

American Telephone and telegraph Company

BELL SYSTEM PRACTICES	ADDENDUM P31.130
Teletypewriter and Manual	Issue B, 11-1-51
Telegraph Station and PBX	Long Lines Department
Installation and Maintenance	Dist. Class. 400AC 600AC

REMOTE SIGNAL BELLS

AND

TELETYPEWRITER INSTALLATIONS
INVOLVING HAZARDOUS LOCATIONS

1. GENERAL

1.00 This addendum covers special instructions regarding installations of teletypewriters, remote signal bells and other telegraph station apparatus in explosive atmospheres. It is re-issued to add Paragraph 1.10 containing instructions now covered in the form of a telegram, and to cover changes necessitated by recent changes in organization. Revised paragraphs are indicated by an asterisk (*).

1.02 Add the following to this paragraph:

The Commercial Department will normally indicate to the customer his responsibility to furnish the wiring between the bell and the teletypewriter. During his initial investigation of the service, however, the Plant Department representative handling installation arrangements with the customer shall make sure that the customer is advised of the requirement that explosion-proof wiring and fittings must be provided from the bell to a point outside the hazardous area and shall make the data on explosion-proof wiring and fittings covered in Section P31.130 available to the customer for his guidance.

1.04 Section P31.130 describes the explosion proof bells that are available for use with Nos. 14, 15 and 19 teletypewriters. These bells have been

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approved by the Underwriters Laboratories for use in locations where explosive atmospheres of ethyl ether vapor, gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors, or natural gas, as outlined in Class 1, Groups C and D, and Class 2, Group G, of the National Electrical Code may exist. These bells shall be provided at all new installations subjected to fumes of the foregoing types when a remote signal bell is required. Existing installations of older types of bell should not be replaced with the explosion proof bells unless the replacement is authorized by Private Line Service Order.

* 1.05 Because of the small difference in cost between the 10 inch and the 8 inch sizes of the explosion proof bells, the 10 inch size shall be provided in all cases unless the Private Line Service Order specifies the other size.

1.06 Where new remote bells are being ordered from the Western Electric Co. for installations to be located out of doors in nonexplosive areas, the outdoor type of explosion proof bell shall be ordered, because the older type of bell requires a separate weather protective hood for out of doors use. However, for new installations of loud ringing remote bells located indoors in nonexplosive areas, the older type of bell (80563M, 80564M and 80565M) may continue to be used.

* 1.07 Because of possible difference in charges to the customer for the new type of bell as compared to the older types, and also for the indoor type as compared to the outdoor type, the type of bell to be provided will be specified in the Private Line Service Order if the Commercial Department knows in advance the exact conditions at the customer's station. If the Order does not specify the type of bell to be provided, or if conditions at the customer's station are such that the use of a bell of a type other than that specified in the Order appears desirable, the type of bell it is proposed to use should be reported to the Division Plant Superintendent's Office in the usual way in connection with the initial investigation of the service involved. This report should also include the reasons for the proposed deviation from the Order if a deviation is being proposed.

1.08 Whenever Private Line Service Orders are received involving new installations at, or moves to, locations where teletypewriters, remote signal bells, or other telegraph station apparatus are likely to be exposed to an explosive atmosphere, follow the procedure outlined below:

- *(1) The regular action toward obtaining all the material required shall be taken. The actual installation or move shall not be made, however, until the Area Plant Manager's approval of the customer's station layout, based on the sketches or information outlined in Paragraphs (2) and (3) below, has been obtained.
- *(2) In connection with new services a sketch showing the complete details of the layout of the customer's premises shall be forwarded, via regular organizational channels, to the Area Plant Manager's Office. Paragraph 1.09 describes the information required. Such sketches should be forwarded far enough in advance of the requested service date to permit consideration by the Area Plant Manager and the Area Chief Engineer.
- *(3) In connection with moves, sufficient details shall be forwarded, via regular organizational channels, to the Area Plant Manager's Office to indicate the new location of the apparatus on sketches previously furnished. If this is not practicable, a new sketch shall be prepared and forwarded.
- *(4) After the sketches or information have been reviewed by the Area Plant Manager and the Area Chief Engineer, the Area Plant Manager should notify the Division Plant Superintendent whether or not it will be satisfactory to proceed with the installation and will include any comments or suggestions he has to offer. Any comments or suggestions regarding the layout or arrangement of the customer's premises or equipment that the Area Chief Engineer or Area Plant Manager has to offer should be referred to the Commercial Department people for discussion with the customer.

*Note: At some locations involving new services it may be difficult to obtain complete details to permit the preparation of sketches along the lines of Paragraph 1.09 at the time such Private Line Service Orders are issued. This would be especially true where the apparatus is to be installed in a temporary shack pending the construction of the permanent building or where the permanent building is only partially completed. It is believed, however, that from discussions of the matter with the customer's representatives at the substation and consulting architectural drawings of buildings and other drawings that the customer may possess showing the layout of the operating area of the pumping station, sufficient information can be obtained to permit preparing a preliminary sketch. This preliminary sketch aside from being helpful in considering the installation of the apparatus with respect to its exposure to an explosive atmosphere will afford an opportunity for the customer to make any changes in, or additions to, his installations that he may consider desirable in accordance with any suggestions made by the Engineering people. Final sketches should be forwarded however, as soon as it is possible to obtain the complete information.

1.09 The details regarding the sketches referred to in Paragraph 1.08, are as follows:

(1) The sketch should be prepared in such form as to permit duplicating. It should show the general relation of the building in which the telegraph station apparatus is installed with respect to storage tanks, loading platforms, pits, pump houses, storage sheds and any other pertinent objects that would influence the location of the telegraph apparatus from the standpoint of its exposure to explosive fumes. Indicate on this sketch the distances from the building housing the telegraph apparatus to these objects. Also indicate the compass directions.

(2) On the same sketch or an additional sketch show the detailed floor plan of the building housing the telegraph apparatus. Indicate on this sketch the following:

- (a) Type of construction of building, i.e., brick, frame, concrete or other.
- (b) Type construction of partitions, i.e., brick, wallboard, glass or wire mesh or other.
- (c) The various rooms should be designated such as pump room, furnace room, office, wash room, corridor, etc.
- (d) Show location of windows and doors in inside and outside walls or partitions.
 - (1) Indicate if the windows are permanently closed and fume proof, or if they can be readily opened and in the latter case, whether they are fume proof when closed. (2) Indicate direction of swing of doors, whether they are self-closing and whether they are fume proof when closed.
- (e) If the pump is located in a room of the same building housing the telegraph apparatus and is driven from another room, show whether the driving shaft enters the pump room through a fume proof bearing or housing. Indicate type of driving agent: whether an electric motor, diesel engine, gas or gasoline engine.
- (f) State, if possible whether electrical lighting wiring, fixtures and fittings are of an explosion proof type.
- (g) If the remote signal bell is to be installed indicate the proposed location, taking into consideration the distance from the floor or ground line. If the bell is to be located indoors or out of doors on a pump room wall or other wall where explosive fumes can be expected, state whether fume proof conduit will be provided through the wall.

(h) If a ventilating system is provided for the room in which telegraph apparatus is installed, indicate whether it is a pressure or suction type and show air intakes and outlets. Also show general direction of the flow of air.

(3) State whether gas, gasoline, oil or other explosive fumes are noticeable and in the opinion of the Telephone Company's representative, or of the customer, they are apt to be present in the locations selected for the telegraph apparatus.

(4) State any special local rules and regulations governing installations at locations where explosive fumes are likely to exist.

*1.10 All teletypewriter apparatus installed in explosive atmospheres must be fused. On apparatus where the fusing arrangements are not a standard part of the machine or table, as for example No. 14 Teletypewriters mounted on 14 type tables, the fusing arrangements should be added to the table. Refer to the applicable standard instructions for the value of Fusetrans to use, and for information on ordering, installing and wiring the parts.

*2.01 Add the following to this paragraph:

Vibrating type and single stroke type bells are understood to be obtainable for operation on 25 cycle and 50 cycle power supply also. To obtain them, use the same ordering information as for 60 cycle bells but specify that they are for operation on 115 Volt, (specify) cycles, AC.

BELL SYSTEM PRACTICES
Teletypewriter Stations

SECTION P31.130
Issue 2, February, 1957
AT&TCo Standard

REMOTE SIGNAL BELLS AND TELETYPEWRITER INSTALLATIONS INVOLVING EXPLOSIVE ATMOSPHERES INSTALLATION AND MAINTENANCE

1. GENERAL

1.01 This section describes and gives installation and maintenance information for the KS-8547 signal bells for use in explosive atmospheres. These bells are intended for remote operation from the uppercase S selection of teletypewriters and are suitable for use in locations made hazardous by the presence of explosive gas, vapor, etc., as defined in Class 1, Groups B, C, and D atmospheres; and Class 2, Groups F and G atmospheres, of the National Electrical Code. **Only** the KS-8547 bells may be used in explosive atmospheres, the teletypewriter and its associated equipment must **never** be installed in explosive atmospheres.

1.02 This section is being reissued:

- (a) to incorporate the addendum to Issue 1, which describes an emergency disconnect relay arrangement for teletypewriter stations operating adjacent to explosive atmospheres.
- (b) to bring up to date the table in Paragraph 2.01 by showing the reduced number of bells now available.
- (c) to make corrections in the various figures.
- (d) to make the installation and maintenance procedures more specific.

1.03 The bells should be installed in areas made hazardous by the presence of explosive atmospheres **only upon proper authorization**, which must be included in the installer's order. It is necessary for the subscriber and the Telephone Company to have a definite agreement regarding the location for

the bell inside the hazardous area, the location for the teletypewriter and accessories which must be located **outside** the hazardous area, and the provision by the customer of approved conduit and wiring between these two points.

1.04 Where Bell System apparatus or wiring other than that designed for use in hazardous locations is found installed or is about to be installed in an atmosphere which is thought likely to be explosive, or to become explosive, installers and maintenance men should bring that fact to the attention of their supervisor. Ordinarily the local board of Fire Underwriters, the Fire Department, or other authorities require building owners or tenants to post suitable notices in locations where special precautions are necessary to avoid fire or explosion.

1.05 The KS-8547 bells have been approved by the Underwriters Laboratories for use only in those hazardous locations where the atmosphere may contain any of the following, and no others of an explosive nature:

- (a) hydrogen, or gases or vapors of equivalent hazard such as manufactured gas (Class 1, Group B, National Electrical Code).
- (b) ethyl-ether vapors, ethylene, or cyclo-propane (Class 1, Group C, N.E.C.).
- (c) gasoline, hexane, naphtha, benzine, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas (Class 1, Group D, N.E.C.).
- (d) carbon black, coal, or coke dust (Class 2, Group F, N.E.C.).
- (e) flour, starch, or grain dusts (Class 2, Group G, N.E.C.).

Caution: No bells or other electrical apparatus or wiring shall be installed at a location where acetylene may become present in the atmosphere.

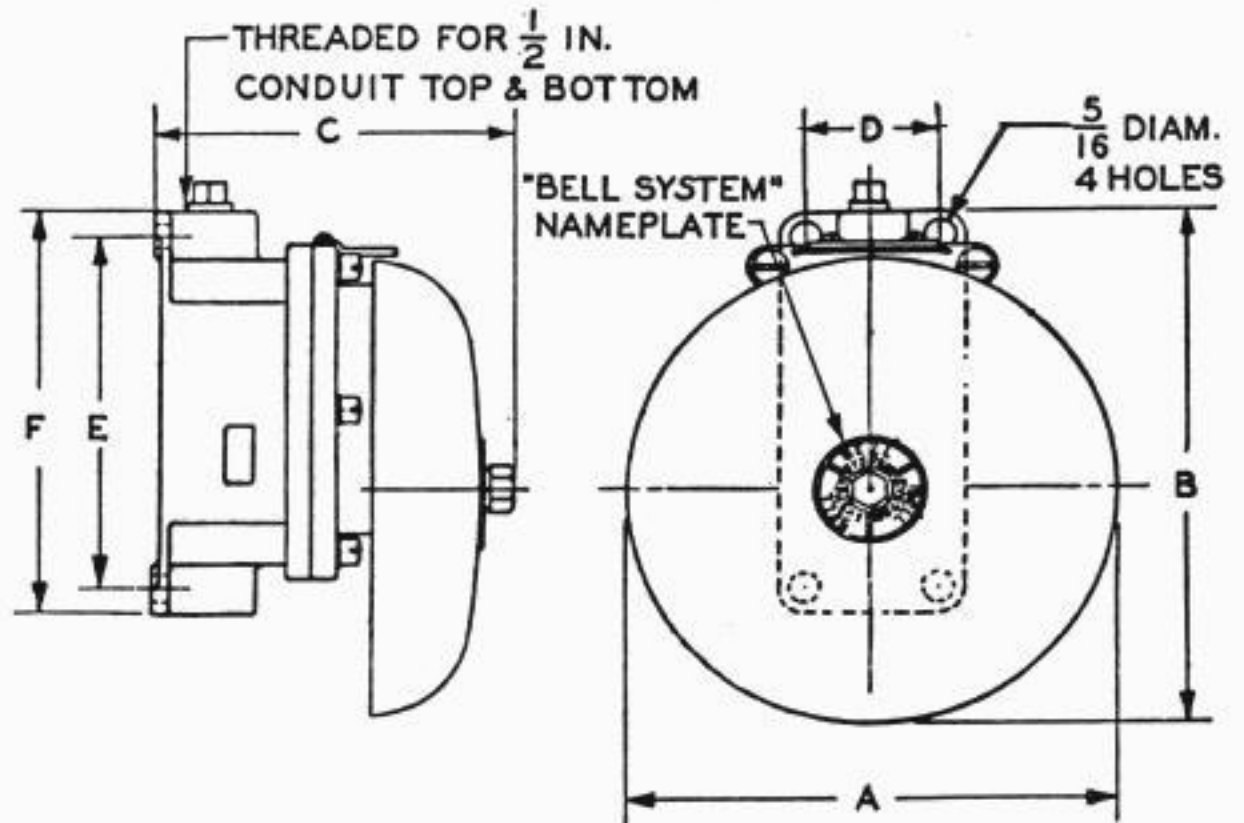
2. DESCRIPTION

2.01 These signal bells are available as follows:

<u>KS-8547 List No.</u>	<u>Type of Op- eration</u>	<u>Indoor or Outdoor</u>	<u>Gong Size</u>	<u>Power Required</u>
1	Vibrating	Indoor	10 inch	115 volt, 60 cycles ac ↗
2	Vibrating	Outdoor	10 inch	115 volt, 60 cycles ac
3	Single Stroke	Indoor	10 inch	115 volt, 60 cycles ac and 115 volt dc*
4	Single Stroke	Outdoor	10 inch	115 volt, 60 cycles ac and 115 volt dc*

* The dc bells may be obtained by special order giving the list number plus the requirement for dc operation. ↘

2.02 The electrical parts of the bells are enclosed in a cast iron explosion-proof housing which is designed to be safe when used in hazardous atmospheres. The cover in the housing is held in place by bolts, and two conduit openings threaded for 1/2-inch conduit are provided, one at the top and one at the bottom of the housing. The general appearance of the bell for indoor use is shown in Fig. 1 and of the outdoor bell in Fig. 2.



BELLS PER LIST NOS.	SIZE OF GONG	DIMENSIONS					
		A	B	C	D	E	F
L1, L3	10	$10 \pm \frac{1}{8}$	$10 \frac{3}{4} \pm \frac{1}{8}$	$6 \frac{1}{8} \pm \frac{1}{4}$	$2 \frac{3}{16} \pm \frac{1}{16}$	$6 \frac{3}{16} \pm \frac{1}{16}$	$7 \pm \frac{1}{8}$

Fig. 1

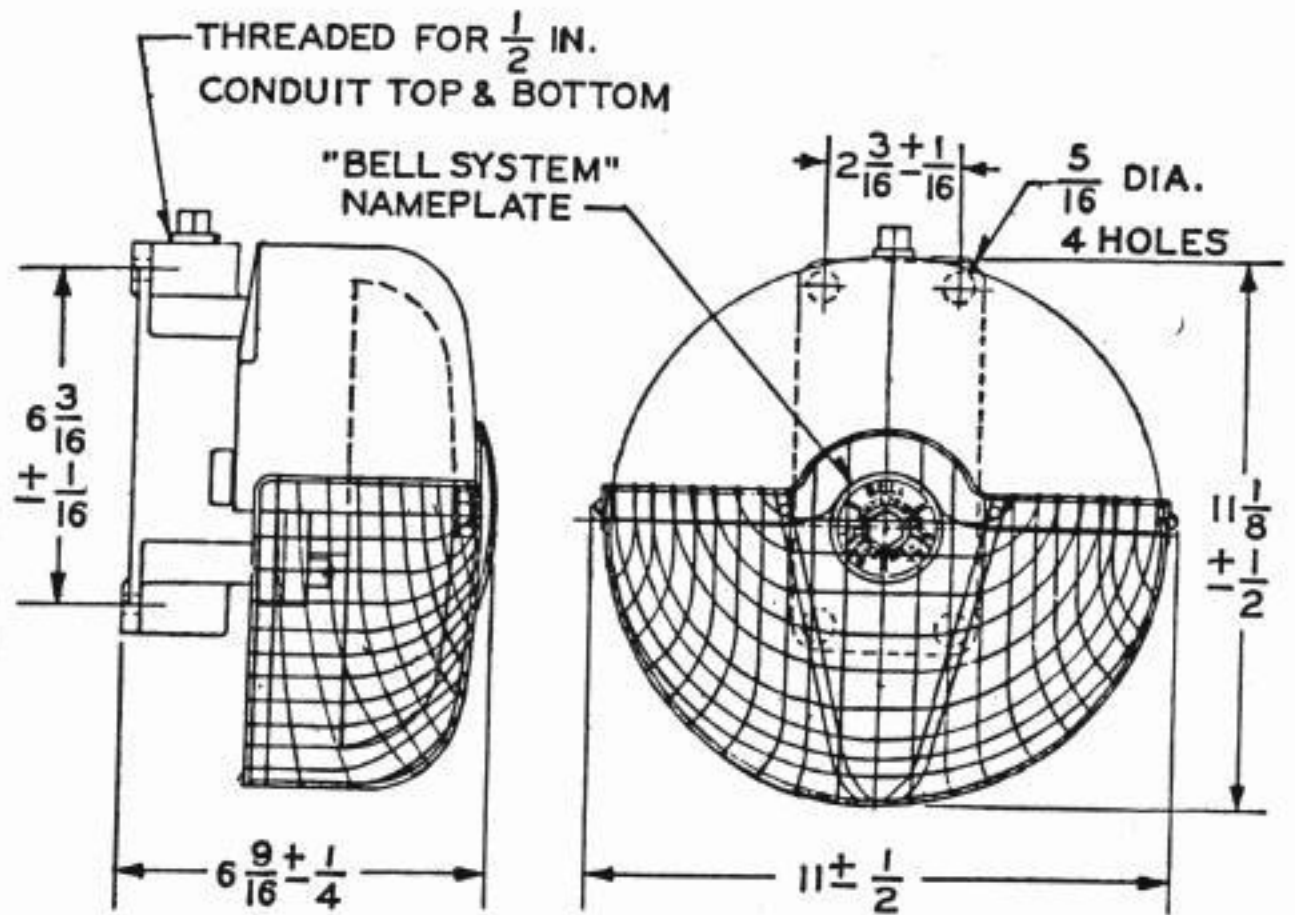


Fig. 2

The outdoor bell is protected by a weatherproof guard. All the bells are finished in black and none contain any contacts, the operating mechanism consisting of a plunger which moves in a solenoid.

2.03 The bells are intended for use with nominal 115-volt power supply but both the ac and dc bells will operate satisfactorily on voltages varying from 88 to 132 volts. The current required to operate the bells and the resistance of the coils are as follows:

	<u>Coil Res.</u>	<u>Normal Starting Current</u>	<u>*Normal Operating Current at 115 Volts</u>
Vibrating bells ac	500 ohms	.15 amp	.10 amp
Single stroke ac	110 ohms	.45 amp	.12 amp
Single stroke dc	1335 ohms	.09 amp	.09 amp

* For single stroke bells the normal operating current is the steady current with the plunger up. With vibrating bells it is the average current with the bell vibrating.

3. INSTALLATION OF BELL, TELETYPEWRITER, AND WIRING

3.01 The teletypewriter, its power outlet, and all accessories including protectors, **must** be located **outside** the hazardous area. If it should be necessary for the teletypewriter loop to pass through the hazardous area, that portion of it must consist of bridle wire or its equivalent and be encased in rigid conduit sealed where it enters or leaves the hazardous area as covered by the National Electrical Code and local regulations. Since all wiring inside the hazardous area is necessarily power wiring, it should not be done by the installer. The installer should make certain however, that all the wiring conforms to the Bell System Practices. All wiring and apparatus outside the hazardous area should be of the type provided for normal installations and should be installed in accordance with the standard instructions for such apparatus.

3.02 If possible the bell should be installed at a time when the location is free of explosive substances. No testing instruments which are capable of producing electric sparks may be used in explosive atmospheres and due care should be taken not to strike metal objects together so as to cause sparks. As much ventilation should be obtained as is permissible remembering that prevailing restrictions posted or otherwise made known at the subscriber's premises must be carefully obeyed.

3.03 The following materials are needed for the installation of the KS-8547 Signal Bell:

KS-8547 Signal Bell of the required list number.

1/2-inch rigid conduit.

1/2-inch pipe bushing for end of conduit.

Explosion-proof conduit fittings, including couplings, sealing condulets, elbows, etc., as required by the National Electrical Code.

Bridle wire (if loop must pass through hazardous area).

Upper-case S contacts for the teletypewriter as covered in Bell System Practices.

Power wiring as required.

Fuse cut-out and box.

Sealing compound.

3.04 The remote bell contacts on the teletypewriter should be installed in accordance with the sections of Bell System Practices covering these parts.

3.05 A single fuse cut-out equipped with a 1 ampere fuse should be installed in the power side of the leads which supply power for operating the bell as shown in Fig. 3. This fuse must be outside the hazardous area.

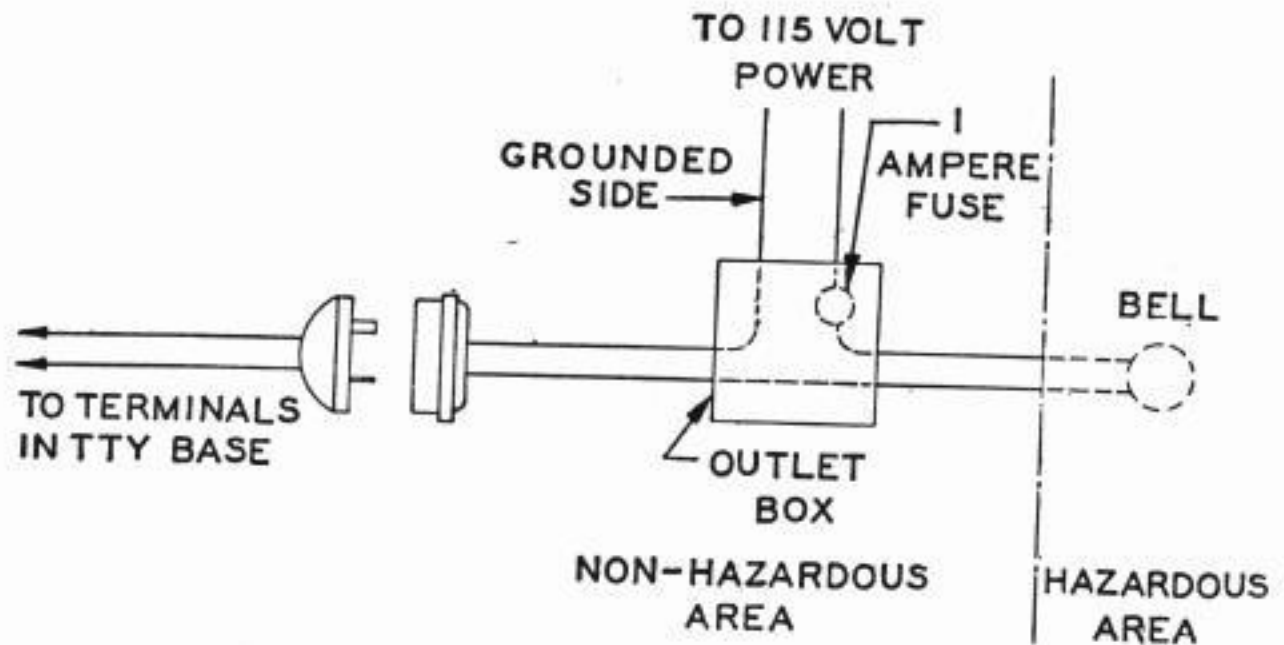


Fig. 3

3.06 The bell should be mounted so that the plunger is vertical and moves upward to strike the gong. It should be fastened to the wall or other vertical support by means of four 5/16-inch screws or bolts through the holes provided.

3.07 Rigid 1/2-inch conduit is required between the signal bell and the point where the wiring leaves the hazardous area. This conduit and all associated joint fittings must be in accordance with the National Electrical Code and any local regulations that may apply for hazardous locations. The bell has two conduit openings, one at the top and one at the bottom. The one not used must be closed with an approved plug which is furnished with the bell. The conduit must be sealed at the bell and at the point where it leaves the hazardous area, using an approved sealing compound as required by the National Electrical Code and local regulations. From the termination of the conduit outside the hazardous area to the teletypewriter other types of regular power wiring will be satisfactory. Fig. 4 shows a typical arrangement. Neither side of the power should be connected to the wiring between the bell and the non-hazardous area during installation until the conduit and case are completely closed and the bell is ready for operation. The connection of the leads from the bell to the power should be made in the non-hazardous area after all connections in the hazardous area are completed. The bell should be tested by operating from the teletypewriter as shown in Paragraph 5.01.

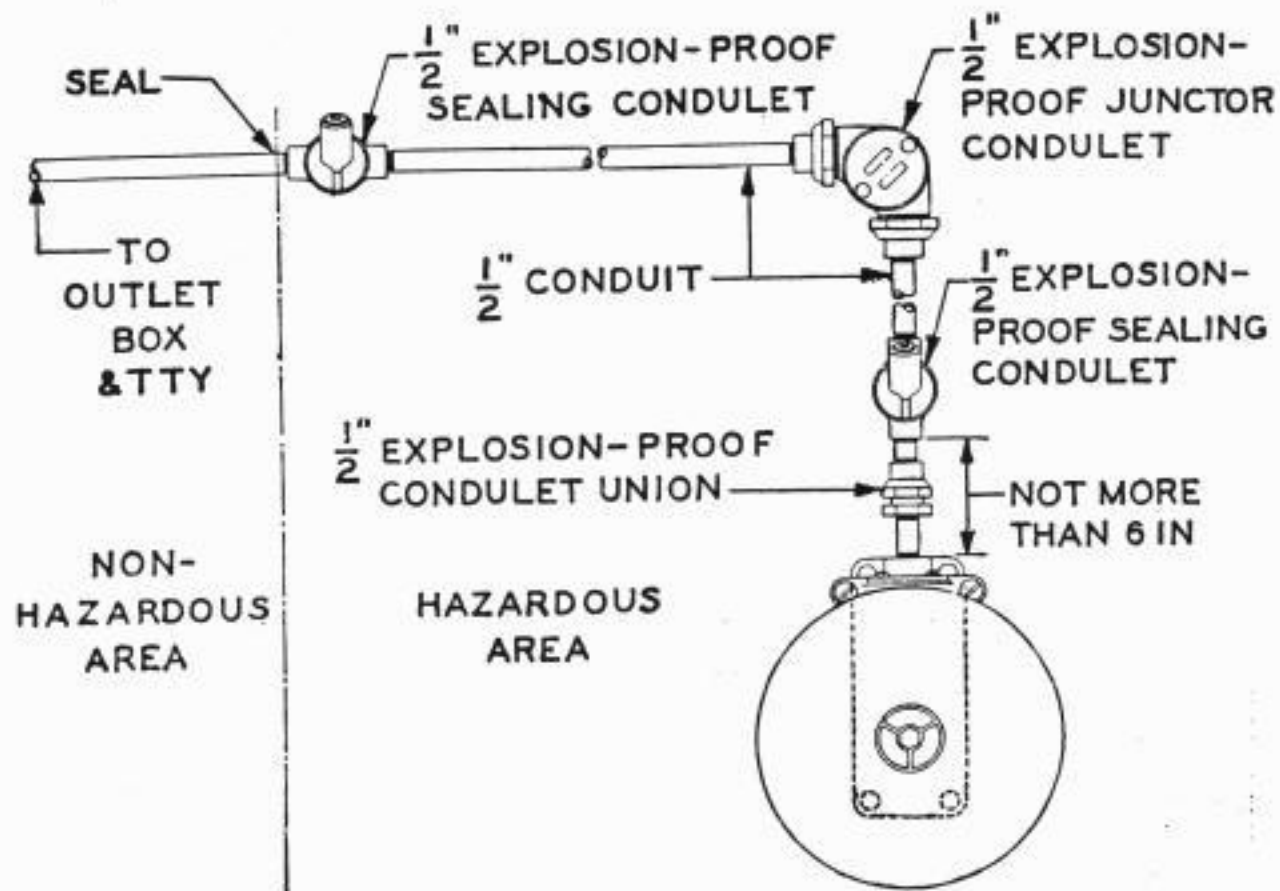


Fig. 4

4. EMERGENCY DISCONNECT RELAY ARRANGEMENT

4.01 For services rendered to customers engaged in pipe line operation, an arrangement is occasionally requested for disconnecting the incoming line from the teletypewriter station set adjacent to a hazardous location, when primary power is removed due to an emergency. To fill a customer's specific order for such an arrangement, an emergency disconnect relay per KS-5483, List 09, should be provided, wired in accordance with Fig. 5A, B, or C; appropriate to the type of line facilities furnished. Under normal conditions the disconnect relay is held operated by the pumping station power circuits, controlled by the station emergency disconnect system. The KS-5483 relay should be installed outside of the hazardous area and as near to the teletypewriter as practicable. It should be connected and housed in accordance with notes of Fig. 5 and the installation made in conformance with the Bell System Practices of the C33 Series.

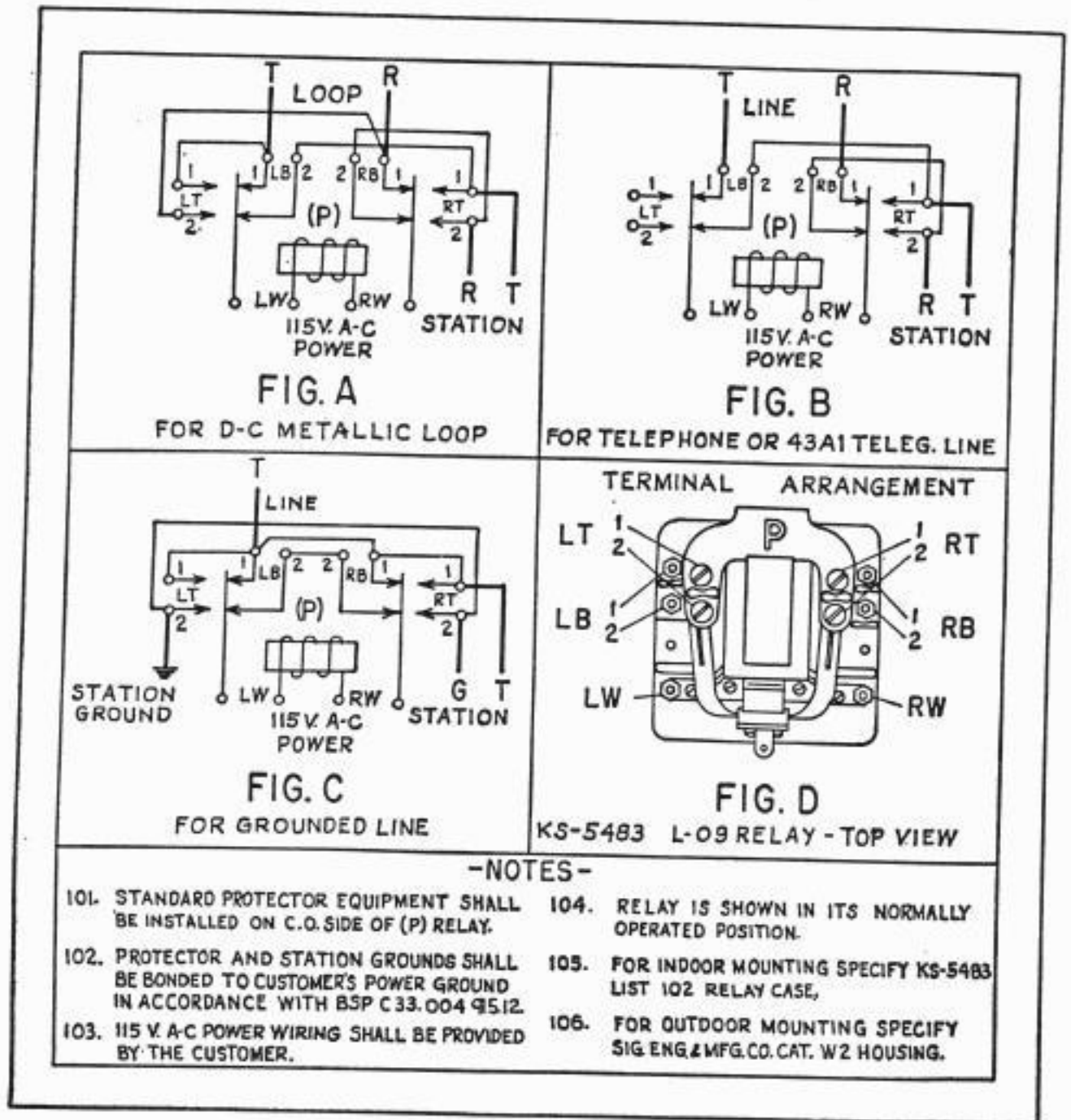


Fig. 5

5. MAINTENANCE

5.01 In order that the bells and the relays and their associated wiring may continue to afford full protection, it is important that all broken or worn parts be replaced and other abnormal conditions, even though minor, be corrected without delay. The bells have no contacts or exposed moving parts and therefore need no special inspections. They can be tested by operating whenever the associated equipment is being tested. The emergency disconnect relays can also be tested by operating. If they fail to work properly, the contacts should be inspected for faulty alignment and dirty surfaces. Neither the relays nor the bells require any lubrication. If either the relays or the bells still fail to work properly after the current and voltage are found to be normal, they should be replaced by new ones and the defective equipment returned for repair.

5.02 If it should be necessary to do any maintenance work on the bells, the circuit should be opened **outside** the hazardous area by removing the fuse before starting the work. The power should not be restored until the cover of the bell is securely in place and the bell is ready for use. The same precautions should be taken as in Paragraph 3.02 to guard against the production of sparks.