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.

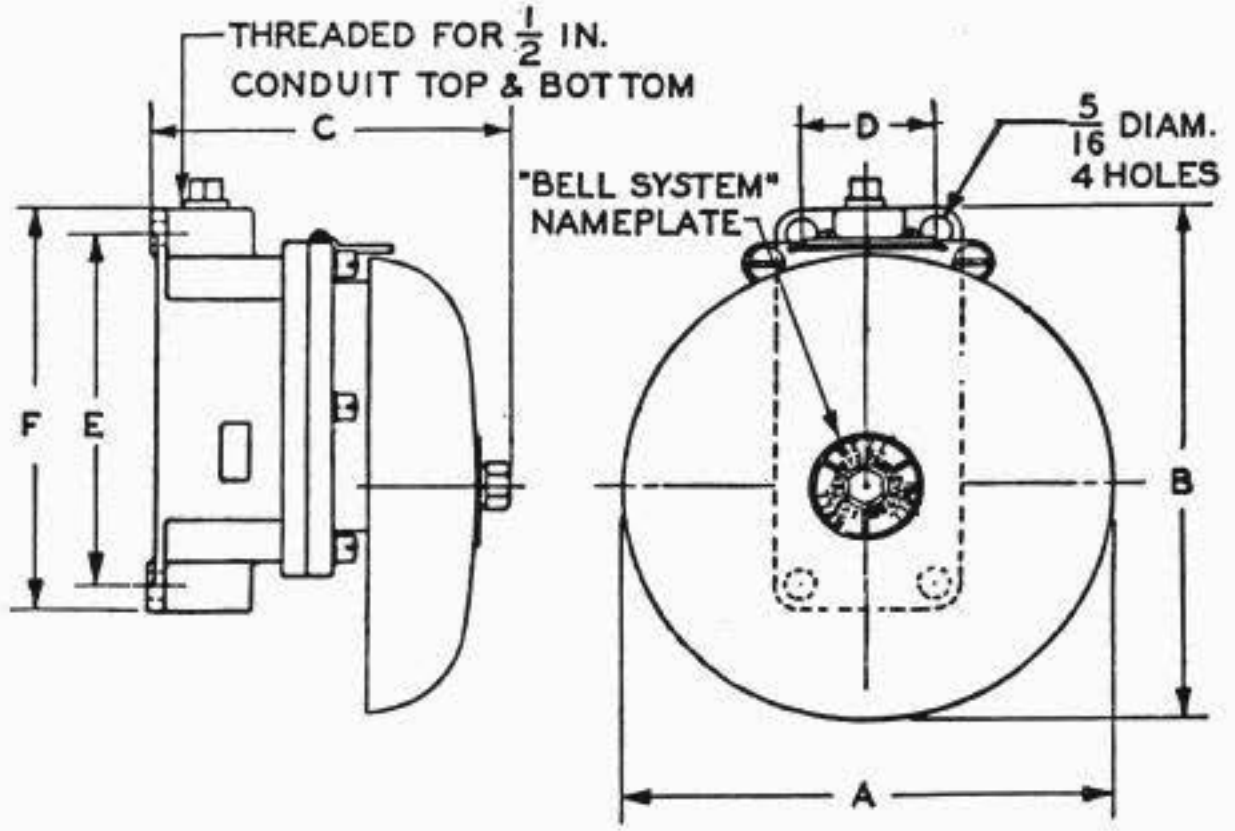
2. DESCRIPTION

2.01 These signal bells are available as follows:

KS-8547 List No.	Type of Operation	Indoor or Outdoor	Gong Size	Power Required
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

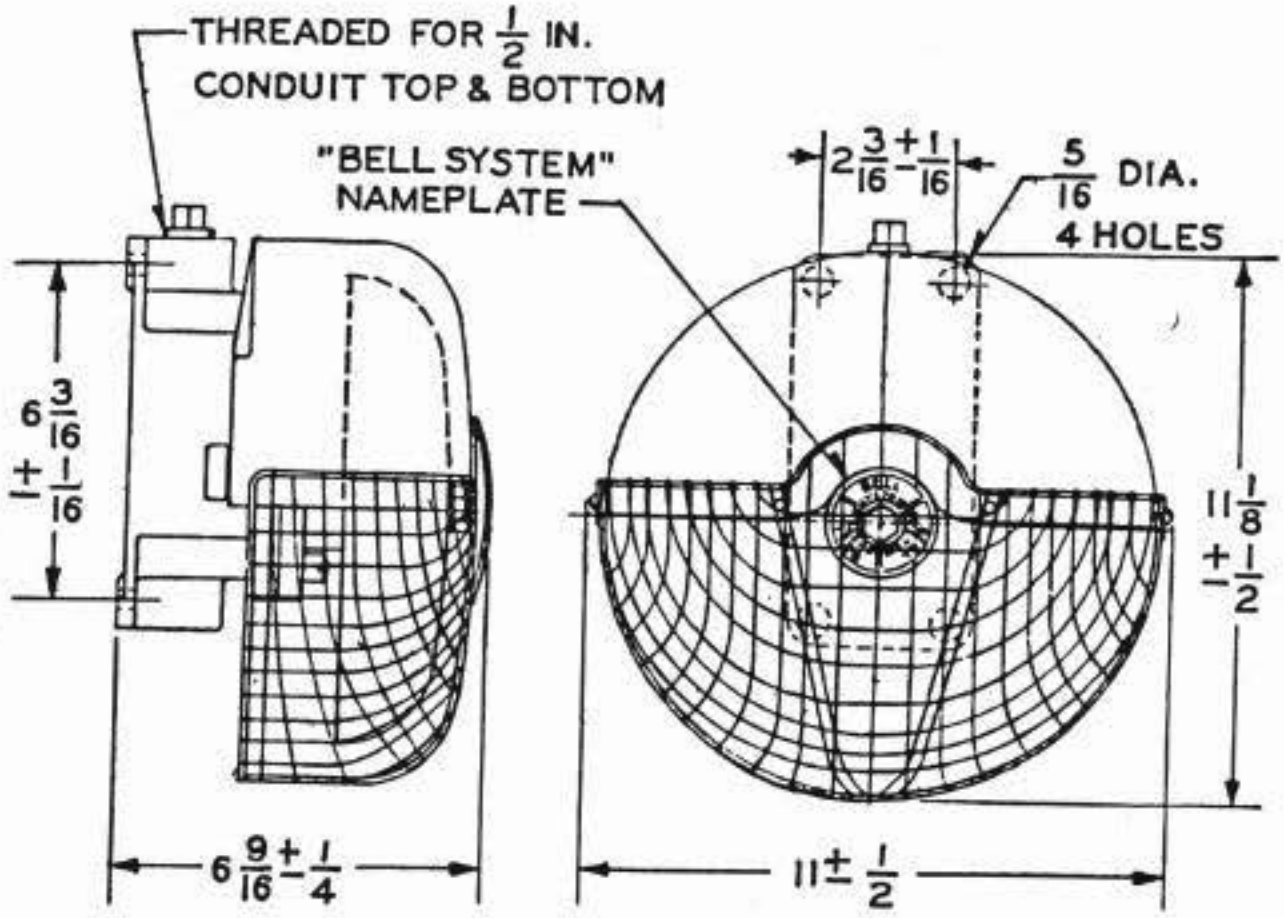


Fig. 2

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:

	Coil Res.	Normal Starting Current	*Normal Operating Current at 115 Volts
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.

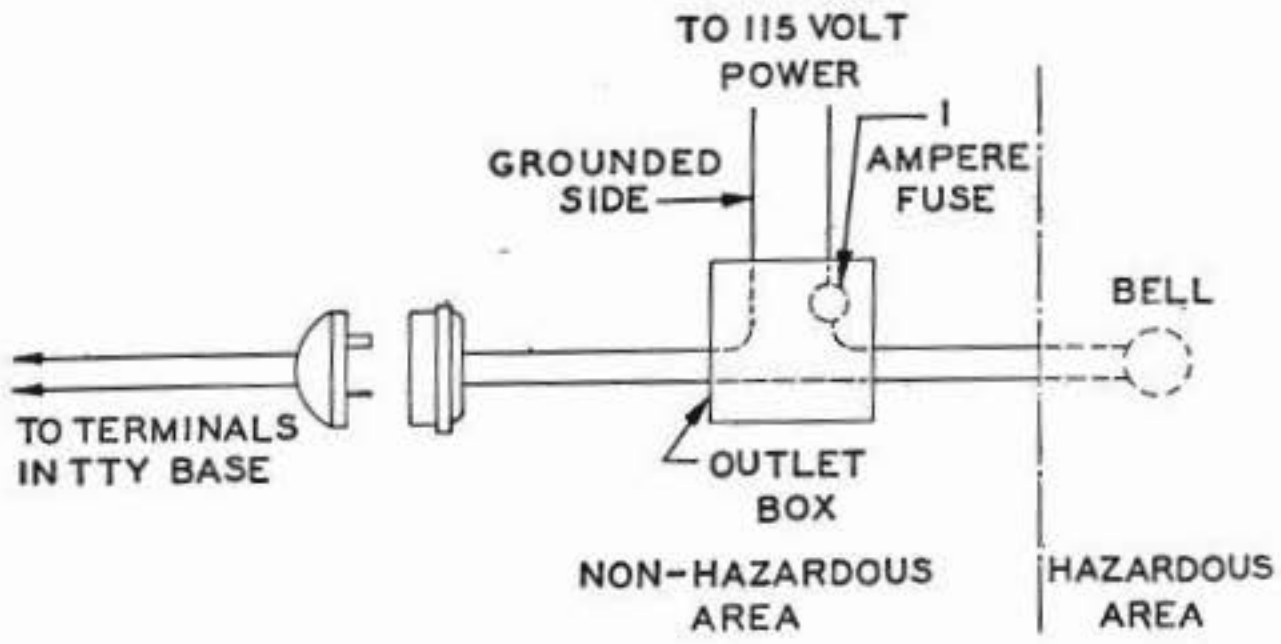


Fig. 3

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.

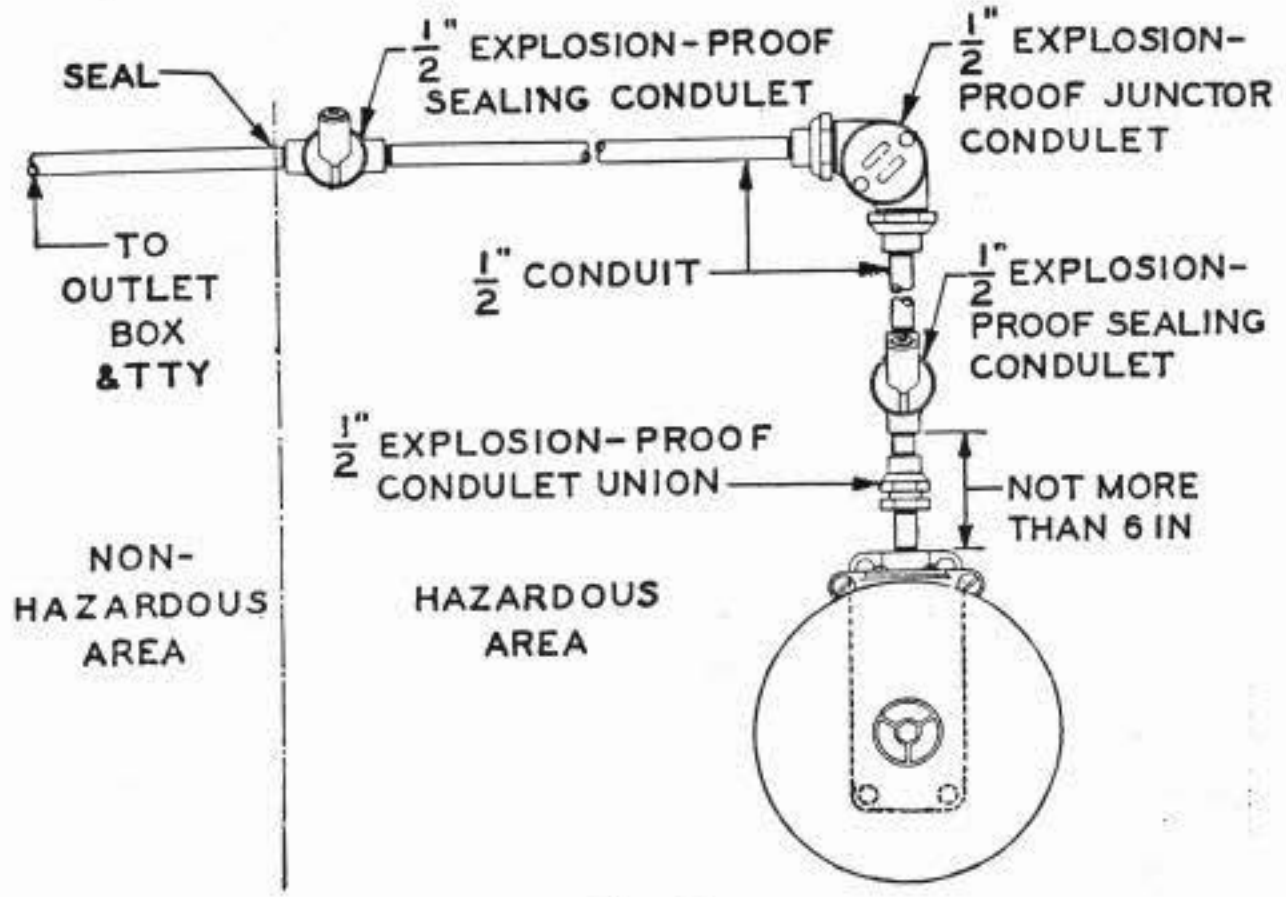


Fig. 4

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.

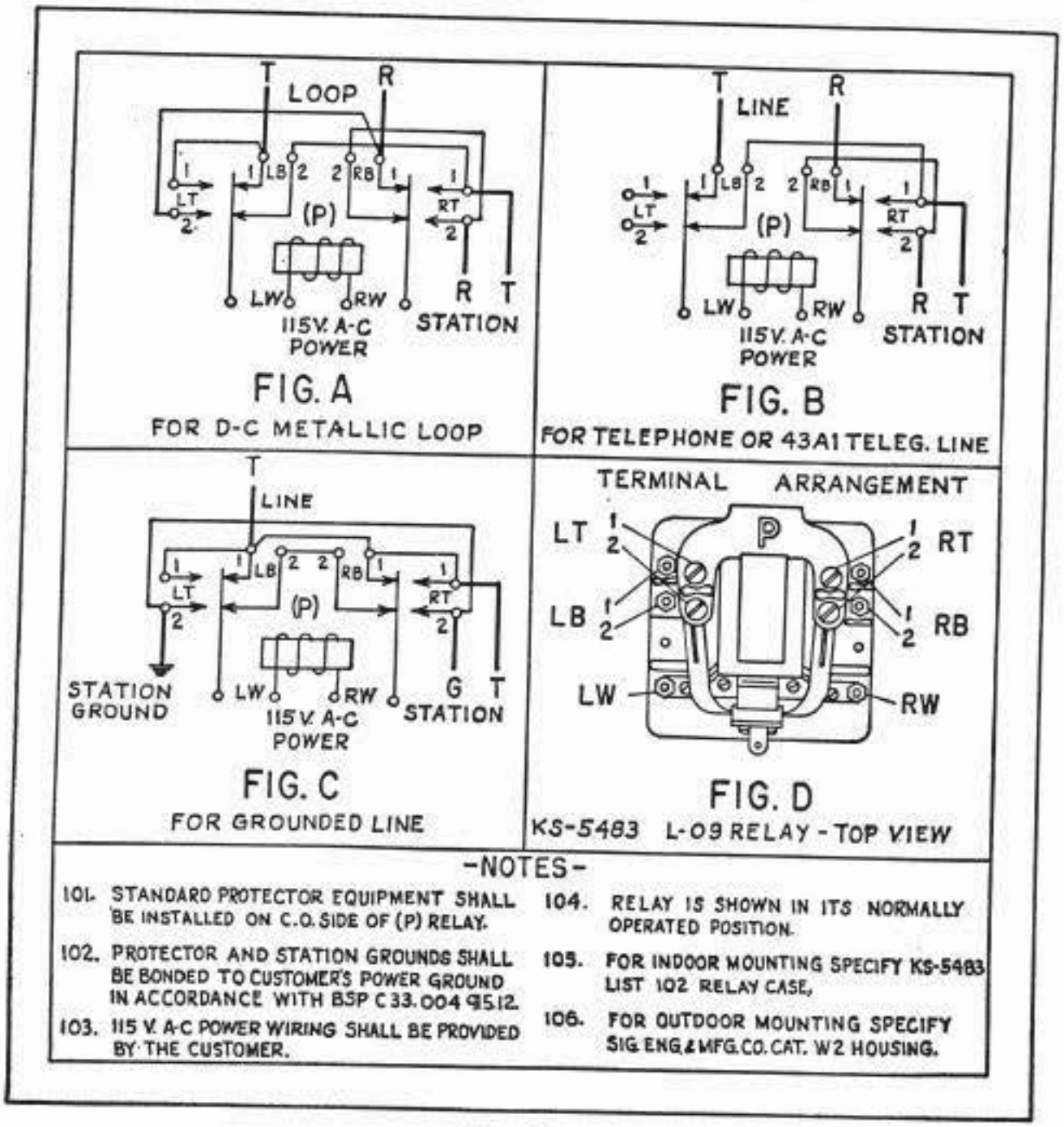

T
LOOP
R
1
LT
2
1 LB 2
2 RB 1
1 RT 2
(P)
LW
RW
115V. A-C POWER
R T STATION
FIG. A
FOR D-C METALLIC LOOP
T
LINE
R
1
LT
2
1 LB 2
2 RB 1
1 RT 2
(P)
LW
RW
115V. A-C POWER
R T STATION
FIG. B
FOR TELEPHONE OR 43A1 TELEG. LINE
T
LINE
1
LT
2
1 LB 2
2 RB 1
1 RT 2
(P)
STATION GROUND
LW
RW
115V. A-C POWER
G T STATION
FIG. C
FOR GROUNDED LINE
TERMINAL ARRANGEMENT
LT
LB
RT
RB
LW
RW
P
FIG. D
KS-5483 L-09 RELAY - TOP VIEW
-NOTES-
101. STANDARD PROTECTOR EQUIPMENT SHALL BE INSTALLED ON C.O. SIDE OF (P) RELAY.
102. PROTECTOR AND STATION GROUNDS SHALL BE BONDED TO CUSTOMER'S POWER GROUND IN ACCORDANCE WITH BSP C33.004 9512.
103. 115 V. A-C POWER WIRING SHALL BE PROVIDED BY THE CUSTOMER.
104. RELAY IS SHOWN IN ITS NORMALLY OPERATED POSITION.
105. FOR INDOOR MOUNTING SPECIFY KS-5483 LIST 102 RELAY CASE,
106. FOR OUTDOOR MOUNTING SPECIFY SIG. ENG. & MFG. CO. CAT. W2 HOUSING.

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.