GAI-TRONICS®
A HUBBELL COMPANY

Model DEX-101, -102, -201, and -202
Hazardous Area Driller's Intercom Stations

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Confidentiality Notice

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General Information

Product Overview

The Driller's Intercom is a communications system designed to serve the needs of oil and gas industry on oil drilling platforms, especially in hazardous areas. It provides all-call, group call, and point to point communications, and is available in digital and analog versions.

The enclosure is rated NEMA-4X, and is factory sealed to ensure explosion-proof integrity.

System Requirements and Limitations

Each Driller's Intercom system requires a Central Switch to operate. The Central Switch must be located in a non-hazardous area. The configuration parameters for all components of the system are set in the Central configuration.

Figure 1. Driller's Intercom with Keypad

Each central switch can manage up to 16 digital or analog subscribers, and can be expanded to 32 subscribers. Central switches can be linked or a larger switch can be used for increased system size. By combining central switches, the system is easily expanded at any time.

All stations must be connected in a star configuration to the Central Switch, but power to the stations can be daisy-chained. Please refer to the "Installation" section for the power cable and system cable distance limitations.

Additional features and functions (not detailed in this manual) are available. Refer to the Central Switch manual or contact a GAI-Tronics Corporation representative for more details.
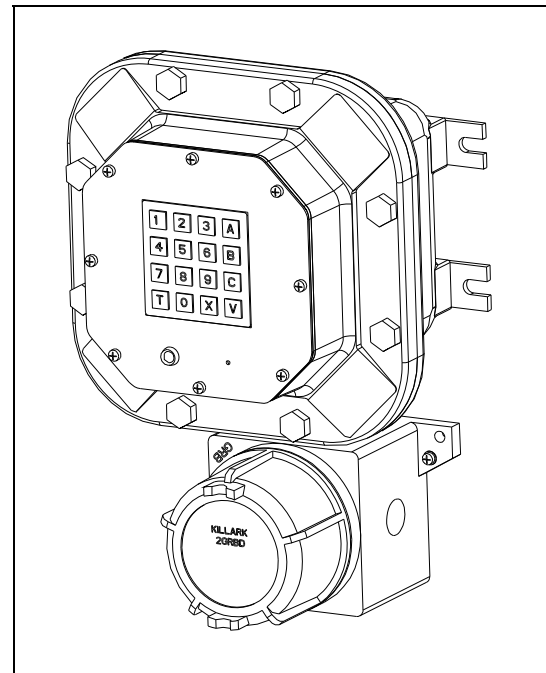
Features and Functions

- Digital and analog models
- 120–240 V ac and 24 V dc models
- NEMA-4X rated enclosure
- 18-watt speaker amplifier
- Speaker volume control
- Beacon control (digital models only)
- Footswitch input
- Call status indicator
- UL Approved

- Factory sealed
- Suitable for Div. 1 & 2 and Zone 1 & 2 Hazardous Areas
- Suitable for high noise areas
- Hands-free duplex and simplex communication
- All-call and group paging
- Broadcast of alarm and music signals
- Master/slave and point-to-point communications
- System upgrade and expansion capability

Available Models

DEX-101   Analog Intercom Station - 24 V dc (UL)

DEX-201   Analog Intercom Station - 120 V ac (UL)

DEX-102   Digital Intercom Station with keypad - 24 V dc (UL)

DEX-202   Digital Intercom Station with keypad - 120 V ac (UL)

Description of Major Components

The Driller's Intercom stations consist of a factory-sealed enclosure (top) and a termination enclosure (bottom). Refer to Figure 1 for details. The factory-sealed configuration eliminates the need for external seals on this unit; however, additional seals may be required on auxiliary devices.

The audio, control, and power components for this assembly are contained in the factory-sealed enclosure. The front panel of the factory-sealed enclosure contains the user interface components (microphone, status LED, and keypad [digital models only]).

All system terminations (power, speaker, system, footswitch, and beacon) are to be made in the termination enclosure.

This station requires an external speaker (sold separately) to operate. Also, a customer-supplied beacon (digital models only) and footswitch can be added to this unit for visual status indication and talk/listen control.

⚠ **CAUTION** ⚠   **Use only suitably listed components for the hazardous area.**

Installation

General Information

⚠️**WARNING** ⚠️ **Always remove power to this station and any associated equipment before beginning any installation.**

Install equipment without modification and according to all applicable local and national electrical codes. Consult the National Electrical Code (NFPA 70), Canadian Standards Association (CSA 22.1), and local codes for specific requirements regarding your installation. Class 2 circuit wiring must be performed in accordance with NEC 725.55.

⚠️ **CAUTION** ⚠️

The factory-sealed section of this station is only to be opened for maintenance or repair by factory authorized personnel. Refer to the "Maintenance" section for more details.

⚠️**WARNING** ⚠️

After installing station and before applying power, verify that the bolts on the factory-sealed section of the station are set at 30 ft-lbs.

This station has a highly sensitive microphone that allows the user to communicate at a distance from the station. This station also contains a high gain amplifier that enables operation in high noise environments.

To prevent feedback problems in the system, the ambient noise levels, volume settings, and station placement must be taken into consideration. In most cases, stations can be mounted perpendicular to the same surface and be placed 150 feet apart. This minimum spacing requirement between stations can be reduced under the following conditions:

- Stations are installed in a high noise environment;
- Stations are configured for simplex mode (depressing T button);
- Stations contain speaker L-pads;
- Stations are placed in separate rooms.
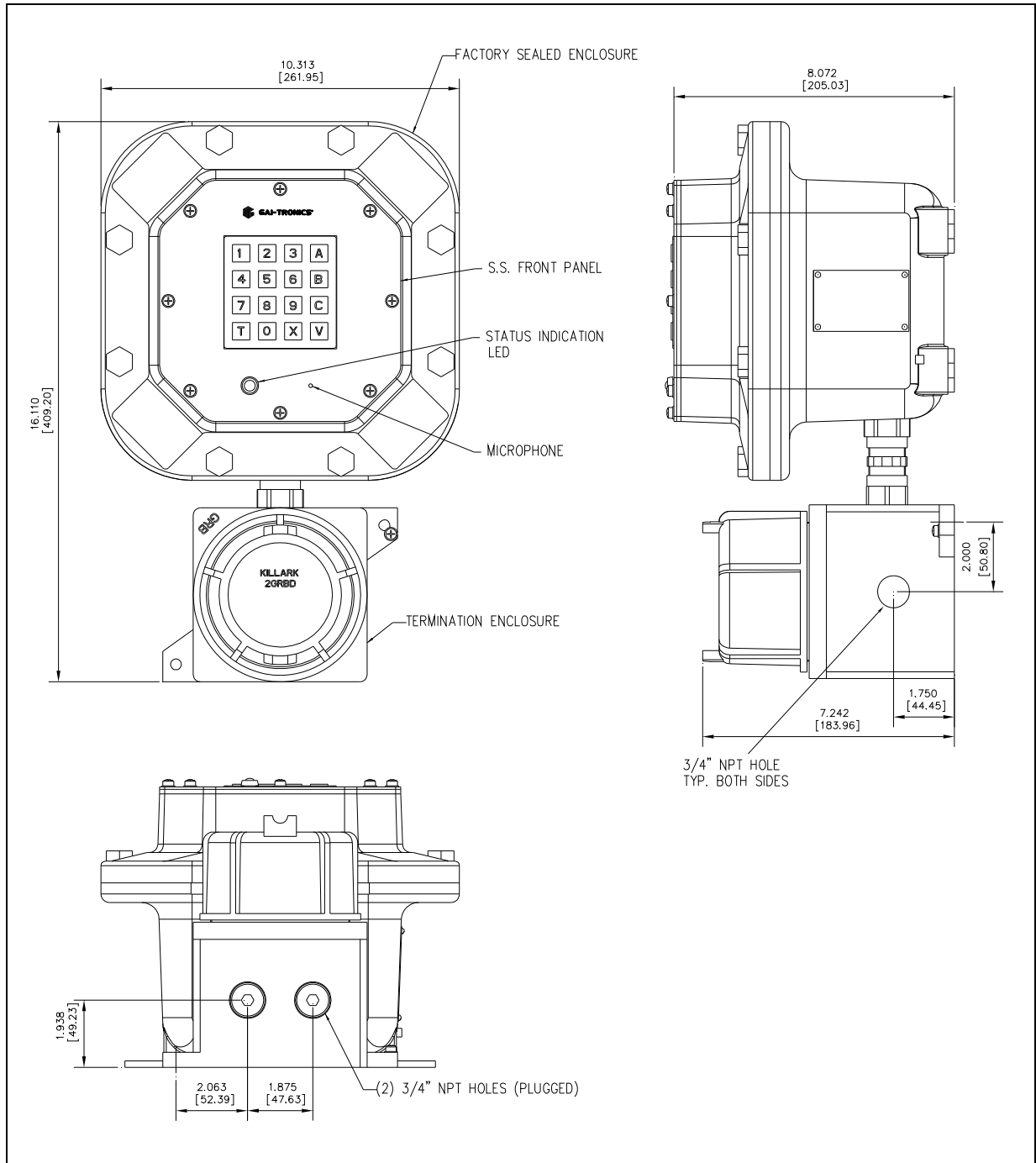
Figure 2. Driller's Intercom Outline

Mounting

The station consists of two enclosures that are connected by a union. The mounting location must be a flat, vertical surface that provides proper clearance, rigidity and strength to support the station.

The suggested mounting height for stations is 54 inches (137 cm) up to the center of the factory-sealed enclosure.

To maintain the explosion-proof integrity of these stations, they are designed with all mounting hardware located outside the enclosures. Refer to Figure 3 for mounting hole and slot dimensions.

Securely fasten the factory-sealed and termination enclosures to the mounting location using steel mounting bolts and washers, or washer-head bolts (hardware not included).

Conduit Installation

Install the conduit using an approved electrical conducting-type lubricant on the threads. The termination enclosure on the station has one conduit entry on each side and two on the bottom of the enclosure.
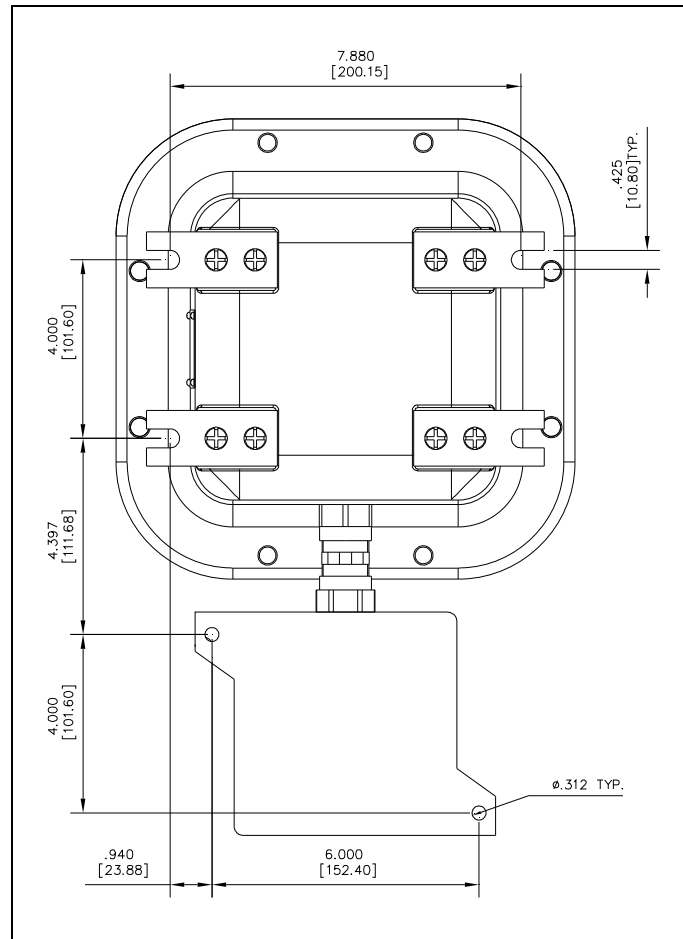
Figure 3. Rear view showing mounting slots

The UL-approved Driller's Intercom models contain ¾-inch NPT conduit entries. The bottom entries are plugged from the factory and can be removed to allow use of the entry. Refer to Figure 2 for locations. All unused conduit openings must be plugged using a close-up plug approved for the specific hazardous location where the enclosure is used. All conduit connections must meet minimum thread engagements as specified by the applicable electrical codes.

Field Wire Installation

Remove the termination enclosure cover and pull all wiring into the termination enclosure. Make all connections as described below.

NOTE: All field wiring is to be completed in the termination enclosure (bottom enclosure) only.
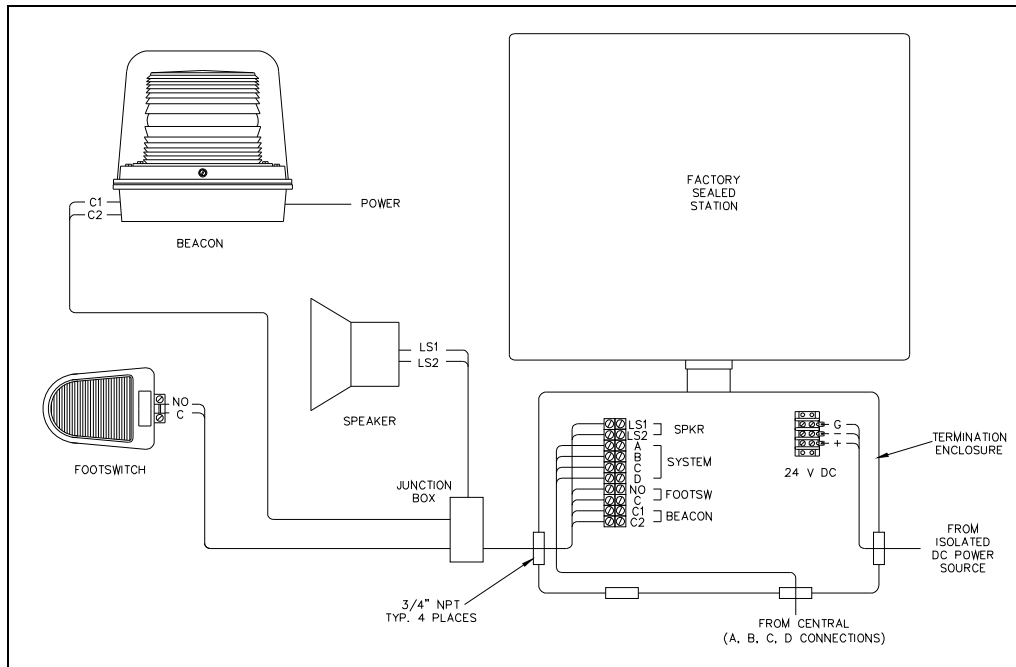
Figure 4. DC Model Installation Diagram (See note below.)
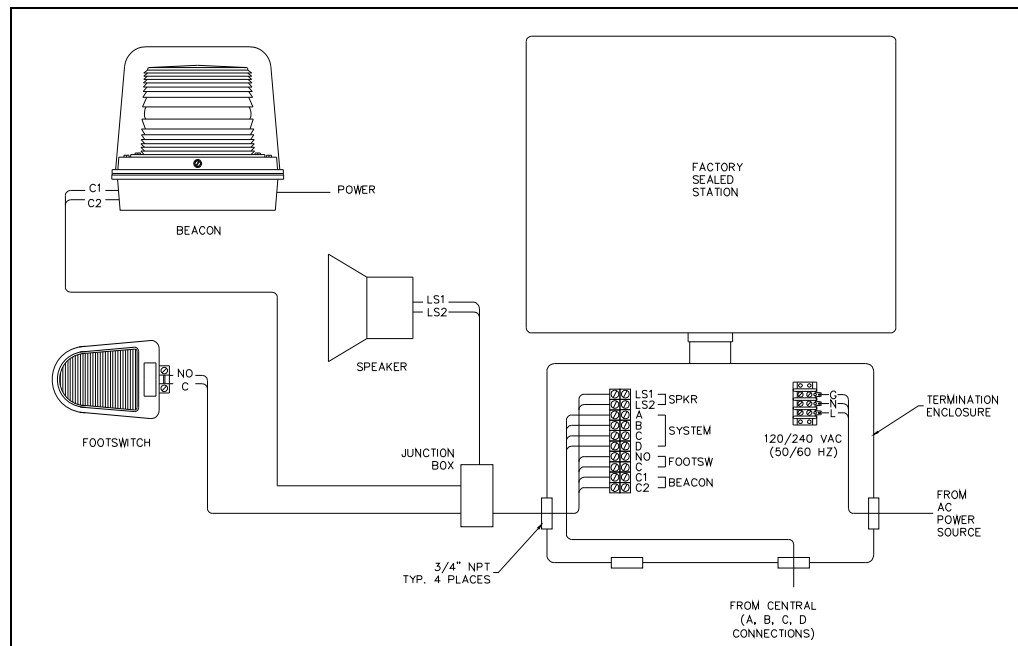
Figure 5. AC Model Installation Diagram (See note below.)

NOTE: Consult the National Electrical Code (NFPA 70), Canadian Standards Association (CSA 22.1), and local codes for the specific requirements regarding your installation. Install all equipment without modification and according to the local and national codes. Install conduit and seals where required. Class 2 circuit wiring must be performed in accordance with NEC 725.55.

Power

A separate power feed is recommended for stations in Div. 1 areas so that the stations can be de-energized for maintenance without disrupting the power supply to the other equipment in the Div. 1 area. Refer to Figure 4 and Figure 5 for wiring details. Remove the termination enclosure cover and pull all wiring into the termination enclosure. Terminal block TB2 is provided for connection of power to the station. Terminate all conductor ends using #6-32 screws lugs.

AC Models

Terminate the 120-240 V ac 50/60 Hz feed on TB2. This terminal block can also be used to connect 120-240 V ac 50/60 Hz to the next station. The maximum current of the ac feed shall not exceed 20 amperes. Refer to Figure 5 for more details.

DC Models

Refer to Figure 4. Terminate the 24 V dc feed on TB2. This terminal block can also be used to connect 24 V dc to the next station. The maximum current of the dc feed shall not exceed 20 amperes. Power must be supplied by an isolated 24 V dc power source. Additional power feeds may be required to increase the system distance and/or the number of stations.

NOTE: Isolated dc power sources must be used for this installation. The 24 V dc source should be located as close to the system center as possible.

Grounding the negative side of the power source at one point is recommended to ensure hum and noise-free operation. Noise present on dc power lines can negatively affect station operation. Therefore, noise should be limited to 10 mV or less.

When installing this equipment, the power cable length is an important consideration. Refer to Table 1 for the recommended wire sizing details and the maximum cable lengths. This table is a guideline that is useful in most applications; however, the installer must take into consideration any parameters specific to their application.

Table 1. Maximum Distance between Driller's Intercom Stations (in feet)* (DC)				
# of Stations	AWG Wire			
	12	14	16	18
1	906	570	358	225
2	302	190	119	75
3	151	95	59	37
4	90	57	35	-------
5	60	38	-------	-------
6	43	27	-------	-------
7	32	-------	-------	-------
8	25	-------	-------	-------

*This chart is based on the following parameters:

1. V(max) = 27 V
2. V(min) = 21 V
3. Cable temperature rating = 90 ºC
4. The American Wire Gauge resistance table

For V(max) of 24 V, multiply the distance shown by a factor of 0.47.

Auxiliary Devices

Terminal block TB1 is provided for connection of the speaker, system cable, footswitch, and beacon. This terminal block accepts a #12–22 AWG wire. Refer to Table 2 for the recommended conductor sizes. Conductor ends can be stripped and terminated with or without a wire ferrule.

Table 2. Recommended Cable Sizes	
Cable Use	**Size**
System	Digital: Two-conductor twisted pair, No. 22 AWG is typical Analog: Four-conductor twisted pair (A/B twist; C/D twist), No. 22 AWG is typical
Power	Three-conductor, No. 12 AWG is typical
Beacon	Two-conductor, No. 18 AWG is typical (for digital models only)
Footswitch	Two-conductor, No. 22 AWG is typical
Speaker Cable	Two-conductor twisted pair, No. 18 AWG is typical

1. Install the system cable on TB1 system terminals A–D. Each system cable must be home run to the Central. Digital stations require termination of a 2-conductor twisted pair cable on system terminals A and B only. Analog stations require termination of a 4-conductor twisted pair cable (A/B twist & C/D twist) on system terminals A–D. Refer to Table 3 for the maximum system cable lengths.

Table 3. Maximum System Cable Lengths				
	Digital Models		**Analog Models**	
Cable Capacitance	**No. 22 AWG**	**No. 20 AWG**	**No. 22 AWG**	**No. 20 AWG**
30.5 nf/1000 feet	6562 feet	6562 feet	4921 feet	6562 feet
13.7 nf/1000 feet	9843 feet	9843 feet		

2. Install the speaker cable on TB1 Speaker terminals LS1 and LS2. Refer to Table 2 for recommended conductor sizes.

3. Install the beacon control cable on TB1 terminals C1 and C2. This control output is available on digital stations only. Refer to Table 2 for recommended conductor sizes.

4. Install the footswitch cable on TB1 terminals N.O. and C. Refer to Table 2 for recommended conductor sizes.

After all connections are made, inspect and clean the machined and threaded surfaces of both the termination cover and box. Clean the surfaces by wiping with a clean, lint-free cloth. Apply a light coat of Killark LUBG lubricant to the cover threads. Install and hand-tighten the cover to the box.

System Interconnection

Refer to Figure 6 for a typical system wiring diagram. Consult the Central Switch manual for further details on equipment connections to the central switch.
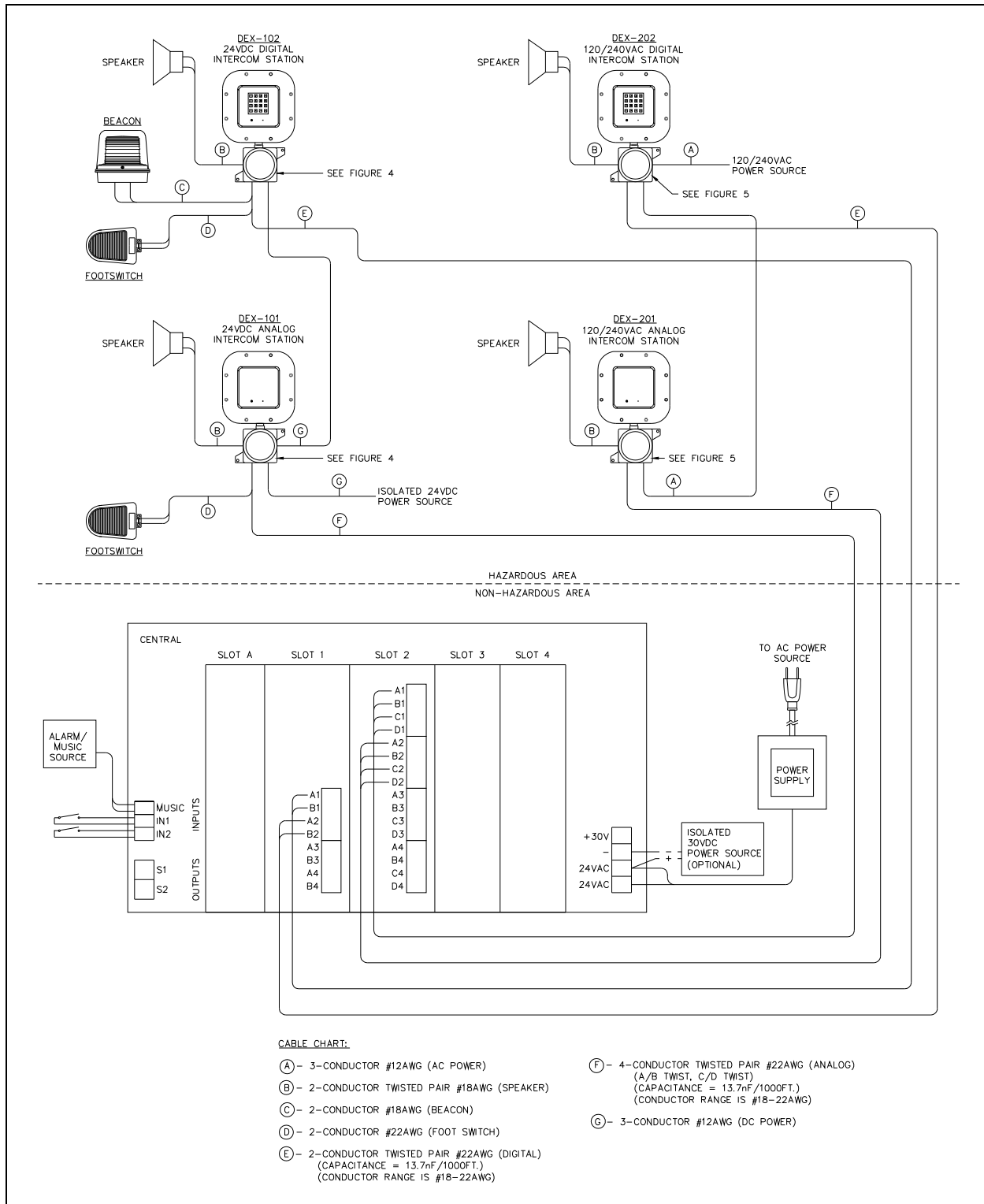
Figure 6. Typical system interconnection diagram

Operation

The Driller's Intercom stations can be operated in hands-free, switched-duplex mode when the conditions permit. If the conditions are not acceptable, the user can switch to simplex mode by depressing the T button. In some situations (example: high ambient noise levels or stations in close proximity), the station must be operated in simplex mode at all times.

Digital Models DEX-102 and DEX-202

Intercom Communication Modes

Master Communication - Communication between two stations can be automatically enabled during the system start-up, or enabled/disabled by the master station.

1. To enable communication depress 6T and the number of the radio channel. To disable communication depress 6T0. Refer to the "Listening to the Radio Channel" section of the Central Switch manual for more details.
    NOTE: The associated slave station must be configured to transmit to the radio channel.

2. The LED on the front panel illuminates to indicate a call is in progress.
    NOTE: For digital stations only, the beacon output can be activated for a variety of conditions. Refer to the "Attendant Contacts" section of the Central Switch manual for details.

3. Depress and hold the T button or the footswitch and speak into the microphone to transmit audio.

4. Audio from the slave station is broadcast over this station's speaker when the T button or footswitch is released.

Point-to-Point Communication – Refer to the "Direct Dialing" section of the Central Switch manual for additional details.

1. Enable point-to-point communication by dialing the extension of the desired station, or by entering the direct dial button(s) sequence.

2. The LED on the front panel illuminates to indicate a call is in progress.
    NOTE: For digital stations only, the beacon output can be activated for a variety of conditions. Refer to the "Attendant Contacts" section of the Central Switch manual for details.

3. Speak into the microphone to transmit audio. (If necessary, talk/listen control from this station can be controlled using the T button on the keypad or by using the station's footswitch input.)

4. Audio is broadcast over this station's speaker when the other station user speaks. (If necessary, talk/listen control from the other station can be controlled using the T button on the keypad or by using the station's footswitch input.)

5. Terminate the call by depressing the X button.

Volume Control

The master volume level adjustments for this station can be configured in the Central. Refer to the "Volume Configuration" section of the Central Switch manual for details.

During an active call, the speaker volume can be increased or decreased. Increase the volume by simultaneously depressing the V and B buttons. Decrease the volume by simultaneously depressing the V and C buttons. The volume level setting range is between 0 and 9, and the volume setting is reset when the call is terminated.

Paging

This station is capable of sending and receiving all-calls and group calls. Refer to the "All-Call" and "Group Call" sections of the Central Switch manual for configuration details.

Alarms and Music

This station is capable of receiving alarms and music. Refer to the "Alarm" and "Music" sections of the Central Switch manual for configuration details.

Analog Models DEX-101 and DEX-201

Intercom Communication Modes

Slave Communication - Communication between two stations can be automatically enabled during the system start-up, or when enabled/disabled by the master station.

1. The LED on the front panel illuminates to indicate a call is in progress.
   NOTE: The beacon output control is <u>not</u> available on this model.

2. Speak into the microphone to transmit audio.

3. Audio is broadcast over this station's speaker when the master station user pushes the T button.

Point-to-Point Communication - Communication with this station can be enabled when another station dials the extension of this station.

1. The LED on the front panel illuminates to indicate a call is in progress.
   NOTE: The beacon output control is not available on this model.

2. Speak into the microphone to transmit audio. If necessary, talk/listen control from this station can be controlled using the station's footswitch input.

3. Audio is broadcast over this station's speaker when the other station user speaks. (If necessary, talk/listen control from the other station can be controlled using the T button on the keypad or by using the station's footswitch input.)

4. The calling station must terminate the call by depressing the X button.

Volume Control

Volume level adjustments for this station can be configured in the Central. Refer to the "Volume Configuration" section of the Central Switch manual for details.

Paging

This station is capable of sending and receiving all-calls and group calls. Refer to the "All-Call" and "Group Call" sections of the Central Switch manual for configuration details.

Alarms and Music

This station is capable of receiving alarms and music. Refer to the "Alarm" and "Music" sections of the Central Switch manual for configuration details.

Maintenance

General Information

If you experience additional problems, please contact the GAI-Tronics Field Service Department at 1-800-492-1212 and follow the voice prompts.

In order to ensure explosion-proof integrity, repairs to this equipment are to be made ONLY by the GAI-Tronics Field Service Department and/or factory-authorized personnel. Factory-authorized personnel must reseal the unit by first checking that all flange surfaces are free of gouges or scratches. Apply a light coating of Killark "LUBG" lubricant to all flanged surfaces before closing. Install the bolts and tighten to 30 ft-lbs.

⚠**WARNING**⚠

Always remove power to this station and any associated equipment before beginning any maintenance.

Troubleshooting

Problem	Possible Solution
Low speaker volume	Increase the actual and/or maximum volume settings in the configuration. Refer to the "Volume Configuration" section of the Central Manual for details.
High speaker volume	Decrease the actual and/or maximum volume settings in the configuration. Refer to the "Volume Configuration" section of the Central Manual for details.
No speaker output	Set the station's attendant contacts OUT 1 to be active while the conversation is active and when the loudspeaker is active. Refer to the "Attendant Contacts Configuration" section of the Central Manual for details.
No beacon contact	Verify the station's attendant contacts OUT 2 are active for the desired condition. Refer to the "Attendant Contacts Configuration" section of the Central Switch manual for details.
Feedback	1. Point the station speakers in opposite directions. 2. Reduce the speaker volume of the stations. Refer to the "Volume Configuration" section of the Central Switch manual for details. 3. Increase the distance between stations. 4. Change the mode of operation from duplex to simplex. Refer to the "Simplex Configuration" section of the Central Switch manual for details. 5. Two stations can be barred from communication. Refer to the "Protection against Feedback Configuration" section of the Central Switch manual for details.

Specifications

Power input (120 V ac) .... Voltage .... 108/132 V ac range, 50/60 Hz

Power consumed .... 23 VA, 10 W (nominal)
52 VA, 50 W (maximum)

Power input (240 V ac) .... Voltage .... 216/264 V ac range, 50/60 Hz

Power consumed .... 43 VA, 11 W (nominal)
63 VA, 50 W (maximum)

Power input (24 V dc) .... Voltage .... 21/27 V dc range

Power consumed .... 42 W (nominal)
50 W (maximum)

Construction/finish .... Enclosure .... Copper-free cast aluminum with
gray powder epoxy/polyester on exterior surfaces

Front panel .... Passivated stainless steel

Microphone amplifier .... Frequency response .... 200–4,000 Hz, ±3 dB ref. @ 1 kHz

Speaker amplifier .... Output .... Class AB, 18 watts into 8 ohms, with nominal supply voltage

Frequency response .... 200–10,000 Hz, ±3 dB ref. @ 1 kHz

Distortion .... 1% maximum THD @ 1 kHz, 18 W

Inputs .... 16-button keypad, footswitch,
speaker volume adjustment (adjusted through keypad)

Outputs .... Call Indication LED

Beacon control (digital only) .... 1 A @ 30 V dc (maximum)

System cabling .... Digital .... Star-feed, two-wire twisted pair

Analog .... Star-feed, four-wire twisted pair

Temperature range .... Analog: −13º F to +149º F (−25º C to +65º C)
Digital: −4º F to +140º F (−20º C to +60º C)

Dimensions .... 10.31 W × 16.11 H × 8.07 D (262.0 × 409.2 × 205.0 mm)

Shipping weight .... 39 lbs. (17.7 kg)

Approvals

UL .... NRTL Listed for USA and Canada
Class I, Div. 1 & 2, Groups C & D T4
Class I, Zones 1 & 2, Group IIB & IIA
Class II, Div. 1 & 2, Groups E, F, & G
Class III, Div. 1 & 2, Type 4X

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.