

**UNATTENDED OFFICE
AUDIBLE AND VISUAL
MAINTENANCE ALARM EQUIPMENT
EQUIPMENT DESIGN REQUIREMENTS
COMMON SYSTEMS**

1. GENERAL

SCOPE

1.01 This specification covers the equipment design requirements for a central office alarm system suitable for unattended offices.

DESCRIPTION

1.02 The alarm equipment in this specification provides a system of audible and visual alarms, for equipment with an alarm feature, by means of which the operation of these alarms may be detected and located.

1.03 The audible alarms consist of one or more sets of signals which differentiate, by means of distinctive tones, between power failure, major, minor, service, and alarm circuit alarms. These alarms may be extended to a distant office using alarm sending.

1.04 The visual signals direct the maintenance force, from any point in the office to the equipment in trouble, or to where the failure can be determined. Lamp display units (optional) located throughout the office indicate where alarm conditions exist. These units can also furnish alarm information on specific items of equipment. The main aisle or room pilot and aisle or equipment pilot lead the maintenance force to the location of the equipment initiating the alarm. The pilot lamps categorize the alarm by the use of different colored lamps for each type of alarm. Red lamps indicate fuse, major no voltage, or power plant alarms; white lamps signify miscellaneous alarms; and yellow lamps indicate service alarms.

1.05 Audible signals are of the following types:

(a) **Power Failure Alarm:** 6-inch vibrating bell. Designated "PF."

Indicates a failure or serious impairment at the source or in the distribution system of power, or failure of a unit of a major power plant. For alarm purposes, discharge fuses are considered to be part of the distribution system; individual fuses are not.

(b) **Major Alarm:** 60 IPM tone bar signal. Frequency about 245 cycles. Designated "MJ."

Indicates an inoperative condition, other than fuse alarm, affecting large groups of equipment, large groups of telephone circuits, or equipment of special importance.

(c) **Minor Alarm:** Tone Ringer, continuous ring. Designated "MA."

Indicates an individual fuse alarm, inoperative conditions affecting small groups of equipment or circuits, or trouble conditions not directly affecting service.

(d) **Service Alarms:** Subset, 30 IPM ring, equipped with one 55A gong and one 58A gong. Designated "SA."

Indicates an incoming call on an order wire, trunk, telephone, other communication facility, or other operating function which requires the attention of the operating force.

(e) **Alarm Circuit Alarm:** Subset, continuous ring, equipped with one 56A gong and one 59A gong. Designated "AB."

Indicates trouble in the alarm system.

1.06 The alarm signals are mounted on a backboard which acts as a resonator, increasing the output of the signals. The assembly is supported from a wall or column.

VISUAL SIGNALS

1.07 The visual signals used with the alarm system are classified as follows:

- (a) Bay or panel lamps individual to the equipment requiring alarm indications
- (b) Aisle and equipment pilots
- (c) Main aisle and room pilots
- (d) Lamp display panels.

1.08 Standard central office arrangements provide rows of bays of equipment. The rows are called equipment lines. For maintenance alarm purposes, an alarm aisle may be considered to be the service area for an equipment line. The service area is normally the space along the front of the equipment line.

1.09 An alarm aisle is comprised of a single line of equipment, or it can be two equipment lines when the two lines are facing and form a common aisle. Equipment and service arrangements dictate that in certain cases two lines of equipment facing each other shall be two separate alarm aisles.

1.10 Standard central office arrangements provide passageways, at right angles to equipment lines, which provide access to the lines of equipment. For maintenance alarm purposes, the passageways shall be considered to be main aisles when aisle pilot lamps for alarm aisles are located in the passageway.

VISUAL SIGNAL REQUIREMENTS

1.11 *Lamp Display Panels:* Lamp display panels may be provided in the office. They should normally be located in a main aisle, near the exits leading to other floors, or where a concentration of operating personnel would normally be located. The display at all locations will be identical. The panels shall have a lamp assignment for the area served by each alarm bay. The lamp localizes an

alarm to the area. Other alarm conditions may be displayed in the unit as required. The lamp displays are available arranged for -24 or -48 volt operation. If the -24 volt choice is selected, the maximum number of display locations per floor is three. For -48 volt operation, the maximum number of display locations is five per floor. For either choice, up to four units may be provided at any one location.

1.12 *Main Aisle Pilot Lamps:* Each main aisle shall have an associated set of main aisle pilot lamps. A second set of main aisle pilots, multiplied from the first set should be provided when necessary. The following requirements shall be met, when determining the location and position of main aisle pilots.

- (a) The main aisle pilots shall be located in the head bay end guard (when provided) in the first lineup in the associated main aisle. If the head bay is not provided, the main aisle pilots shall be hung from brackets off the cable rack.
- (b) When standing at the location of the main aisle pilots, the main aisle pilots of all parallel main aisles shall be visible.
- (c) All aisle pilot lamps and equipment pilot lamps associated with the main aisle pilots shall be visible from the location of the main aisle pilots.

The following conditions shall be met, whenever possible, in determining the location of main aisle pilots.

- (a) They shall be visible from normal work locations.
- (b) They shall be visible from exits from the floor.

- (1) ***Room or Area Pilots:*** A room or area pilot shall be used when there are items of equipment, in the same general area, which are not arranged in an equipment line or when there are equipment lines or items of equipment in enclosed areas on the floor. The room or area pilot is like a main aisle pilot in all respect, with the exception of location requirements. The pilot shall be located in a main aisle with the lamp positioned to point in the direction of the room or area.

The room or area pilot shall not be in line, horizontal or vertical, with aisle pilot lamps.

(2) **Aisle Pilot Lamps:** Aisle pilot lamps shall be provided for all alarm aisles. The lamps shall be located in the main aisle and mounted in the end guard at the end of an equipment line served by the alarm aisle. When the head bay in the aisle is not provided, the aisle pilot lamps shall be hung from brackets off the cable rack. All aisle pilots, or multiples thereof, shall be visible from the location of the associated main aisle pilots. To meet all aisle pilot requirements, a multiple, in the main aisle of the lamps on the end of an equipment line may be necessary. The positioning of the aisle pilot lamps in the main aisle shall be uniform. Normally, all lamps should be in line, in both horizontal and vertical planes.

(3) **Equipment Pilot Lamps:** An equipment pilot is used to provide visual indication of an alarm from an item of equipment which is not in an equipment line or an alarm aisle. All major power plants shall have equipment pilots. The equipment pilot shall be located at or near the equipment which initiates the alarm when there is a room or area pilot. In all other cases it shall be located in the main aisle and be in agreement with positioning requirements for aisle pilot lamps. Equipment pilots, red, green, or amber, shall be provided as required.

AISLE TERMINAL STRIPS

1.13 Each alarm aisle shall have an associated aisle terminal strip arranged to provide an interconnect and strapping field for all alarm leads from the aisle.

1.14 An aisle terminal strip and all basic wiring for an alarm aisle shall be provided when an alarm aisle is established. The terminal strip shall be located in the head bay end guard or hung from brackets off the cable rack when the head bay is not provided. The following preassigned punchings on the aisle terminal strip are considered to be basic wiring for the aisle.

- (a) 4 audible leads
 - (1) Power Failure (PF)

- (2) Major (DL)

- (3) Minor (F)

- (4) Service (SV)

- (b) Three visual control leads, R, W, and Y

- (c) Two alarm battery supplies and an alarm ground to the alarm battery supply fuse panel in the floor alarm bay

- (d) The battery supply and control leads R, W, and Y to the aisle pilot lamp assembly.

1.15 All alarm leads from the equipment in the aisle shall be connected to spare punchings on the aisle terminal strip. They are interconnected, by a strap, to the corresponding alarm lead from the alarm bay. The aisle terminal strip also accommodates circuits requiring paired alarm leads. The basic rules covering the connection of alarm leads in an aisle are as follows:

Within an Aisle

1.16 Any circuit generating an alarm lead in an aisle shall bring up an aisle pilot lamp for that aisle and that aisle only.

Within a Bay or Frame (Other Than Fuse Bay)

1.17 All circuits having the same "SD" shall be multiplied and only one set of alarm leads shall be brought out to the aisle terminal strip. Any of these leads which do not have a ground output shall be converted to ground per NS01078-02 or similar circuit prior to connecting to the aisle terminal strip.

Within a Fuse Bay

1.18 Fuse alarm leads shall be converted to ground using NS01078-02 or similar circuit with similarly designated alarm leads multiplied within the bay and one set of leads brought out to the aisle terminal strip. It shall be an engineering function to initiate and maintain an office record, in tabular form, of all terminations and straps on the aisle terminal strip.

ROOM OR AREA TERMINAL STRIP

1.19 Rooms or areas on a floor containing equipment not arranged into equipment lines with clearly defined aisles, shall have room or area terminal strips, in lieu of aisle terminal strips. Power plant locations shall have room terminal strips.

1.20 The room or area terminal strip may be located in an end guard or on brackets off the cable rack at some convenient location in the area to be served. The strip is identical to, and shall be treated like an aisle terminal strip, with the exception of the visual alarm control leads.

1.21 On a room or area terminal strip the basic R, W, and Y visual alarm leads to the aisle pilot lamp control circuit in the alarm bay are omitted. Each unit of equipment requiring an equipment pilot shall have a separate appearance on the aisle pilot lamp control circuit. Visual alarm leads from the unit equipment are strapped at the room terminal strip to like leads, provided as required, which are cabled to the floor alarm bay, aisle pilot lamp control unit. Like leads are combined on the negative side of the diode to control a main aisle or room pilot relay. When considering visual alarm leads for units of equipment not in alarm aisles, they should be treated exactly like the basic visual alarm leads for an aisle except that only the leads required (R, W, or Y) shall be used.

1.22 When single items of equipment with equipment pilots are not in the area serviced by a room terminal strip, the alarm leads shall be terminated on the closest aisle terminal strip and connected as described above.

AISLE PILOT CONTROL AND GROUPING PANEL

1.23 The aisle grouping terminal strip cross-connection is part of a mounting plate equipped with two 40-point connectors. It provides a terminating point, from each individual aisle or room terminal strip, for the basic audible alarm leads.

1.24 The combining of all alarm leads is accomplished by inserting preprogrammed printed wiring boards into the connectors. The printed wiring boards provide the correct interconnection, into each connector and are used to isolate problems to a particular aisle or area.

1.25 The initial unit has the capability of serving 20 aisles and shall be located in the alarm bay. Each additional unit will serve 20 aisles.

1.26 The aisle pilot diode circuit is also part of the mounting plate and is equipped with terminal strips mounting diodes. It provides a termination point for visual control leads R, W, and Y from each of the aisle or room terminal strips. It permits the interconnection of like visual control leads, from aisle or room terminal strips, associated with the same main aisle pilot relay, while providing necessary isolation between the leads to the current flow in the reverse direction.

1.27 It shall be an engineering function to maintain an office record of aisles assigned and strapping of the unit terminal strips.

STATUS INPUT AND LAMP DISPLAY CONTROL UNIT

1.28 The status input and lamp display control unit is a 251-type terminal strip assembly located in the office alarm bay. Three functions are performed at this unit. First, terminations are provided for alarm battery supply and lamp control leads from the lamp display relay unit and terminations for cables to a maximum of five locations on the first four. Second, space is provided for status indication connections to the alarm sending circuit. Lastly, space is provided for display (DA) leads to operate the lamp display relays.

Lamp Display Control Unit

1.29 The lamp display control unit, NJ01207F, is a 234D terminal strip located on each floor except the first. Terminations are provided for alarm battery supply and lamp control leads from the alarm bay, and terminations for cables to a maximum of five lamp display locations on the floor.

Lamp Display Relay Panel

1.30 The lamp display relay panel, NJ01207G, is a mounting plate with ten AK-type relays wired to terminal strips. The lamp display relay panel(s) shall be located in the alarm bay. Each relay panel furnished will serve two lamp display panels at each location on three floors. System arrangements provide for a maximum of five lamp display panel locations per floor and a maximum

of four panels (40 lamps) at each location. Punchings are provided on the terminal strip for the termination of control leads for the lamp display relays.

1.31 With each lamp display relay panel furnished, provide cabling for the twenty lamp control leads and alarm battery supplies required to the lamp display control unit on each floor.

Lamp Display Panel

1.32 The lamp display, NJ01207H, is a ten lamp display panel for the visual display of alarm conditions throughout the office.

1.33 Display panels may be installed at a maximum of five locations on a floor with a maximum of four panels at each location. They should normally be located in a main aisle, near the exits leading to other floors, or where a concentration of operating personnel would normally be located. The panel is designed to be suspended from ceiling inserts, superstructure, auxiliary framing, etc, using half inch threaded rods. It may be attached to a wall or column using a mounting bracket.

1.34 Since the unit is symmetrical and the lamps are vertically mounted, an alarm display can be visible from either side of the unit. This should be considered when planning the location of the unit.

1.35 The lamp display panel is furnished equipped and wired except the mounting rods and wall mounting bracket. The legend plates designated as required shall be ordered by the engineer. A total of twenty display legends must be ordered with each lamp display panel.

1.36 The display legends are inserted in front of each lamp on the panel. They are used to display the alarm information when the lamps are lighted. A floor designation, indicating on which floor an alarm has originated shall always be displayed in the panels. Other alarm information may be displayed when specifically requested by the operating forces. If at a later date the plant forces desire to change the display, other legends may be ordered as described on drawing NJ01207H.

BUILDING ALARM TERMINAL STRIP

1.37 If specified by the customer, the building contractor shall provide a building alarm

terminal strip located in a telephone equipment area, to which shall be extended a set of dry relay contacts, normally open, for all building alarms in the office. A table shall be incorporated in the office alarm drawings which lists the position number on the terminal strip and the associated type of building alarm. This will normally be a plant function. Building alarms shall light a yellow aisle or equipment pilot and shall normally be assigned to a minor audible alarm.

1.38 The installer shall group the building alarm leads at the terminal strip, as directed by the station supervisor, at the time of installation.

Alarm Sending Equipment

1.39 All circuits requiring connection to the alarm sending circuit are terminated on the status input terminal strip and must be in the contact closure, paired lead format. Consequently, input buffer circuits for these telemetry leads are not required. Detailed information for connection to various telemetry systems is included in the schematic and circuit description.

Alarm Battery Supply

1.40 The NJ01207-01 alarm system requires ± 105 , -24 and/or -48 volt alarm battery supply. The alarm battery fusing for all alarm equipment will be located in the alarm bay. All alarm battery fuse panels in the office should be served by the same power plant.

1.41 The equipment covered in this specification is in the form of shop wired units and miscellaneous equipment. The interconnection of the items of equipment is standard and covered by NS01207-01 and the NT01207 series of drawings.

Capacity and Location of Equipment

1.42 Each floor requiring alarms shall have a floor alarm bay. Standard arrangements provide the capability of serving a maximum of 80 aisles and rooms.

1.43 A maximum of five lamp display panel locations may be provided per floor. There may be a maximum of three audible alarm panels associated with each set of audible signal relays on a floor. When more than three audible panels are required, a second set of audible signal relays

must be provided for that group with the inputs made parallel.

Conversion of an NS01207-01 Unattended Office to the NS01046-01 Attended Mode

1.44 The ready convertibility of NS01207-01 to an attended mode NS01046-01 office is an integral part of the design intent of this system. In the interest of minimizing overall effort, an office should be converted as soon as practical after it becomes attended. The following major items are involved in such a conversion:

- (a) Provision of functional grouping capability.
 - (1) Rearrangement of the aisle terminal strip strapping to yield additional functional groups and provision of associated cables to the alarm bay.
 - (2) Conversion of the NJ01207A units to the NJ01046E units.
 - (3) Provision of additional NJ01046B units for each functional group provided.
 - (4) Addition of the NJ01046A master office control unit.
- (b) Provision of lamp displays if not previously furnished. (Note, if the office becomes fully attended, the status output connections on the lamp display relays can be reused to serve two additional floors of lamp displays.) While the relay circuitry of the NS Systems can operate on either -24 volt or -48 volt options, if expanded use of the display subsystem is desired, arrangement of the lamp displays for -48 volt option should be considered. This will permit five locations per floor versus three for -24 volt option.
- (c) If the office becomes fully attended, the alarm sending circuit should be removed for reuse elsewhere. This will require a coordination order at the alarm receiving center.
- (d) If expansion of building alarm capability is desired, the building alarms may be reassigned to their own unit NJ01046AC L-7.

SUBDIVISIONS OF EQUIPMENT

NJ01207A—Aisle Grouping Unit
 NJ01207B—Audible Alarm Relay Unit
 NJ01207C—ABS Fuse Alarm Relay Unit
 NJ01207D—Main Aisle Pilot Relay Unit
 NJ01207E—Display, Control, and Status Input Terminal Strip Assembly
 NJ01207F—Display and Control Terminal Strip Assembly
 NJ01207G—Lamp Display Relay Unit
 NJ01207H—Lamp Display Panel
 ED-96188-30—Audible Alarm Panel

2. SUPPLEMENTARY INFORMATION

800-600-000—List of General Equipment Requirements
 801-006-154—Channel Relay Rack
 801-006-155—Angle Relay Rack
 CD01207-01—(Part of NS)

3. DRAWINGS

NS01046-01—Common Systems Central Office Alarm System
 NS01078-02—Common Systems Central Office Alarm Fuse Alarm Circuit
 NS01207-01—Common Systems, Central Office Alarm System—Remote Office Application
 NE01207-11—Typical Relay Rack Layouts
 NE01207-15—Cabling Plan
 NE012707-30—Miscellaneous Aisle Pilot Equipment
 NE01207-50—Miscellaneous Aisle Pilot Equipment

4. EQUIPMENT

NJ01207A—(WEC Co Appd)—Aisle Grouping Unit

Equipment—NJ01207A()

List 1—Assembly, wiring, and equipment for one aisle grouping unit per NS01207-01 Fig. 3, 4 and Cad 3, 4 (see Note A).

Notes

A. One unit has the capacity to serve twenty alarm aisles, rooms, or areas on a floor.

NJ01207B—(WEC Co Appd)—Audible Alarm Relay Unit

Equipment—NJ01207B()

List 1—Assembly, wiring, and equipment for one audible alarm relay unit per NS01207-01 Fig. 2 and Cad 1 (see Note A).

Notes

A. One List 1 is required for each three or less audible alarm panels (maximum two per office).

NJ01207C—(WECO Appd)—ABS Fuse Alarm Relay Unit

Equipment—NJ01207C-()

List 1—Assembly, wiring, and equipment for one ABS Fuse Alarm relay panel per NS01207-01 Cad 13.

List 2—Wiring and equipment required in addition to list 1 for one ABS Fuse Alarm Relay per NS01207-01 Fig. 1 (max. 9).

NJ01207D—(WECO Appd)—Main Aisle Pilot Relay Panel

Equipment—NJ01207D()

List 1—Assembly, wiring, and equipment for one main aisle pilot relay unit per NS01207-01 Cad 17.

List 2—Wiring and equipment required in addition to list 1 for three main aisle pilot relays per NS01207-01 Fig. 17 (max. 2).

NJ01207E—(WECO Appd)—Display, Control, and Status Input Terminal Strip

Equipment—NJ01207E-()

List 1—Wiring and equipment for one display, control, and status input terminal strip per NS01207-01 Cads 5, 6, 15 (maximum one per alarm system).

NJ01207F—(WECO Appd)—Display and Control Terminal Strip

Equipment—NJ01207F-()

List 1—Wiring and equipment for one display and control terminal strip per NS01207-01 Cad 15 (Note A).

Notes

A. A display and control terminal strip should be provided for each floor other than the first when option (LD) is provided.

NJ01207G—(WECO Appd)—Lamp Display or Relay Panel

Equipment—NJ01207G-()

List 1—Assembly, wiring, and equipment for one twenty circuit lamp display relay panel per NS01207-01 Fig. 5 and Cad 5 (Note A).

Notes

A. A maximum of two units wired for use as lamp displays should be provided per alarm system.

NJ01207H—(WECO Appd)—Lamp Display

Equipment—NJ01207H-()

List 1—Assembly, wiring, and equipment for one lamp display unit per NS01207-01 Fig. 14 and Cad 14

List 2—Equipment required in addition to List 1 to mount 2nd or 4th display unit

List 3—Equipment required in addition to List 1 to mount 3rd or 4th display unit

List 4—Blank Designation Panel

List 5—Panel Marked "B"

List 6—Panel Marked "1"

List 7—Panel Marked "2"

List 8—Panel Marked "3"

List 9—Panel Marked "4"

List 10—Panel Marked "BLDG"

List 11—Panel Marked "RAD"

List 12—Panel Marked "-24"

List 13—Panel Marked "+24"

List 14—Panel Marked "-48"

List 15—Panel Marked "+130"

List 16—Panel Marked "-130"

List 17—Panel Marked "+130"

List 18—Panel Marked "+250"

List 19—Custom Translucent Designation

List 20—Equipment required in addition to 1st or 3rd List 1 when wall mounting is required.

Notes

- A. When List 20 is not required, two each of Lists 4 or 5, etc, to 19 is required.
- B. When List 20 is required only one each of Lists 4 or 5, etc, to 19 is required. Accordingly, 10 List 4s will be required.
- C. The engineer shall specify designations required.

5. TEST EQUIPMENT

The following portable test equipment is required to test an alarm system:

KS-14510 L1 Volt-ohm-milliammeter

J94730A L1 1A Fault Location Test Set

6. EQUIPMENT LOCATION**BAY EQUIPMENT**

6.01 Office alarm bays do not require any specific equipment location on the floor and may be located where convenient. This equipment, while

arranged for noise suppression through the extensive use of diodes, could cause interference with noise sensitive equipment such as N carrier or multiplex. For this reason, when location restrictions on other equipment drawings exist, their restrictions are controlling.

6.02 Lamp Display Location Guidelines

ITEM	CHARACTER HEIGHT	READABILITY DISTANCE
Floor Indication	2 inch	80 feet
Fault Indication	1/2 inch	20 feet

In some installations, it has been noted that the full complement of 40 lamps were furnished. As a general guideline, the lamp quantities furnished should be limited to the floor in general and those equipment fault indications absolutely essential. A simpler, less expensive, easier engineered job will result, and the possibility of alarm fault masking will become negligible if these guidelines are observed.

TABLE A
EQUIPMENT ORDERING GUIDE

ITEM	J CODE	QUANTITY TO BE PROVIDED	SIZE #	LOCATION	
			OF 2 X 23" MPS	OAB	MISC
Aisle Grouping Unit	NJ01207A	1 per 20 Eqpt Aisles on a Floor	1	X	
Audible Alarm Relay Unit	NJ01207B	1 per 3 Audible Alarm Appearances	1	X	
ABS Fuse Alarm Relay Unit	NJ01207C	1 Relay/ABS Fuse Pnl	1	X	
Main Aisle Pilot Relay Unit	NJ01207D	As Reqd 1 L-2/Main Aisle	1	X	
Display, Control, and Status Input TS	NJ01207E	1 per System	2	X	
Lamp Display Output TS	NJ01207F	Max. 2, 1/Floor Except 1st Floor	2		X
Lamp Display Relay Unit	NJ01207G	1/20 LP Indications Max. 2 and/or IF Alarm Sending Prov	1	X	
Lamp Display Panel (10 Lamps)	NJ01207H	Misc Basis Max. 5 Locs/Floor and 4 Panels/Loc	N/A		X
Aisle End Gd Equipment	NE01207-30	As Reqd per Aisle	N/A		X
Aisle End Gd Equipment	NE01207-50	As Reqd per Aisle	N/A		X
Audible Alarm Panel	ED-96188-34	As Reqd per AA Appearance	N/A		X