Layout
Installation
Operating Instructions

NUTONE APARTMENT HOUSE COMMUNICATION SYSTEM 4

Model 478
Control Unit

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NuTone

PLANNING THE SYSTEM

From the "SYSTEM COMPONENT CHART," page 3, select the appropriate equipment for the desired system. The five different systems are listed in the left hand column.

The system wire and cable requirements can be determined by referring to the wiring diagrams (back foldout page).

Use WIRING DIAGRAM NO. 2 for systems that include the Model 469, i.e. "Two-Entry System with Timed Door Release and Postal Lock at Both Entries, and with Auto Call Transfer (Unused Directory Lockout)." (System 5).

Use WIRING DIAGRAM NO. 1 for all other systems that use the Model 478 Terminal Board on the Master Unit.

When Riser Cable, and the interconnecting wires and cables between the Control Unit and Entrance Directory(s) have been selected, the color-coding of the individual wires must be determined and this code must be followed exactly when installing and connecting the individual wires at their various terminations. (Make drawing and/or chart if required.)

The specific installation instructions that are supplied with all NuTone components should be followed when installing the individual units.

SELECTING ENTRANCE DIRECTORY AND ROUGH-IN HOUSING

The 490 (series) Rough-in Housing should be used with all NuTone Entrance Directories.

The Model 490-1 should be used for the Model 498 Single Panel Directory.

Rough-in Housing for the Model 496 (series) Entrance Directories can be determined from the chart on page 4.

All Entrance Directories are supplied in Silver Anodized (SA) finish and in Brass Anodized (BA) finish.

The Model 498 Single Panel Directory can be supplied, with 4, 8, 12, 16, or 20 pushbuttons, from stock.

The Model 498 can be supplied, with 6, 10, 14, or 18 pushbuttons; by special order.

Directory Panels should be ordered by model no., finish, and number of pushbuttons:

Example: Model 498-BA-12 (stock item)
(Brass Anodized Panel with 12 pushbuttons)
Model 498-SA-10 (special order)
(Silver Anodized Panel with 10 pushbuttons)

Model: 498 Entrance Directory should be ordered as directed in the charts, page 3.

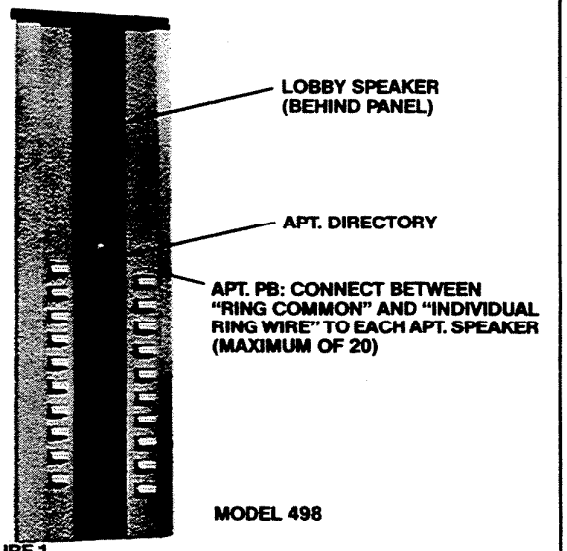


FIGURE 1

System Component Chart

SYSTEM FEATURES	REQUIRED NUTONE EQUIPMENT BY MODEL NUMBER								
	POWER TRANSFORMER	CONTROL UNIT	MODULE(S) ADDED TO CONTROL UNIT	APT. SPKR. (MINIMUM ONE IN EACH APT.)	BUILT-IN APARTMENT SPEAKER ROUGH-IN	SURFACE-MOUNT APT. SPKR. ROUGH-IN	ELECTRIC DOOR RELEASE	ENTRANCE DIRECTORY AND ROUGH-IN	POSTAL LOCK SWITCH
ONE-ENTRY SYSTEM WITH TENANT CONTROLLED MOMENTARY ELECTRIC DOOR RELEASE. (Door Release remains activated while the Apt.Spkr. Door Release Switch is held in position 1 or 2.) ①	301-T	478	NONE	485	IR-3 or IR-4 ****	IA-15	DR-1 (†)	2-20 Apts., 498, installed in 490-1 Rough-in. 2-100 Apts., 496*	 NONE
ONE-ENTRY SYSTEM WITH TIMED DOOR RELEASE AND POSTAL LOCK ②	301-T	478	467	485	IR-3 or IR-4 ****	IA-15	DR-1 (†)	2-20 Apts., 498, installed in 490-1 Rough-in. 2-80 Apts. 496 (P)**	499*** NONE
TWO-ENTRY SYSTEM WITH TENANT CONTROLLED, SELECTIVE, MOMENTARY ELECTRIC DOOR RELEASE AT BOTH ENTRIES. (Door release at Entry No. 1 remains activated while the Apt. Spkr. Door Release Switch is held in position 1; and Door Release at Entry No. 2 remains activated while the switch is held in position 2. ③	301-T	478	466	485	IR-3 or IR-4 ****	IA-15	DR-1 Both Doors (†)	2-20 Apts., 498, installed in 490-1 Rough-in at both entries. 2-100 Apts., 496 Installed at both entries.	 NONE
TWO-ENTRY SYSTEM WITH TIMED DOOR RELEASE AND POSTAL LOCK AT MAIN ENTRY, AND TIMED DOOR RELEASE AT SECOND ENTRY ④	301-T	478	467 468	485	IR-3 or IR-4 ****	IA-15	DR-1 Both Doors (†)	2-20 Apts., 498, installed in 490-1 Rough-in at both entries. 2-80 Apts., 496(P) at Main Entry and 496 at Second Entry.	499 MAIN ENTRY NONE
TWO-ENTRY SYSTEM WITH TIMED DOOR RELEASE AND POSTAL LOCK AT BOTH ENTRIES: AND AUTO CALL TRANSFER (UNUSED DIRECTORY LOCKOUT) ⑤	301-T	478	469	485	IR-3 or IR-4 ****	IA-15	DR-1 Both Doors (†)	2-80 Apts. 496(P) at both entries NOTE: If Postal Lock Switch is not required at Second Entry, use 496.	NONE

NOTE: (*) Rough-in Housing for 496 Entrance Directory is determined by the number of apartments served.

(**) Suffix "(P)" indicated directories supplied with Postal Lock provisions.

(***) Postal Lock Switch Model 499 may be used at entries with Model 496 Entrance Directory installed, i.e. where a remote Postal Lock release is desired.

(****) When riser cable to apartment speakers is run free (not in conduit), use IR-3 Rough-in Frame. When riser cable to apartment speakers is run in conduit, use IR-4 Rough-in Housing (closed back).

(†) Use NuTone Model DR-1 with wood frame and door. For metal frame and door, use Electric Door Release Model DR-2-5A.

SELECTING ENTRANCE DIRECTORY AND ROUGH-IN HOUSING

Specification Chart For 496 and 496P Entrance Directories

Model	Description	
496-SA* (Silver Anodized Finish) 496-BA* (Bronze Anodized Finish)	Entrance Directory for one or two entrance buildings. Complete frame and panel assembly including entrance speaker, apartment buttons, name panel and indicator light for use with the Auto Call Transfer System.	*Add suffix (even number only) to specify number of apartment buttons required. (Example: For 59 apartments order 496-SA-60 Arrangement of buttons will be determined by factory when maximum button capacity is not required. Buttons provided in even numbers only. To order a directory with name panel, specify **with** name directory panel.
496-SA*P (Silver Anodized Finish) 496-BA*P (Bronze Anodized Finish)	Same as Model 496 plus postal lock door release provision on speaker panel (only required at main entry—use 496 at second entrance.)	

Panels included in Directory Frame—496		Height of panels: 17¾"		Projection of panels: 1 9/16"		
Number of Apartments	Speaker Panel 0-20 Buttons	Button Panel 20-40 Buttons	Name Panel 40 Names	Overall Width	Rough-In Required	order (separately)
2-20	1	–	–	6¾"	490-1	
22-60	1	1	–	10¾"	490-2	
62-100	1	2	–	14¾"	490-3	
2-20	1	–	1	10¾"	490-2	
22-40	1	1	1	14¾"	490-3	

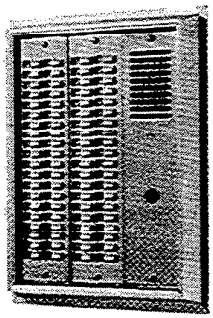
Panels included in Directory Frame—496P		Height of panels: 17¾"		Projection of panels: 1 9/16"		
Number of Apartments	Postal Lock and Speaker Panel—0 Buttons	Button Panel 20-40 Buttons	Name Panel 40 Names	Overall Width	Rough-In Required	order (separately)
2-40	1	1	–	10¾"	490-2	
42-80	1	2	–	14¾"	490-3	
2-40	1	1	1	14¾"	490-3	

Note: Postal Lock of 496P is furnished by local Post Office.

Surface-Mounted Name Directories

For use with 496 Series Directories. Each name panel includes 40 plastic name spaces. Tenant names and apartment numbers can be applied with ¼" Dymo® pressure adhesive tape, can be typewritten or can be engraved locally.

FIGURE 2



MODEL 496P

One, two or three name-panels are included within a frame for easy surface mounting. Your choice of silver or brass anodized finish. Panels have window lenses; are secured to mounting frame with two special tamper-resistant fasteners. When released, they swing out for easy rearrangement of names. Directories are 17¾" high and project 1 9/16".

Brass Anodized Model No.	Silver Anodized Model No.	Name Capacity	No. of Panels	Overall Width
ND-1-BA	ND-1-SA	40	1	6¾"
ND-2-BA	ND-2-SA	80	2	10¾"
ND-3-BA	ND-3-SA	120	3	14¾"

Entrance Directory Rough-In Framing Dimensions

Model	490-1	490-2	490-3
Panel Capacity	1	2	3
Dimension "A"	5"	9"	13"
Dimension "B"	4½"	8½"	12½"

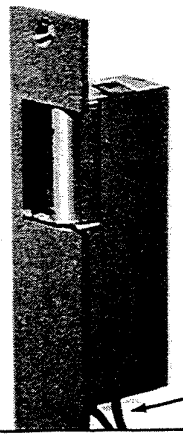
Electric Door Release

NuTone Model DR-1-SA/BA (silver anodized or brass anodized) is recommended for use with wood doors and frames.

The mortise-type door release flush mounts in place of the lock strike plate. (Figure 3)

For metal frame and door, use Electric Door Release supplied (or recommended) by the door manufacturer. The door release should be capable of operating on a pulsating d-c with an average value of 6 to 8 volts.

FIGURE 3

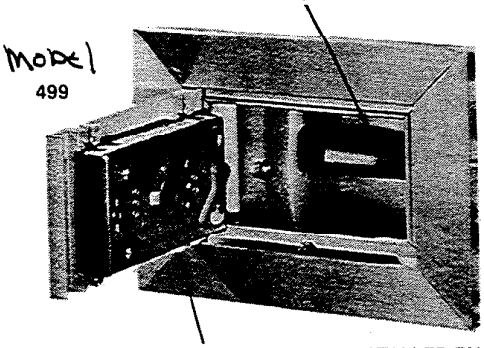


DR-1

CONNECT BOTH WIRES FROM 478/469

FIGURE 4

CONNECT "POSTAL LOCK" FROM CONTROL UNIT TO SWITCH



POSTAL LOCK INSTALLED BY LOCAL POSTAL AUTHORITIES

Postal Lock Door Release Switch

The NuTone Model 499-SA/BA (silver anodized or brass anodized) must be used when the Model 498 Entrance Directory is used and postal release of the electric door release is desired. (Figure 4)

The Model 499 can be used with the 496 (series) directory when remote operation of the electric door release is desired.

The 496 (series) directory may be ordered with the postal lock door release feature included. See chart page 4.

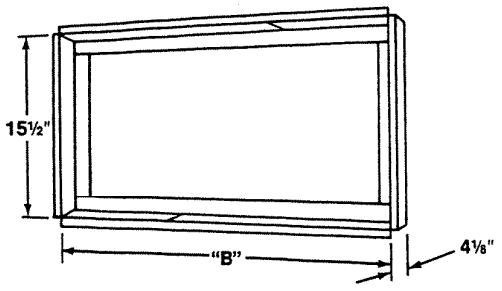
The postal lock is installed by local postal authorities. Consult your local postmaster.

INSTALLATION

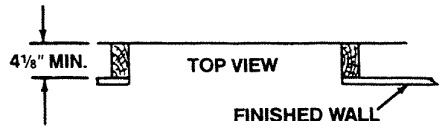
System Rough-In

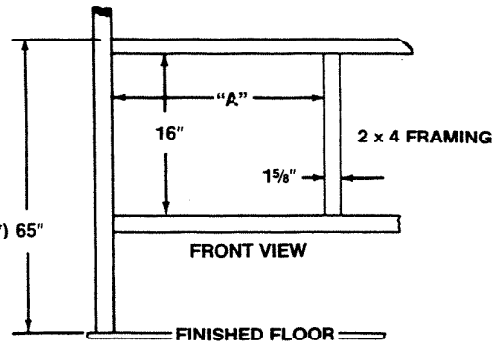
NEW CONSTRUCTION: The rough-in frames and housings for the entrance directories and apartment speakers and the interconnecting wires and cables should be installed before the walls are in place—during normal electrical rough-in.

The Model 490 series rough-in housing for the entrance directory(s) should be framed-in as shown in Figure 6 and installed according to its installation instructions.



MODEL 490 ROUGH-IN FRAME





Entrance Directory Rough-In Framing Dimensions

Model	490-1	490-2	490-3
Panel Capacity	1	2	3
Dimension "A"	5"	9"	13"
Dimension "B"	4½"	8½"	12½"

FIGURE 5: MODEL 490 (SERIES) ROUGH-IN HOUSING INSTALLATION

(*) Recommended height above finished floor; may vary to meet individual requirements.

INSTALLATION

At least one apartment speaker rough-in is required in each apartment. When an apartment includes the optional second apartment speaker, an additional rough-in is required.

Use IR-3 Rough-in Frame for apartment speakers when the Riser Cable is run free.

Use IR-4 Rough-in Housing (closed back) for apartment speakers when the Riser Cable is run through electrical conduit.

Use IA-15 Frame for surface mounting of the apartment speakers. The IA-15 is used when built-in installation is not feasible, such as in a new or replacement system in an existing building.

Install the interconnecting wires and cables as determined from the WIRING DIAGRAMS (back fold-out page).

Use WIRING DIAGRAM NO. 2 for systems that include the Model 469, i.e. "Two Entry Systems with Timed Door Release and Postal Lock at Both Entries and with Auto Call Transfer (System 5, page 3). (Figure 10)

Use WIRING DIAGRAM NO. 1 for all other systems (Systems 1 through 4, page 3). These systems use the Model 478 Terminal Board. (Figure 9)

CABLE JUNCTION (Figure 6)

The cable junction may be made in the Entrance Directory (either directory in a two-entry system) or in an optional electrical junction box. (Junction box is not supplied by NuTone—local purchase item.)

The COMMON CABLE from Control Unit; RISER CABLE to all Apartment Speakers and the INDIVIDUAL RING WIRES from the Entrance Directory Pushbuttons are connected at the Cable Junction.

CONNECT: (OBSERVING COLOR CODE)

AUD 1 wire in Common Cable to AUD 1 wire in every Riser Cable;

AUD 2 wire in Common Cable to AUD 2 wire in every Riser Cable;

NOTE: AUD 1 and AUD 2 wires must be a twisted-pair throughout the system.

CONTROL wire in Common Cable to Control wire in every Riser Cable;

GROUND wire in Common Cable to GROUND wire in every RISER CABLE;

INDIVIDUAL RING WIRE from each Directory Pushbutton to the corresponding INDIVIDUAL APARTMENT SPEAKER RING WIRE in the Riser Cable.

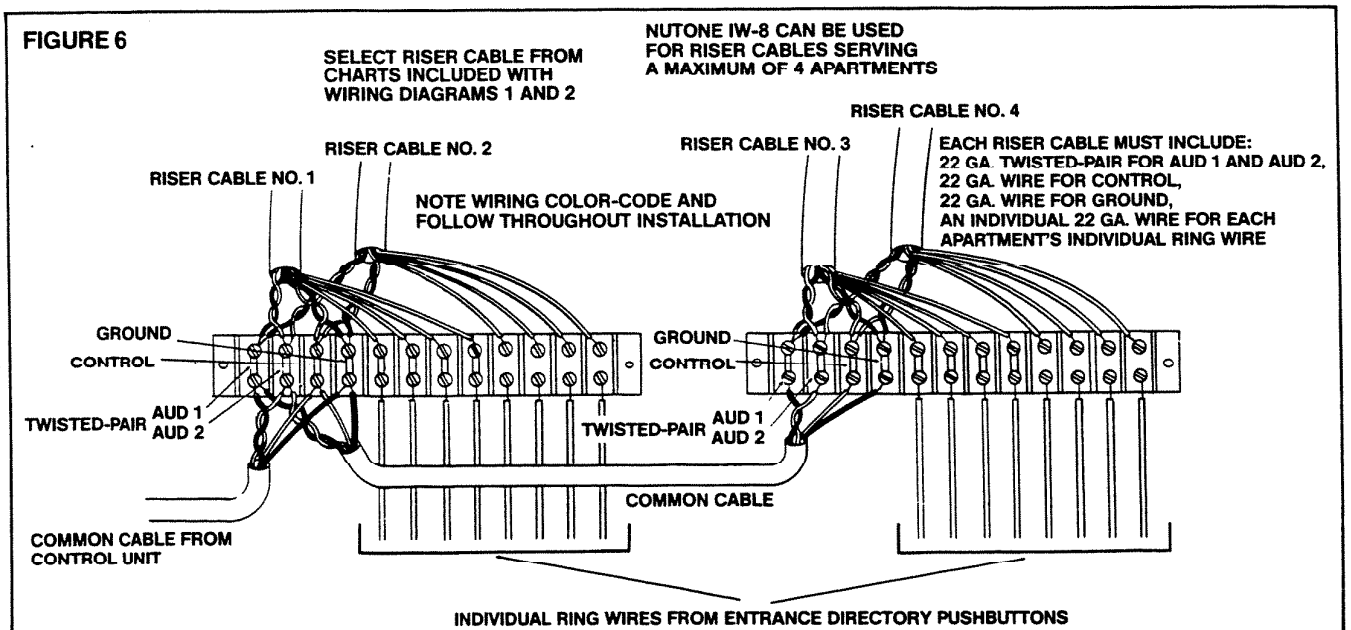
The wires may be spliced together using solderless connectors or, they may be joined at a barrier type terminal block as shown in Figure 6. The latter is preferred method for ease and speed of installation, and to facilitate check-out of system in case of malfunction.

When two entrance directories are used, install a 22 ga. multi-wire cable between directories. Cable should contain a wire for each apartment pushbutton in a directory.

Connect a wire between the similarly numbered pushbuttons in each directory, i.e. PB101 in directory number 1 to PB101 in directory number 2; PB102 to PB102; PB103 to PB103, et al.

Install the wires and cables between the Control Unit and Directory Panel(s); Control Unit and Cable Junction; Control Unit and Electric Door Release(s); and when required between the Control Unit and Model 499 Postal Lock Switch for the Electric Door Release. (Wiring Diagrams 1 and 2; and Figures 9 and 10)

FIGURE 6



CABLE JUNCTION
REPRESENTATIVE INSTALLATION

Model 301-T Power Transformer Installation

Install transformer on octagon electrical box near main fuse or circuit breaker box.

Connect electrical box to earth ground.

Install #18/2 cable (NuTone S-143), 16Vac line, between transformer and Control Unit.

At transformer, connect the wires of the #18/2 cable to the secondary 16Vac screw terminals.

Connect class 1, 120V, 60 Hz. wiring to transformer's black and white primary leads. If possible use a separately fused 120V supply line to transformer. Use #14/2 or #12/2 power cable—observe local code.

At the Control Unit, recommend that the ends of the wires of the #18/2 cable be insulated and left unconnected until installation of the entire system has been completed.

When installation is completed and the system is ready to be checked-out, connect the wires to the "16VAC" terminals on the Control Unit terminal Board.

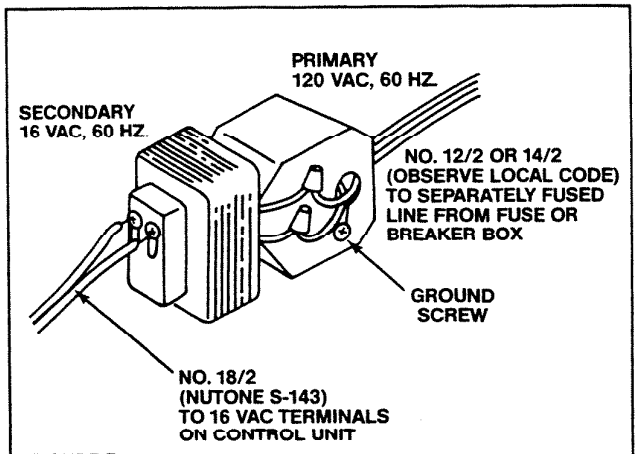


FIGURE 7

Model 478 Control Unit Installation

The Control Unit should be installed in a convenient location where it is readily accessible for adjustment and/or checking. Such areas as power or utility rooms are recommended.

Fasten Control Unit to a flat wall. Secure the Unit with screws through the four mounting holes. On masonry walls—brick, concrete block, et al—it may be necessary to use screw anchors or toggle bolts.

If required (See SYSTEM COMPONENT CHART, page 3), install optional modules—Models: 466; 467; 468; or 469—according to the installation instructions which are supplied with each module.

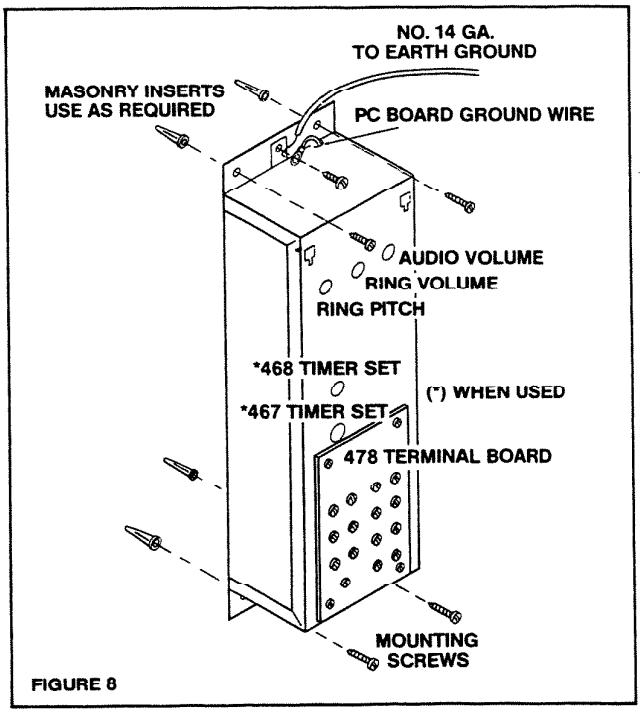


FIGURE 8

Control Unit Wiring Connections

NOTE: Interconnecting wires must make good contact with the foil under the terminal screw. A loose screw may not make contact with the foil terminal and may allow the wire to spring away from the terminal—opening the circuit.

In properly installed systems, the Control Unit is connected to earth ground. Make certain that no interconnecting wire is shorted to rough-in housing; conduit; etc.

INSTALLATION

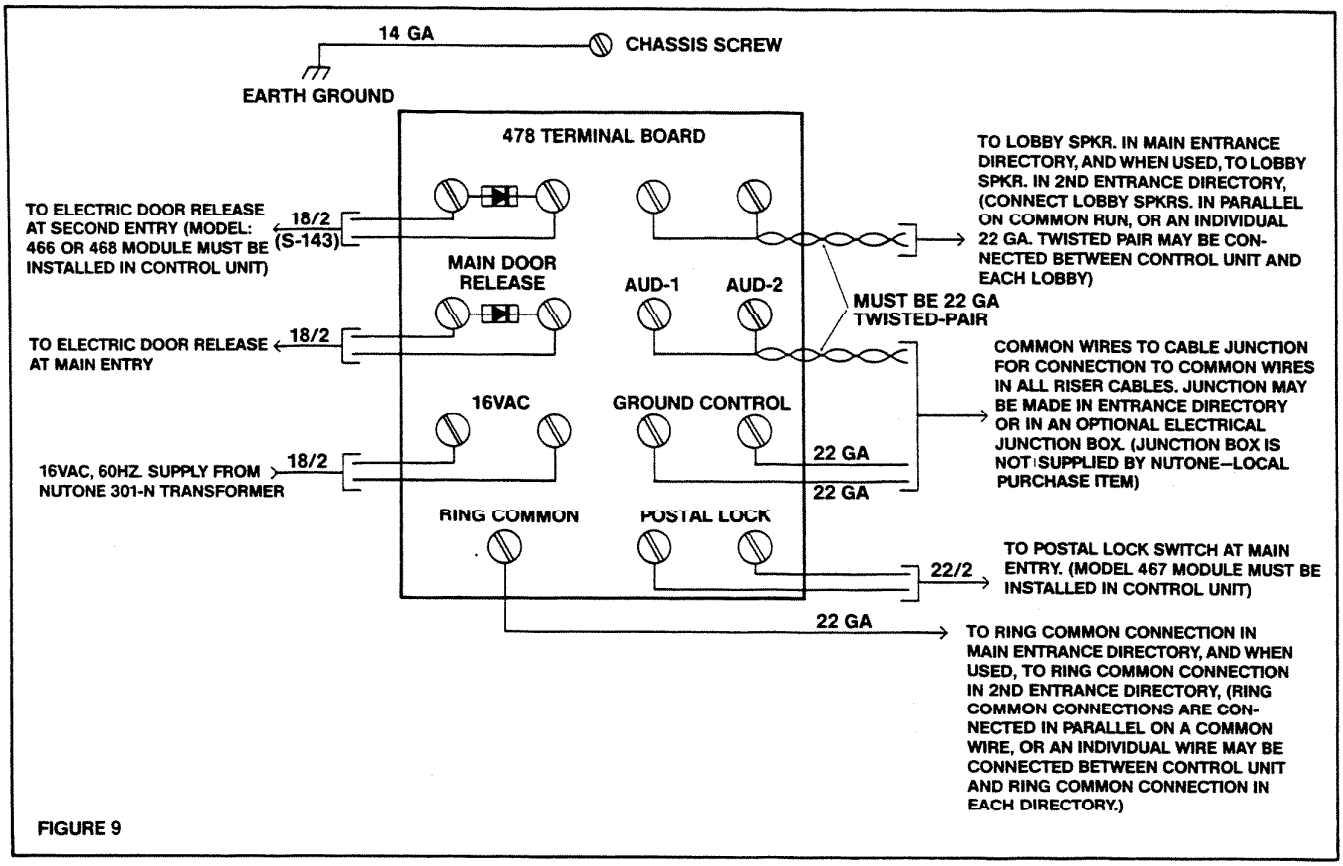


FIGURE 9

ALL SYSTEMS: (See WIRING DIAGRAMS NO. 1 and 2 and Figures 9, 10, and 11)

GROUND WIRE: Connect 14 ga. wire from top chassis screw (same screw to which Control Unit's PC board is grounded) to Earth Ground.

16VAC POWER WIRING: After installation has been completed and system is ready to be checked-out, connect the #18/2 cable wires from the 16Vac secondary of Model 301-N Power Transformer to the "16VAC" terminals on the Master Unit terminal board. See paragraphs below Figure 8.

COMMON CABLE CONNECTIONS:

Twisted-pair: AUD 1 wire to "AUD 1" terminal, and AUD 2 wire to "AUD 2" terminal;

CONTROL wire to "CONTROL" terminal;

GROUND wire to "GROUND" terminal.

The Common Cable should be terminated at the Cable Junction, see first 4 paragraphs under **"Cable Junction"**.

SYSTEM 1, page 3: One-Entry System with Momentary Door Release. (WIRING DIAGRAM NO. 1 and Figure 10)

Make GROUND and 16VAC connections as directed above.

Make COMMON CABLE CONNECTIONS as directed in **"Common Cable Connections"** above.

If Common Cable is to be terminated at the optional remote junction box, use 3-twisted-pair cable (NuTone IW-6) between the Control Unit terminal board and the Cable Junction.

If the Cable Junction is made in the Directory Panel, use 4-twisted-pair cable (NuTone IW-8) between the Control Unit terminal board and the Entrance Directory and connect as follows.

Use one-twisted pair for AUD 1 and AUD 2 connections;

Use one wire for CONTROL connections;

Use one wire for GROUND connections;

Connect one-twisted pair between "LOBBY SPEAKER" terminals on the Control Unit terminal board and the LOBBY SPKR in the Entrance Directory;

Connect one wire between "RING COMMON" terminal on the Control Unit terminal board and the RING COMMON connection in the Entrance Directory;

Note: When the Entrance Directory contains more than one panel, the RING COMMON connection to the pushbuttons on every panel must be connected to the RING COMMON wire.

Connect wires from 18/2 cable (NuTone S-143) between "MAIN DOOR RELEASE" terminals and Electric Door Release at the entrance.

SYSTEM 2, page 3: One-Entry System with Timed Door Release and Postal Lock.

The Model 467 Module must be installed in the Model 478 Control Unit.

Complete all wiring as indicated above, under **"SYSTEM 1."**

Connect a pair of 22 ga. wires (NuTone IW-2) between the "POSTAL LOCK" terminals on the Master Unit terminal board and the POSTAL LOCK SWITCH at the entrance.

The Model 499 Postal Lock Switch must be used with the Model 498 Entrance Directory and may be used with the 496 series directory.

The 496P series directory includes the POSTAL LOCK SWITCH. The 22 ga. pair should be connected to the switch in these directories.

SYSTEM 3, page 3: Two-Entry System with Momentary Electric Door Release at Both Entries. (WIRING DIAGRAM NO. 1 and Figure 10)

The Model 466 Module must be installed in the Model 478 Control Unit.

Complete all wiring as indicated in **"SYSTEM 1"** on page

Connect a 22 ga. twisted-pair between the LOBBY SPKR in the second entry directory and the LOBBY SPKR in the main entry directory; or between the second LOBBY SPKR and the "LOBBY SPEAKER" terminals on the Master Unit terminal board. (The lobby speakers are connected in parallel across the "LOBBY SPEAKER" terminals on the Control Unit.)

Connect a 22 ga. wire from the RING COMMON terminal(s) in the second directory and the RING COMMON terminal(s) in the main directory; or between the RING COMMON terminal(s) in the second directory and the "RING COMMON" terminal on the Master Unit terminal board.

Connect a #18/2 cable (NuTone S-143) between the "SECOND DOOR RELEASE" terminals on the Master Unit terminal board and the Electric Door Release at the second entrance.

SYSTEM 4, page 3: Two-Entry System with Timed Door Release and Postal Lock at Main Entry, and Timed Door Release at Second Entry. (WIRING DIAGRAM NO. 1 and Figure 10)

The Model 467 and Model 468 Modules must be installed in the Model 478 Control Unit.

Complete all wiring as indicated in **"SYSTEM 1"** on page

Complete all wiring as indicated in **"SYSTEM 2"** above.

Complete all wiring as indicated in **"SYSTEM 3"** above.

NOTE: The entry at which the Postal Lock Switch is located must be considered the "MAIN ENTRY" for installation and operation.

SYSTEM 5, page 3: Two-Entry System with Timed Door Release and Postal Lock at Both Entries and Auto Call Transfer (Unused Directory Lockout). (WIRING DIAGRAM NO. 2 and Figure 11).

The Model 469 Module must be installed in the Model 478 Control Unit. (The Model 467 module is supplied with the Model 469 and it too must be installed in the Model 478, See installation instructions supplied with 469.)

The Model 496(P) series Entrance Directories are designed for use in this system.

At entrance where remote operation of the Postal Lock Door Release Switch is desired, the Model 496 series Entrance Directory and Model 499 Postal Lock Door Release Switch may be used.

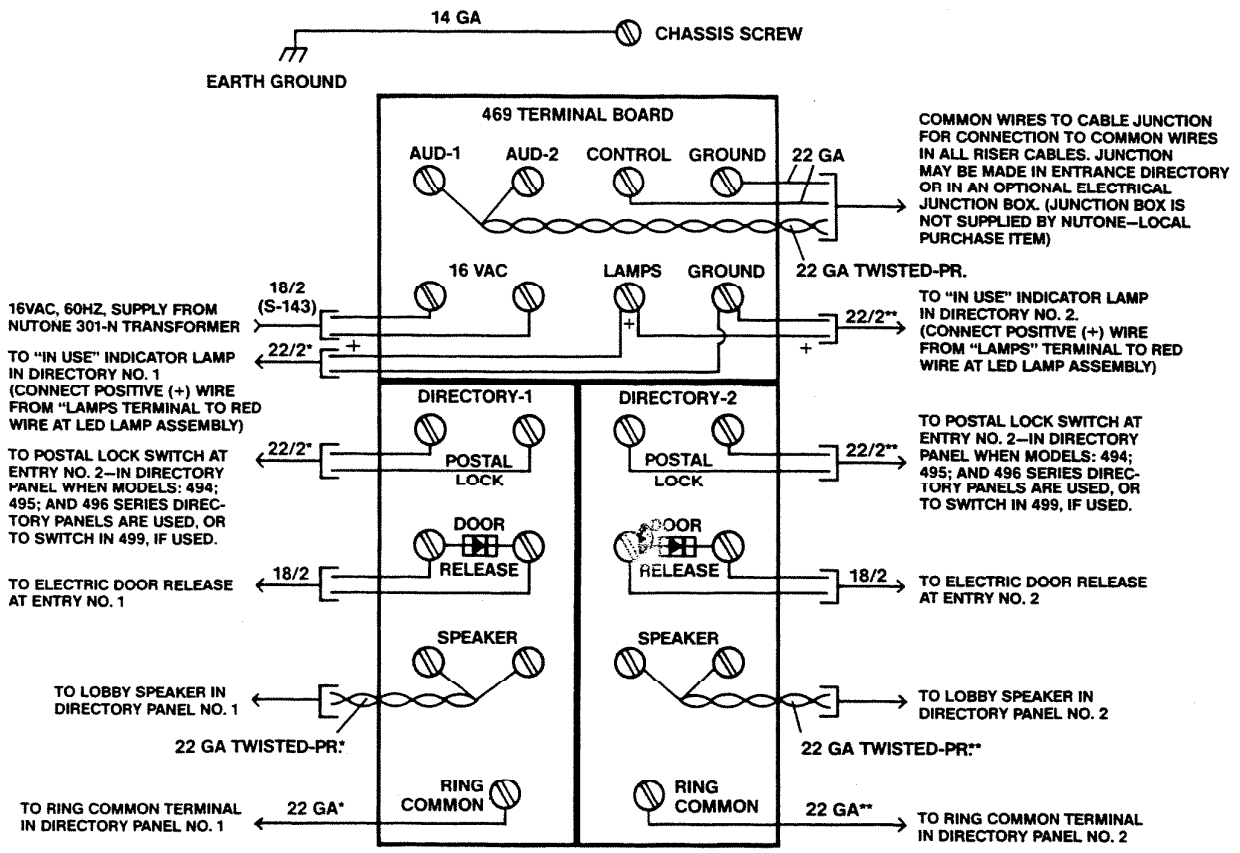
At entrance where postal lock door release switch is not desired, the Model 496 series Entrance Directory may be used.

Connect GROUND; 16VAC; and COMMON CABLE wiring as indicated in **"ALL-SYSTEMS"** on page

Connect DIRECTORY-1 wiring—including LAMP wiring between Model 469 terminal board and No. 1 Entrance Directory exactly as shown in Figure 10.

Connect DIRECTORY-2 wiring—including LAMP wiring between Model 469 terminal board and No. 2 Entrance Directory exactly as shown in Figure 10.

NOTE. LAMP WIRING IS POLARIZED AND MUST BE CONNECTED AS SHOWN IN FIGURE 11. IF CONNECTIONS ARE REVERSED THE LAMPS WILL NOT FLASH OFF-AND-ON WHEN THE SYSTEM IS IN USE.



NOTE: (*) THESE WIRES MAY BE INCLUDED IN A RUN OF NUTONE'S IW-8 (4 TWISTED-PAIR, COLOR-CODED) CABLE BETWEEN THE CONTROL UNIT AND NO. 1 ENTRANCE DIRECTORY.
(**) THESE WIRES MAY BE INCLUDED IN A RUN OF NUTONE'S IW-8 CABLE BETWEEN THE CONTROL UNIT AND NO. 2 ENTRANCE DIRECTORY.

FIGURE 10

Model DR-1 Electric Door Release Installation

The NuTone Model DR-1(SA/BA) is designed for use with wood frames and doors, and should be installed according to the installation instructions which are supplied with the unit.

For metal frame and door, use the Electric Door Release which is supplied (or recommended) by the door manufacturer. Such Door Release should be capable of operating on a pulsating DC with an average value of 6 to 8 volts.

SILENT OPERATION: The Model 478 and Model 469 terminal boards are supplied with a silencing diode connected across the "DOOR RELEASE" terminals.

Diode specifications: 1 amp; 100 PIV; Type 1N4002; NuTone Part No. 36549-000. Cathode-end is designated by white (or silver) band.

Diode must be connected exactly as shown. Reversing diode connections will "Short" door operation, and probably burn-out diode.

For audible operation of the Electric Door Release, remove the diode.

Model 499 Postal Lock Door Release Switch

The Model 499 must be used with the Model 498 Entrance Directory when postal lock operation of the Electric Door Release is desired.

The Model 499 may be used with the Model 496 series Entrance Directory when remote (from the Entrance Directory) operation of the Door Release Switch is required.

496(P) series Entrance Directories are supplied with a Postal Lock Switch installed on their speaker panels.)

Install the unit near the door, following the installation instructions included with the unit.

Consult local postal authorities for installation of the Postal Lock.

Entrance Directory Installation

The Entrance Directory should be installed as directed by its individual installation instructions.

When Cable Junction is made in the directory, the wires may be joined with solderless connectors, but recommend the installation of barrier type terminal blocks in the directory and that the wires and cables be connected as shown in Figure 6.

DIRECTORY POSTAL LOCK SWITCH: Switch is normally closed, momentary type. In normal operation the postal lock holds the switch open, and when the postman operates (unlocks) the postal lock the switch closes—resulting in timed operation of the Electric Door Release. The postman must relatch the lock, which opens the switch, in order to remove his key from the Lock.

Directory Panel is supplied by NuTone with the switch held open—with tape or rubber band

After postal authorities have installed the postal lock, the tape or rubber band should be removed to allow normal operation.

MODEL 496 series "IN USE" indicator lamps. Light Emitting Diodes (LED) are used for reliability and long life. The diodes are polarized; the red wire from the diode assembly must be connected to the positive (+) wire from the 469 terminal board; and the other "LAMP" wire must be connected to the black wire from the LED assembly. (Figure10)

If the wires are reversed, the "IN USE" light will not be turned on when the system is in use.

The "IN USE" indicator lamps are functional only when the control unit is equipped with the Model 469 Auto-Call-Transfer Adapter.

Series ND Surface Mounted Name Directories are used with 496 series Entrance Directories in buildings with up to 100 apartments. (See page 3)

The Name Directory should be installed according to the instructions supplied with each unit.

CONNECT 16VAC POWER TO CONTROL UNIT:

When system installation has been completed, connect the 16Vac wires (#18/2 cable from secondary of Model 301-N Power Transformer) to the "16VAC" terminals on the Control Unit's terminal board.

At the terminal board, the voltage across the "16 VAC" terminals should read 16-19 volts. (Figures 14 and 15)

If voltage is not present across terminals, check:

For 16-18Vac across secondary screw terminals on 301-N (Figure 7)

120Vac to primary of 301-N Power Transformer—line fuse, wiring, etc.

For shorts and open in wiring between transformer and Control Unit's terminal board.

If voltage is present at the leads when they are disconnected from the terminal board, and the voltage disappears when the wires are connected to the "16VAC" terminals, there is probably a short in the Control Unit and it must be repaired or replaced.

SYSTEM OPERATIONAL CHECKOUT

One-Entry System (Systems 1 and 2, page 3)

RING CIRCUIT

At the Entrance Directory, signal an apartment by activating (push-in) that apartment's pushbutton.

While the pushbutton is held in, the ring tone should be heard in the signaled Apartment Speaker and at a somewhat lower level at the Entrance Directory speaker.

The amplitude of the Apartment Speaker's ring tone can be adjusted by the RING VOLUME CONTROL in the Master Unit. Using a small screwdriver, turn control clockwise to increase volume; or turn control counterclockwise to decrease volume. (Figure 11)

The amplitude of the ring tone to the lobby speaker is fixed and very little, if any, change will be noticed when the RING VOLUME CONTROL is adjusted.

The pitch of the ring tone—to both lobby and apartment speaker—can be adjusted by the RING PITCH CONTROL in the Model 478. Use a small screwdriver, turn clockwise to raise pitch; or turn counterclockwise to lower pitch.

APARTMENT SPEAKER TALK

Push down the Apartment Speaker's PUSH TO TALK SWITCH and speak into the unit. The message should be heard in the lobby speaker.

APARTMENT SPEAKER LISTEN

Push down the Apartment Speaker's PUSH TO LISTEN SWITCH and the caller can speak into the lobby speaker and the tenant will hear the message through the Apartment Speaker.

TALK/LISTEN VOLUME

The amplitude of the TALK/LISTEN signals—at both the lobby and apartment speaker—can be adjusted by the AUDIO VOLUME CONTROL in the Master Unit. Turn the control clockwise to increase volume; or turn the control counterclockwise to decrease the volume.

The control should be set so that there is sufficient volume in any Apt. Spkr., paying particular attention to the Apt. Speaker that is on the end of the longest riser cable.

SYSTEM OPERATIONAL CHECKOUT

DOOR RELEASE (MOMENTARY)

When the DOOR LOCK RELEASE SWITCH is thrown to position 1 or 2, the Electric Door Release will be activated—allowing the door to be opened.

The Door Release will remain activated so long as the Apartment Speaker's DOOR LOCK RELEASE SWITCH is held in position 1 or 2.

TIMED DOOR RELEASE (MODEL 467 MODULE MUST BE INSTALLED IN THE 478 MASTER UNIT)

Throw the DOOR LOCK RELEASE SWITCH to position 1 or 2 and release. The Electric Door Release will remain energized—allowing the door to be opened for the length of the timing cycle.

The duration of the timing cycle can be adjusted by the 467 TIMER SET CONTROL. Turn the control full counterclockwise for minimum (3 seconds) to full clockwise for maximum (20 seconds) timing cycle duration.

TIMED POSTAL LOCK DOOR RELEASE

Activate (close) the Postal Lock Door Release Switch and release.

MODEL 499 REMOTE POSTAL LOCK SWITCH: (Figure 4)

Before installation of Postal Lock: press in the pushbutton and release;

After installation of Postal Lock: with postman present, open door, press in the pushbutton and release.

MODEL 496(P) DIRECTORIES (WITH POSTAL LOCK PROVISION): (Figure 2)

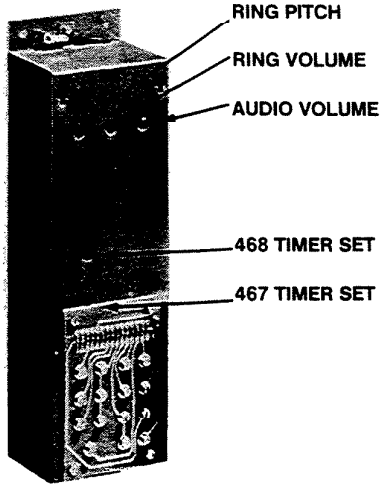
Before installation of Postal Lock: open speaker panel; remove tape or rubber band that holds switch open; allow switch to close for an instant; replace tape or rubber band keeping switch open;

After installation of Postal Lock: with postman present, unlatch postal lock—allowing switch to close; relatch postal lock and remove key—holding switch open.

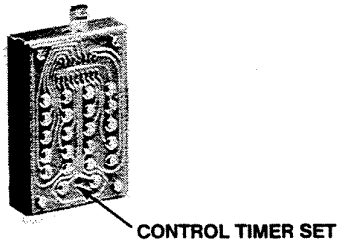
When the Postal Lock Switch is closed, the Electric door release is energized and will remain energized for the length of the Model 467 timing cycle.

The duration of the Model 467 timing cycle is determined by the setting made above (in second paragraph under **"TIMED DOOR RELEASE"**) and will allow the postman from 3 to 20 seconds for opening the door.

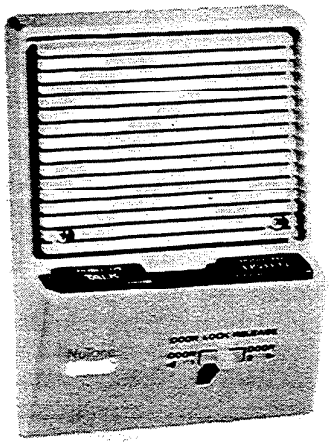
The RING circuit between each pushbutton and each apartment speaker; the TALK/LISTEN and DOOR RELEASE operation from each Apartment Speaker should be checked as directed above.



478 CONTROL UNIT
FIGURE 11



469 AUTO CALL TRANSFER
FIGURE 12



485 APARTMENT SPEAKER
FIGURE 13

Two-Entry System (Systems 3 and 4, page 3)

RING CIRCUIT

At either Entrance Directory, signal an apartment by activating (push-in) that apartment's pushbutton.

While the pushbutton is held in, the ring tone should be heard in the signaled Apartment Speaker and at a somewhat lower level at the speaker in both Entrance Directories.

The amplitude of the Apartment Speaker's ring tone can be adjusted by the RING VOLUME CONTROL in the Master Unit. Using a small screwdriver, turn control clockwise to increase volume; or turn control counter-clockwise to decrease volume.

The amplitude of the ring tone to the lobby speaker is fixed and very little, if any, change will be noticed when the RING VOLUME CONTROL is adjusted.

The pitch of the ring tone—to both lobby speakers and the apartment speaker—can be adjusted by the RING PITCH CONTROL in the Master Unit. Use a small screwdriver, turn clockwise to raise pitch; or turn counter-clockwise to lower pitch.

APARTMENT SPEAKER TALK

Push down the Apartment Speaker's PUSH TO TALK SWITCH and speak into the unit. The message will be heard in the both lobby speakers. (Figure 14)

The lobby speakers are connected in parallel. When the system is in "Standby," they are connected across the audio amplifier input. When the Apartment Speaker is in "TALK," the lobby speakers are switched to the audio amplifier output.

APARTMENT SPEAKER LISTEN

Push down the Apartment Speaker's PUSH TO LISTEN SWITCH and when the caller speaks into the lobby speaker at his entrance, the message will be heard through the Apartment Speaker.

The lobby speaker at the other directory will not "Hear" the audio message from the in-use lobby speaker, but sound in the vicinity of the out-of-use speaker will be heard at the Apartment Speaker.

TALK/LISTEN VOLUME

THE AMPLITUDE OF THE TALK/LISTEN signals—at both lobby speakers and at the apartment speaker—can be adjusted by the AUDIO VOLUME CONTROL in the Master Unit. Turn the control clockwise to increase volume; or turn the control counterclockwise to decrease volume.

The control should be set so that there is sufficient volume in any speaker; paying particular attention to the Apartment Speaker that is on the end of the longest riser cable.

SELECTIVE DOOR RELEASE—MOMENTARY—MODEL 466 MODULE MUST BE INSTALLED IN THE 478 MASTER UNIT—(System 3, page 3)

The tenant must determine (by asking) which entrance the caller is using.

If the caller is at Entry No. 1, throw the Apartment Speaker's DOOR LOCK RELEASE SWITCH to position 1; the Electric Door Release at Entry No. 1 will be activated—allowing the door to be opened—while the DOOR LOCK RELEASE SWITCH is held in position 1.

If the caller is at Entry No. 2, throw the Apartment Speaker's DOOR LOCK RELEASE SWITCH to position 2; the Electric Door Release at Entry No. 2 will be activated—allowing the door to be opened—while the DOOR LOCK RELEASE SWITCH is held in position 2.

SELECTIVE TIMED DOOR RELEASE (MODEL 467 AND 468 MODULES MUST BE INSTALLED IN THE 478 MASTER UNIT—System 4, page 3)

The tenant must determine (by asking) which entrance the caller is using.

In two-entry systems that include the Model 467 Postal/Main Door Timer Module, the Entry at which the Postal Lock Release Switch is installed is considered the "MAIN" Entry, the other entry is "2ND Entry."

If the caller is at the MAIN entry, throw the DOOR LOCK RELEASE SWITCH in the apartment speaker to position 1 and release. The Electric Door Release at the MAIN entry will remain energized—allowing its door to be opened—for the length of the timing cycle.

The duration of the timing cycle can be adjusted by the 467 TIMER SET CONTROL in the Master Unit. Turn the control full counterclockwise for minimum (3 seconds) to full clockwise for maximum (20 seconds) timing cycle duration.

If the caller is at the 2ND Entry, throw the DOOR LOCK RELEASE SWITCH in the apartment speaker to position 2 and release. The Electric Door Release at the 2ND Entry will remain energized—allowing its door to be opened—for the length of the timing cycle.

The duration of the timing cycle can be adjusted by the 468 TIMER SET CONTROL in the Master Unit. Turn the control full counterclockwise for minimum (3 seconds) to full clockwise for maximum (20 seconds) timing cycle duration.

TIMED POSTAL LOCK DOOR RELEASE

The Postal Lock Door Release Switch is installed at the MAIN Entry.

Activate (close) the Postal Lock Door Release Switch and release.

MODEL 499 REMOTE POSTAL LOCK SWITCH: (Figure 4)

Before installation of Postal Lock: press in the push-button and release;

After installation of Postal Lock: with postman present, open door, press in the pushbutton and release.

MODEL 496(P) DIRECTORIES (WITH POSTAL LOCK PROVISION): (Figure 3)

Before installation of Postal Lock: open speaker (or handset) panel; remove tape or rubber band that holds switch open; allow switch to close for an instant; replace tape or rubber band keeping switch open;

After installation of Postal Lock: with postman present, unlatch postal lock—allowing switch to close; relatch postal lock and remove key—holding switch open.

When the Postal Lock Switch is closed, the MAIN Electric Door Release is energized and will remain energized for the length of the Model 467 timing cycle.

The duration of the Model 467 timing cycle is determined by the setting made above (in last paragraph under **"TIMED DOOR RELEASE"**) and will allow the postman from 3 to 20 seconds for opening the door.

AT THE MAIN ENTRY: The RING circuit between each pushbutton and each apartment speaker; the TALK/LISTEN and DOOR RELEASE operation from each Apartment Speaker should be checked as directed above.

AT THE 2ND ENTRY: Repeat paragraph above.

Two-Entry System with Model 469 Auto Call Transfer

RING CIRCUIT

At either Entrance Directory, signal an apartment by activating (push-in) that apartment's pushbutton.

The 496(P) series Entrance Directories are designed for use with this system. The 496 Directory may be substituted if the Model 499 Remote Postal Lock Door Release Switch is used.

While the pushbutton is held in, the ring tone should be heard in the signaled Apartment Speaker and at a somewhat lower level at the lobby speaker in the originating directory.

When the pushbutton is activated, the "IN USE" indicator lamp (LED) should be turned on—flashing—at both directories. The lamp should remain on for the length of the Control Timing Cycle, which starts when the pushbutton is pushed-in.

The Control Timing Cycle may be adjusted by the CONTROL TIMER SET in the Model 469.

Insert a small screwdriver in the 469 Terminal Board opening. Turn the control full counterclockwise for minimum (30 seconds) to full clockwise for maximum (60 seconds) Control Timing Cycle Duration.

During the CONTROL TIMING CYCLE the pushbuttons; lobby speaker; and electric door release; are locked-out at the unused directory.

If, ring is originated at Directory No. 1 and Directory No. 2 is locked-out; and the Postal Lock Door Release Switch at Entry No. 2 is closed, the Electric Door Release at Entry No. 2 will not be activated but, the Electric Door Release at Entry No. 1 will be activated.

If, ring is orginated at Directory No. 2 and Directory No. 1 is locked-out; and the Postal Lock Door Release Switch at Entry No. 1 is closed, the Electric Door Release at Entry No. 1 will not be activated but, the Electric Door Release at Entry No. 2 will be activated.

The amplitude of the Apartment Speaker ring tone may be adjusted by the RING VOLUME CONTROL in the Model 478 Control Unit. Use a small screwdriver, turn control clockwise to increase; and turn control counter-clockwise to decrease.

The amplitude of the ring tone to the lobby speaker is fixed, and very little, if any, change will be noticed when RING VOLUME CONTROL is adjusted.

The pitch of the ring tone—to both lobby and apartment speaker—can be adjusted by the RING PITCH CONTROL in the Model 478. Use a small screwdriver, turn clockwise to raise pitch; and counterclockwise to lower pitch.

APARTMENT SPEAKER TALK

Push down the Apartment Speaker's PUSH TO TALK SWITCH and speak into the unit. The message should be heard in the "IN USE" lobby speaker.

When the Apartment Speaker PUSH TO TALK SWITCH is activated (closed), the CONTROL TIMING CYCLE is restarted and the locked-out directory will remain locked-out for the full timing cycle duration, which will commence when the SWITCH is released.

APARTMENT SPEAKER LISTEN

Push down the Apartment Speaker's PUSH TO LISTEN SWITCH and the caller at the "IN USE" directory can speak into the lobby speaker and the tenant will hear the message through the Apartment Speaker.

TALK/LISTEN VOLUME

The amplitude of the TALK/LISTEN signals—at both the lobby and apartment speaker—can be adjusted by the AUDIO VOLUME CONTROL in the 478 Master Unit. Turn the control clockwise to increase volume; or turn the control counterclockwise to decrease the volume.

TIMED DOOR RELEASE

When the Apartment Speaker's DOOR LOCK RELEASE SWITCH is thrown to either position 1 or 2, the Electric Door Release at the "IN USE" Entrance will be activated—and remain activated for the 467's timing cycle —allowing the door to be opened.

The duration of the timing cycle can be adjusted by the 467 TIMER SET CONTROL. Turn the control full counterclockwise for minimum (3 seconds) to full clockwise for maximum (20 seconds) Door Release Timing Cycle Duration.

NOTE: The Model 467 Module is included with the Model 469 Auto Call Transfer and must be installed in the 478 Master Unit. (See Model 469 Installation Instructions.)

When the 467 Door Release Timing Cycle has been completed, the Control Timing Cycle will be terminated; the "IN USE" indicator lamps in both directories will be turned off; and the system returned to its "Standby" condition.

TIMED POSTAL LOCK DOOR RELEASE

Activate (close) the Postal Lock Door Release Switch, and release.

MODEL 496(P) DIRECTORIES (Figure 3)

Before installation of Postal Lock; open speaker panel; remove tape or rubber band that holds switch open; allow switch to close for an instant; replace tape or rubber band keeping switch open;

After installation of Postal Lock; with postman present, unlatch postal lock—allowing switch to close; relatch postal lock and remove key—holding switch open.

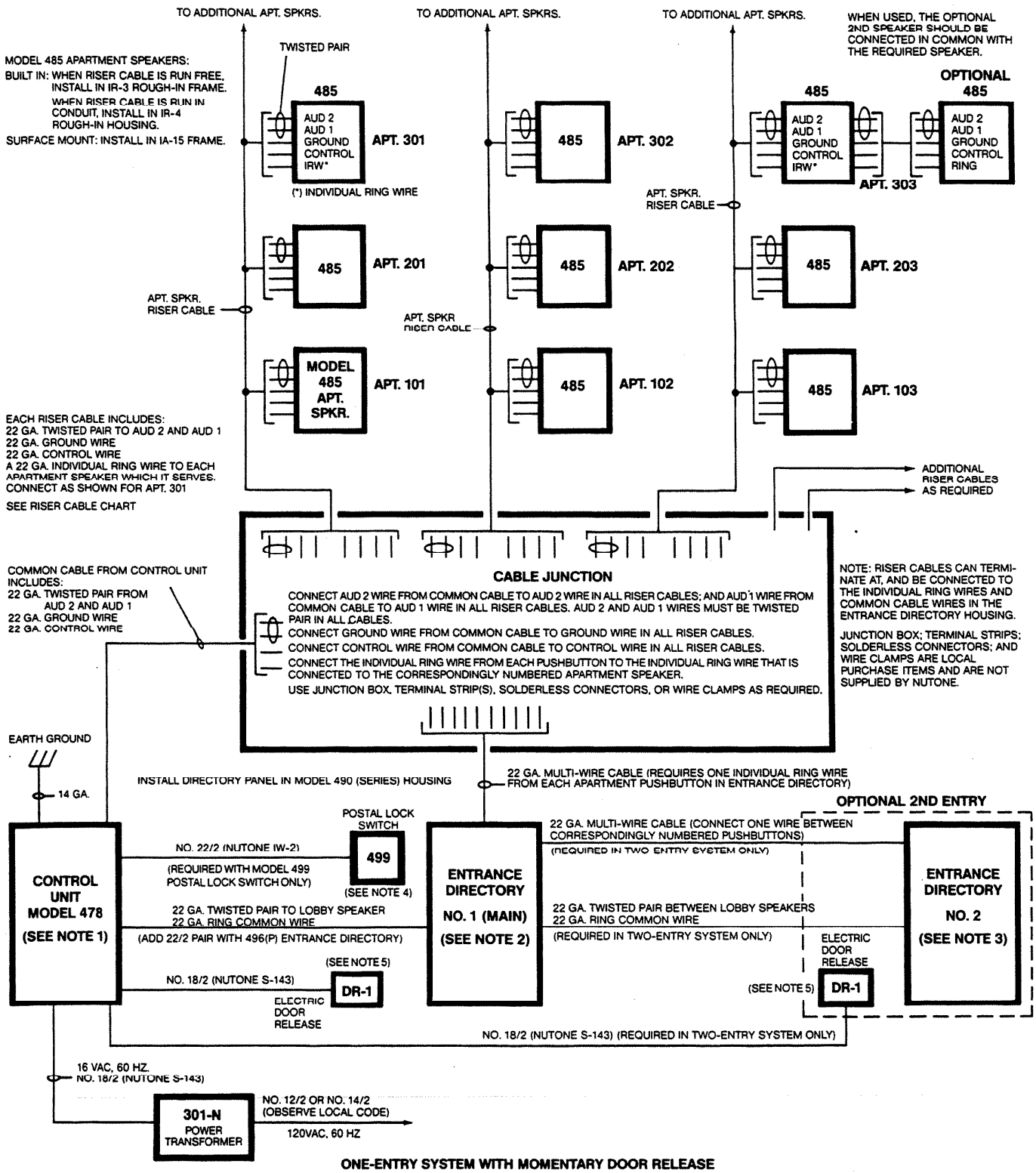
When Postal Lock Switch is closed, the Electric Door Release at that entry will be activated—and remain activated for the duration of the 467 Timing Cycle.

While the Door Release is energized, the "IN USE" indicator lamps will be turned on (flashing); and the lobby speaker, ring and door release function at the other directory will be locked-out.

Repeat complete checkout from each pushbutton and each apartment speaker while originating calls at each directory.

WIRING DIAGRAMS

Wiring Diagram #1



ONE-ENTRY SYSTEM WITH MOMENTARY DOOR RELEASE
ONE-ENTRY SYSTEM WITH TIMED DOOR RELEASE AND POSTAL LOCK
TWO-ENTRY SYSTEM WITH MOMENTARY DOOR RELEASE AT BOTH ENTRIES
TWO-ENTRY SYSTEM WITH TIMED RELEASE/POSTAL LOCK AT MAIN ENTRY AND TIMED DOOR RELEASE AT SECOND ENTRY

WIRING DIAGRAM NO. 1—REPRESENTATIVE INSTALLATION

NOTE 1: MODEL 478 CONTROL UNIT.

FOR ONE-ENTRY SYSTEM WITH MOMENTARY DOOR RELEASE, USE AS SUPPLIED

FOR ONE-ENTRY SYSTEM WITH TIMED DOOR RELEASE AND POSTAL LOCK, ADD MODEL 467 POSTAL/MAIN DOOR TIMER.

FOR TWO-ENTRY SYSTEM WITH MOMENTARY DOOR RELEASE AT BOTH ENTRIES, ADD MODEL 465 2ND DOOR RELEASE

FOR TWO-ENTRY SYSTEM WITH TIMED DOOR RELEASE AND POSTAL LOCK AT MAIN ENTRY, AND WITH TIMED DOOR RELEASE AT ENTRY NO. 2, ADD MODEL 467 POSTAL/MAIN DOOR TIMER AND MODEL 468 TIMED 2ND DOOR RELEASE.

NOTE 2: ENTRANCE DIRECTORY NO. 1 (MAIN):

USE MODEL 498 ENTRANCE DIRECTORY FOR A MAXIMUM OF 20 APARTMENTS.

USE MODEL 496 ENTRANCE DIRECTORY FOR A MAXIMUM OF 100 APARTMENTS (MAXIMUM OF 80 APARTMENTS WITH POSTAL LOCK 496(P)).

NOTE 3: ENTRANCE DIRECTORY NO. 2: SAME REQUIREMENTS AS FOR MAIN ENTRY, EXCEPT, THE POSTAL LOCK VERSION IS NOT REQUIRED.

NOTE 4: POSTAL LOCK SWITCH:

MODEL 499 POSTAL LOCK SWITCH IS USED WITH MODEL 498 ENTRANCE DIRECTORY, AND MAY ALSO BE USED WITH THE MODEL 496 ENTRANCE DIRECTORY.

MODEL: 496(P) IS SUPPLIED WITH POSTAL LOCK SWITCH.

NOTE 5: ELECTRIC DOOR RELEASE:

USE NUTONE MODEL DR-1 WITH WOOD FRAME AND DOOR.

FOR METAL FRAME AND DOOR, USE ELECTRIC DOOR RELEASE SUPPLIED BY DOOR MANUFACTURER. (DOOR RELEASE SHOULD OPERATE ON 6 TO 8 V AVERAGE PULSATING DC.)

RISER CABLE CHART

NUMBER OF APARTMENTS SERVED	NUMBER OF WIRES REQUIRED*	CABLE ** MAKE/NUMBER	CABLE SIZE NOMINAL O.D.
1-2	5-6	NuTone IW-6 (3-Twisted-Pair)	7/32 In.
3-4	7-8	NuTone IW-8 (4-Twisted-Pair)	1/4 In.
5-8	9-12	Belden No. 8743*** (6-Twisted-Pair)	5/16 In.
9-14	13-18	Belden No. 8744 (9-Twisted-Pair)	3/8 In.
15-18	19-22	Belden No. 8753 (11-Twisted-Pair)	13/32 In.
19-22	23-26	Belden No. 8754 (13-Twisted-Pair)	7/16 In.
23-26	27-30	Belden No. 8745 (15-Twisted-Pair)	15/32 In.

NOTE: (*) Must contain at least 1-Twisted Pair for AUD 1 and AUD 2 leads.

(**) Cables that are the engineering equivalent of those listed may be used.

(***) Belden cable not supplied by NuTone. It or equivalent cable must be purchased locally.

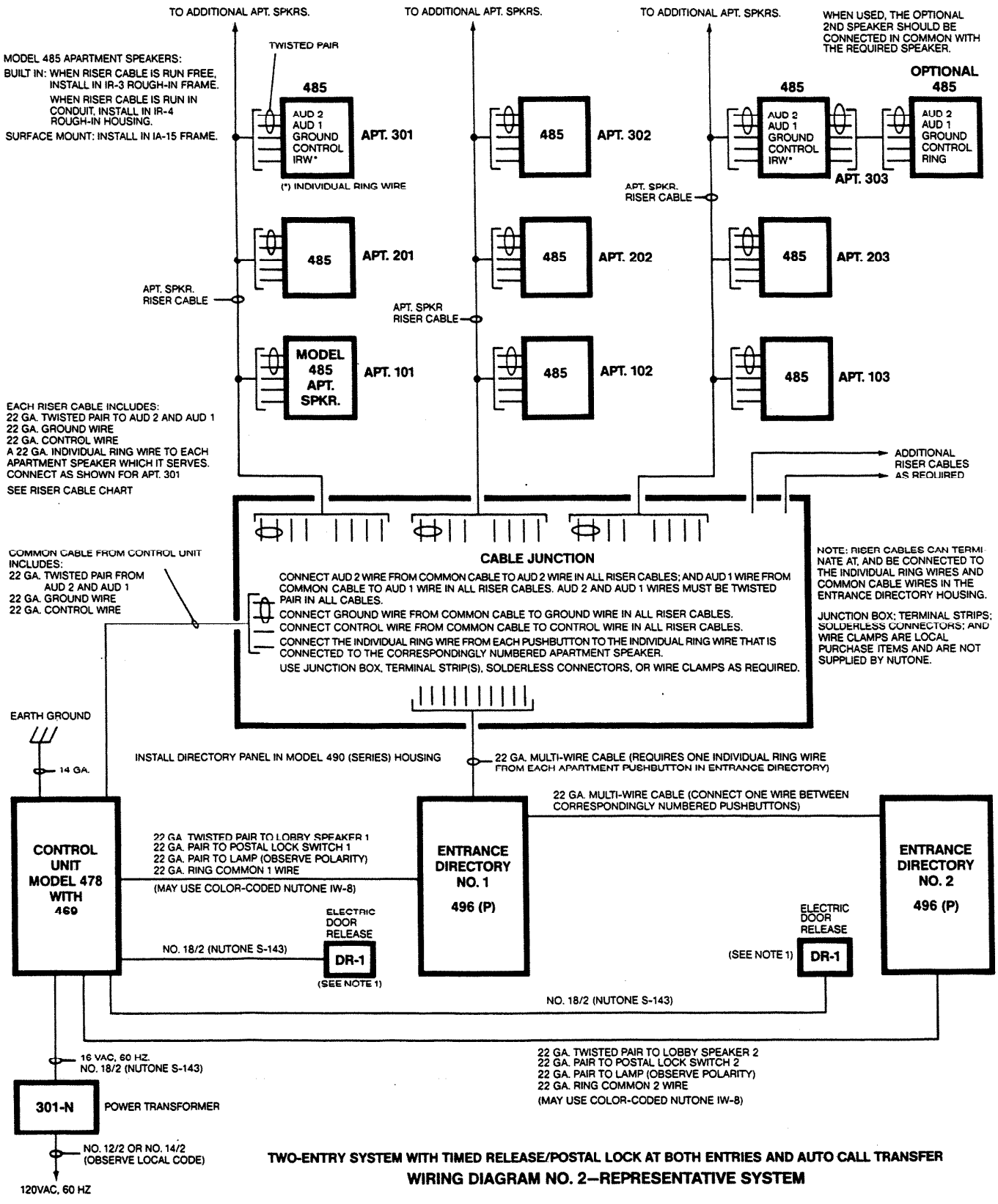
USE COLOR CODED CABLE

NUTONE WIRE AND CABLE

NUTONE MODEL NO.	DESCRIPTION	HOW SUPPLIED
IW-2	22 Ga. Twisted Pair (Color Coded)	IW-2-100 (100 Ft. Spool) IW-2-500 (500 Ft. Spool)
IW-6	22 Ga. 3-Twisted Pairs (Color Coded)	IW-6-200 (200 Ft. Spool) IW-6-1000 (1,000 Ft. Spool)
IW-8	22 Ga. 4-Twisted Pairs (Color Coded)	IW-8-250 (250 Ft. Spool) IW-8-1000 (1,000 Ft. Spool)
S-142	18 Ga. Single Conductor	500 Ft. Spool
S-143	18/2 (Insulation marked for polarity)	500 Ft. Spool

WIRING DIAGRAMS

Wiring Diagram #2



TWO-ENTRY SYSTEM WITH TIMED RELEASE/POSTAL LOCK AT BOTH ENTRIES AND AUTO CALL TRANSFER

WIRING DIAGRAM NO. 2—REPRESENTATIVE SYSTEM

NOTE 1: ELECTRIC DOOR RELEASE:

USE NUTONE MODEL DR-1 WITH WOOD FRAME AND DOOR.

FOR METAL FRAME AND DOOR, USE ELECTRIC DOOR RELEASE SUPPLIED BY DOOR MANUFACTURER. (DOOR RELEASE SHOULD OPERATE ON 6 TO 8 VDC.

RISER CABLE CHART

NUMBER OF APARTMENTS SERVED	NUMBER OF WIRES REQUIRED*	CABLE ** MAKE/NUMBER	CABLE SIZE NOMINAL O.D.
1-2	5-6	NuTone IW-6 (3-Twisted-Pair)	7/32 In.
3-4	7-8	NuTone IW-8 (4-Twisted-Pair)	1/4 In.
5-8	9-12	Belden No. 8743*** (6-Twisted-Pair)	5/16 In.
9-14	13-18	Belden No. 8744 (9-Twisted-Pair)	3/8 In.
15-18	19-22	Belden No. 8753 (11-Twisted-Pair)	13/32 In.
19-22	23-26	Belden No. 8754 (13-Twisted-Pair)	7/16 In.
23-26	27-30	Belden No. 8745 (15-Twisted-Pair)	15/32 In.

NOTE: (*) Must contain at least 1-Twisted Pair for AUD 1 and AUD 2 leads.

(**) Cables that are the engineering equivalent of those listed may be used.

(***) Belden cable not supplied by NuTone. It or equivalent cable must be purchased locally. USE COLOR CODED CABLE

NUTONE WIRE AND CABLE

NUTONE MODEL NO.	DESCRIPTION	HOW SUPPLIED
IW-2	22 Ga. Twisted Pair (Color Coded)	IW-2-100 (100 Ft. Spool) IW-2-500 (500 Ft. Spool)
IW-6	22 Ga. 3-Twisted Pairs (Color Coded)	IW-6-200 (200 Ft. Spool) IW-6-1000 (1,000 Ft. Spool)
IW-8	22 Ga. 4-Twisted Pairs (Color Coded)	IW-8-250 (250 Ft. Spool) IW-8-1000 (1,000 Ft. Spool)
S-142	18 Ga. Single Conductor	500 Ft. Spool
S-143	18/2 (Insulation marked for polarity)	500 Ft. Spool