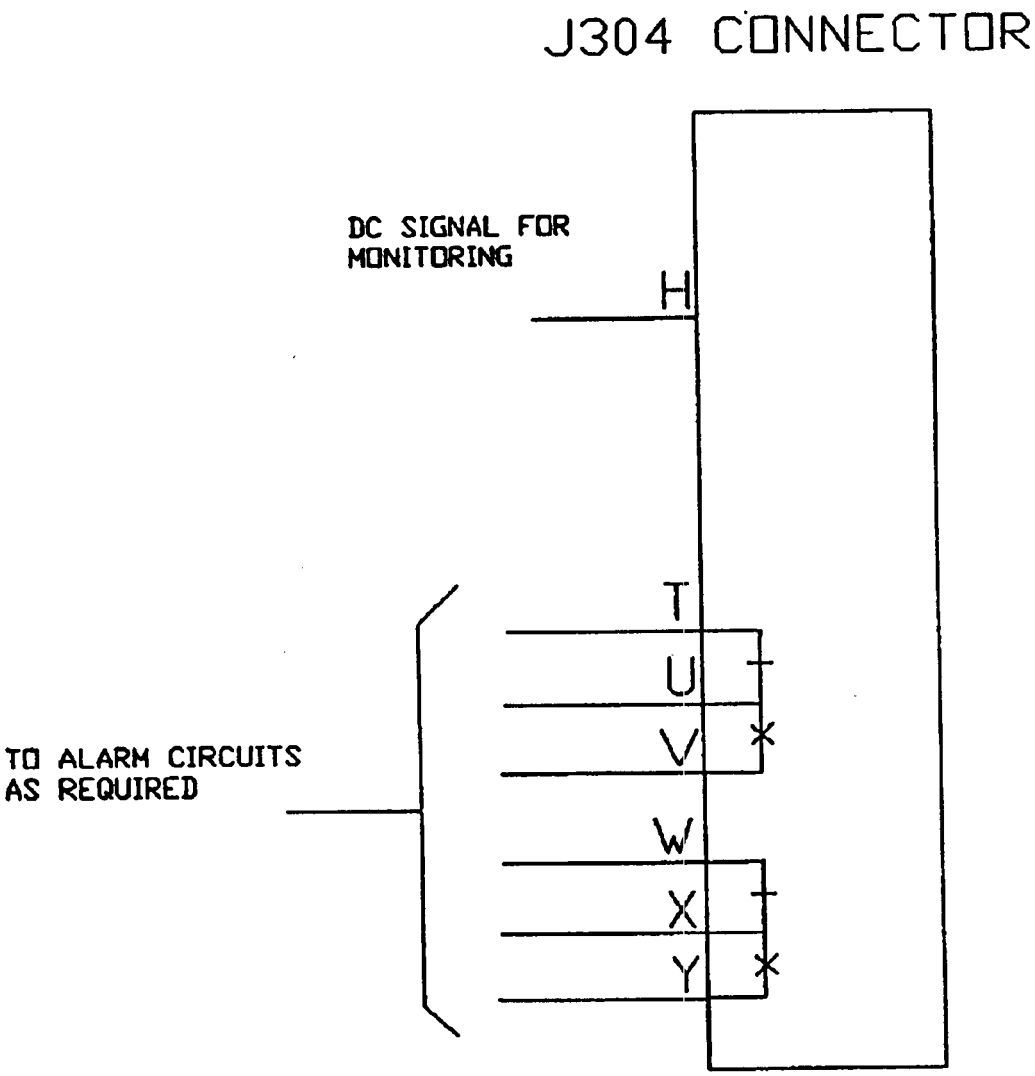


Figure 3-4: Remote Monitoring and Alarm Contact Connections

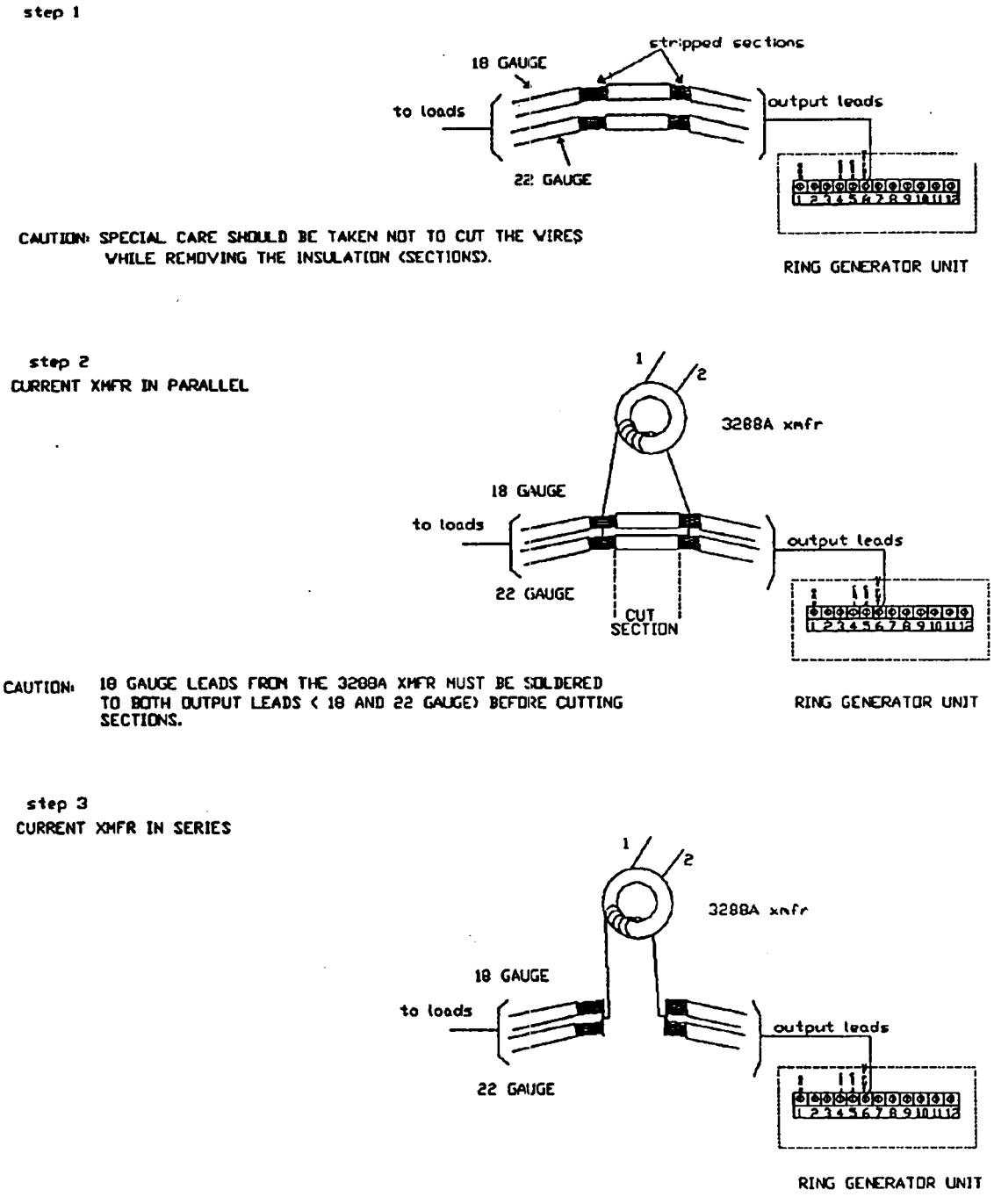


Figure 3-5: Sequential Overview of 3288A Current Transformer Installation

4 Installation and ECP for Non-Synchronized Output Plant

General

This section provides a detailed procedure for applying a Class B enhancement to the Residual Ringing System PEC 5880 during initial installation or in a working plant. The Class B enhancement involves adding a circuit pack, adding one current transformer per 0.5 amp ring generator unit(s) and associated wiring to the interrupter unit.

Note

This section is written for upgrading a RRS-PEC 5880 plant with a non-synchronized (out of phase) output. "Non-synchronized" output refers to the isolated output of each 0.5 amp ring generator. See Section 3 for the upgrade procedure for synchronized plants.

The Ring Capacity Monitor (RCM) has the ability to monitor 1 to 4 ring generators of 0.5 amp, summarize their loads and provide a visual display output in the form of a 10-segment LED bar graph. The RCM also provides a dc signal scaled to the plant load and two form C alarm contacts.

All initial installations of the class B enhancement to a new RRS PEC 5880 are done before power is applied to the plant. See the appropriate section for installation instructions.

All working plant installations of the Class B enhancement are done without interruption to service. See the appropriate section for installation instructions.

Installation Tools and Materials

Installation Tools

Quantity	Description
1 set	Electrician's Tools
1	Soldering Iron (ungrounded)
1	Digital Multimeter (Fluke or equivalent)
1 of each	GMT Type Fuses (5,3,2, 1-1/3, 1/2 Amp)
1 roll	Electrical Tape or equivalent

Installation Material

Note

Verify the contents of the enhancement kit before proceeding with the installation.

Comcode	Description
846873651	One Class B Enhancement Kit (RCM)
Enhancement Kit Contents	
Quantity	**Description**
1	Ring Capacity Monitor Circuit Pack
1	RCM label
*	3288A Current Transformer
1	Instructions (ECP)
10	Tie wrap
1	8 feet 22 gauge wire (slate)

* Quantity is dependent on ring capacity.
0.5 amp plant requires 1 current transformer
1 amp plant requires 2 current transformers
1.5 amp plant requires 3 current transformers
2 amp plant requires 4 current transformers

Initial Installation Procedure

Preparation

- Install the Class B enhancement before power is applied to the plant.
- All connections made to the Interrupter unit require soldering.
- The RCM circuit board requires two DIP switches to be set according to plant capacity as explained in "RCM Circuit Board Installation."
- One 3288A current transformer is required per ring generator unit.

Required Wiring

1. Locate the output terminal block (TB1) on the Ring Generator unit.
2. Remove the two existing output leads from TB1 punching 6.

3. Measure and cut a 12-inch strip using the 18 gauge wire provided in the Kit.
4. Wrap the 12-inch piece of 18 gauge wire through the 3288A current transformer 5 complete turns. Use a tie wrap to secure the 5 turns on the current transformer. See Figure 4-1.
5. Connect one end of the 18 gauge wire to TB1 punching 6 of the Ring Generator unit.
6. Solder the remaining end of the 18 gauge wire to both leads which were removed in Step (2). Use electrical tape to insulate the soldered leads. Dress the leads to the existing cable form. See Figure 3-2 for an installation overview.
7. The RCM circuit board requires a ground lead to be routed to its associated connector. All three of the positions designated as INT Relay have -48 volts already present.
8. Wire a ground lead from TB1 punching 1 of the Ring Generator unit to Terminal 1 of the INT Relay 3 (J304) connector. Dress the wire run to the existing cable form. See Figure 4-3 for Interrupter Unit connector pin designation.
9. Solder the connection at the INT Relay 3 connector.

Note

All connections to the Interrupter unit must be soldered.

10. The red leads designated 1 and 2 from the 3288A current transformer require connections to the INT Relay 3 connector.
11. Wire the 3288A transformer lead 1 to INT Relay 3 connector terminal J. See Figure 4-3.
12. Wire the 3288A transformer lead 2 to INT Relay 3 connector terminal K See Figure 4-3.
13. For PEC 5880 plants which house more than one Ring Generator unit, refer to Figure 4-2 for current transformer leads 1 and 2 termination pins.

RCM Circuit Board Installation

The RCM circuit board requires two DIP switches to be set according to plant ring capacity. They are SW2 (scale factor) and SW3 (ring generators). See the following table for the proper DIP switch settings.

Scale Factor (SW2)		
Ring Bay Capacity	**Closed**	**Open**
0.5 Amp	Segment: 1	Segment: 2, 3, 4
1 Amp	Segment: 2	Segment: 1, 3, 4
1.5 Amps	Segment: 3	Segment: 1, 2, 4
2 Amps	Segment: 4	Segment: 1, 2, 3
Ring Generators (SW3)		
Ring Bay Capacity	**Closed**	**Open**
0.5 Amp	Segment: 1	Segment: 2, 3, 4
1 Amp	Segment: 1, 2	Segment: 3, 4
1.5 Amps	Segment: 1, 2, 3	Segment: 4
2 Amps	Segment: 1, 2, 3, 4	Segment: --

The RCM circuit board should be installed in the Interrupter Unit. The Interrupter Unit has three positions designated as INT Relay 3 (J304), INT Relay 2 (J303) and INT Relay 1 (J302).The RCM circuit board should be installed in the position designated INT Relay 3 (J304). If this position is occupied, use the next vacant position to the left of position INT Relay 3. See Figure 4-3.

Note

This section will reference only the Interrupter unit position (INT Relay 3) as the location for the RCM circuit board. Pin designation for the INT Relay 3 connector is identica1 to position INT Relay 1 and 2 connectors.

The upgrade kit has provided an identification label for the RCM circuit board. This label should be placed over the existing INT Relay identification.

Remote Monitoring and Alarm Connections

The RCM provides a dc signal and alarm contacts for plant load monitoring and plant overload conditions. The dc signal is scaled to the total plant load.

Terminal H on the J304 connector of the Interrupter unit provides the remote monitoring dc signal. A 6.25 Vdc represents a maximum capacity of 100%. See Figure 4-4.

Interfacing the RCM dc signal with monitoring units (OMNIpulse, RAS, etc.) requires configuring. Refer to the monitoring unit's Product Manual.

The RCM provides two alarm contacts which are generated when the sum of the Ring Plant loads exceed 100% of the ring capacity for longer than 1 minute.

A closed contact will be generated between terminals U and V and between terminals X and Y during an alarm condition. See Figure 4-4.

An open contact will be generated between terminals T and U and between terminals W and X during an alarm condition. See Figure 4-4.

Field Upgrade Installation

Precautions and General Notes

Note

The following precautions and general notes are intended for all field upgrade installations. All initial installation should be done before power is applied to the PEC 5880 Residual Ringing System.

The implementation of the Class B enhancement to a working plant should be scheduled during periods of light service demand.

A Method Of Procedure (MOP) should be written before installation of the Class B enhancement. **Before proceeding with the installation, the MOP should be reviewed and revised if necessary for local office conditions and approved by the local operating company representatives.**

During the procedure, the outputs will require monitoring using a multimeter. If at any point during the procedure, the system or the multimeter indicates a loss of an output, retrace the last step taken in an attempt to regain ringing and tone plant operation. Do not continue with the installation until the cause of the failure is rectified.

Several steps in the procedure will require the soldering of leads. **The soldering iron must be ungrounded at its ac connection. Failure to comply with this requirement can result in damaging equipment.** During the installation of the Class B enhancement, insulate all loose hanging wire ends to prevent any accidental shorting of bare wires to the equipment. Use electrician's tape or equivalent.

Warning

Always consider personal safety while working on live equipment. Remove all jewelry before beginning work.

Preparation

- All connections made to the Interrupter unit require soldering.
- The RCM circuit board requires two DIP switches to be set to correspond to plant capacity.
- One 3288A current transformer is required per ring generator unit.
- Load output voltage (ac) is monitored on the distribution panel of the plant.

Required Wiring

1. Measure and cut a 12-inch strip of the 18 gauge wire provided in the Kit.
2. Wrap the 12-inch piece of 18 gauge wire through the 3288A current transformer 5 complete turns. Use a tie wrap to secure the 5 turns on the current transformer. See Figure 4-1.
3. Locate the output terminal block (TB1) on the Ring Generator unit.
4. Identify the two existing output leads from TB1 punching 6.

Caution

Take special care not to cut the output leads while removing the insulation sections.

5. The RCM circuit board requires the 3288A current transformer in series with the output leads. The following steps will achieve this requirement by installing the 3288A current transformer in parallel first.
6. Using wire strippers, remove two sections of insulation from each output lead. **Take care not to cut the wire.** See Figure 4-5.
7. Wrap one end of the 18 gauge wire around the bare sections of the two output leads. See Figure 4-5.
8. Wrap the other end of the 18 gauge wire around the other bare sections of the two output leads. See Figure 4-5.

Caution

The soldering iron must not be grounded to ac ground. Failure to comply with this requirement can result in equipment damage.

9. Solder the connections made in Steps (7) and (8). See Figure 4-5.
10. At this time the current transformer is still in parallel. Cut the output leads between the two soldered connections. See Figure 4-5.
11. Insulate both soldered connections using electrical tape.
12. The RCM circuit board requires a ground lead routed to its associated connector.
13. Wire a ground lead from TB1 punching 1 of the Ring Generator unit to Terminal 1 of the INT Relay 3 (J304) connector. See Figure 4-3 for Interrupter Unit connector pin designation. **Do not remove the existing GRD lead on TB1.**

Caution

- Take special care not to disconnect the existing GRD 1ead on TB1 punching 1 of the Ring Generator Unit.
- The soldering iron must not be grounded to ac ground. Failure to comply can result in a service interruption.

14. Dress the wire run to the existing cable form.
15. Solder the connection at the INT Relay 3 connector.
16. The red leads designated 1 and 2 from the 3288A current transformer require solder connections to the INT Relay 3 connector.
17. Wire the 3288A transformer lead 1 to INT Relay 3 connector terminal J. See Figure 4-4.
18. Wire the 3288A transformer lead 2 to INT Relay 3 connector terminal K See Figure 4-4.
19. Refer to Figure 4-2 for current transformer leads 1 and 2 termination pins in PEC 5880 plants which house more than one Ring Generator unit.

RCM Circuit Board Installation

The RCM circuit board requires two DIP switches to be set according to plant ring capacity. DIP switch SW2 (scale factor) and SW3 (ring generator) must be set to correspond to the Plant Ring Capacity. See the following table for the proper DIP switch settings.

Scale Factor (SW2)		
Ring Bay Capacity	**Closed**	**Open**
0.5 Amp	Segment: 1	Segment: 2, 3, 4
1 Amp	Segment: 2	Segment: 1, 3, 4
1.5 Amps	Segment: 3	Segment: 1, 2, 4
2 Amps	Segment: 4	Segment: 1, 2, 3
Ring Generators (SW3)		
Ring Bay Capacity	**Closed**	**Open**
0.5 Amp	Segment: 1	Segment: 2, 3, 4
1 Amp	Segment: 1, 2	Segment: 3, 4
1.5 Amps	Segment: 1, 2, 3	Segment: 4
2 Amps	Segment: 1, 2, 3, 4	Segment: --

Install the RCM circuit board in the Interrupter Unit. The Interrupter Unit has three positions designated as INT Relay 3 (J304), INT Relay 2 (J303) and INT Relay 1 (J302). Install the

RCM circuit board in the position designated INT Relay 3 (J304). If this position is occupied, use the next vacant position to the left of position INT Relay 3. See Figure 4-3.

Note

This section will reference only the Interrupter unit position (INT Relay 3) as the location for the RCM circuit board. Pin designation for the INT Relay 3 connector is identical to position INT Relay 1 and 2 connectors.

The upgrade kit provides an identification label for the RCM circuit board. Place this label over the existing INT Relay identification.

Remote Monitoring and Alarm Connections

- The RCM provides a dc signal and alarm contacts for plant load monitoring and plant overload conditions. The dc signal is scaled to the total plant load.
- Terminal H on the J304 connector of the Interrupter unit provides the remote monitoring dc signal. A 6.25 Vdc represents a maximum capacity of 100%. See Figure 4-4.
- Interfacing the RCM dc signal with monitoring units (OMNIpulse, RAS, etc.) requires configuring. Refer to the monitoring unit's Product Manual
- The RCM provides two alarm contacts which are generated when the sum of the ring plant loads exceed 100% of the ring capacity for longer than one minute.
- A closed contact will be generated between terminals U and V and between terminals X and Y during an alarm condition. See Figure 4-4.
- An open contact will be generated between terminals T and U and between terminals W and X during an alarm condition. See Figure 4-4.
- This completes the installation.

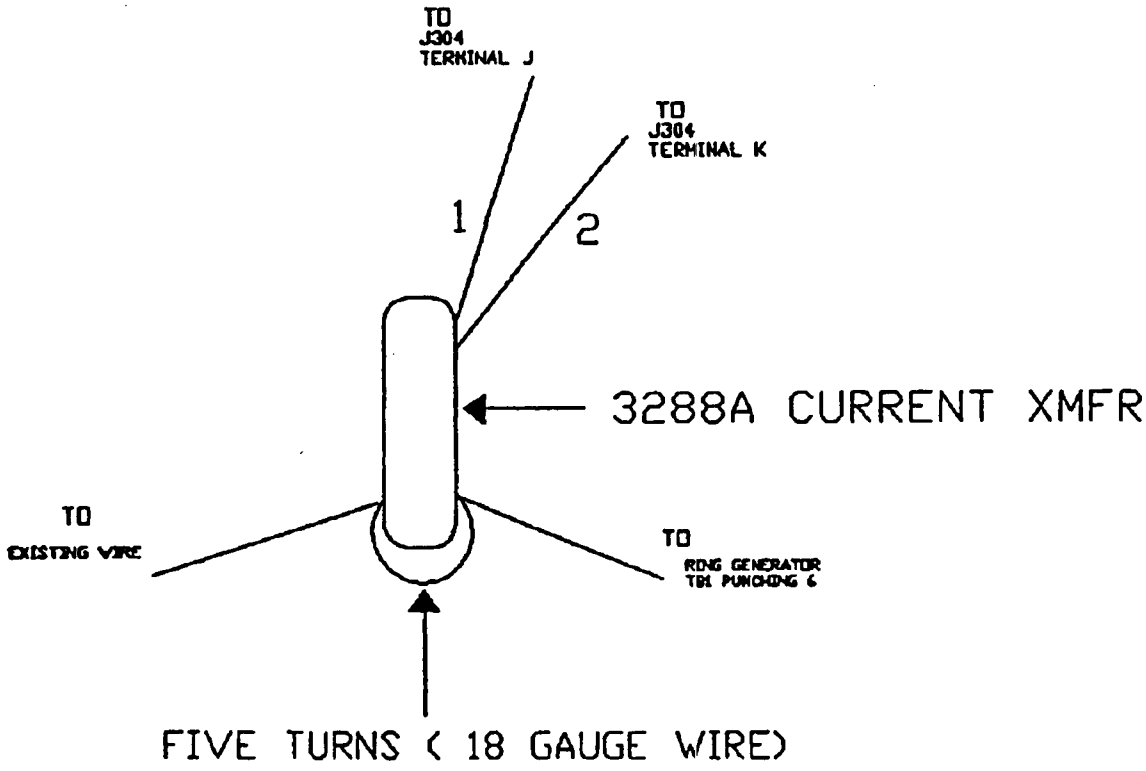
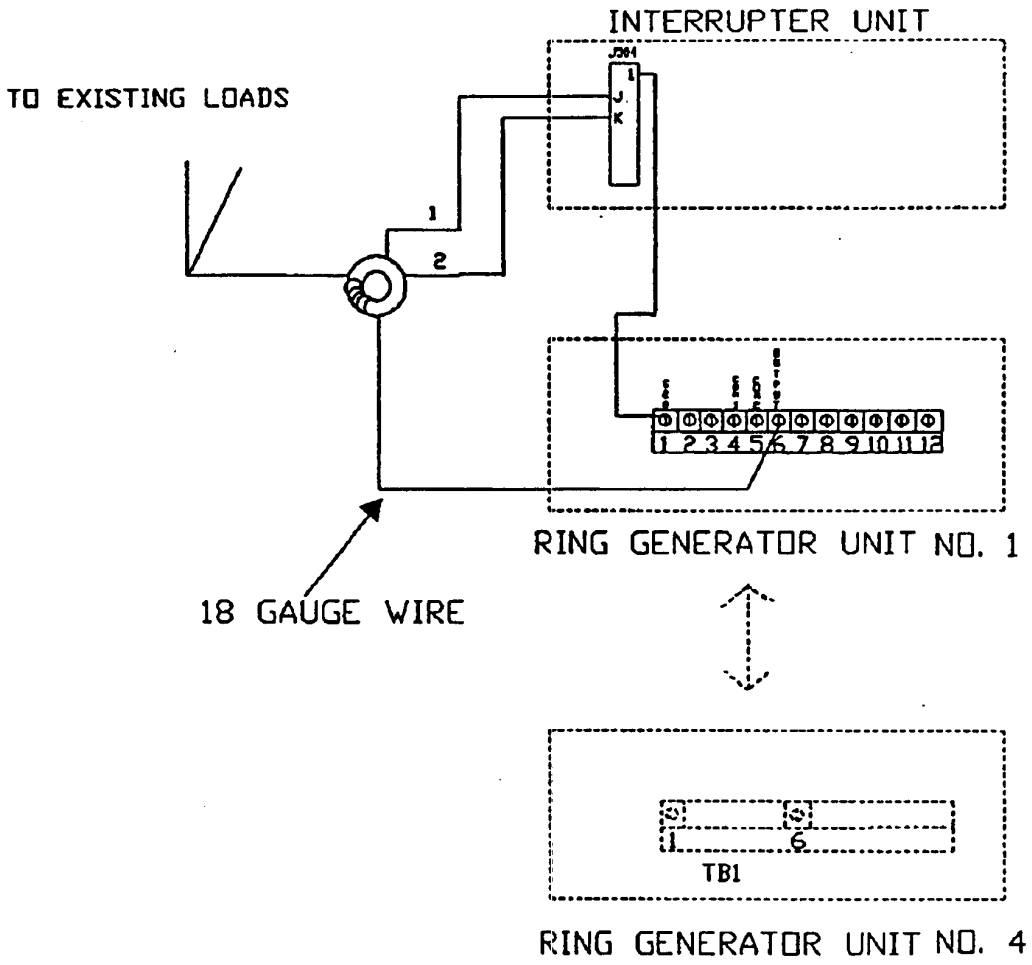


Figure 4-1: 3288A Current Transformer (Side View)



RING GEN. #	CKT. PACK TERM'S
1	J & K
2	L & M
3	N & P
4	R & S

Figure 4-2: Installation Overview

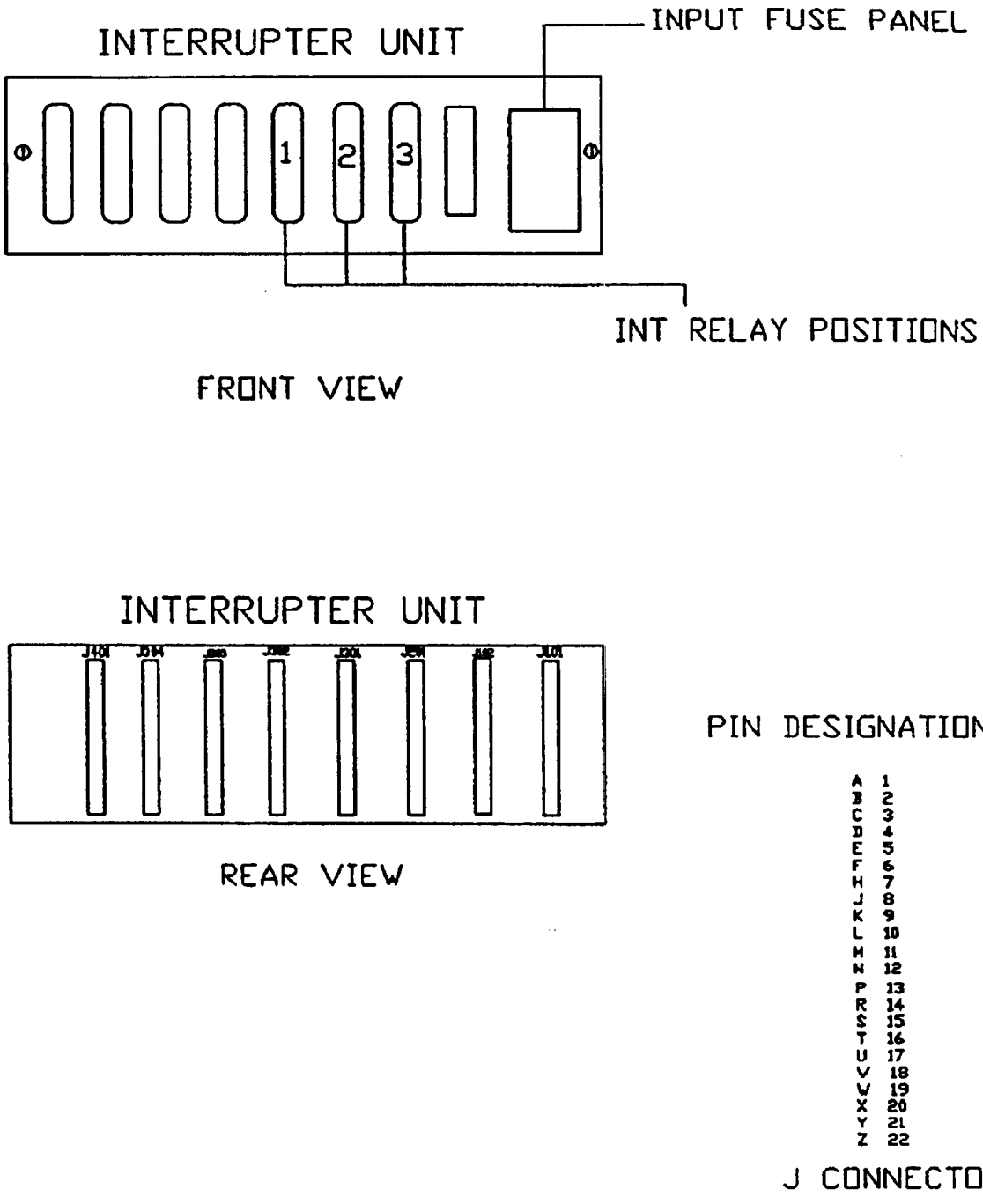


Figure 4-3: Interrupter Unit

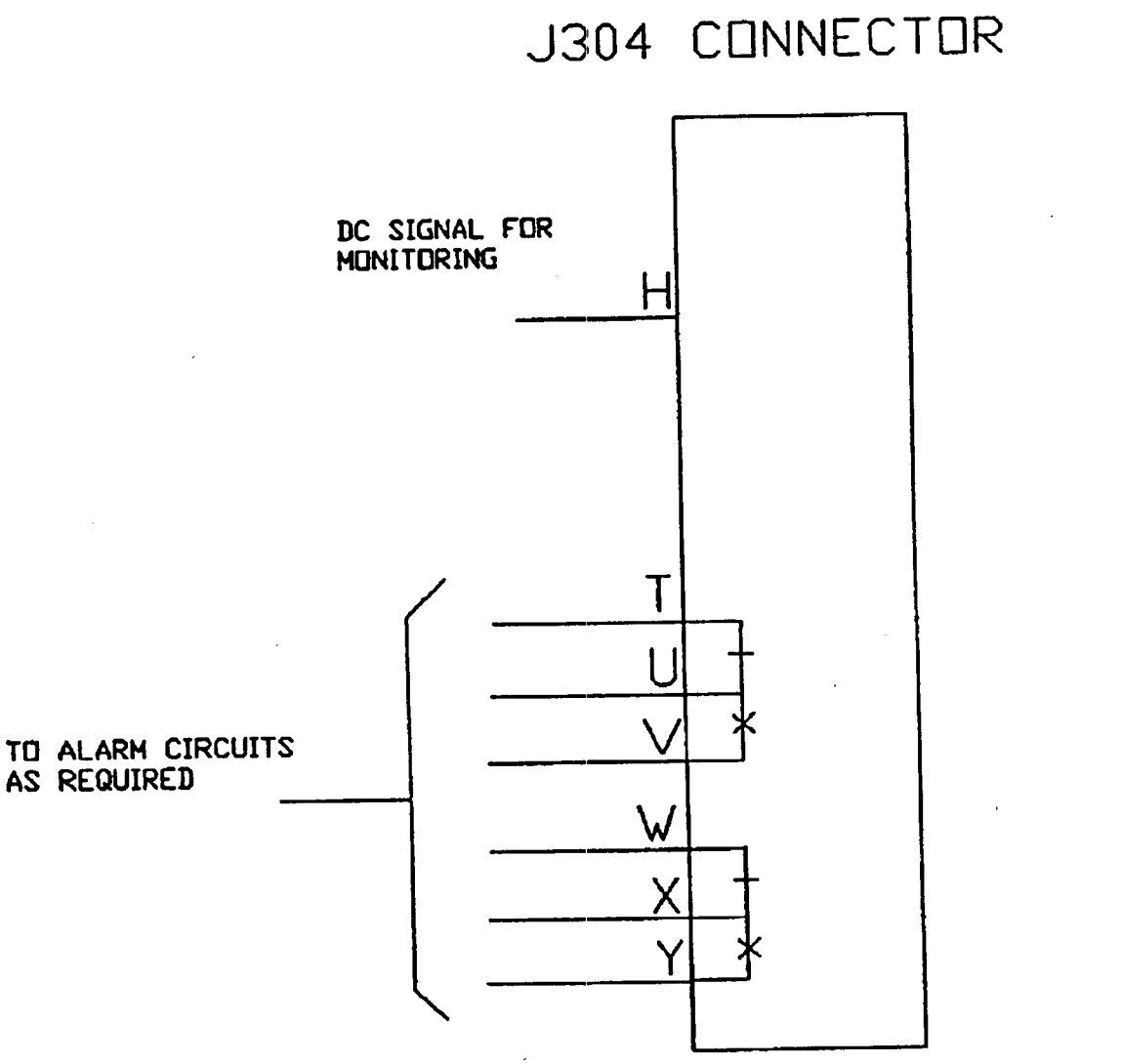
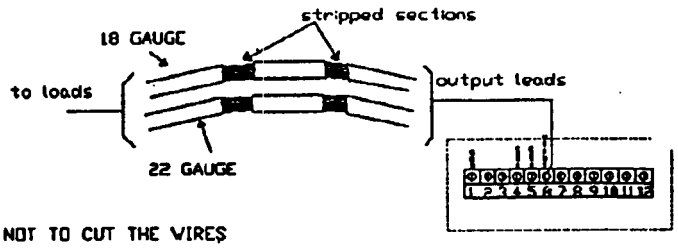


Figure 4-4: Remote Monitoring and Alarm Contact Connections

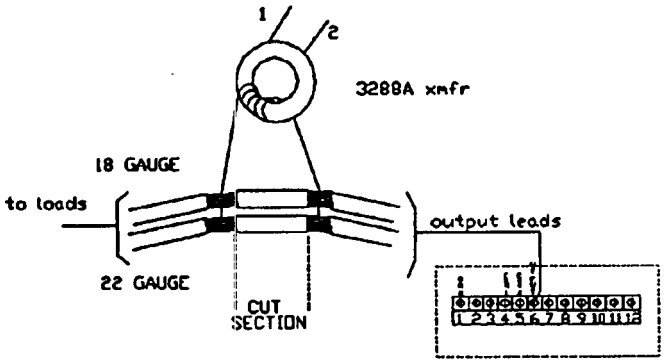
step 1



CAUTION: SPECIAL CARE SHOULD BE TAKEN NOT TO CUT THE WIRES WHILE REMOVING THE INSULATION (SECTIONS).

RING GENERATOR UNIT

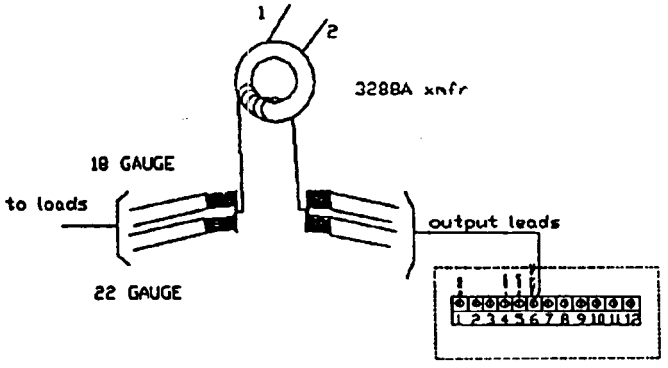
step 2
CURRENT XMFR IN PARALLEL



CAUTION: 18 GAUGE LEADS FROM THE 3288A XMFR MUST BE SOLDERED TO BOTH OUTPUT LEADS (18 AND 22 GAUGE) BEFORE CUTTING SECTIONS.

RING GENERATOR UNIT

step 3
CURRENT XMFR IN SERIES



RING GENERATOR UNIT

Figure 4-5: Sequential Overview of 3288A Current Transformer Installation

5 References

- Refer to Product Manual 167-790-116 for OMNIpulse operation.
- Refer to Product Manual 115-005 for RAS operation.
- Refer to 167-790-109 for ECS controller operation.

6 *Product Warranty*

A. Seller warrants to Customer only, that:

1. As of the date title to Products passes, Seller will have the right to sell, transfer, and assign such Products and the title conveyed by Seller shall be good;
2. Upon shipment, Seller's Manufactured Products will be free from defects in material and workmanship, and will conform to Seller's specifications or any other agreed-upon specification referenced in the order for such Product;
3. With respect to Vendor items, Seller, to the extent permitted, does hereby assign to Customer the warranties given to Seller by its Vendor of such Vendor Items, such assignment to be effective upon Customer's acceptance of such Vendor Items. With respect to Vendor items recommended by Seller in its specifications for which the Vendor's warranty cannot be assigned to Customer, or if assigned, less than Sixty (60) days remain of the Vendor's warranty or warranty period when the Vendor's items are shipped to Customer or when Seller submits its notice of completion of installation if installed by Seller, Seller warrants that such Vendor's items will be free from defects in material and workmanship on the date of shipment to Customer. In such an event, the applicable Warranty Period will be sixty (60) days.

B. The Warranty Period listed below is applicable to Seller's Manufactured Products furnished pursuant to this Agreement, unless otherwise stated:

Warranty Period

Product Type	New Product	Repaired Product or Part*
Central Office Power Equipment**	24 Months	6 Months

* The Warranty Period for a repaired Product or part thereof is as listed or, in the case of Products under Warranty, is the period listed or the unexpired term of the new Product Warranty Period, whichever is longer.

** The Warranty Period for Products ordered for Use in Systems or equipment Manufactured by and furnished by Seller is that of the initial Systems or equipment.

C. If, under normal and proper use during the applicable Warranty Period, a defect or nonconformity is identified in a Product and Customer notifies Seller in writing of such defect or nonconformity promptly after Customer discovers such defect or nonconformity, and follows Seller's instructions regarding return of defective or nonconforming Products, Seller shall, at its option attempt first to repair or replace such Product without charge at its facility or, if not feasible, provide a refund or credit based on the original purchase price and installation charges if installed by Seller. Where Seller has elected to repair a Seller's Manufactured Product (other than Cable and Wire Products) which has been installed by Seller and Seller ascertains that the Product is not readily returnable for repair, Seller will repair the Product at Customer's site.

With respect to Cable and Wire Products manufactured by Seller which Seller elects to repair but which are not readily returnable for repair, whether or not installed by Seller, Seller at its option, may repair the cable and Wire Products at Customer's site.

D. If Seller has elected to repair or replace a defective Product, Customer shall have the option of removing and reinstalling or having Seller remove and reinstall the defective or nonconforming Product. The cost of the removal and the reinstallation shall be borne by Customer. With respect to Cable and Wire Products, Customer has the further

responsibility, at its expense, to make the Cable and Wire Products accessible for repair or replacement and to restore the site. Products returned for repair or replacement will be accepted by Seller only in accordance with its instructions and procedures for such returns. The transportation expense associated with returning such Product to Seller shall be borne by Customer. Seller shall pay the cost of transportation of the repair or replacing Product to the destination designated by Customer within the Territory.

E. The defective or nonconforming Products or parts which are replaced shall become Seller's property.

F. If Seller determines that a Product for which warranty service is claimed is not defective or nonconforming, Customer shall pay Seller all costs of handling, inspecting, testing, and transportation and, if applicable, traveling and related expenses.

G. Seller makes no warranty with respect to defective conditions or nonconformities resulting from actions of anyone other than Seller or its subcontractors, caused by any of the following: modifications, misuse, neglect, accident, or abuse; improper wiring, repairing, splicing, alteration, installation, storage, or maintenance; use in a manner not in accordance with Seller's or Vendor's specifications or operating instructions, or failure of Customer to apply previously applicable Seller modifications and corrections. In addition, Seller makes no warranty with respect to Products which have had their serial numbers or month and year of manufacture removed, altered, or with respect to expendable items, including, without limitation, fuses, light bulbs, motor brushes, and the like.

H. THE FOREGOING WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. CUSTOMER'S SOLE AND EXCLUSIVE REMEDY SHALL BE SELLER'S OBLIGATION TO REPAIR, REPLACE, CREDIT, OR REFUND AS SET FORTH ABOVE IN THIS WARRANTY.