CENTRAL OFFICE AUDIBLE AND VISUAL MAINTENANCE ALARM EQUIPMENT NS-01046-01 OPERATING METHODS, ALARM PROCEDURES, ADJUSTMENT PROCEDURES, AND TROUBLE LOCATING PROCEDURES

1. GENERAL

1.01 This section describes operating methods and alarm procedures for central office audible and visual maintenance alarm equipment per NS-01046-01. Adjustment procedures for the repeat cycle timer and trouble locating procedures for the alarm equipment are also covered in this section.

1.02 The section is reissued to:

(a) Expand the title of the section to more fully describe the contents of the section

(b) Revise 1.01, 2.04, 3.03, 5.01, 5.02, and 7.01

(c) Revise Tables A and B

(d) Add note to 5.01

(e) Make other minor changes as required.

Since this reissue covers a general revision, arrows normally used to indicate changes have been omitted. This reissue affects the Equipment Test List.

1.03 The maintenance alarm equipment provides audible and visual alarms for equipment with an alarm feature. The operation of these alarms provides means for detecting and locating the source of the alarm. Audible alarms are differentiated by means of distinctive tones between various alarms. Visual signals, consisting of lamp display units and pilot lamps, direct the maintenance force from any point in the office to the equipment in trouble or to a point where the trouble can be determined.

1.04 The audible alarm arrangement permits the grouping of up to 32 alarm zones or floors in a standard arrangement. In addition, the following arrangement options are available:

(a) A day program with a fixed, minimum grouping of alarms

(b) An evening program with a nominal amount of alarm grouping

(c) A night program with a maximum alarm grouping which is made variable by the use of spare pre-programmed connectors or by changing the program pins in an X-Y matrix.

When the desired arrangements have been established, programs automatically cycle on a weekly, seven-day repetitive basis.

1.05 Overall supervision of alarms is obtained by bringing indications from equipment within an aisle to an aisle terminal strip, to a floor alarm bay, and from there to the Master Office Bay. Each of these locations may be isolated by using patchable connectors or chain form connectors.

2. AUDIBLE ALARMS

2.01 Audible alarms are furnished by various bells, gongs, tone bars and ringers, according to the type of alarm. The audible alarms are located in the service areas of the functional group and in other areas where maintenance forces for the functional group are normally located. Functional groups of alarms may be arranged in a predetermined grouping arrangement for automatic operation on a preset time sequence or they may be arranged in any desired grouping arrangement for manual operation.

2.02 The audible alarm for a power failure is furnished by a 6-inch vibrating bell designated PF. This alarm indicates a failure or serious impairment at the source or in the distribution

system of power. The distributing system includes discharge fuses but not individual fuses. This alarm may also indicate failure of a unit of a major power plant.

2.03 Major alarms actuate a 245-Hz interrupted at 60-ipm tone bar signal designated MJ. This alarm indicates trouble conditions affecting large groups of equipment, large groups of telephone circuits, or equipment of major importance.

2.04 Minor alarms cause the continuous ringing of a tone ringer designated MA. A minor alarm indicates an individual fuse alarm, troubles affecting small groups of equipment or circuits, or troubles not directly affecting service.

2.05 Service alarms consist of the 30-ipm ringing of a subset designated SA. This alarm indicates an incoming call on a communication facility, or other operating functions which require the service of the maintenance force.

2.06 Alarm circuit alarms are furnished by the continuous ring of a subset designated AB. This alarm indicates trouble in the alarm system.

2.07 The operating room alarm is furnished by a 980-Hz tone bar struck at 2-minute intervals. This alarm may be provided to extend any or all central office alarms into the operating room.

2.08 Equipment aisle terminal strips should have the audible control leads strapped as required to actuate the proper signals. Records of strapping assignments will be kept by operating personnel.

3. VISUAL ALARMS

3.01 Visual signals are furnished by lamp display panels and pilot lamps. Lamp display panels localize an alarm to the area involved. Pilot lamps further localize an alarm to a room, area, main aisle, aisle, or specific item of equipment.

3.02 Lamp display panels are located throughout the office. One to five display locations are provided in the area serviced by each floor alarm bay. The display at all locations will be identical. A maximum of four panels, each containing ten lamps, may be furnished at each location. Each lamp indicates the particular floor or area served by a floor alarm bay as shown by an associated translucent legend plate.

3.03 Main aisle pilot lamps are located in the main aisles and are lighted when an associated aisle pilot lamp is lighted. A lighted main aisle pilot lamp is visible from normal work locations, and at the main aisle lamp location the lighted aisle pilot is visible.

3.04 Room or area pilot lamps serve the same purpose as main aisle pilot lamps except that they are located in main aisles to point to the direction of the room or area where associated pilot lamps are located.

3.05 Aisle pilot lamps are located at the end of equipment aisles to indicate alarms within an individual aisle or equipment line.

3.06 Equipment pilot lamps are used to indicate alarm conditions from equipment which is not in an equipment line or aisle. Major power plants have equipment pilots. The lamps are located at or near the equipment which generates the alarm when there is a room or area pilot. If there is no room or area pilot, the lamp is located in the main aisle.

4. OPERATING MODES

4.01 The automatic and manual alarm grouping control panel or master office control panel is furnished to provide automatic or manual control of audible alarms. The panel is equipped with a 4-position control switch and a repeat cycle timer. When the manual control switch is set to AUTO, the audible alarm system is automatically programmed to a preset time sequence. When the switch is set to DAY, EVE, or NIGHT, the audible alarm system will function in a manual mode.

AUTOMATIC CONTROL

4.02 To operate in the automatic control mode, the manual control switch is set to position AUTO. The AUTO lamp is lighted to indicate that automatic control is in effect. In this mode, the timer controls three alarm programs daily, repeating the cycle each day, except for days when the exclusion feature is in effect. The time when each program is placed in effect and the duration of each program is adjustable.

4.03 The three programs, day, evening, and night, each have different alarm grouping arrangements as required. The day and evening grouping

arrangements are set up at the master office grouping relay panel or master office control panel by means of strapping at the B terminal strip. Night grouping arrangements are set up by strapping the 40-point male connector plugs which are inserted at the master audible alarm grouping panel or by inserting program pins into an X-Y matrix. The programmed connectors may be replaced by male patch plugs to meet an abnormal condition.

4.04 Operating in the automatic mode may require adjustments to be made to the repeat cycle timer. Procedures for making the adjustments are outlined in Part 5 of this section.

MANUAL CONTROL

4.05 To operate in the manual mode, using the day, evening, or night program, the control switch is set to position DAY, EVE, or NIGHT as desired. The appropriate lamp is lighted to indicate that the day, evening, or night grouping arrangement of audible alarms is in effect. The timer is ineffective until the control switch is reset to AUTO.

5. TIMER ADJUSTMENT PROCEDURES

5.01 The tools, gauges, and materials specified in Table A are required to perform the adjustments. The tools marked with an asterisk are furnished with the timer.

> ***Note:*** Adjustments in Parts 5, 6, and 7, while not difficult to perform, are time consuming. It is recommended they ***not*** be performed unless absolutely necessary.

5.02 If adjustment of time sequence intervals is required, perform the following steps.

(1) Disconnect ac plug from the timer.

(2) Disconnect all leads to the timer at the manual control switch for the automatic control and grouping unit. If the master office unit has been furnished instead, disconnect the timer leads at the terminal strip.

(3) Remove the four screws on the rear of the case using the C screwdriver and slide the unit out the front of the case.

(4) Turn the knob on the face of the unit until the dial indicates the exact time of day when the day program should be placed into effect. Adjust cam A of cam assembly 2 so that switch 2 contacts close at that instant. Cam adjustments are outlined in 6.01 of this section.

(5) Turn the knob on the face of the unit until the dial indicates the exact time of day when the night program should be placed into effect. Adjust cam B of cam assembly 2 so that switch 2 contacts open at that instant.

(6) Check contact gap for switch 2 contacts as outlined in 7.01. If contacts are readjusted to meet the requirements, repeat Steps (4), (5), and (6).

(7) Turn the knob on the face of the unit until the dial indicates the exact time of day at which the evening program should be placed into effect. Adjust cam A of cam assembly 1 so that the normally closed contact (bottom contact as viewed from bottom) closes at that instant.

(8) Turn the knob on the face of the unit until the dial indicates the exact time of day the day program should be placed into effect. Verify that the normally open contact (top contact as viewed from bottom) of switch 1 is closed. If contacts are not closed, adjust cam B of cam assembly 1 so that the normally open contact is closed, and repeat Steps (7) and (8).

(9) Cam assembly and switch 3 allow a certain day of the week, or consecutive days of the week, when the exclusion feature should operate. Turn the knob on the face of the unit until the dials indicate the exact time of day and day of the week when the exclusion feature should operate. Adjust cam B of cam assembly 3 so that the contacts of switch 3 open at that instant.

(10) Turn the knob on the face of the unit until the dials indicate the time of day and day of week when the exclusion feature should be released. Adjust cam A of cam assembly 3 so that the contacts of switch 3 close at that instant.

(11) Check the contact gap for switch 3 as outlined in 7.01. If contacts are readjusted to meet the requirements, repeat Steps (9), (10), and (11).

(12) Slide the unit into the front of the case and replace the four screws on the rear of the case.

(13) Connect all leads to the timer which were disconnected in Step (2).

(14) Reconnect ac plug to the timer.

TABLE A

CODE OR SPEC NO.	DESCRIPTION
*H 13666-49-1	Spanner wrench
*H 13666-49-2	Spanner wrench
*H 13666-50	5/16 Open end wrench
or	
372 Tool	5/16 Open end wrench
R-1005	Screwdriver, jewelers
—	C Screwdriver, 3-inch
—	Bristo wrench with 6 flutes for #4 setscrew
131A	Gauge, thickness gauge nest
—	Glyptal** red enamel GE 1201-B

* Manufacturer's part numbers (furnished with unit) (A. W. Haydon Co.)

** Trademark of General Electric Co.

5.03 If the time sequence intervals for all programs are correct, but the time at which the programs are placed in effect is wrong, synchronize the dials as follows:

(1) Loosen the setscrews which secure the dials to the shaft with the Bristo wrench.

(2) Reposition the dials to the correct positions.

(3) Tighten the setscrews.

5.04 If the time of day and/or day of week dials are incorrect, turn the knob on the face of the timer unit until the positions are correct.

6. CAM ADJUSTMENTS

6.01 If adjustment of cams is required, perform the following steps, using Fig. 1, 2, and 3 as a guide.

(1) Hold 5/16-inch nut, located on the cam shaft, using the open end wrench.

(2) Insert the lugs of the spanner wrench, (H13666-49-1 for cams 2 and 3, H13666-49-2 for cam 1) into holes provided on either side of the cam assembly, depending upon which adjustment (cam A or cam B) is being made.

(3) Holding the cam shaft stationary with the open end wrench, turn the spanner wrench in the direction of normal cam shaft rotation (counterclockwise as viewed from nut end of cam shaft). The selected cam will also move in this direction.

Caution: Never attempt to turn spanner wrench in opposite direction (clockwise as viewed from nut end of cam shaft) as the 5/16-inch nut may loosen, switch blades may be bent, or the cam assemblies may lose relationship to each other.

(4) Repeat Step 3 until the cam is set to the required time sequence.

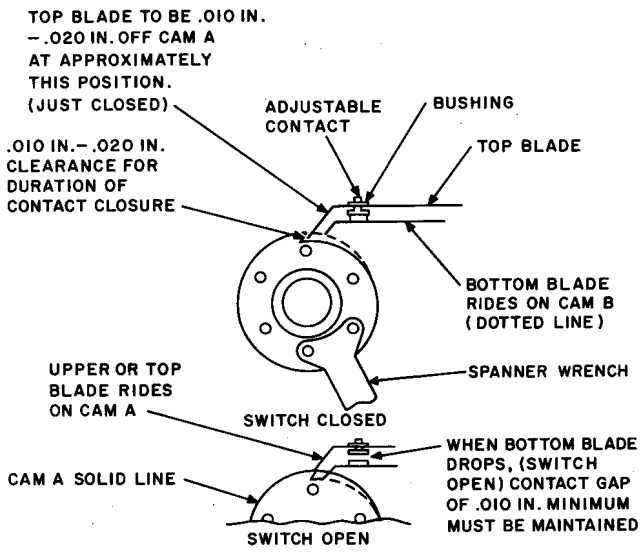

Fig. 1—Cam and Switch (Viewed from Shaft End)

7. CONTACT GAP ADJUSTMENTS

7.01 The requirement for contact gap is checked by rotating the cam shaft through the switch closure duration. During this rotation, there shall be a .010 through .020 inch clearance between the tip of the top blade and its cam as checked with the proper 132-type gauges (part of 131-type gauge

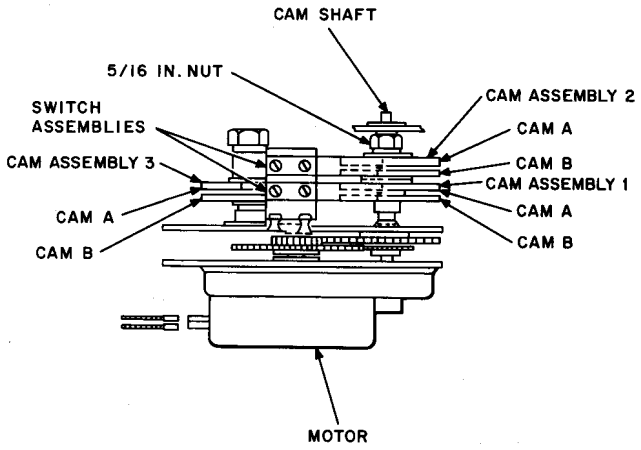

Fig. 2—Bottom View of Timer

nest). If this requirement is met, no adjustment is needed. If the requirement is not met, perform the following steps.

(1) Remove all Glyptal which bonds the threaded portion of the adjustable contact to the switch blade bushing.

(2) Turn the adjustable contact counterclockwise all the way out using the R-1005 jewelers screwdriver.

(3) Rotate the cam shaft until the top switch blade just drops off from its highest point on cam A.

(4) Adjust the screw-type contact in so that the tip of the top blade is .010 through .020 inches off its cam.

(5) Rotate the cam shaft through the switch closure duration making sure the requirements (7.01) are met.

(6) Rotate the cam shaft through the switch open duration. Check for a minimum contact gap of .010 inches for this duration.

(7) Using Glyptal, bond the threaded portion of the adjustable contact to the switch blade bushing.

8. TROUBLE LOCATING PROCEDURES

8.01 When the audible alarm sounds and no visual signal is lighted, localize the alarm to the alarm grouping equipment or floor by removing the chain strap on the master office combining unit or master office control panel and test the punchings for presence of ground. To localize the alarm to the alarm relays or aisles, remove the connector at the floor audible alarm control unit and test the punchings for presence of ground. Finally, to isolate the alarm to the specific item of equipment, remove the straps to the basic audible lead at the aisle terminal strip and test individual punchings for presence of ground.

8.02 When no audible signal is operated, test for ground from the circuit initiating the alarm to:

(1) Aisle terminal strip

(2) Floor audible alarm control unit

(3) Audible signal relay

(4) Audible signal device.

8.03 When audible signals located on another floor do not operate, test from floor audible alarm control unit on the floor originating the alarm to the following:

(1) Master office combining unit

(2) Floor audible alarm control unit on the floor where inoperative audible signal is located

(3) Audible signal relay

(4) Audible signal device.

8.04 When the audible grouping function is inoperative, make an operation test of the grouping relay circuits. Then perform the tests described in 8.03, including a test for continuity through the grouping circuits.

8.05 Visual alarm troubles may be located by taking action as shown in Table B.

Caution: Do not apply foreign potential to the leads of diodes which are used extensively in the visual circuit. Do not use the X1 scale of the ohmmeter section of the KS-14510 volt-ohm-milliammeter when testing diodes.

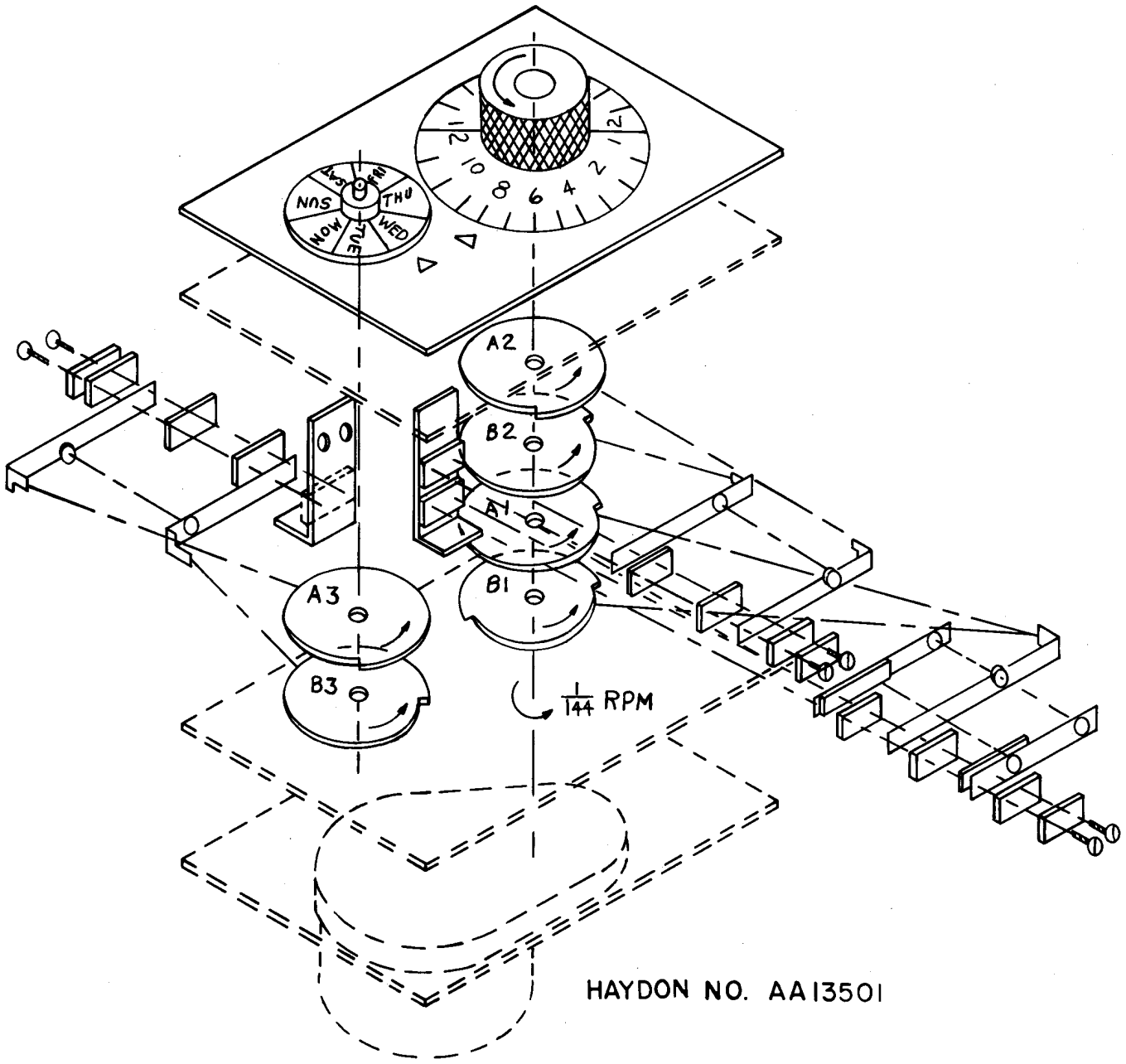

Fig. 3—Exploded View of Timer

TABLE B

CONDITION	TEST
Equipment or aisle pilot does not light. Main aisle pilot and lamp display lighted.	Lamp and lamp circuit.
Equipment or aisle pilot lights. No main aisle pilot or lamp display.	Basic visual alarm lead from aisle terminal strip, through aisle pilot lamp control unit to main aisle pilot relay.
Equipment or aisle and main aisle pilot lighted. No lamp display.	DA lead to lamp display relay.
Main aisle pilot lamp does not light.	Lamp and lead from main aisle pilot relay to main aisle pilot lamp.
Equipment and aisle pilot, main aisle pilot and display not lighted.	ABS discharge fuse probably blown.
Alarm battery subset rings.	Test ABS discharge fuse circuit.