GAI-TRONICS®
A HUBBELL COMPANY

Intrinsically-Safe Rack-Mount Telephone System

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General Information

The GAI-Tronics Intrinsically-Safe Series Telephones are designed to be installed in hazardous areas. The rack-mount components listed below are placed in a non-hazardous area up to one mile from the telephone. This limits the energy levels going to the hazardous area to conform to all of UL's intrinsically safe requirements. This publication contains installation, operation, and detailed specifications for the I.S. telephone rack-mount system.

GAI-Tronics Intrinsically-Safe (I.S.) Series Rack-Mount Telephone System configurations include the following components:

Model	Description
265	Line Card
266	Power Supply
267	Subrack Assembly
268	Patch Panel

NOTE: Please refer to the Ordering Information table on page 9 for information on ordering these components.

⚠ **CAUTION** ⚠
All details in this manual must be followed to conform to UL requirements for intrinsic safety.

Installation and Setup

1. Install each Model 267 Subrack into a standard 19-inch cabinet by inserting and tightening the two screws into the holes on each side of the subrack.

   NOTE: This rack is designed for M6 metric screws. Additional hardware will be required if this cabinet is to be used with 10-32 screws.

   If installing multiple subrack assemblies, install one Model 268 Patch Panel between each pair of subracks. See Figure 1 for details. The Model 268 Patch Panels are installed in the same manner as the subrack assemblies. When installing the patch panels, install the two user-supplied 25-pair harness assemblies to the rear of each patch panel.

2. Install the Model 265 Line Cards into the subrack assemblies by sliding them into the card guides. Once fully inserted (so that the front surface of the card is flush with the subrack assembly), secure it into place by tightening the four captive screws located on the bezel of the line card. Each subrack assembly accommodates up to seven cards. When using less than seven cards in any one subrack assembly, we recommend installing Part No. 14758-001 Blank Front Panel Bezels, which are available from GAI-Tronics.

3. Install the Model 266 Power Supplies. Each subrack assembly requires one power supply.

   NOTE: To select 220 V power, slide the switch on the top of the Model 266 Power Supply to the 220 V position before installation.

   Fit the supply into the guide at the left end of the subrack assembly. Insert it fully so that the front surface of the card is flush with the subrack assembly, and secure it into place by tightening the four captive screws located on the bezel of the power supply. Access the rear of the subrack assembly, and locate the grounding screw at the right end of the assembly. Tighten the screw into the power supply by turning it clockwise.

4. Packed with each Model 265 Line Card is a modular telephone line cord with a connector on each end. Connect one end of this cord is to be connected to a line card, and the other end to a jack in a patch panel. Refer to Figure 1 to clarify the general wiring configuration.

   NOTE: The Model 268 Patch Panel provides 24 connectors, but for this application a maximum of 14 will be used. Connector selection is limited only by the length of the line cord.

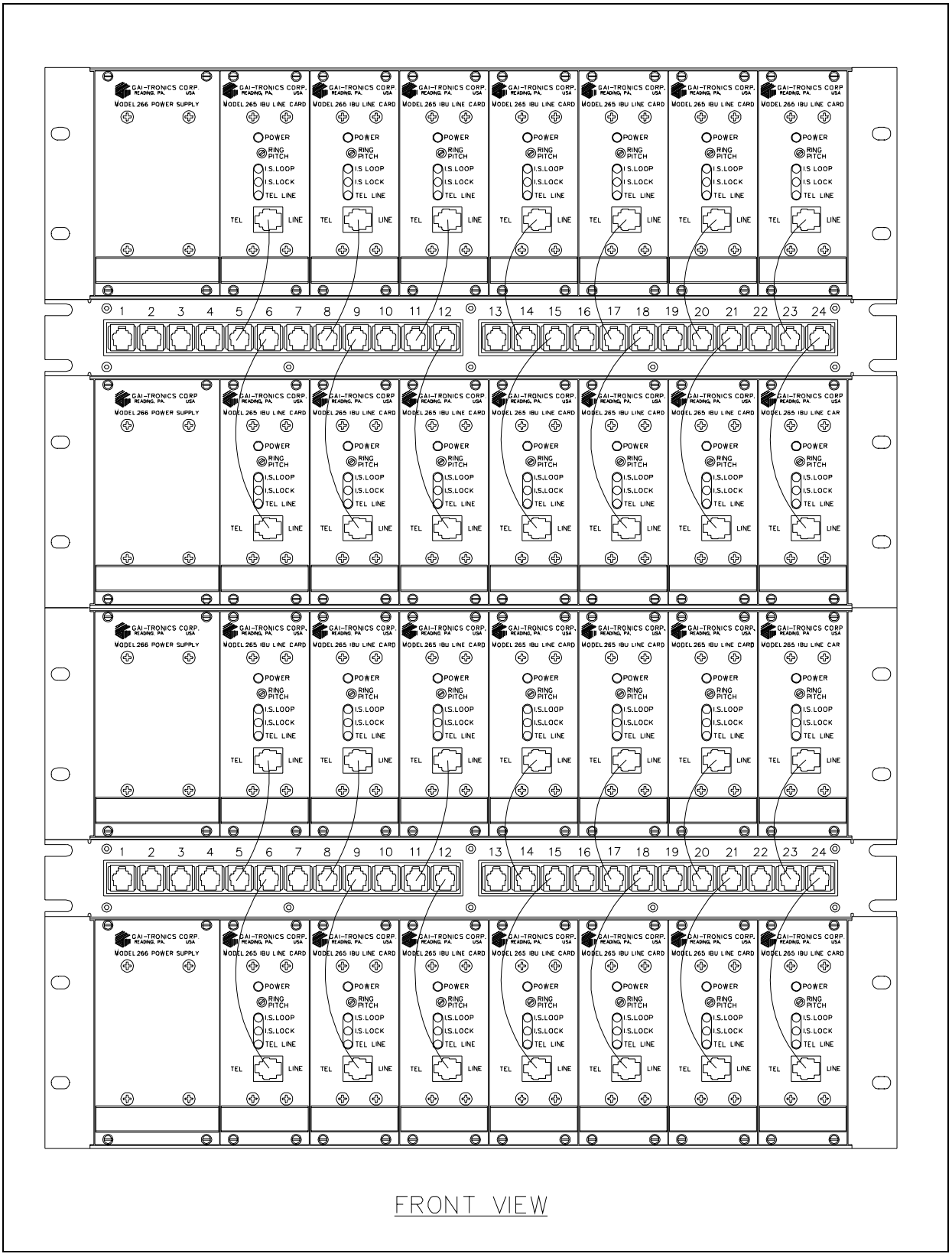

Figure 1. Typical Mechanical Configuration for Rack Mount System - Front View

5. Wire the central office (CO) or PBX lines to a punch-down block (66) near the cabinet. Then wire the appropriate conductors from the 25-pair patch panel harness assembly to the punch-down block. Refer to Figure 2. Verify that the wired pairs are from the connectors used in the patch panel. This can be verified by checking the color coding of the harness assembly wires.

6. We recommend creating a local "base station" to aid in adjusting the telephone ring pitch and to verify the correct operation of each line card. The base station will aid in ring pitch adjustment by allowing personnel at the cabinet to communicate to those in the field to adjust the ring pitch level. The base station can also be connected to each diode barrier terminal strip to check for the correct operation of that circuit. See Step 7 to assure the correct connection of the base station to a line card.

7. Install the I.S. Series Telephones and wire them back to the central cabinet. The wires will terminate at the back of the Model 267 Subrack on terminal strips provided on the diode barriers (one terminal strip per telephone). Follow the wiring instructions in Pub. 42004-380.
   NOTE: The wiring on this drawing must be followed to maintain intrinsic safety.

8. Plug a user-supplied power cord with a type IEC 320 connector into the socket located on the rear right side of the subrack assembly. Be sure to select the appropriate cord for the voltage selected on the power supply (110 V or 220 V). Connect the power cord to a power source.

9. Use the base station to assist in adjusting the ring pitch of each telephone. Several calls must be placed from the base station to the remote telephone to complete each adjustment. When all the telephones are properly adjusted, remove the base station, and install it at the desired location.

10. Perform any necessary troubleshooting. See the Troubleshooting section on page 6.

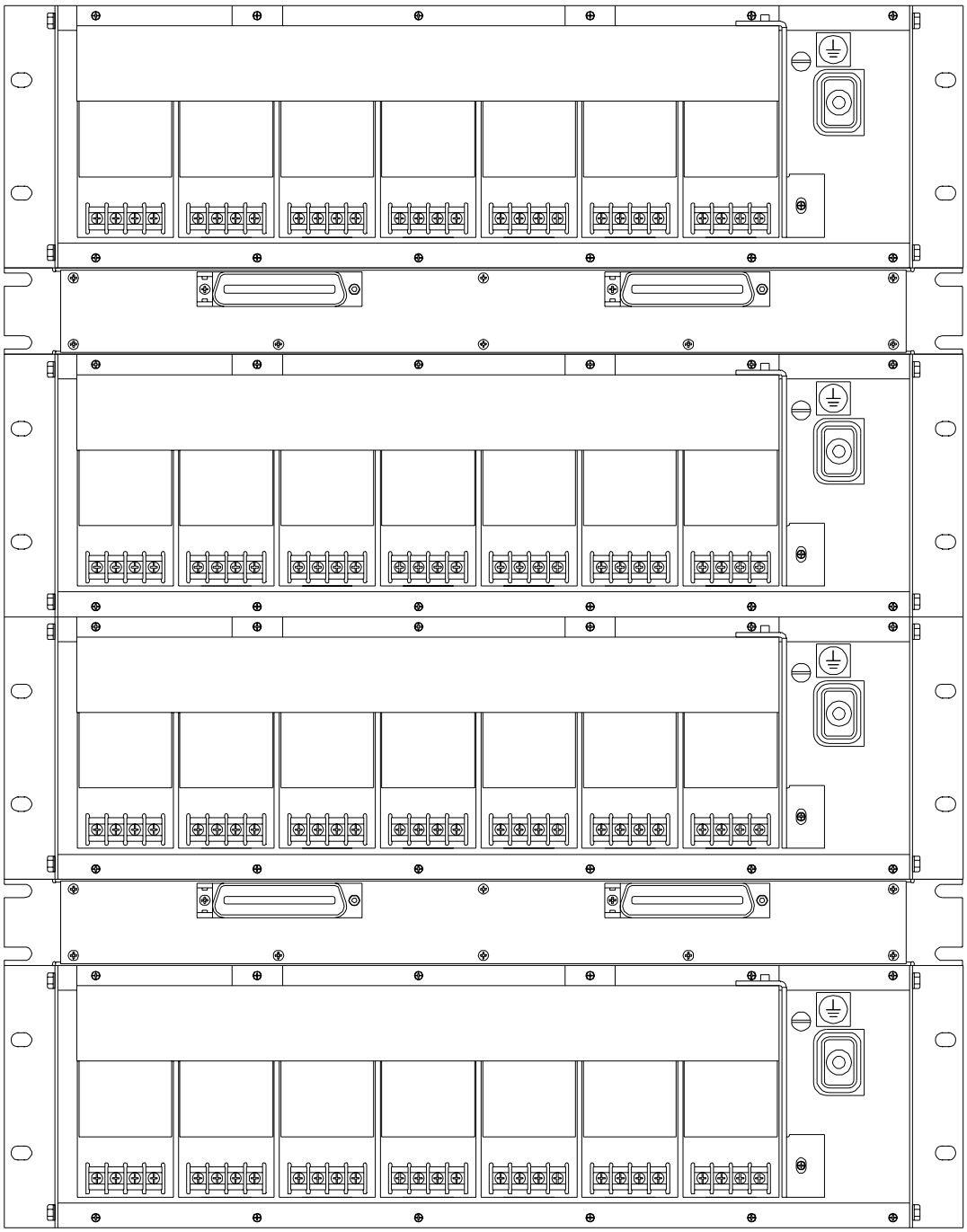

Figure 2. Typical Mechanical Configuration for Rack Mount System - Rear View

Troubleshooting

This section includes two troubleshooting charts designed to quickly pinpoint the source of problems.

NOTE: It may be advantageous to temporarily connect an I.S. telephone panel directly to the output terminals of the Model 267 Subrack when troubleshooting. Then, using the charts below, the cause of the problem should be more easily determined.

Non-Equipment Related Problems

Problem	Solution
The I.S. phone is inactive with no lights on the IBU when the phone is off-hook.	1. Check the ac power to the Model 266 Power Supply. 2. Check the ac fuse F1 at the Model 266 Power Supply.
The power light is on only when the phone is off hook.	Check for I.S. telephone wiring open.
The I.S. phone has no dial tone.	1. If there is a problem with the ac power to the Model 266 Power Supply, the IBU lights will be lit in the following pattern: ● = On, ❍ = Off ISLOOP ● LOCK ❍ HOOK ❍ TELCO ❍
	2. If the I.S. telephone has a wiring short, the IBU lights will be lit in the following pattern: ● = On, ❍ = Off (Short may be between conductors, or either/both conductor(s) to ground/shield.) ISLOOP ● LOCK ❍ HOOK ❍ TELCO ❍
	3. If the TELCO line has an open, the IBU lights will be lit in the following pattern: ● = On, ❍ = Off ISLOOP ● LOCK ● HOOK ● TELCO ❍
The lights on the IBU flash randomly.	The I.S. telephone has an intermittent wiring short. The short may be between the conductors or either/both conductor(s) to ground/shield.

Equipment-related Problems

Problem	Solution
There is no incoming ring tone.	1. Check the I.S. telephone panel. 2. Check the Model 265 Line Card.
There is no receiver audio, no side tone, and no touch tones when pressed.	1. Check the I.S. telephone panel. 2. Check the Model 265 Line Card. 3. Check for an open or short in the connecting cable.
Cannot dial out, but can hear touch tones when pressed.	1. Check the Model 265 Line Card. 2. Check the TELCO line connection. It may be bad or there may be no connection.
I.S. telephone is inactive.	1. Check the I.S. telephone panel. 2. Check the Model 265 Line Card. 3. Check for an open or short in the connecting cable.
No power lights are on.	Check the Model 266 Power supply.

⚠ **CAUTION** ⚠

Any field repairs on the intrinsically-safe design of the phone are strictly prohibited. Any such change will void ALL hazardous approvals. Please contact the GAI-Tronics Field Service Department at 800-492-1212 inside the USA or 610-777-1374 outside the USA for the Regional Service Center closest to you.

Lightning Protection

Telephone lines are susceptible to lightning strikes and must be properly protected and maintained. On-premise line protection is usually provided at the building entrance by the responsible telephone company when it is installed. This protection is often neglected after installation.

Degradation of conventional protection, such as carbon blocks or gas discharge types, will occur with each lightning strike. To ensure safe operation, protective elements should be replaced frequently and checked for proper connection and grounding. Gas discharge types are by far the most robust, cost-effective means of protection.

The registered I.S. equipment meets all isolation and safety requirements of FCC, Part 68 and UL 913. However, lightning strikes are not predictable or considered to be a condition of fault likely to occur in practice as defined by the guidelines for intrinsic safety. Therefore, it is imperative that the user employ and maintain a proper lightning protection scheme. This is true for all hazardous area equipment and all telecommunications equipment subject to lightning.

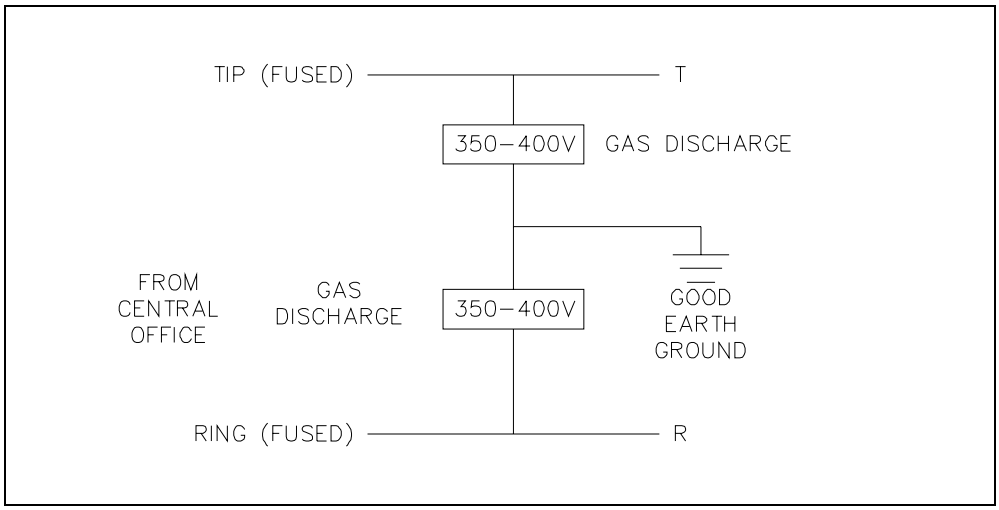

Figure 3. Example of Lightning Protection Design

Proper grounding is the most critical consideration in any intrinsically-safe system. Unsafe energy levels are limited by the protective diode barrier with reference to the I.S. ground terminals.

It is **imperative** to make good mechanical and electrical ground connections to maintain intrinsic safety (for low impedance ground connections, less than 1 ohm required; less than 0.1 ohms is recommended).

Use the latest National Electrical Code (NEC) published by NFPA to ensure that proper ground connections are made.

References: UL 913 NEC, Article 504

NOTE: Do not connect the intrinsically-safe ground directly to the ac power ground terminals.

⚠ **WARNING** ⚠

Installation must be in accordance with GAI-Tronics Pub. 42004-380 to ensure intrinsic safety.

Ordering Information				
Quantity of Stations Desired	Number of Model 265 Line Cards Required	Number of Model 266 Power Supplies Required	Number of Model 267 Card Cages Required	Number of Model 268 Patch Panels Required
1-7	1-7 (same as quantity of stations)	1	1	1
8-14	8-14 (same as quantity of stations)	2	2	1
15-21	15-21 (same as quantity of stations)	3	3	2
22-28	22-28 (same as quantity of stations)	4	4	2
29-35	29-35 (same as quantity of stations)	5	5	3
For 36 or more telephones, follow the same ratio as demonstrated above.				

Service Information

Per UL requirement, no replacement parts are available for this unit. Please contact the GAI-Tronics Field Service Department at 800-492-1212 inside the USA or 610-777-1374 outside the USA for the Regional Service Center closest to you.

User Instructions

This equipment complies with Part 68 of the FCC Rules. On the side of the Model 265 Line Card is a label that contains, among other information, the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. If requested, this information must be provided to the telephone company.

This equipment uses the RJ11C USOC jack.

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENS on the telephone line may result in the devices not ringing in response to an incoming call. In most, but not all areas, the sum of the RENS should not exceed five (5.0). To be certain of the number of devices that may be connected to the line, contact the telephone company to find out the maximum REN for the calling area.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance. If advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice for you to make the necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment please contact GAI-Tronics at 800-492-1212 (if calling from outside Pennsylvania), or 610-777-1374 (within Pennsylvania and outside the US) for repair and/or warranty information. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment until the problem is resolved.

This equipment cannot be used on telephone company-provided coin service. Connection to party-line service is subject to state tariffs.

When making test calls to emergency numbers:

- Remain on the line and briefly explain to the dispatcher the reason for the call.
- Perform such activities in the off-peak hours, such as early morning or late evenings.

Specifications

General/Environmental

Location (rack-mounted IBU)..... Ordinary (non-classified) indoor/outdoor
FCC Registration Number ADGUSA-65066-TE-E
Ringer Equivalence Number (REN)..... 0.4B
Operating temperature range
I.S. Series Telephones..... -40° F to +140° F (-40° C to +60° C)
Rack equipment ..... +32° F to +104° F (0° C to +40° C)
Relative humidity ..... 95% (non-condensing) maximum

Maximum safe wiring distance between IBU and I.S. Series telephones

Standard wire types ..... 1 mile
Using GTC 60059-001 conductor ..... 1.5 miles
Using GTC 60021-301 conductor ..... 1.5 miles

Wiring

Construction..... Twisted pair
Type..... Shielded*
Conductor size (minimum) ..... 24 AWG
Wiring loop resistance (maximum)..... 275 ohms
Wiring capacitance (maximum)..... 0.316 uF

*Shielded cable is required where multiple I.S. telephone wires are routed together.

Shipping weight

Model 265 Line Card..... 2.88 lbs. (1.31 kg)
Model 266 Power Supply ..... 4.88 lbs. (2.22 kg)
Model 267 Subrack Assembly ..... 8.42 lbs. (3.83 kg)
Model 268 Patch Panel ..... 1.56 lbs. (0.71 kg)

Dimensions

Model 265 Line Card..... 5.06 H × 2 W × 12.9 D; inches (128.6 × 50.8 × 327.6 mm)
Model 266 Power Supply ..... 5.06 H × 3.8 W x 12.1 D; inches (128.6 × 96.5 × 307.3 mm)
Model 267 Subrack Assembly ..... 5.25 H × 19 W × 14.5 D; inches (133.3 × 482.6 × 368.3 mm)
Model 268 Patch Panel..... 1.75 H × 19.75 W × 1.25 D; inches (44.5 × 501.65 × 31.75 mm)

Electrical /Acoustical

Rack-mounted IBU consisting of ..... One Model 267 Subrack Assembly
One Model 266 Power Supply
Up to seven Model 265 Line Cards

Telephone Network Interface
- 2-wire ..... BELL PUB 61100 Compatible
- 4-wire ..... See the 4-Wire Option Interface below

AC power input
- Voltage (selectable) 90-130V/180-240V
- Frequency ..... 47-63 Hz
- Current ..... 0.5 amps (maximum)

Ringer pitch adjust ..... 1 kHz-8 kHz (nominal

Intrinsically-Safe Interface
- Voltage (maximum) ..... 18 V
- Resistance (minimum) ..... 66 ohms
- Current Limited (maximum) ..... 136 mA

IBU Indicators

I.S. Loop Current..... I.S. LOOP (GRN)
I.S. Lock Detect..... I.S. LOCK (GRN)
Telephone Line Loop Current.....TELCO (YEL)
Hook .....HOOK (YEL)

Model 265 4-Wire Option Interface

Receive (TB2-1, 2)..... DRY (No dc)
Signal Level ..... 0 dBm (nominal)
+3 dBm (maximum)
Transmit (TB2-3, 4) .....WET
- DC loop current ..... 20 mA - 70 mA
- Signal level ..... 0 dBm (nominal)
- Ring voltage input..... 40 V - 150 Vrms

I.S. Series Telephones

Electrical specifications (nominal) ..... 12 V, 12 mA
Ringer performance (typical) ..... 98 dB @ 10 feet
Frequency (adjustable at IBU) ..... 1 kHz - 8 kHz (nominal)
Ring signal loss (18 AWG) ..... -4 dB/mile
Signaling ..... DTMF
Transmission path (2-conductor) ..... Full duplex
Microphone ..... Noise-canceling
Earpiece ..... Hearing aid compatible
Output (0 dBm @ IBU TELCO Line) ..... 105 dB SPL @ 1 kHz
Audio signal loss (18 AWG) ..... -1.3 dB/mile

NOTE: Must be connected in accordance with GAI-Tronics publication 42004-380.

Approvals

When connected according to GAI-Tronics Pub. 42004-380:
..... Class I, Div. 1, Groups A, B, C, and D;
Class II, Div. 1, Groups E, F, and G; Class III;

Warranty

Equipment. GAI-Tronics warrants for a period of one (1) year from the date of shipment, that any GAI-Tronics equipment supplied hereunder shall be free of defects in material and workmanship, shall comply with the then-current product specifications and product literature, and if applicable, shall be fit for the purpose specified in the agreed-upon quotation or proposal document. If (a) Seller's goods prove to be defective in workmanship and/or material under normal and proper usage, or unfit for the purpose specified and agreed upon, and (b) Buyer's claim is made within the warranty period set forth above, Buyer may return such goods to GAI-Tronics' nearest depot repair facility, freight prepaid, at which time they will be repaired or replaced, at Seller's option, without charge to Buyer. Repair or replacement shall be Buyer's sole and exclusive remedy. The warranty period on any repaired or replacement equipment shall be the greater of the ninety (90) day repair warranty or one (1) year from the date the original equipment was shipped. In no event shall GAI-Tronics warranty obligations with respect to equipment exceed 100% of the total cost of the equipment supplied hereunder. Buyer may also be entitled to the manufacturer's warranty on any third-party goods supplied by GAI-Tronics hereunder. The applicability of any such third-party warranty will be determined by GAI-Tronics.

Services. Any services GAI-Tronics provides hereunder, whether directly or through subcontractors, shall be performed in accordance with the standard of care with which such services are normally provided in the industry. If the services fail to meet the applicable industry standard, GAI-Tronics will re-perform such services at no cost to buyer to correct said deficiency to Company's satisfaction provided any and all issues are identified prior to the demobilization of the Contractor's personnel from the work site. Re-performance of services shall be Buyer's sole and exclusive remedy, and in no event shall GAI-Tronics warranty obligations with respect to services exceed 100% of the total cost of the services provided hereunder.

Warranty Periods. Every claim by Buyer alleging a defect in the goods and/or services provided hereunder shall be deemed waived unless such claim is made in writing within the applicable warranty periods as set forth above. Provided, however, that if the defect complained of is latent and not discoverable within the above warranty periods, every claim arising on account of such latent defect shall be deemed waived unless it is made in writing within a reasonable time after such latent defect is or should have been discovered by Buyer.

Limitations / Exclusions. The warranties herein shall not apply to, and GAI-Tronics shall not be responsible for, any damage to the goods or failure of the services supplied hereunder, to the extent caused by Buyer's neglect, failure to follow operational and maintenance procedures provided with the equipment, or the use of technicians not specifically authorized by GAI-Tronics to maintain or service the equipment. THE WARRANTIES AND REMEDIES CONTAINED HEREIN ARE IN LIEU OF AND EXCLUDE ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Return Policy

If the equipment requires service, contact your Regional Service Center for a return authorization number (RA#). Equipment should be shipped prepaid to GAI-Tronics with a return authorization number and a purchase order number. If the equipment is under warranty, repairs or a replacement will be made in accordance with the warranty policy set forth above. Please include a written explanation of all defects to assist our technicians in their troubleshooting efforts.

Call 800-492-1212 (inside the USA) or 610-777-1374 (outside the USA) for help identifying the Regional Service Center closest to you.