

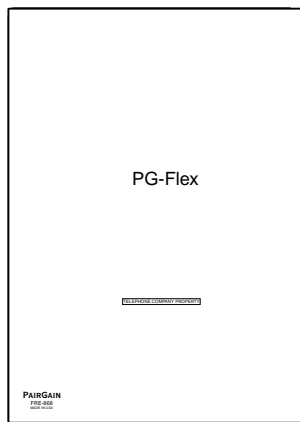
PG-FLEX

TECHNICAL PRACTICE

FRE-860



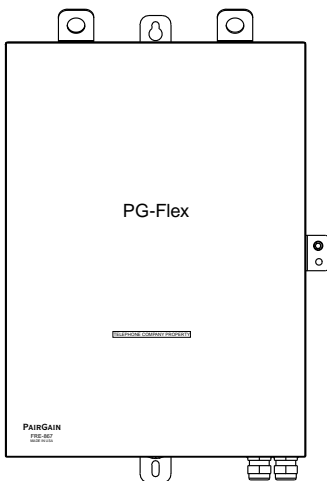
FRE-868



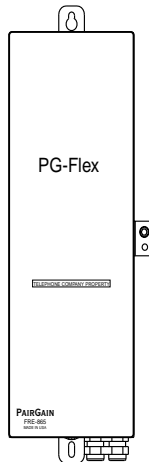
Remote Terminal Enclosures

Model	List No.	Part No.	CLEI Code
FRE-860	1	150-2360-01	VAMRMS0A
	1A	150-2360-11	VAMRRS0A
FRE-865	1	150-2365-01	VAMRNS0A
	1A	150-2365-11	VAMRVS0A
	1B	150-2365-12	VAMRNS0A
FRE-867	1	150-2367-01	VAMRP40A
	1A	150-2367-11	VAMRU40A
	1B	150-2367-12	VAMRP40A
FRE-868	1	150-2368-01	VAMRT40A
	2	150-2368-02	VAMRTS0A
	3	150-2368-03	VAMRS40A
	4	150-2368-04	VAMRSS0A

FRE-867



FRE-865



Revision History of This Practice

Revision	Release Date	Revisions Made
01	October 27, 1999	Initial Release
02	March 28, 2000	Added List 1B to the FRE-865 and FRE-867 models.

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USING THIS TECHNICAL PRACTICE

Three types of messages, identified by icons, appear in the text.



Notes indicate information about special circumstances.



Cautions indicate the possibility of equipment damage or the possibility of personal injury.



Electrostatic Discharge (ESD) susceptibility symbols indicate that a device or assembly is susceptible to damage from electrostatic discharge.

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to PairGain. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact PairGain as described in the [“Limited Warranty” on page 13](#). If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

The PairGain® PG-Flex® FRE-860, FRE-865, FRE-867, and FRE-868 Remote Terminal (RT) Enclosures (see [Figure 1](#)) conveniently mount RT line units (LU) and channel units (CU). The RT Enclosures provide termination points for subscriber circuits, HDSL, auxiliary power, and metallic bypass pairs.

The units described by this document get power from the HDSL lines connected to the COT Shelf. For each doubler installed between the COT Shelf and RT Enclosure, two additional power pairs are required from the COT Shelf to the RT Enclosure.

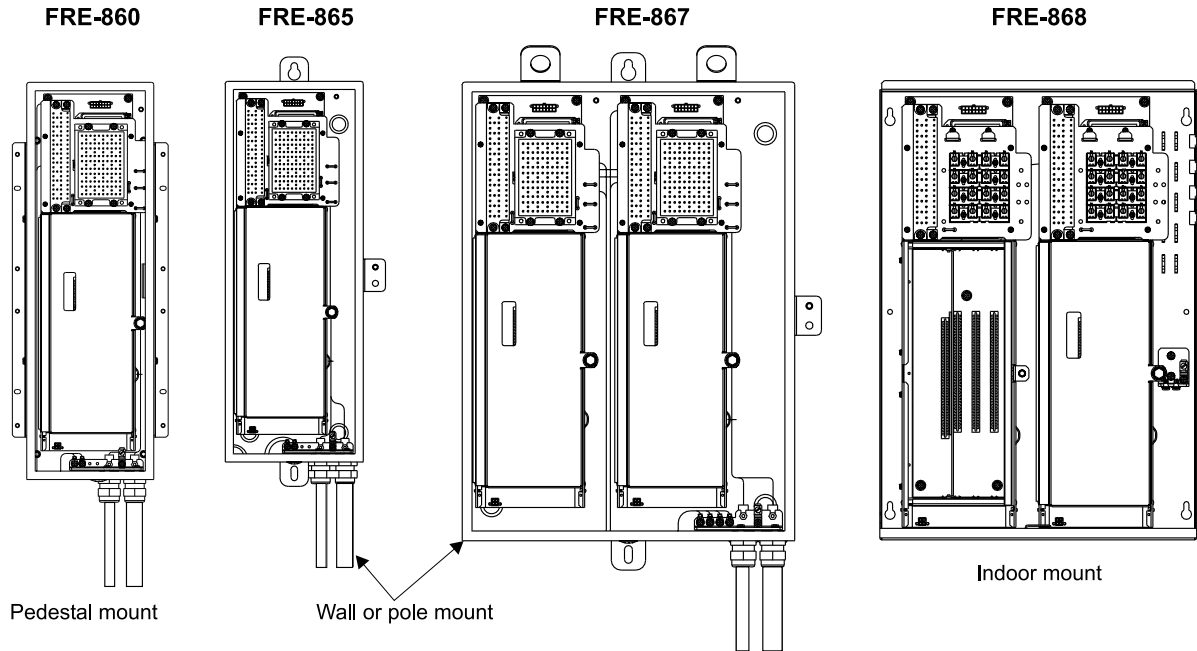


Figure 1. Internal Views of the Enclosure

Table 1. FRE-860, 865, 867, and FRE-868 Features

RT Enclosures		RTE-860		RTE-865			RTE-867			RTE-868			
		L1	L1A	L1	L1A	L1B	L1	L1A	L1B	L1	L2	L3	L4
Installation Type	Outdoor Wall or Pole Mount			X	X	X	X	X	X				
	Outdoor Pedestal Mount (Marconi UP 10900)	X	X										
	Indoor Wall Mount									X	X	X	X
Number of Subscriber Lines	24 Channel	X	X	X	X	X					X		X
	48 Channel						X	X	X	X		X	
Subscriber Protection	35 ft. Gel-filled Cable Stub			X	X		X	X					
	35 ft. Air-filled Cable Stub					X			X				
	Marconi A-Line Terminations	X	X										
	25-Pair Amphenol (male)									X	X	X	X
Subscriber Protection	5-Pin Sockets	X	X	X	X	X	X	X					
	None									X	X	X	X
HDSL Terminations	35 ft. Gel-filled Cable Stub			X	X		X	X					
	35 ft. Air-filled Cable Stub					X			X				
	Marconi A-Line Terminations	X	X										
	Screw Terminal									X	X	X	X
HDSL Protection	5-Pin Sockets	X	X	X	X	X	X	X				X	X
	None									X	X		

SPECIFICATIONS

Environment

Temperature	-40 °F to +150 °F (-40 °C to + 65 °C)
Humidity	5% to 95% (noncondensing)
Altitude	-200 ft to 13,000 ft (-60 m to 4,000 m)

Compliance

NEBS	SR-3580 for Level 3
Human Safety	UL 1950 for Restricted Access
Emissions Radiation and Immunity	GR-1089-CORE for Class B Equipment

Dimensions

	FRE-860	FRE-865	FRE-867	FRE-868
Height	23.6 in., 59.9 cm	23.6 in., 59.9 cm	23.6 in., 59.9 cm	23.3 in., 60.0 cm
Width	7.7 in., 19.5 cm	8.7 in., 22.0 cm	17.2 in., 43.6 cm	15.8 in., 40.1 cm
Depth	6.8 in., 17.2 cm	6.8 in., 17.2 cm	6.8 in., 17.2 cm	6.8 in., 17.2 cm
Weight	30 lbs., 11.1 Kg	34 lbs., 12.6 Kg (including cables)	56 lbs., 20.9 Kg (including cables)	32 lbs., 11.9 Kg
Cable Length		35 ft. (10.6 m)	35 ft. (10.6 m)	
Subscriber Lines	24	24	48	48

INSTALLATION AND TURN-UP

The installation of an RT Enclosure involves the following procedures:

- mounting the RT Enclosure
- wiring the RT Enclosure
- turn-up and testing
- closing the housing



Be careful when working with telephone circuits. Dangerous voltages can be present. It is unsafe to install telephone wiring during a lightning storm.

All wiring external to the product should follow the local wiring codes.

Always treat the HDSL pairs as if they were live with high voltage present. Use caution when installing HDSL pairs that are already connected to a COLU, because dangerous voltages are present on the HDSL pairs.

The COLU, unless previously disabled by means of Craft provisioning, periodically attempts to power up the RT Enclosure by applying +/-130 Vdc to the HDSL pairs.

REQUIRED TOOLS AND TEST EQUIPMENT

- 216 Tool (can wrench)
- flat-head screwdriver
- insulated-handled needlenose pliers

INSTALLING THE FRE-860 RT ENCLOSURE

The FRE-860 RT Enclosure has external mounting flanges with tapped holes for #10-machine screws for pedestal mounting.

- 1 Remove horizontal crossbars from the UP10900 pedestal prior to mounting the FRE-860.
- 2 Attach the RT Enclosure to the pedestal frame, using the mounting flanges (see [Figure 2](#)). Use the mounting hardware provided with the RT Enclosure. Follow local practices to ensure a secure mounting.

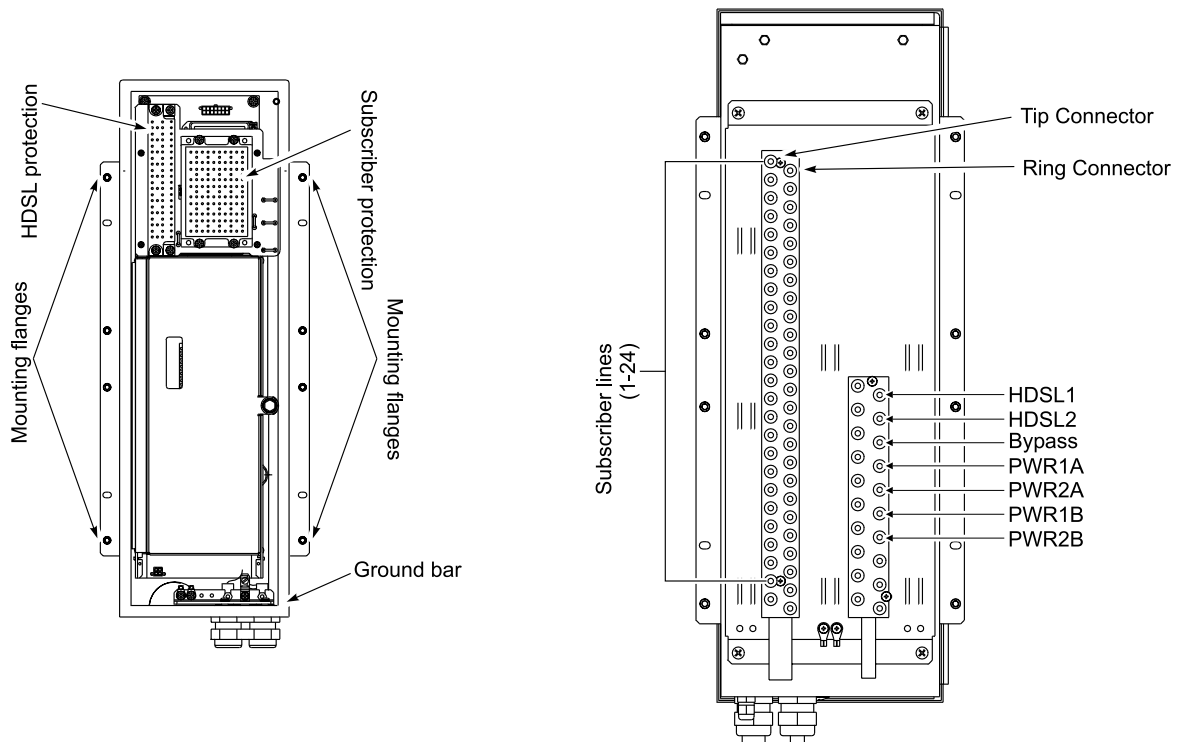


Figure 2. FRE-860 RT Enclosure and Termination Panel

- 3 Termination points for Subscriber and HDSL wiring are on the back of the unit as shown in [Figure 2](#) and detailed in [Table 2](#).

Table 2. FRE-860 Subscriber Terminations

Channel Unit 1		Channel Unit 2		Channel Unit 3	
Subscriber Line	Circuit	Subscriber Line	Circuit	Subscriber Line	Circuit
1	1	9	1	17	1
2	2	10	2	18	2
3	3	11	3	19	3
4	4	12	4	20	4
5	5	13	5	21	5
6	6	14	6	22	6
7	7	15	7	23	7
8	8	16	8	24	8

- 4 Install 5-pin protector plugs for all connected pairs.

INSTALLING THE FRE-865 AND FRE-867 RT ENCLOSURES

The FRE-865 and FRE-867 RT Enclosures have external mounting tabs with clearance holes for $\frac{3}{8}$ -inch bolts (see [Figure 3](#)).

- 1 When mounting to a pole using the Pole Mounting Kit (150-2397-0x), ensure the kit and FRE-86x are fully installed before connecting the cables. The customer must provide the appropriate mounting hardware. Follow local practices to ensure a secure mounting. The FRE-867 has lifting tabs to facilitate the mounting of the enclosure.

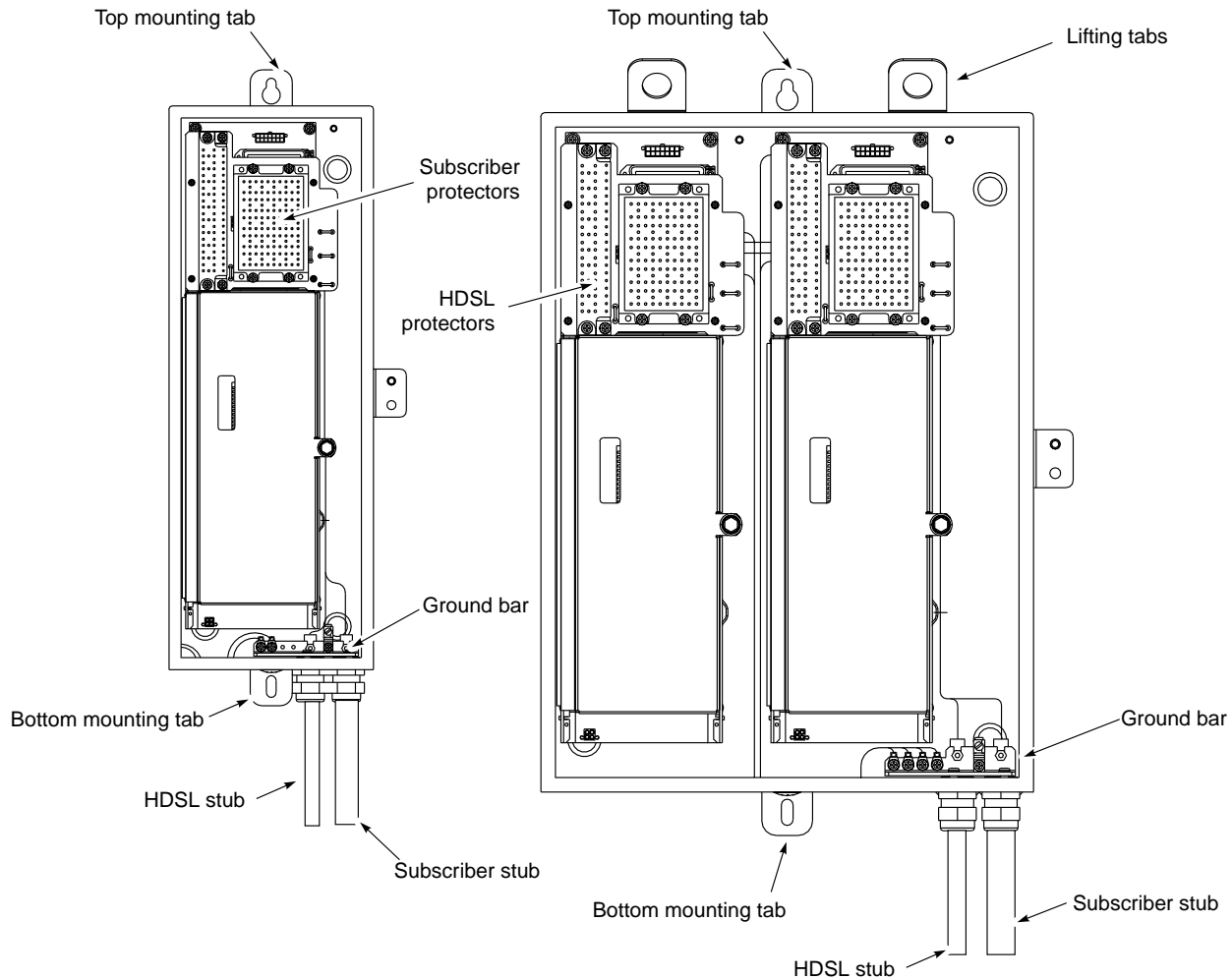


Figure 3. FRE-865 and FRE-867 RT Enclosures

- 2 Connect the HDSL cable stub as listed in [Table 3](#). The FRE-865 contains only one system (designated as System 1), the FRE-867 has two systems, System 1 and System 2.

Table 3. FRE-865 and FRE-867 HDSL Terminations

HDSL Stub					
System 1			System 2		
HDSL	Tip	Ring	HDSL	Tip	Ring
HDSL 1	WH	BL	HDSL 1	RD	GN
HDSL 2	WH	OR	HDSL 2	RD	BN
Bypass	WH	GN	Bypass	RD	SL
PWR 1A	WH	BN	PWR 1A	BK	BL
PWR 2A	WH	SL	PWR 2A	BK	OR
PWR 1B	RD	BL	PWR 1B	BK	GN
PWR 2B	RD	OR	PWR 2B	BK	BN

- 3 Connect the Subscriber cable stub as listed in Table 4. For the FRE-867, the System 1 subscriber lines are in the blue binder group, and System 2 subscriber lines are in the orange binder group.

Table 4. FRE-865 and FRE-867 Subscriber Terminations

Channel Unit 1				Channel Unit 2				Channel Unit 3			
Sub- scriber Line	Circuit	25-Pair Subscriber Cable Stub		Sub- scriber Line	Circuit	25-Pair Subscriber Cable Stub		Sub- scriber Line	Circuit	25-Pair Subscriber Cable Stub	
		Tip	Ring			Tip	Ring			Tip	Ring
1	1	WH	BL	9	1	RD	BN	17	1	YL	OR
2	2	WH	OR	10	2	RD	SL	18	2	YL	GN
3	3	WH	GN	11	3	BK	BL	19	3	YL	BN
4	4	WH	BN	12	4	BK	OR	20	4	YL	SL
5	5	WH	SL	13	5	BK	GN	21	5	VI	BL
6	6	RD	BL	14	6	BK	BN	22	6	VI	OR
7	7	RD	OR	15	7	BK	SL	23	7	VI	GN
8	8	RD	GN	16	8	YL	BL	24	8	VI	BN

- 4 Install 5-pin protector plugs for all connected pairs.

INSTALLING THE FRE-868 RT ENCLOSURE

The FRE-868 RT Enclosure has four mounting slots for #10 wood screws for indoor wall mounting.

- 1 Attach the RT Enclosure to the wall, using the mounting slots. Follow local practices to ensure a secure mounting.

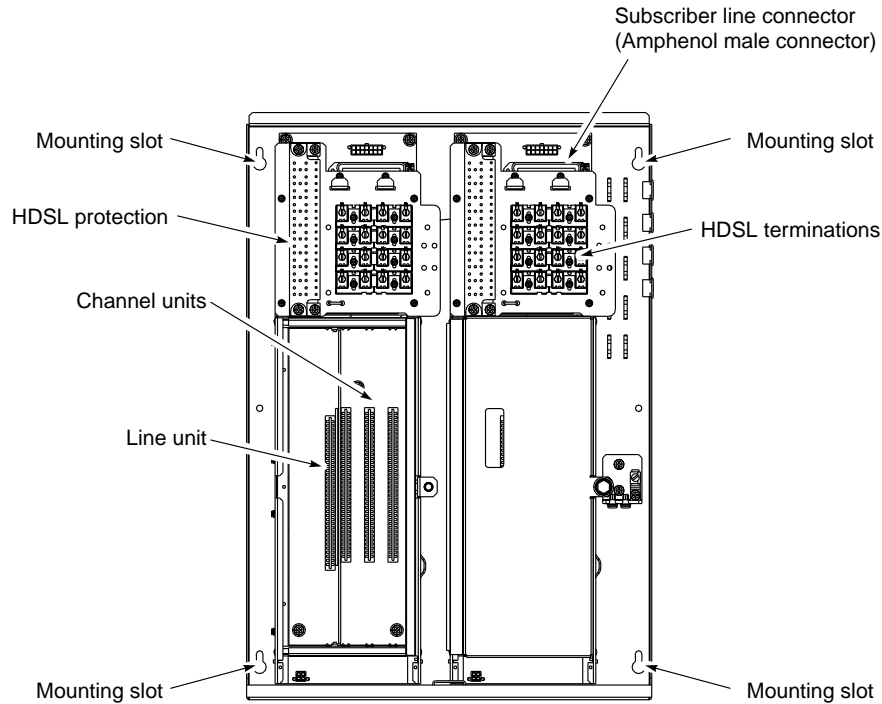


Figure 4. FRE-868 RT Enclosure

- 2 Connect the HDSL pairs to the HDSL Terminations (see [Figure 4](#)).
- 3 Connect a female Amphenol-ended subscriber cable to the subscriber line connector (not supplied) (see [Figure 4](#)).
- 4 Terminate the connector as shown in [Table 5](#).
- 5 FRE-868 List 3 and List 4 provide for HDSL protection. Install 5-pin protector plugs on all connected pairs.

Table 5. FRE-868 24-Line Subscriber Terminations

Channel Unit 1					Channel Unit 2					Channel Unit 3							
Sub- scriber Lines	Circuit	Backplane Connector P1		25-Pair Subscriber Cable Stub		Sub- scriber Lines	Circuit	Backplane Connector P1		25-Pair Subscriber Cable Stub		Sub- scriber Lines	Circuit	Backplane Connector P1		25-Pair Subscriber Cable Stub	
		Tip	Ring	Tip	Ring			Tip	Ring	Tip	Ring			Tip	Ring	Tip	Ring
1	1	26	1	WH	BL	9	1	34	9	RD	BN	17	1	42	17	YL	OR
2	2	27	2	WH	OR	10	2	35	10	RD	SL	18	2	43	18	YL	GN
3	3	28	3	WH	GN	11	3	36	11	BK	BL	19	3	44	19	YL	BN
4	4	29	4	WH	BN	12	4	37	12	BK	OR	20	4	45	20	YL	SL
5	5	30	5	WH	SL	13	5	38	13	BK	GN	21	5	46	21	VI	BL
6	6	31	6	RD	BL	14	6	39	14	BK	BN	22	6	47	22	VI	OR
7	7	32	7	RD	OR	15	7	40	15	BK	SL	23	7	48	23	VI	GN
8	8	33	8	RD	GN	16	8	41	16	YL	BL	24	8	49	24	VI	BN

CHASSIS GROUND WIRING

To install the chassis ground wire, perform the following steps for the appropriate unit. The location for the grounds for the different models are shown in [Figure 5](#).



Use 6 AWG wire to ensure a good ground connection to the FRE-86x.

- 1 For the FRE-860, FRE-865, and FRE-867, List 1 and List 1A, route the chassis ground wire through the small hole in the strain relief on the bottom of the RT Enclosure.
- 2 For the FRE-868, List 1, List 2, List 3, and List 4, route the chassis ground wire through the hole provided on the right side of the RT Enclosure.
- 3 For all models, connect one end of the chassis ground wire to the grounding lug.
- 4 Connect the other end of the chassis ground wire to a suitable ground termination point (ground rod or cold water pipe).
- 5 Tighten the strain relief around the wire.

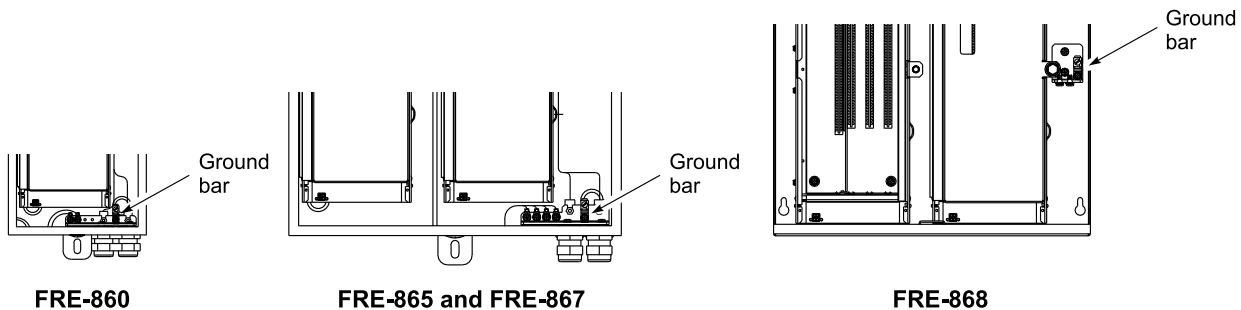


Figure 5. Installing the Ground Wire

CABLING VERIFICATION



Perform the following verifications before inserting any cards in the RT Enclosure or the COT Shelf.

Verify the following connections:

- 1 Visually ensure that the ground wire is tightly secured to the grounding post inside the RT Enclosure and at the ground termination point.
- 2 Visually verify that the HDSL lines are terminated correctly and with the correct orientation.
- 3 Verify that the HDSL lines are dry.
 - a Verify 0 Vdc between the Tip and Ring, Tip and Ground, and Ring and Ground of each of the HDSL pairs terminated at the RT Enclosure.
 - b Verify greater than 100 k Ω resistance between Tip and Ground, and Ring and Ground for each of the HDSL pairs terminated at the RT Enclosure.

TURN-UP AND TESTING



To prevent condensation, power the RT Enclosures soon after installation. It is sufficient to power up only the LUs.

Refer to the COLU Technical Practice or RTLU Technical Practice for complete COT and RT turn-up and testing procedures.

CLOSE THE HOUSING

- 1 If you have not already done so, close the LU Access doors.
- 2 Close the RT Enclosure housing cover and use the 216 tool to secure the door.
- 3 The installation is complete.

TROUBLESHOOTING

Refer to the COLU Technical Practice or RTLU Technical Practice for complete COT and RT troubleshooting procedures.

ABBREVIATIONS

AWG	American Wire Gauge
Ckt	Circuit
CO	Central Office
COLU	Central Office Line Unit
COT	Central Office Terminal
CU	Channel Unit
FCC	Federal Communications Commission
GND	Ground
HDSL	High bit-rate Digital Subscriber Line
LU	Line Unit
PWR	Power
RT	Remote Terminal
RTL	Remote Terminal Line Unit

PRODUCT SUPPORT

TECHNICAL SUPPORT

Technical assistance is available 24 hours a day, 7 days a week by contacting PairGain Customer Service Group at:

Telephone: 800.638.0031 or 714.730.3222
The 800 telephone support line is toll-free in the U.S. and Canada.

Fax: 714.832.9924

Email: support@pairgain.com

During normal business hours (7:30 AM to 5:30 PM, Pacific Time, Monday through Friday, excluding holidays), technical assistance calls are normally answered directly by a Customer Service Engineer. At other times, a request for technical assistance is handled by an on-duty Customer Service Engineer through a callback process. This process normally results in a callback within 30 minutes of initiating the request.

WORLD WIDE WEB

PairGain product and company information can be found at <http://www.pairgain.com> using any Web browser. To download PairGain product manuals from the Customer Site portion of the PairGain Web page, you need to provide a customer password. If you do not have a password, contact your PairGain sales representative.

LIMITED WARRANTY

PairGain Technologies, Inc. ("PairGain") warrants that, for a period of sixty (60) months from the date of shipment, the hardware portion of its products will be free of material defects and faulty workmanship, under normal use. PairGain's obligation, under this warranty, is limited to replacing or repairing, at PairGain's option, any such hardware product which is returned during the 60-month warranty period per PairGain's instructions and which product is confirmed by PairGain not to comply with the foregoing warranty.

PairGain warrants that, for a period of 30 days from the date of purchase, the software furnished with its products will operate substantially in accordance with the PairGain published specifications and documentation for such software. PairGain's entire liability for software that does not comply with the foregoing warranty and is reported to PairGain during the 30-day warranty period is, at PairGain's option, either (a) return of the price paid or (b) repair or replace of the software. [PairGain also warrants that, for a period of thirty (30) days from the date of purchase, the media on which software is stored will be free from material defects under normal use. PairGain will replace defective media at no charge if it is returned to PairGain during the 30-day warranty period along with proof of the date of shipment.]

The transportation charges for shipment of returned products to PairGain will be prepaid by the Buyer. PairGain will pay transportation charges for shipment of replacement products to Buyer, unless no trouble is found (NTF), in which case the Buyer will pay transportation charges.

PairGain may use reconditioned parts for such repair or replacement. This warranty **does not** apply to any product which has been repaired, worked upon, or altered by persons not authorized by PairGain or in PairGain's sole judgment has subjected to misuse, accident, fire or other casualty, or operation beyond its design range.

Repaired products have a 90-day warranty, or until the end of the original warranty period—whichever period is greater.

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RETURNS

To return equipment to PairGain:

- 1 Locate the number of the purchase order under which the equipment was purchased. To obtain a return authorization number, you need to provide the original purchase order number to PairGain's Return Material Authorization (RMA) Department.
- 2 Call or write PairGain's RMA Department to ask for an RMA number and any additional instructions. Use the telephone number, fax number or email address listed below:
 - Telephone: 800.370.9670
 - Fax: 714.832.9923
 - Email Address: rma@pairgain.com
- 3 Include the following information, in writing, along with the equipment you are returning:
 - Company name and address.
 - Contact name and telephone number.
 - The shipping address to which PairGain should return the repaired equipment.
 - The original purchase order number.
 - A description of the equipment that includes the model and part number of each unit being returned, as well as the number of units that you are returning.
 - The reason for the return. For example:
 - The equipment needs an ECO/ECN upgrade.
 - The equipment is defective.



If the equipment is defective, please tell us what you observed just before the equipment malfunctioned. Be as detailed in your description as possible.

- If there is another reason for returning the equipment, please let us know so we can determine how best to help you.
- 4 Pack the equipment in a shipping carton.
 - 5 Write PairGain's address and the RMA Number you received from the RMA Department clearly on the outside of the carton and return to:

PairGain Technologies, Inc.
14352 Franklin Ave.
Tustin, CA 92780-7013

Attention: **RMA (Number)**



All shipments are to be returned prepaid. PairGain will not accept any collect shipments.

FCC COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

MODIFICATIONS

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by PairGain Technologies, Inc. voids the user's warranty.

All wiring external to the product(s) should follow the provisions of the current edition of the National Electrical Code.

Corporate Office

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