

**CABLE PRESSURE SYSTEMS**  
**SUPERSEDED CONTACTORS AND CONTACTOR-TERMINALS**  
**DESCRIPTION**

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**1. GENERAL**

1.01 This section covers the description and adjustment of the superseded contactors and contactor-terminals used on cables maintained under air pressure.

1.02 This section is reissued to include the procedures for checking and adjusting the operating pressure for the superseded contactors and contactor-terminals. Revision arrows have been used to indicate changes. These procedures were formerly contained in Section 637-210-500.

1.03 This section is retained for maintenance purposes only, since there are numerous contactors and contactor-terminals of this type still in plant.

1.04 Table A is a listing of the superseded contactors and contactor-terminals covered in this section, along with their replacing unit and associated Bell System Practice.

**NOTICE**

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Bell System except under written agreement

TABLE A  
SUPERSEDED CONTACTOR OR CONTACTOR-TERMINALS

SUPERSEDED CONTACTORS	SUPERSEDED BY	REFERENCE BSP FOR REPLACING UNIT
B End Point Contactor	L and M Contactor	637-214-100
C Pressure Contactor	G Pressure Contactor	—
H Pressure Contactor	N Pressure Contactor	637-213-100
G Pressure Contactor	P Pressure Contactor	637-211-100
J Pressure Contactor		
K Pressure Contactor-Terminal		
T Pressure Contactor-Terminal	Not Replaced	—
E-2 and E-8 Contactor-Terminals		

## 2. DESCRIPTION

**2.01** The *nontemperature*-compensated contactor provides the most favorable operating characteristics for use on cables in continuous flow pressure systems. The *temperature*-compensated contactor provides the most favorable operating characteristics for use on cables in static or periodic charge pressure systems. The contactors are identified as follows:

Nontemperature Compensated—Orange nameplate

Temperature Compensated—Green nameplate.

### B End Point Contactor

**2.02** The B end point contactor (Fig. 1) is a nontemperature-compensated pressure monitoring device. It is similar in operation to the single resistor L or M pressure contactor and is designed for pole or wall mounting. It differs from the L pressure contactor in the following respects:

(a) The housing is larger, being 3-1/4 by 2-3/4 by 2-1/2 inches as compared with 2-1/4 by 2-3/4 by 1-1/2 inches for the L contactor.

(b) The bellows are contained in a separate housing mounted on the underside of the aluminum housing of the contactor.

(c) A 330K ohm resistor is used instead of a 270K ohm resistor.

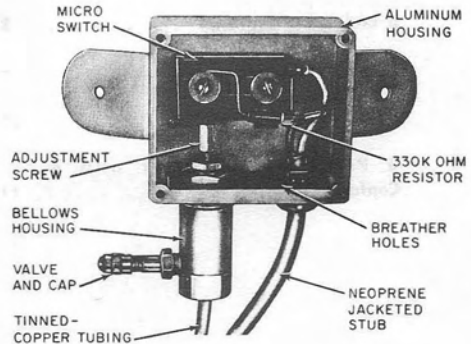
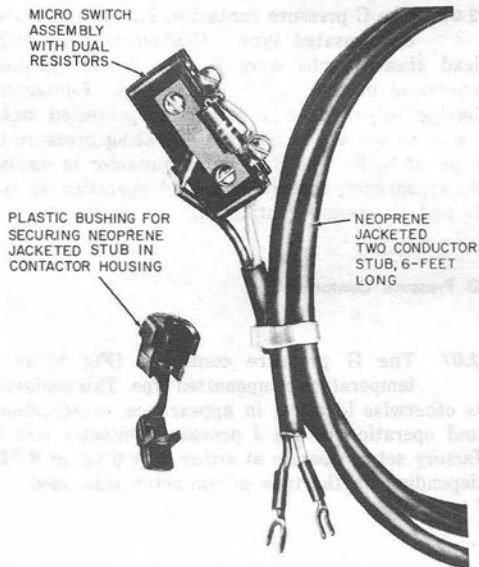


Fig. 1—B End Point Contactor

**2.03** The procedure for converting this contactor to dual resistor operation is included to cover existing installations. Kits are available for converting to dual resistor operation and are ordered as follows:

Kit, Conversion, B-650382 (for B end point contactor).

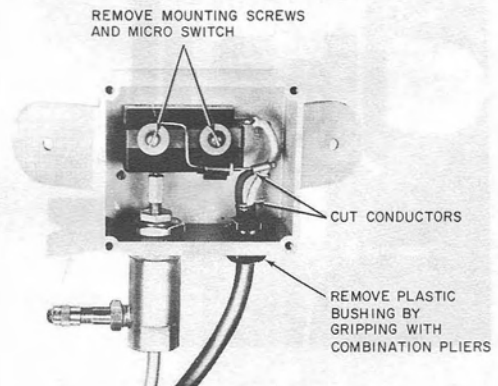
**2.04** The conversion kit (Fig. 2) is a prewired harness consisting of a switch, two 270K ohm resistors, a 6-foot long neoprene jacketed stub, and a plastic bushing. A patch of yellow pressure-sensitive tape is furnished also for identification purposes. Combination pliers (AT-7582X) are necessary for removing and placing the plastic bushing.



**Fig. 2—Conversion Kit for B End Point Contactor**

**2.05** The B end point contactor is converted to dual resistor operation as follows:

- (a) Disconnect the stub from the terminal binding post.
- (b) Remove the contactor housing cover and cut the conductors of the stub as shown in Fig. 3.



**Fig. 3—B End Point Contactor With Single 330K Ohm Resistor**

- (c) Unseat the plastic bushing from the contactor housing (using combination pliers) and remove stub.
- (d) Remove the two mounting screws securing the microswitch to housing and remove switch.
- (e) Feed the spade-clipped end of the stub (B-650382 conversion kit) through the lead hole of the contactor housing, feeding from the inside toward the outside.

- (f) Secure the switch in place with the mounting screws furnished as shown in Fig. 4.

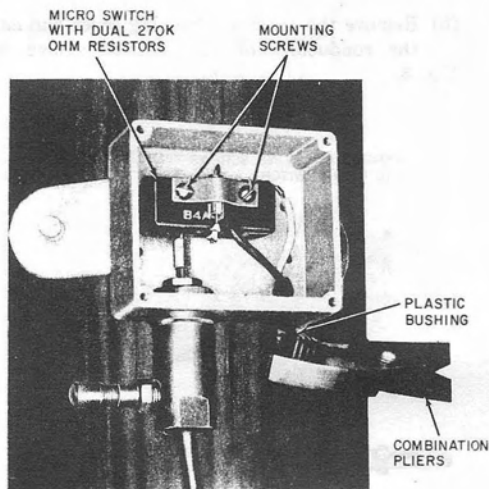


Fig. 4—B End Point Contactor Modified for Dual Resistor Operation

- (g) Place the plastic bushing on the stub and set it into the lead hole in the contactor housing. Apply pressure on the pliers and push upward until the bushing seats firmly in the housing.

- (h) Remove the paper backing from the yellow tape and apply the tape to the stub immediately adjacent to the contactor housing. This will indicate that the contactor is arranged for dual resistor operation.

- (i) Check for contactor operation as described in Section 637-214-100 covering L and M contactors.

- (j) Replace the contactor housing cover and reconnect the stub to the terminal binding post.

### C Pressure Contactor

2.06 The C pressure contactor, is a temperature-compensated type. Contactors with plain lead sheath stubs were factory set to nominal operating pressure of 3 psi at 60°F. Contactors having polyethylene jacketed lead protected stubs were factory set to nominal operating pressure of 6 psi at 60°F. The C pressure contactor is similar in appearance, construction, and operation to the G and J pressure contactors.

### G Pressure Contactor

2.07 The G pressure contactor (Fig. 5) is a temperature-compensated type. This contactor is otherwise identical in appearance, construction, and operation to the J pressure contactor and is factory set to operate at either 3 or 6 psi at 60°F, depending on the type of contactor stub used.

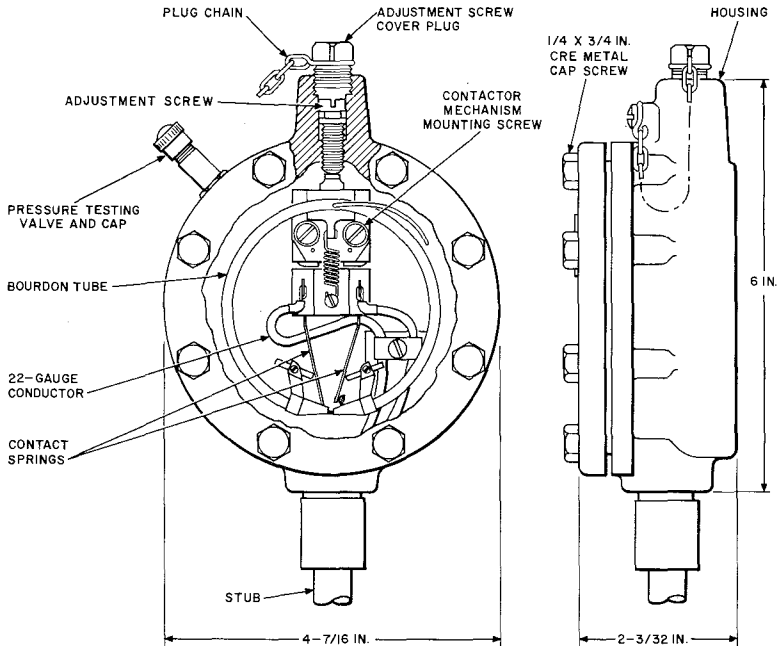


Fig. 5—G or J Pressure Contactor

### H Pressure Contactor

2.08 The H pressure contactor (Fig. 6) is designed for installation inside the lead sleeve at a splice. It consists of a standard Bourdon tube and contact spring assembly housed in a brass case. Wire leads (3 feet long) are provided for making connections to the alarm pair in the cable.

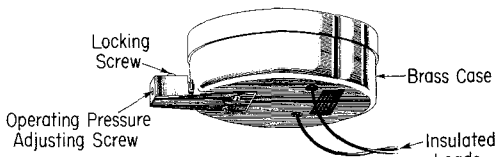


Fig. 6—H Pressure Contactor

2.09 The contactor is equipped with an externally operated screw for adjusting the mechanism to the desired operating pressure. There is also a set screw for locking the adjustment screw in position. The Bourdon tube of this contactor is sealed at a pressure of 3 psi above normal sea level atmospheric pressure. Air enters the case through the opening for the adjusting screw.

### J Pressure Contactor

2.10 The J pressure contactor is a nontemperature-compensated type. The evacuated Bourdon tube and contact spring assembly are contained in a brass housing, as illustrated in Fig. 5. The contactor has a 15-foot stub containing two conductors for bridging to the alarm pair at the cable. The stub is available with either a plain lead sheath or a lead sheath with polyethylene jacket and mechanical protection. Contactors equipped with plain lead sheath stubs are factory set to nominal operating pressure of 3 psi at 60°F. Contactors with protected stubs are factory set to a nominal

operating pressure of 6 psi at 60°F. An externally operated screw permits adjustment of the contactor within a nominal range of 0 to 7 psi at 60°F.

### K Pressure Contactor-Terminal

2.11 This equipment combines in a brass housing, a nontemperature-compensated contactor, and cable terminal facilities for talk and alarm pairs as shown in Fig. 7. The K pressure contactor-terminal has the most favorable operating characteristics for use on cables in continuous flow

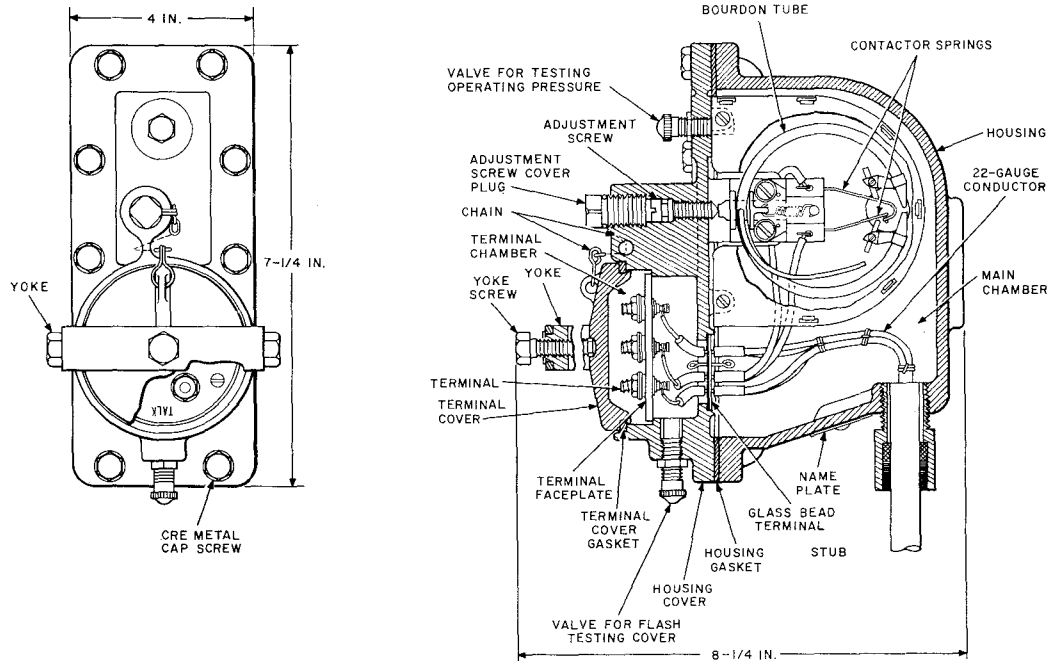


Fig. 7—K or T Contactor-Terminal

### T Pressure Contactor-Terminal

2.12 The T pressure contactor-terminal, identical in appearance and construction to the K pressure contactor-terminal, differs only in that the contactor is of the temperature-compensated type. This contactor-terminal has the most favorable operating characteristics for use on cables in static or periodic charge pressure systems. As with the

systems. This contactor-terminal has a 2-pair, 15-foot stub for bridging to the talk and alarm pairs in the cable. The stub is available with either a plain lead sheath or a lead sheath protected with a polyethylene jacket. Units equipped with plain lead sheath stubs are factory set to a nominal operating pressure of 3 psi at 60°F. An externally operated adjustment screw permits adjustment of the contactor within a nominal range of 0 to 7 psi at 60°F. The orange nameplate on the underside of the housing, adjacent to the stub, identifies the contactor as the nontemperature-compensated type.

K unit, this contactor-terminal is factory set to operate at 3 or 6 psi at 60°F, depending on the type of stub required. The green nameplate on the underside of the housing, adjacent to the stub, identifies the contactor as the temperature-compensated type.

2.13 The terminal chamber in both the K and T contactor-terminals is sealed against the

entrance of air from the main housing by means of a fused glass-to-metal seal, as illustrated in Fig. 7. The binding posts are appropriately marked. The contactor is connected to the alarm pair by cross-connections in the terminal, as indicated in Fig. 8.

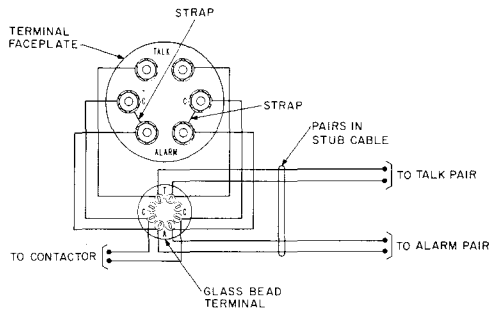


Fig. 8—K or T Contactor-Terminal—Wiring Diagram

2.14 The terminal cover on the K and T pressure contactor-terminals has a synthetic rubber

gasket and is held in place by a cap screw in a swinging yoke. The screw should be sufficiently tightened with a 1/2-inch wrench to ensure a satisfactory seal against the entrance of moisture. A pressure-testing valve is provided for flash testing the terminal cover. In order to prevent the cover from being dropped, it is attached to the contactor-terminal housing by means of a short brass chain.

## E-2 and E-8 Contactor-Terminals

2.15 The E-type contactor-terminal illustrated in

Fig. 9 is similar in external appearance to the K or T contactor-terminal, but the contactor mechanism is designed to operate at nitrogen cylinder pressure. These contactor-terminals are used at nitrogen cylinder pressure sources to operate an alarm when the supply of air in the cylinder falls to 200 psi for the E-2 or to 800 psi for the E-8 contactor-terminal. A 2-pair, 15-foot plain lead sheath stub cable is provided for bridging to the talk and alarm pairs in the cable. A 4-foot length of flexible high-pressure capillary tubing connected to the Bourdon tube provides the air connection to the unit.

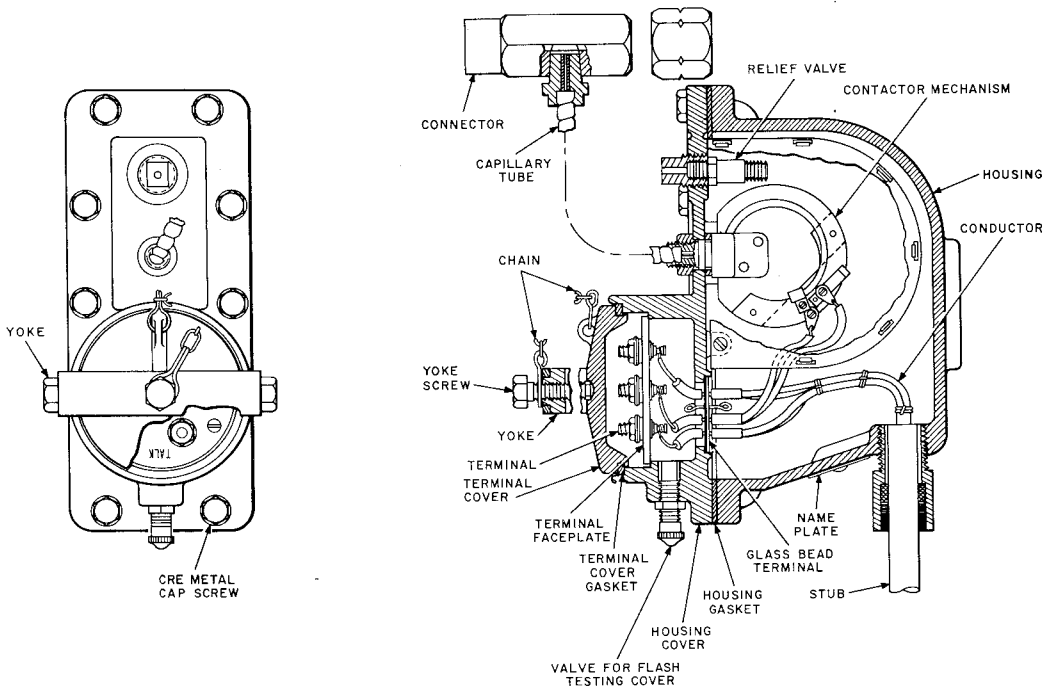


Fig. 9—E-2 or E-8 Contactor-Terminal

2.16 Air at cylinder pressure is applied to the inside of the Bourdon tube through the capillary tubing connected between the tube and the high-pressure side of a 2-stage regulator on the air cylinder. Thus, the operation of the E-type contactor-terminal differs from that of the K or T contactor-terminal, in which the air pressure is applied outside the Bourdon tube.

2.17 A relief valve is incorporated in the contactor housing to protect the apparatus and the cable in the event that a leak occurs in the high-pressure Bourdon tube.

2.18 The wiring diagram for the E-type contactor-terminal is the same as for the K or T contactor-terminal shown in Fig. 8.

### 3. OPERATING PRESSURES (CHECK AND ADJUSTMENT)

3.01 Generally, no check of operating pressure is required after one year of operation. However, if for any reason it is desired to check and adjust the operating pressure, it may be done as outlined in this Part.

#### B End Point Contactor

3.02 Checking and adjusting procedures for the B end point contactor are identical to those outlined in Section 637-214-100 for the L and M pressure contactors.

#### C and G Pressure Contactors

3.03 Tables B and C give the desired operating pressures and the allowable variation for contactors whose operating pressures are 3 and 6 psi, respectively. †



TABLE B  
PRESSURE CONTACTOR ADJUSTMENT LIMITS

FOR CONTACTOR – TERMINALS AND CONTACTORS EQUIPPED WITH BOURDON TUBE SEALED AT 3 POUNDS						
CABLE TEMP DEGREES FAHRENHEIT	FOR CABLES MAINTAINED AT 6 LBS			FOR CABLES MAINTAINED AT 9 LBS		
	NOT LESS THAN	DESIRED	NOT MORE THAN	NOT LESS THAN	DESIRED	NOT MORE THAN
130	4.9	5.4	5.9	7.9	8.4	8.9
125	4.7	5.2	5.7	7.7	8.2	8.7
120	4.5	5.0	5.5	7.5	8.0	8.5
115	4.4	4.9	5.4	7.4	7.9	8.4
110	4.2	4.7	5.2	7.2	7.7	8.2
105	4.0	4.5	5.0	7.0	7.5	8.0
100	3.8	4.3	4.8	6.8	7.3	7.8
95	3.7	4.2	4.7	6.7	7.2	7.7
90	3.5	4.0	4.5	6.5	7.0	7.5
85	3.3	3.8	4.3	6.3	6.8	7.3
80	3.2	3.7	4.2	6.2	6.7	7.2
75	3.0	3.5	4.0	6.0	6.5	7.0
70	2.8	3.3	3.8	5.8	6.3	6.8
65	2.7	3.2	3.7	5.7	6.2	6.7
60	2.5	3.0	3.5	5.5	6.0	6.5
55	2.3	2.8	3.3	5.3	5.8	6.3
50	2.2	2.7	3.2	5.2	5.7	6.2
45	2.0	2.5	3.0	5.0	5.5	6.0
40	1.8	2.3	2.8	4.8	5.3	5.8
35	1.7	2.2	2.7	4.7	5.2	5.7
30	1.5	2.0	2.5	4.5	5.0	5.5
25	1.3	1.8	2.3	4.3	4.8	5.3
20	1.1	1.6	2.1	4.1	4.6	5.1
15	1.0	1.5	2.0	4.0	4.5	5.0
10	0.8	1.3	1.8	3.8	4.3	4.8
5	0.6	1.1	1.6	3.6	4.1	4.6
0	0.5	1.0	1.5	3.5	4.0	4.5

TABLE C  
PRESSURE CONTACTOR ADJUSTMENT LIMITS

FOR CONTACTOR – TERMINALS AND CONTACTORS EQUIPPED WITH BOURDON TUBE SEALED AT 6 POUNDS						
CABLE TEMP DEGREES FAHRENHEIT	FOR CABLES MAINTAINED AT 6 LBS			FOR CABLES MAINTAINED AT 9 LBS		
	NOT LESS THAN	DESIRED	NOT MORE THAN	NOT LESS THAN	DESIRED	NOT MORE THAN
130	5.3	5.8	6.3	8.3	8.8	9.3
125	5.1	5.6	6.1	8.1	8.6	9.1
120	4.9	5.4	5.9	7.9	8.4	8.9
115	4.7	5.2	5.7	7.7	8.2	8.7
110	4.5	5.0	5.5	7.5	8.0	8.5
105	4.3	4.8	5.3	7.3	7.8	8.3
100	4.1	4.6	5.1	7.1	7.6	8.1
95	3.9	4.4	4.9	6.9	7.4	7.9
90	3.7	4.2	4.7	6.7	7.2	7.7
85	3.5	4.0	4.5	6.5	7.0	7.5
80	3.3	3.8	4.3	6.3	6.8	7.3
75	3.1	3.6	4.1	6.1	6.6	7.1
70	2.9	3.4	3.9	5.9	6.4	6.9
65	2.7	3.2	3.7	5.7	6.2	6.7
60	2.5	3.0	3.5	5.5	6.0	6.5
55	2.3	2.8	3.3	5.3	5.8	6.3
50	2.1	2.6	3.1	5.1	5.6	6.1
45	1.9	2.4	2.9	4.9	5.4	5.9
40	1.7	2.2	2.7	4.7	5.2	5.7
35	1.5	2.0	2.5	4.5	5.0	5.5
30	1.3	1.8	2.3	4.3	4.8	5.3
25	1.1	1.6	2.1	4.1	4.6	5.1
20	0.9	1.4	1.9	3.9	4.4	4.9
15	0.7	1.2	1.7	3.7	4.2	4.7
10	0.5	1.0	1.5	3.5	4.0	4.5
5	0.3	0.8	1.3	3.3	3.8	4.3
0	0.1	0.6	1.1	3.1	3.6	4.1

**3.04** **Checking Operating Pressure:** Determine from Table B or C the operating limits of the contactor at the cable temperature. The cable temperature may be measured as outlined in Section 637-400-504. The operating pressure should be checked as follows before making any adjustment:

- (1) Call the testboard, advise the attendant of the work that is being done, and the location of the contactor. Request the testboard to set up the circuit to send tone on the talking pair when the contactor operates.
- (2) Connect a condenser in series with a talking set across the talking pair in the terminal.
- (3) Connect a C pressure gauge to the valve in the contactor to be adjusted or, in the case of buried cables, to the associated valve provided for this purpose. This may be an extra valve on the marker or the READ valve in the 37-type terminal.
- (4) Lower the cable pressure by releasing air at the valve on the cable adjacent to the contactor point. On single buried cables, use the valve in the 3-pair airtight terminal or the BLEED valve in a 37-type terminal. On multiple buried cable routes, two extra valves are brought out to the marker from the second and subsequent cables. In this case, use the second extra valve for lowering cable pressure.♦

◆(5) When the contactor operates, tone will be heard in the receiver. The reading observed on the gauge at the instant the tone is heard indicates the operating pressure of the contactor.

(6) Allow the pressure to drop about 1 psi below the operating point of the contactor and then stop the escape of air. Allow the pressure in the sleeve and cable to build up until the contacts of the contactor mechanism open and the tone is disconnected, at which time a second pressure reading should be made. The pressure at which the contacts open should not differ by more than 0.2 to 0.3 pound from that at which the contacts close. If the variation is substantially more than this, it is usually an indication of loose screws or binding in the contactor mechanism.

(7) The pressure at which the contacts close on decreasing pressure should be taken two or three times, allowing the pressure to build up to about 1 psi above the operating point of the contactor before each test. The average of these readings should be considered as the operating pressure of the contactor.

(8) If someone should call the testboard on the same talking circuit from another terminal, the tone connection will automatically be disconnected until he removes his talking set from the line.

(9) After the contactor has been tested and adjusted, call the testboard as before and advise the attendant that the work has been completed.

### **3.05 Adjustment of Operating Pressure:**

C or G pressure contactors whose operating pressure is factory set at 3 psi can be adjusted to operate from 0 to 8 psi at sea level and 60°F. Those set at 6 psi can be adjusted to operate from 2 to 10 psi at sea level and 60°F.

**3.06** The adjustment screw is normally covered by a brass plug which can be removed with a 7/16-inch open-end wrench when adjustment is necessary.

**3.07** The operating pressure is lowered by turning the adjustment screw in a clockwise direction

(facing the screw head). One complete revolution of the screw will normally change the operating pressure approximately 2 psi. If the operating pressure cannot be regulated closely by turning the screw, it indicates that the operating mechanism is defective.

**3.08** After the adjustment has been made, the operating pressure should be checked again. On completion of the test, coat the brass plug with approved pipe joint compound and screw firmly into position over the adjustment screw. Flash test the plug.

### **H Pressure Contactor**

**3.09** Generally, no check of operating pressure is required after the H contactor has been installed unless faulty operation develops. If it is desired to check and adjust the operating pressure, it can be done in the same manner as described for the C or G pressure contactor (paragraphs 3.03 through 3.08).

### **J Pressure Contactor and K Contactor-Terminal**

**3.10 Checking Operating Pressure (J Pressure Contactor)** is identical to the procedures outlined for the C or G pressure contactor (paragraph 3.04, (1) through (9)).

**3.11 Checking Operating Pressure (K Contactor-Terminal)** is performed as follows:

(1) Disconnect the contactor from the alarm circuit by opening the connections at the terminal. Connect to the C binding posts in the terminal a KS-8455 test set (using the ohmmeter circuit), a 76-type test set (using the wet section circuit), or another approved test set that will indicate a short circuit.

(2) Connect a C pressure gauge to the valve on the contactor-terminal to be adjusted.

(3) Lower the cable pressure by releasing air at the valve on the cable adjacent to the contactor-terminal. The core may be removed from the valve if desired, and the rate at which the cable pressure is lowered can then be controlled by placing the finger over the open valve stem.◆

◆(4) Allow the pressure to fall to a point where the contacts of the contactor close, whereupon the meter will test short or the buzzer will operate. Read the pressure as measured by the gauge, at the instant the buzzer operates or the meter pointer deflects.

(5) After allowing the pressure to drop about 1 pound below the contactor operating point, permit the cable pressure to build up by closing the valve. Read the gauge the moment the contacts open as signified when the buzzer ceases to operate or the meter test open. The pressure at which the contacts open should not differ by more than 0.2 to 0.3 pound from that at which the contacts close. If the variation is substantially more than this, it is usually an indication of loose screws or binding in the contactor mechanism.

(6) Allow the pressure in the sleeve to build up about 1 pound and repeat the test. Two or three such tests should be made and the average of these readings should be considered as the operating pressure of the contactor.

### **3.12 Adjustment of Operating Pressure:**

The J pressure contactor and K contactor-terminal can be adjusted to operate within a range of 0 to 7 psi at 60°F. An externally operated adjustment screw is normally covered by a brass plug which can be removed with a 7/16-inch open-end wrench when adjustment is necessary.

**3.13** The operating pressure is lowered by turning the adjustment screw in a clockwise direction (facing the screw head). One complete revolution

of the screw will normally change the operating pressure approximately 2 psi. If the operating pressure cannot be regulated closely by turning the screw, it indicates that the operating mechanism is defective.

**3.14** After the adjustment has been made, the operating pressure should be checked again. On completion of the test, coat the brass plug with approved pipe joint compound and screw firmly into position over the adjustment screw. Flash test the plug.

### **T Contactor-Terminal**

**3.15 Checking Operating Pressure:** Determine from Table B or C the operating limits of the contactor-terminal at the cable temperature. The cable temperature is measured as outlined in Section 637-400-504. The operating pressure should be checked as outlined in paragraph 3.11 (1) through (6) before making any adjustment.

### **3.16 Adjustment of Operating Pressure:**

The T contactor-terminal can be adjusted as outlined in paragraphs 3.05 through 3.08 covering the C and G pressure contactors.

### **E-2 and E-8 Contactor-Terminals**

**3.17** The E-2 and E-8 contactor-terminals are adjusted by the manufacturer to operate at 200 psi and 800 psi, respectively. Since the operating pressure is not critical, field checks or adjustment of operating pressure is not required.◆