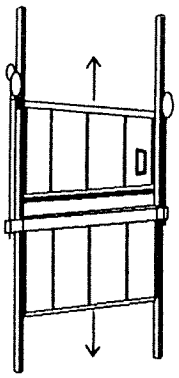
PEELLE



BI-PARTING DOOR

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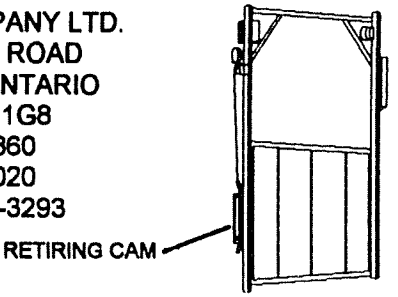


CAR GATE

FREIGHT ELEVATOR DOOR
SEQUENCE OF OPERATIONS MANUAL
RELAY CONTROL SYSTEMS SERIES 2776

SUBJECT: SEQUENCE OF OPERATIONS FOR DYNAMIC DUAL DRIVE CONTROL - CONTROL SYSTEM SERIES 2776 - CONTROLLERS 277632 TO 277698 INCLUSIVE

GENERAL DESCRIPTION OF POWER DOORS

Note: Where the term Gate or Car Gate is used, it is inclusive of Car Doors. Where the term Door is used, it usually means Hoistway Landing Door.

The Dynamic Dual Drive® Operator system maintains full control of the doors and gates through out the complete cycle of operation or any portion thereof.

It consists, besides the doors and gates, of power operators, coupled to a suitable door controller, which is initiated by door operating push buttons in the car (and at the landing when required) and/or by signal from the elevator controller.

Door/gate travel is determined by an individual limit switch. Motor speed is controlled to ensure full travel without slamming. The equipment permits immediate emergency manual operation.

Each car gate shall operate in conjunction with an associated hoistway landing door. Power operated doors and gates shall be arranged to open automatically as the elevator arrives at a floor and to close by continuous-pressure push button operation. Door and gate will reopen automatically if not closed to full limit switch operation.

The equipment is designed for three phase AC power supply of 50/60 Hertz frequency.

A. Component Assemblies-Power Doors/Gates

1. Hoistway Landing Doors and Gate(s).
2. Power Door Operator (Motorized Sheave) - (2) per door.
3. Power Gate Operator (Motorized Sheave) - (1) per gate.
4. Geared Limit Switch - (1) per door and (1) per gate.
5. Interlock (Door Locking Device) - (1) per door (includes Door Contact DC and Interlock Contact DI, plus Motor and Control Zone Switches).
6. Gate Contact - (1) per gate.
7. Controller - (1) basic control panel (controller) for each line of doors, except one controller can serve two lines of doors if rear line landing zones are staggered from the front line landing zones. (See Staggered Openings Section). A Front Line (Line A) of doors consists of all the hoistway doors providing entrance to the front end of the elevator and a Rear Line (Line C) consists of all the hoistway doors providing entrance to the rear end of the elevator car.
8. Push Button Station - (1) station per car gate when car operation is inside only, and another station at the landing for each door if elevator is fully automatic. Note: Push Button Stations are usually elevator company supplied.
9. Retiring Cam - usually (1) per line of doors to operate interlocks (unlocks door, operates Interlock Contact DI and Zone Contacts Z).
10. Door Unlocking Devices - Unlocking devices are used for emergency access to the hoistway and may be provided at every landing. When provided at the lowest landing and an upper landing, they may be used to access the pit and top of the car for inspection, maintenance or repair.

B. Component Assemblies Descriptions

1. Hoistway Landing Doors and Car Gate(s). The power operated hoistway doors and car gate(s) worked by this system are similar to manually operated doors/gates and are installed in the same manner, with door rails fastened to entrance frames.
   The hoistway doors (vertically sliding-biparting, single section or telco two section) are suspended by roller chains from two power door operators, mounted one on each door rail just above the lintel.
   The car gate (vertically sliding) is counterbalanced by a guided counterweight that travels in a fixed track mounted on the outside of the car enclosure. A power gate operator with double chain drive provides the opening and closing effort for the car gate.
2. Power Door Operator and Power Gate Operator (Motorized Sheave). The power operator assemblies consist of two-speed squirrel cage polyphase high slip induction torque motors that drive the sheaves by means of pinion gears. On the door operator, one motor winding has a synchronous speed of 900 RPM (on 60 Hertz) and the other 450 RPM, thereby giving a 2:1 ratio. On the gate operator, prior to January 1994, motor windings have a synchronous speed of 1200 RPM and 300 RPM, thereby giving a 4:1 speed ratio. After January 1994 the gate operator motor windings have a synchronous speed of 900 RPM and 300 RPM, thereby giving a 3:1 speed ratio. The high speed is for the main travel, and the slow speed serves as a dynamic slowdown on speed transfer when entering the slow speed zone, to ensure full panel travel without slamming. The motor pinion on the gate operator has twice the number of teeth as the door operator, therefore, at high speed it drives a single section gate at approximately twice the speed of each bi-parting door panel to maintain operation at approximately the same opening-clearing-speed for both the gates and the door.
3. Geared Limit Switch. The geared limit switches control the length of the high speed zones and the start of slow speed zone. The end of slow speed zone (final cutoff) is controlled either by geared or time final limit. Geared limit cam settings are "locked" in step with the door and gate travel by roller chains and sprockets.
   The arrangements of the control circuits in the controller and the setting of the limit switches are to provide initial power to the high speed motors. This will start the door and/or gate, either open or close, at high speed power, and then at final travel will apply the slow speed power to control (override the inertia) and slow the door or gate down.
4. Interlock (Door Locking Device) and Gate Contact. The interlock (hoistway-door locking device), (1) located at each opening, is a combination assembly serving as a mechanical door lock, an electric interlock and a zone selector. The lower portion of the door interlock has a contact DC operated by the action of the door. The upper portion carries a contact DI and a series of zone contacts Z operated by action of a retiring cam mounted on the car. The gate contact GC on the car rail is operated by action of the car gate counterweight or the car gate panel. Elevator operation is prevented unless the car gate contact GC, door contact DC, and the retiring cam operated DI contacts are closed.
5. Controller. The door controller (or controllers) is usually located in the elevator machine room and can be mounted on the wall or set on a floor supported frame. The door controller contains the power contactors and logic functions to direct the door operation in accordance with the requirements. The power circuits for all controller types are based on 208/220/240 VAC, 3 phase, 50/60 Hertz power. Any other voltages, frequencies or direct current must have transformers or conversion equipment to provide the basic power. Transformers (3 phase, 50/60 Hertz) are available from Peelle as optional equipment, while special instruction will be required for other conversion systems. The controller carries, besides the terminal blocks and fuses, the following relays:
   a. O & C - Open and Close Main Direction Relay Mechanically interlocked.
   b. OA, OB, & OC- Auxiliary Open Direction Control Relays.
   c. CA - Auxiliary Close Direction Control Relay.
   d. DH & DL, GH & GL - Door & Gate High and Slow Speed Power Relays, with High & Slow Speeds Mechanically Interlocked.
   e. DS & GS - Door & Gate Speed Control Relays.
   f. CR - Reopening Control Relay.
   g. RC - Retiring Cam Power Relay.
   h. TP & TPR - Time Protection Relay & Reset Switch.
   i. OT & CT - Direction Time Protection Relays.
   j. ACT & AOT (where used) - Time Limit Relays.
   k. GHA - Gate Staging Relay.
   l. OF - Gate Final Open Limit Relay.
   m. AC (where used) - Open Push Button Relay.
   n. TRSF- Control Transformer.

o. Reopening Device Group:
   (1) GR & GRA - Reopening Device Relay and Auxiliary.
   (2) TO - Photo Eye Override Time Relay.
   (3) TOA - Gate Slow Speed Setup Time Relay.
   (4) SP - Gate Slow Speed Override Relay.
   (5) SU - Low Volt Power Fail Relay.
   Note: See Section 4 Para a. for optional addition of contact type gate reversing edge to the Sensor Beam.

p. SGA - Gate Selector Relay used with Staggered Openings.

q. Firefighters' Service Relay Group:
   (1) FS: Phase I Relay
   (2) ZL: Designated or Alternate Landing
   (3) ES:Phase II Relay
   (4) ESA: Phase II Auxiliary Relay
   (5) RO: Momentary Open Disabling Relay
   (6) LU: Reversal To Close Lockup Relay
   (7) HO: Phase II Hold Open Relay
   (8) ESO: Phase II Off Relay

r. Automatic Time Closing Relay Group - Optional:
   (1) TG: Automatic Time Closing Time Allowance Relay
   (2) TAC: Warning Timer and Close Initiation
   (3) GA: Bell Operate and Hold Relay
   (4) GB: Override Lockout Relay

6. Push Button Station. Door Operation is based on using door operating push buttons with momentary pressure for the open direction and continuous pressure for the close direction.

7. Retiring Cam. The retiring cam (motor driven) is lifted (retired) by a slow speed torque motor that is capable of being stalled during elevator flight. Lifting and gravity dropping of the retiring cam operates the interlocks. At least one retiring cam is usually furnished for each line of doors and is mounted on the elevator car.

BASIC POWER AND CONTROL OPERATIONS

(Refer to Job Schematic)

A. POWER CIRCUIT

1. GENERAL

The power circuit for all control types is based on 208/220/240 VAC, 3 phase, 50/60 Hertz power. Any other voltages, frequencies or direct current must have transformers or conversion equipment to provide basic power. Transformers for standard 50/60 Hertz power are available from Peelle as optional equipment, while special instruction will be required for any other conversion systems.

Door and gate motor winding connections must be phased to open and close doors and gates as directed by the controller . Hoistway door motor high and slow speed windings are factory phased and shipped in pairs. The retiring cam motor must be phased to provide rotation for proper lift rod direction.

2. RETIRING CAM MOTOR

If all hoistway landing doors and the car gate are closed, and proper initiation energizes the RC relay making up the RC contacts, the retiring cam motor will operate. When this motor operates, the retiring cam retires (lifts), allowing the zone switch roller arm to extend, locking the door, opening all Z contacts, and closing the door interlock contact DI. If there are two lines of doors, a retiring cam may also be furnished for the additional rear line (line C). When so furnished, it is connected in parallel with the front line (line A) retiring cam motor and operates at the same time. Occasionally, there are two retiring cams per line of doors and they are also connected in parallel.

3. CAR GATE MOTOR

a. If O contacts and GH contacts "make up", the car gate motor will operate at high speed in the open direction. If C contacts and GH contacts "make up", the car gate motor will operate at high speed in the close direction.

b. If O and GL contacts "make up", the car gate motor will operate at slow speed in the open direction. If C contact and GL contacts "make up", the car gate motor will operate at slow speed in the close direction.

c. A rear line (line C) of doors is considered 'staggered' when no rear landing elevation is within 12in. (300mm) above or below the elevation of a front landing. If there is a 'staggered' rear line of doors, a single line controller is used to operate the system including the rear line gate by the use of a gate selector relay SGA. With normally closed SGA contacts "made up" as shown as shown on the controller schematic diagram, the front line gate motor will operate under the same conditions as a. and b. above. With normally open SGA contact "made up" (when SGA relay is energized), the rear line gate will operate under the same conditions as a. and b. above.

4. DOOR MOTORS

a. If the elevator car is within 12 in. (300mm) above or below the floor and the door zone switch has been operated by the retiring cam, closing all contacts marked Z at that door, then:

b. If O contacts and DH contacts "make up", the hoistway landing door motors will operate at high speed in the open direction. If C contacts and DH contacts "make up", the hoistway door landing motors will operate at high speed in the close direction.

c. If O contacts and DL contacts "make up", the hoistway landing door motors will operate at low speed in the open direction. If C contacts and DL contacts "make up", the hoistway landing door motors will operate at slow speed in the close direction.

5. POWER OPERATION OF DOORS AND GATES

The arrangement of the control circuits and the setting of the limit switches are to provide initial power to the high speed motors. This will start the door and/or gate, either open or close at high speed power, and then at the final travel to apply the slow speed power to control or override the inertia and slow the door or gate down. Refer to Installation Manual 203 covering the setting of Door and Gate Limit Switches.

B. CONTROL CIRCUIT

1. GENERAL

Standard Door Operation is based on using push buttons with momentary pressure for the open direction and continuous pressure for the closed direction.

A control transformer is provided with each basic controller and provides 120 VAC (approx.) single phase power for the control circuit, and is tapped to provide a 24 VAC (approx.) circuit for the Sensor Beam reopening device as well as any optional contact type reversing edge.

Relays O and C are main direction relays, O for open direction and C for close direction. These relays are mechanically and electrically interlocked so both cannot pull in at the same time. These relays set up the proper phasing of the door and gate motors at the start of an operation, and remain energized until the final door and gate limits have actuated at the ends of door and gate final travel. Relays OA, OB, OC, and CA serve as auxiliary relays to operate in parallel with the O relay and the C relay respectively to provide additional contacts for the opening and the closing directions, and to provide time stages for functions in proper sequence.

High speed power relays, DH for the door and GH for the gate, become energized sequentially when either O or C relays become energized to power the high speed winding of door and gate motors. They remain energized until the door is approximately 8 in. (200mm) from the end of door travel and the gate is 12 in. (300mm) from the end of gate travel, at which time the door and the gate slow speed limits actuate. Relays DS and GS are operated by the slow speed limits. They serve to de-energize the high speed power relays, energize the slow speed power relays, and to prevent the high speed and the slow speed windings from being energized at the same time.

The slow speed power relays, DL for the door and GL for the gate, are energized when the slow speed limits actuate. The slow speed windings, when energized, allow the motors to dynamically check the speed of the door and gate to prevent slamming at the end of travel when final limits or final limit timers ACT or AOT are actuated and relays O or C and DL and GL become de-energized.

Reopening Control Relay CR energizes after the close direction (or the open direction) is established and remains energized until the last slow down limit action of the door or gate occurs.

Until de-energizing of CR occurs, the CR contact will initiate the open direction in the event that the close direction is interrupted by the release of the door close push button or operation of the gate Sensor Beam reopening device.

Interruption of the Sensor Beam reopening device (or pressure on the optional contact type reversing edge) will interrupt the closing direction and CR will instantly initiate the open direction causing full open travel. Close operation at reduced speed within Code Kinetic Energy limitation will result upon close initiation; a) after 20 seconds of continuous and continuing Sensor Beam interruption, failure of the beam source light or detector, b) under Firefighters' Service Phase I conditions and c) failure of the Sensor Beam power.
The OT and CT direction time protection relays are on-delay, automatic reset, time relays that provide 30 seconds for normal door and gate open/close functions. Normally these functions complete well within this time allowance and the relay resets prior to operation.

Misoperation of limits or push buttons, etc., that cause a continuous direction initiation beyond the normal time span will force operation of the respective protection timer, opening its contact

and de-energizing the associated power and control relays. The contact will remain open as long as the timer relay coil is energized. The timer will recycle and reclose its contact when de-energized through opposite direction door operating push button initiation, opening the zone contacts, clearing the fault, or removal of power.

When it is noticed that open or closed power to motors does not complete with the end of the door and gate movement or within a second or two thereafter, but continues on until OT or CT times out, adjustment or circuit correction is required.

The TP time protection relay (3 minutes) is an electronic, on-delay timer that commences timing when either the O series, C series, or RC relays are energized closing either the OC-1NO, CA-3NO, or RC-4NO contact. Under normal operation contact OC-1NO, CA-3NO or RC-4NO reopen prior to the timer contact operation. This allows the timer to reset to full time allowance without operating the time protection contact TP-1NC. Under a fault operation, if contact OC-1NO, CA-3NO, or RC-4NO remain closed for approximately 3 minutes, the TP timer will open contact TP-1NC which de-energizes the control circuit. When the TP relay contact operates, TP becomes selfholding through contact TP-1NO until its coil circuit is interrupted by opening the TPR reset switch (push type) contact or removing power from the control portion of the controller. When the TPR manual reset (push type) contact is opened, time relay TP is de-energized and recycles to a full time allowance and recloses contact TP-1NC allowing the control circuit to re-energize. The TPR manual reset switch is a momentary action normally closed switch.

2. RETIRING CAM OPERATION

The RC relay controls the operation of the retiring cam. When elevator operation is initiated, a contact on the elevator control board is made, causing the RC relay to energize operating the cam motor, which moves (lifts) the cam into a retired position. When the car levels to a floor or is standing at the floor, the contact on the elevator board opens, de-energizing the RC relay. This permits the cam to extend by gravity, engaging the zone switch roller. The cam remains extended until the door and gate are completely closed and the car is signalled to another landing.

The elevator control de-energizing of the RC relay should be set so that the RC relay is dropped out before the automatic opening is initiated. This will allow the zone switch to be made up completely before power is applied to the door motors. This sequence prevents power from being applied to the door motor before the door is completely unlocked. The doors are unlocked at the same time as the zone switch is made up. The elevator circuitry must also provide that initiation of the RC relay be subject to both the hoistway landing door (DC) and car gate (GC) contacts and not just the door or just the gate contact. Further, if the cam retires (lifts), but the hoistway landing door interlock (DI) contact does not "make up", or the car does not run for some other reason, the initiation to the RC relay should be discontinued after a short time period, thereby preventing continuous power from being applied to the cam motor.

3. FIREFIGHTERS' SERVICE
   a. Firefighters' service is included in the logic system of all Peelle controllers since the 1992 edition of the ANSI A17.1 Code.
   b. Where Firefighters' service is not required, Firefighters' initiating interconnect terminals should be left unconnected.
   c. A complete write up of Firefighters' Service is provided herein after the Sequence of Operations for the various schematic types.

4. ELEVATOR TO DOOR INITIATIONS AND INTERCONNECTS
   a. Each schematic diagram carries a schedule of the necessary elevator controller to door controller interconnects for operation of the logic system covered in the diagram. The terminal or wire number on the Peelle controller is listed in the schedule and the associated terminal or wire number on the elevator controller is also listed if made available by timely return of the Peelle drawing submission sheets.
   b. A complete discussion of initiation requirement is covered in Peelle Manual #202.

DETAILED SEQUENCE OF OPERATION

A. SEQUENCE OPERATION - Hoistway Door and Gate

Based on: Schematic #277633 rev. 10/14/94, single line or line A of a double line
Schematic #277643 rev. 10/14/94, line C of a double line
Schematic #277636 rev. 10/14/94 staggered opening double line

Where the control system (controller) is arranged so that the hoistway landing door is at least 2/3 open

prior to the opening of the adjacent car gate and that the car gate is at least 2/3 closed prior to the closing of the adjacent hoistway landing door, the operation is called "Sequence Operation" and meets the requirements of Rule 112.6 ANSI A17.1

1. OPENING DIRECTION - GEARED SLOWDOWN AND GEARED FINAL LIMITS
   a. All doors and car gates being closed, the elevator car leveling to or at the landing, and with the retiring cam extended pushing the zone switch roller causing contacts Z to be closed.
   b. Automatic opening is initiated when the car is leveling to a landing through a contact on the elevator controller closing the circuit from DO1 to DO2 which parallels the door open push button circuit.
   c. When contacts Z, C-5NC, OT-1NC the door open final limit switches DOFL are closed, the gate final limit contact OF-1NC is closed (GOFL limit switch is open), and the automatic opening initiating circuit is closed (or door open push button is momentarily pressed), the open main direction relay O, auxiliary relay OA and the direction time protection relay OT become energized, causing O and OA contacts to operate.
   d. Contact OA-1NO closes energizing the OB relay, contact OA-2NO closes forming a holding circuit across the door open push button, and contact OA-3NO closes energizing the DS relay.
   e. Contacts OB-2NO and DS-1NO close energizing door high speed power relay DH, contact OB-1NO closes energizing the GS relay, contact OB-3NO closes energizing the OC relay, contact DS-2NC opens and DS-3NO closes, contact DH-4NC opens temporarily locking out gate high speed power relay GH, and contact DH-5NO closes energizing CR relay.
   f. Contact OC-1NO closes initiating time protection relay TP, contact OC-2NO closes setting up a subsequent operation of DL & GL, contact OC-3NO and GS-1NO close setting up gate high speed power relay GH.
   g. Contact CR-1NO closes and seals CR through closed contact DL-5NC or GL-5NC. Relay CR and associated contacts perform no function in the open direction except under special arrangements not covered here.
   h. The hoistway landing door is now operating in the open direction powered by high speed motor windings.
   i. The hoistway landing door will continue in high speed until it reaches approximately 8 in. (200mm) of full opening, at which time the slow speed limit DOL-1 will open, de-energizing DS relay.
   j. Contact DS-1NO opens, de-energizing high speed door opening relay DH; contact DS-2NC closes, energizing slow speed door power relay DL and contact DS-3NO (when used) opens.
   k. With DH de-energized, contact DH4NC closes energizing gate high speed power relay GH and the gate starts to open and moves open at high speed.
   l. The door speed is now being checked from high speed to low speed and the gate is now operating at high speed.
   m. The door continues at low speed to full open travel and opens door final limit switch DOFL but remains held full open under stalled low speed power through holding contact OF-1NC and when the gate reaches approximately 12 inches (300mm) from full open travel, the gate low speed limit GOL opens de-energizing GS relay.
   n. Contact GS-1NO opens de-energizing high speed car gate power relay GH and contact GS-2NC closes energizing slow speed car gate power relay GL.
   o. With DL and GL energized contacts DL-5NC and GL-5NC are opened and CR relay is de-energized.
   p. The gate speed is now being checked from high speed to low speed and continues at low speed until approximately 1 inch (25mm) of full open travel at which time the final car gate limit GOFL closes and gate open final relay OF is energized.
   q. Contact OF-1NC opens and with final door limit switch DOFL open, open direction relays O, OA, OB, and OC de-energize and time relays OT and TP reset.
   r. Contacts OA-3NC and OB1-NC close, and since DCL-1 and GCL-1 have previously closed due to the movement of the door and gate, relays DS and GS energize, operating their respective contacts. Fast acting contact GS-3NC opens, preventing any slow power relay contacts from introducing a close pulse.
   s. Door micro sealing limit switch DOL-2 and car gate micro sealing limit switch GOL-2 close when door and car gate slow speed limit DOL-1 and GOL-1 open.
   t. Micro sealing contacts DOL-2 and GOL-2, both being closed, should door or gate rebound causing either final limit DOFL to close and/or

gate final limit GOFL to open (causes the contact OF-1NC to close), the open direction will re-enter the slow speed stage and apply slow speed power to the door and gate motors until the final door and gate limits DOFL and GOFL operate.

u. Should the open direction be energized for 30 seconds continuously without completing an operation which would allow the time protection relay OT to reset, OT times out opening contact OT-1NC which de-energizes all open direction relays and remains open until; a) the fault is corrected, b) the door close push button is operated, or c) power is removed from the controller.

2. CLOSING DIRECTION - GEARED SLOWDOWN AND TIME FINAL LIMITS

a. With the door and car gate in an open position, and with zone contacts Z, contacts O-5NC, ACT-1NC, and CT-1NC closed, then continuous-pressure of the car or landing door close push button will energize direction time protection relay CT and close auxiliary relay CA.

b. With DS and GS relays energized (see Opening Operation item r. above) and contacts DS-1NO and GS-1NO closed, contact CA-1NO closes, energizing the gate high speed power relay GH through OC-3NC and closed contact GS-1NO, contact CA-2NO closes, energizing main direction relay C, and contact CA-3NO closes, initiating time protection relay TP. Contact GS-2NC is open locking out GL, GS-3NC is open, and GS-4NC is open temporarily locking out door high speed power relay DH.

c. Contact C-4NO closes, setting up door high speed power relay DH through OB-2NC and closed contact DS-1NO, and contact GH-3NO closes energizing reopening relay CR. (When relay GHA is used - contact GH-5NO closes energizing gate auxiliary staging relay GHA. Contact GHA-1NO closes, energizing reopening relay CR.)

d. Contact CR-1NO closes and seals in CR relay through closed contacts DL-5NC and GL-5NC CR-2NO closes setting up the open direction for possible operation .

e. The gate is now operating in the closed direction powered by high speed motor windings.

f. The gate will continue in high speed until it reaches approximately 12 in, (300mm) of full closing, at which time slow speed gate limit GCL-1 will open, de-energizing GS relay.

g. Contact GS-1NO opens, de-energizing high speed gate power relay GH, contact GS2-NC closes energizing low speed gate power relay GL. Contact GS-3NC closes setting up a close direction operation and contact GS-4NC closes allowing high speed door power relay DH to energize. GH-5NC closes setting up the close final time circuit.

h. With DH energized, the door operates in the closed direction powered by high speed motor windings and with GL energized the gate is checked from high speed to low speed.

i. The gate continues at low speed to full closed travel and remains held full closed under stalled low speed power.

j. The door similarly continues in high speed until it reaches approximately 8 in. (200mm) (16 in. - 400mm opening space) of full closing, at which time slow speed door limit DCL-1 will open, de-energizing the DS relay.

k. Contact DS-1NO opens, de-energizing high speed door power relay DH, contact DS-2NC closes, energizing slow speed door power relay DL..

l. With DL and GL energized, contact DL-3NO closes and starts the timer relay ACT timing, contacts DL-4NC and GL4-NC open locking out the retiring cam power relay RC until completion of the close direction operation, contacts DL-5NC and GL-5NC open de-energizing reopening relay CR, and contact DL-5NO closes to seal in the close operation relays whether or not the close push button is released.

m. The door is now being checked from high speed to low speed power and will continue in low speed to final close and stall while the gate remains stalled at full close under low speed power. Low speed power will remain applied until the ACT time allowance completes. This time is adjustable and should be set as short as possible but long enough with sufficient tolerance to allow full travel to complete and stall prior to de-energizing.

n. Upon completion of the time as set on the ACT timer (0.4 to 4 seconds), then ACT operates, contact ACT-1NC opens and de-energizes main close relay C and auxiliary relay CA.

o. With the close direction relays de-energized, TP and CT timers reset, relays DL and GL de-energize, and time limit relay ACT recycles.

p. Reoperation of the door close push button will provide slow speed power on the door and gate for a new time allowance of ACT time (as set 0.4 to 4 seconds). This is kept available in

the event of a door rebound where additional power-on time is helpful. Should the close push button be operated continuously or should the ACT timer fail to de-energize, after approximately 30 seconds the protection timer CT will trip and de-energize relays C and CA. CT relay will remain energized with contact CT-1NC held open until; a) cam retires and elevator moves, b) door open push button is operated, c) closed final limit timer is replaced or operation corrected, or d) power is removed from controller.

q. Contact O-4NC in the retiring cam power relay RC circuit prevents an attempt to power the retiring cam when a door open push button is being held in as the close direction completes.

3. AUTOMATIC REOPENING

a. During full gate close travel and door high speed travel, if the close bush button is released, auxiliary relay CA, and the direction time protection relay CT and the main close direction relay C become de-energized. Door and gate motors are de-energized.

b. With reversal relay CR sealed in (see Closing Direction, Item d.), contact CR-2NO closed, and as soon as interlocking contact C-5NC "makes up", the open direction will initiate and continue as outlined beginning with Item c. of the Opening Direction - Geared Slowdown and Geared Final Limits.

4. REOPENING DEVICE (Peelle trade name "Sensor Beam")

a. The reopening device consists of a retractable infrared beam, "Sensor Beam," across the full width of the gate that leads the gate by approximately 5 inches (125mm) during the gate closing operation and retracts behind the gate vertical side members as the gate reaches full close position.
Note: A physical contact reversing edge type reopening device optionally may be included as a backup to the Sensor Beam and when included is mounted directly on and across the full width of the gate leading edge. See item h. below for electrical connection.

b. The reopening circuit consists of a fused low voltage 24VAC supply tapped from the 120VAC control transformer that powers the beam, detector, and relays GR, GRA, and SU. Associated relays in the 120VAC control circuit are SP and timers TO and TOA.

c. When the gate is in any position except full closed (gate closed final limit GCFL open), the reopening device is active. Beam interruption (or reversing edge contact) during close travel will cause gate relay GRA to energize.

d. Contact GRA-1NO closes and energizes relay GR and contact GRA-2NO closes and starts time relay TO timing.

e. If the car gate is traveling in the open direction or is open, the operation of the GR contact has no effect. If the car gate is traveling in the close direction, the opening of GR-1NC contact causes auxiliary relay CA, direction time protection relay CT and the main close direction relay C to de-energize and the actions of the Automatic Reopening circuit per items 3.a. and 3.b. above will occur.

f. With the gate returned to the full open position and the door full open (if the door was not full open it will also return to full open), the door and gate will respond normally to a new close initiation.

g. When a close initiation is made, contact CA-4NO closes. Under three conditions the Sensor Beam circuitry will provide a low speed, low KE (within code) gate close operation while the beam is ineffective. Each of these conditions will cause very short term (± .5 sec.) timer TOA to energize and when it times out, relay SP energizes and swings the gate power system from high speed to low speed through contacts SP-1NC opening and SP-2NO closing. Low speed mode is sealed in to full close by contact SP-3NO closing until SP is de-energized when the close operation completes.

i. Phase I Firefighters' Service - When Phase I is initiated through an elevator control signal, contact FS-1NC opens deactivating the Sensor Beam and contact FSA-1NO closes energizing TOA time relay.

ii. Low voltage circuit failure - When low voltage power is disrupted but main control power keeps the door controller active, relay SU is de-energized and contact SU-1NC closes energizing TOA time relay.

iii. Continuous beam interruption for 20 ± seconds by smoke, beam source or detector failure - Beam interruption energizes relay GRA and contact GRA-2NO closes and energizes 20 second timer TO. If TO times out before a reset by beam and detector restoration, contact TO-1NO closes and energizes timer TOA while contact TO-2NC opens and de-energizes relay GR allowing close operation to proceed. Note: A detector failure has a remote possibility that low speed will not be introduced.

h. Optional addition of a physical contact reversing edge type reopening device has not been shown on the schematic diagram. Should a reversing edge be incorporated, it is to be connected at the gate electrical box in parallel with the Sensor Beam detector at wire points 32 and 170 on Line A and 34 and 170 on line C. Physical action on the reversing edge will cause the reopening circuit to function in the same manner as the Sensor Beam. If the edge should short out, the action will be the same as a continuous beam interruption and if the edge should electrically open, its action will be ineffective.

5. STOPPING OF DOORS/GATES
   a. A door stop push button in the car is standard, while non-inclusion is optional.
   b. To stop the doors and gate in the closing direction, release the door close push button. This action establishes reopening of the doors/gates and dynamically brakes the closing inertia.
   c. After release of the door close push button, momentary pressure of the door stop push button in the car will de-energize the control, thus removing power from the door and gate motors.
   d. To stop the door and gate in the open direction, momentarily press the stop button in the car to de-energize the control, thus removing power from the door and gate motors. In the open direction, a coast will be experienced when the door stop push button is pushed.
   e. When a door stop button is operated and then released while the door or gate is in its high speed zone or in the close direction slow speed zone, a close or open push button operation will reinitiate the desired direction operation. If the door and gate both coast into the open slow speed zone and the door stop push button is released in this zone, the micro sealing limit switch contacts will come into action and cause door and gate movement to final (fully) open position.
   f. In the event de-energization of the control is desired, continuous pressure on the door stop push button will de-energize all door open and door close control circuits.
6. CAR LEAVING LANDING.
   a. The hoistway landing door being closed, the door contact DC actuated by the door hanger bar is closed.
   b. The gate being closed, the gate contact GC is actuated by a cam on the gate counterweight (or gate panel) is closed.
   c. With the door contacts and the gate contact(s) being closed, when a floor selector button is pressed on the elevator panel, the contact (RC) on the elevator controller that initiates the retiring cam closes.
   d. When contact (RC) on the elevator controller closes, the circuit between DO3 and DO4 closes, and, with O-4NC, DL-4NC and GL-4NC being closed, retiring cam relay RC is energized.
   e. Contact RC-4NO closes, energizing time protection relay TP and starts the time cycle for retiring cam motor protection.
   f. The retiring cam motor being energized, the cam is retired (lifted) disengaging the zone switch roller. This action allows the interlock locking arm to extend mechanically locking the door, and causes the interlock "door locking" contact DI in the zone box to close.
   g. Contacts GC (gate contact), DC (door contact) and DI (door interlock contact) being closed (all must be closed), the car moves from the landing with the cam retired.
   h. The retiring cam remains retired until the car levels to or stops at another landing and the elevator controller opens the DO3 to DO4 circuit.
7. LINE C OF A DOUBLE LINE OF DOORS (Schematic #277643)
   a. Where there are openings at the front and rear of the elevator and at least one rear door is within the level of a front door landing zone, Line C schematic is used in combination with the Line A schematic.
   b. All the open and close power and control relays of Line A are duplicated in the Line C controller and selective operation of front or rear doors is provided.
   c. Isolated contact initiations from the elevator for Line C are required for automatic opening, landing located door pushbutton cutout, and inspection circuit in addition to the Line A initiations.
   d. Line A to Line C controller interconnections are required for power feed, retiring cam lockout, firefighters' service and door open signal.
   e. Line A and Line C retiring cams are driven by the same power relay RC as both cams must operate in unison.

8. DOUBLE LINE OF DOORS AT STAGGERED LEVELS
(Schematic #277636)
   a. Where there are openings at the front and rear of the elevator but no rear door is within ±12in. (300mm) of the level of a front door landing, a single controller using the staggered line schematic covers both the Line A and Line C doors and gates.
   b. The logic system for staggered opening operation is the same as the Line A diagram but modified to operate the rear line gate when the elevator is within the landing zone of a rear line door by the addition of relay SGA to the controller and provision for a Sensor Beam on the rear gate.
   c. One of the Line C rear door zone contacts energizes relay SGA which then transfers the gate motor power feeds from the Line A gate to the Line C gate.
   d. Since the front line gate and the rear line gate each have their own mechanical limits (GOL-A&C, GCL-A&C, GOFL-A&C, GCFL-A&C) connected in series or parallel to suit, proper operation of the gates can only be achieved if the gate opposite to the gate and door being operated is kept in the closed position.
   e. There is a front line and a rear line retiring cam that operate in unison similar to Line C above. When the retiring cams are de-energized and the elevator is at a rear door level, the rear door cam unlocks the rear door and the zone switch for that door is activated and closes the zone contacts. The front line cam extends but with no unlocking action.
   f. Interconnections between the elevator controller and the door controller are the same as the Line A schematic.

B. ALTERNATE - OPEN and CLOSE DIRECTION WITH TIME FINAL LIMITS and CAM OPERATED DOOR and GEAR OPERATED GATE SLOWDOWN LIMITS

Based on: Schematic #277640 rev. 10/14/94 single line or line A of a double line
Schematic #277650 rev. 10/14/94 line C ofa double line
Schematic #277651 rev. 10/14/94 staggered openings double line

Time final limit control using timers on the door controller is provided as a practical alternative to geared final limits under some circumstances. It is not economically justifiable to include the high cost switches needed to provide micro sealing contacts at each floor for use as final geared final limits under certain conditions such as explosion resistant requirements.

1. Switches for the open and close door and gate slowdown limits DOL, DCL, GOL and GCL and final gate limits GOFL and GCFL are modified to suit the particular NEMA (IP) conditions. Final limit DOFL is eliminated and its function handled by a time relay (AOT) on the controller.
2. While the schematics numbered above show GOFL and GCFL switches in the circuitry, under NEMA 7 & 9 explosion resistant condition, they are eliminated with their functions handled by relays on the controller and a modified job schematic to suit is provided for the job.
   a. The GOFL switch normally operated relay OF and is replaced with an open final timer contact AOT-2NO. When AOT-2NO closes at the end of open direction travel, relay OF is energized and is self-held through contact OF-4NO until a power close operation is initiated. When the close relays are energized, contact CA-1NC opens and de-energizes OF. Note that this system does not measure the physical location of the gate and manually closing the gate will not cause OF to de-energize.
   b. The GCFL switch normally opened at the end of gate close travel and turned off the Sensor Beam circuit. This switch is replaced with a GSA-1NO contact that closes when the gate is fully opened and during gate high speed close travel energizing the Sensor Beam circuit. The contact opens and turns off the Sensor Beam circuit at the point where the gate is being checked to slow speed travel or approximately 12 in. (300mm) from full close travel. This meets requirements by reducing the gate KE to within Code limitation at slow speed travel.
3. Open final limit time relay AOT is provided, paragraphs o,p,q,r,s and t in the Opening Direction sequence are voided and the following sequence (paragraphs 4,5,6,7 and 8) is substituted.
4. After the hoistway landing door and then car gate reach their slow speed limit (DOL and GOL), contact DS-3NC and GL-3NO close, the open final limit timer AOT is energized and commences timing.
5. In sequence operation, the door is now stalled full open and the gate is proceeding to full open both on low speed motor winding power and will continue until the AOT time allowance. This time is adjustable and should be set as short as possible but long enough (with sufficient

tolerance) to allow all doors and car gates to reach full travel and stall prior to de-energizing.

6. Upon completion of the time as set on the AOT timer (0.4 to 4 seconds) then AOT-1NC opens and de-energizes all open direction relays, which drops out the open holding circuit and allows time relays TP and OT to reset while AOT recycles.
7. Re-operation of the door open push buttons will provide slow speed power on the door and gate for a new time allowance of AOT time. Should the door open push button be operated continuously or should the AOT timer fail to operate, after approximately 30 seconds the direction time protection relay OT will operate and de-energize all open direction relays. OT relay will remain energized with contact OT-1NC held open until a) the fault is corrected, b) the door close push button is operated, or c) power is removed from the controller.
8. Close operation is the same as in the close direction sequence. Switch types for DCL and GCL are modified to suit the NEMA condition.

C. ALTERNATE - SIMULTANEOUS OPERATION - Door and Gate

Based on: Schematic #277632 rev. 10/14/94 single line or line A of a double line
Schematic #277642 rev. 10/14/94 line C of a double line
Schematic #277635 rev. 10/14/94 staggered openings double line

Where the controller is arranged so that the hoistway landing door and the adjacent car gate operate at essentially the same time, the operation is called "Simultaneous ("straight freight") Operation."

1. Where Simultaneous Operation is originally specified, the above schematic diagrams are issued for the job. However, the Sequence and Simultaneous Operation logic systems are the same and with the addition of an auxiliary speed override relay SPA (see d. below) Simultaneous Operation can be achieved when certain contacts are modified as shown below.
2. The contact modification is a simple jumper arrangement around
   a. The gate GS-4NC contact in the open direction which then allows the gate to start to operate open at the same time as the door rather than waiting until the door has reached its low speed point, and
   b. The DH-4NC contact in the close direction which allows the door to start to operate close at the same time as the gate without waiting until the gate has reached its low speed point.
3. The logic system will perform speed changes from high to low speed and complete the final close or open operations regardless of whether the first arrival at these points is the door or the gate.
4. When any of the three low speed low KE Sensor Beam circuitry conditions are in effect, auxiliary door slow speed override relay SPA is energized and swings the door power system from high speed to low speed through contact SPA-!NC opening and SPA-2NO closing. Low speed mode is sealed in to full close by contact SPA-3NO closing until SPA is de-energized when the close operation completes. See Reopening Device Section 4, item g. for gate speed change.
5. The Simultaneous control system and schematics may also be arranged to provide a sequence close operation by eliminating the jumper around DH-4NC and disconnecting relay SPA and/or a sequence opening operation by eliminating the jumper around GS-4NC.
6. A simultaneous opening with sequence close can save operating time and usually is an accepted arrangement but it is not recommended that simultaneous closing be used with sequence open operation.

D. FIREFIGHTERS' SERVICE

Required on all new Automatic Elevators with ANSI A17.1b 1992 and included in all logic systems and schematic diagrams covered in this manual.

1. **General - Firefighters' Service Per ANSI A17.1**
   a. Freight elevators or passenger rated elevators with vertically sliding doors that are defined as "Automatic Operation Elevators" require special provisions for "Firefighters' Service" per ANSI A17.1. The requirements for Peelle doors and gates to meet the intent of Rule 211.3 are outlined herein. The arrangement incorporates necessary modifications peculiar to vertically sliding doors and modifications anticipated to meet forthcoming A17.1 editions.
   b. Controllers of the 2776 series set up with Firefighters' Service are provided with the relay logic necessary to alter standard operation of power doors and gates upon receipt of initiations from elevator company supplied Phase I, Designated/Alternate landing, Phase II - ON, Phase II - HOLD and Phase II - OFF isolated relay contacts. Initiation action is to be based on effective operation as defined in appropriate rules. The Peelle control provides an isolated contact to the elevator control to signal completion of the Door Open power operation.

i. Manually operated doors and continuous pressure push button close power doors require an elevator supplier/installer provided audio-visual signal to alert the attendant to close doors (if open) to allow the elevator to be returned to the Designated/Alternate level.

ii. Power doors equipped with the Automatic Time Close feature will (if open) automatically initiate the close operation on receipt of a Phase I Firefighters' Signal.

c. Freight elevators that are defined as "Attendant Operated Elevators" with manually operated or power operated vertically sliding doors and car gates require an elevator supplier/installer provided audio-visual signal to alert the attendant to close doors (if open) and return elevator to Designated/Alternate level. See Rule 211.4. When the doors are power operated, a Phase II operation may be desirable or required by some jurisdictions. To make Phase II operation effective, Firefighters' Service initiations must be interconnected between the elevator controller and the door controller.

d. Elevators defined as "Dual Operation Elevators", (attendant/non-attendant per Rule 211.5) when on attendant operation shall receive an audio-visual signal per Rule 211.3a(8) and after a time delay of 15 second minimum and 60 second maximum the elevator control shall initiate "Automatic Operation Elevator" (non-attendant) Firefighters' Service for the doors (see Paragraph 1.b.i., 1.b.ii., and sections 2 & 3).

2. **Phase I - Automatic Operation Elevators**

a. When a Phase I isolated initiation is received from the elevator controller as a result of the recall switch at the designated landing being turned to the ON position or due to smoke detector action:

i. With the car standing at a landing other than the designated level and with the doors open:

a. If equipped with Automatic time closing, the door closing sequence (warning bell before door movement) will commence without delay.

b. If equipped with manually operated doors or power doors with Continuous Pressure closing means the audio-visual signal installed by the elevator supplier/installer shall alert an attendant to manually operate or push button operate the doors to a closed position.

ii. With the elevator on Inspection Service at the time Phase I is initiated, the audio-visual shall alert the inspecting person to return the car to normal service.

iii. With the door and car gate closed, or if the Phase I initiation is received while the elevator is running with the door and gate closed, the elevator control directs the car to the Designated/Alternate landing.

b. An elevator control Phase I initiation received through interconnection at door controller terminals X10 and X11 energizes relays FS and FSA.

i. Contact FS-1NC opens and deactivates the Sensor Beam reopening device, contact FS-2NO closes and provides an initiation to an FS relay on a Line C controller, contact FS-3NC opens and its function relates to Phase II, contact FSA-1NO closes and sets up gate (and door where operation is Simultaneous Door and Gate) slow speed low KE travel upon a close initiation, and in Automatic Time Closing systems (See Section E) contact FSA-2NO closes to bypass the variable set time allowance for doors open time.

c. Upon arrival at the Designated/Alternate landing, the elevator control shall initiate normal automatic opening to the doors and for Automatic time closing door systems shall provide a Designated/Alternate landing initiation to deactivate the automatic closing feature. See Manual 202 (W20) for initiations.

d. During Phase I operation, door open and close push buttons (in car and at landing) are to remain active. When the retiring cam is activated, all door (open and close) push buttons are rendered inoperative through the door control at the time the interlock contact closes and allows the car to run.

e. This completes Firefighters Phase I Recall and leaves the doors open at the Designated/Alternate landing with the door operating push buttons active.

f. The Phase I recall initiation to the door control may be removed at any time during recall, at the completion of recall, or during Phase II by moving the designated landing key switch to BYPASS, or to BYPASS then OFF if Phase I was commenced through smoke detector action or to OFF if Phase I was commenced by turning the switch to ON.

3. **Phase II** Automatic Operation Elevators

a. When an isolated Phase II - ON initiation is received from the elevator control as a result of

the Emergency In-car Switch being placed in the ON position and effective only with the Phase I Recall Switch also being in the ON position or a smoke detector is activated and the elevator is at the designated or alternate landing with the door open, Phase II operation is effective and the door control provides:

i. Continuous-pressure door open push button operation with automatic reversal to the fully closed position should the door open push button be released prior to the completion of the open operation.

ii. Continuous-pressure door close push button operation with automatic reversal to the fully open position should the door close push button be released prior to the completion of the open operation.

iii. The Sensor Beam reopening device is rendered inoperative and remains inoperative throughout Phase II operation. Gate and Door speeds are standard.

iv. When the door and gate opening power operation is completed during Phase II, an isolated contact on the door controller closes to provide a door open signal to the elevator controller.

b. An elevator control Phase II initiation received through interconnection at door controller terminals X10 and X13 will energize relay ES.

i. Contact ES-1NC opens and keeps the Sensor Beam circuit deactivated, contact ES-2NO provides an initiation to ES relay on a Line C controller , and contact ES-3NC opens to reset the gate travel speed to normal from the Phase I low speed mode.

c. The elevator controller is to disable the hoistway landing door push button circuit between DO11 and DO12 during Phase II <u>except when Phase II OFF is initiated.</u>

d. A close door pushbutton initiation causes normal continuous pressure close operation including reversal to open on pushbutton release prior to final slowdown to close. An open door pushbutton initiation causes constant pressure open operation with reversal to full close on pushbutton release prior to reaching full open.

i. The open door pushbutton operation energizes relay AC and contact AC-1NO closes and initiates the open direction relays, contact AC-2 is not used here, and contact AC-3NO closes and energizes relay RO.

ii. Contact RO-1NC opens deactivating the open direction holding circuit, contact RO-2NC opens locking out the reversal to open contact CR-2NO and contact RO-2NO closes to energize lockup relay LU.

iii. Contact LU-1NO closes to set up the close direction, contact LU-2NO closes to seal in the RO relay and contact LU-3NO closes to seal in the LU relay.

iv. In the event the open pushbutton is released during open travel, the AC relay de-energizes causing the open direction relays to de-energize and the close direction relays are energized and held in through closed contact LU-1NO until final close is complete.

v. When the close direction travel completes, final close time relay ACT operates and de-energizes the LU relay in addition to the normal close relays and in turn RO relay is de-energized. A new open attempt is now available through the open pushbutton.

vi. If pressure is maintained on the open pushbutton to final open travel, limit switch GOFL closes and energizes the OF relay and the open direction relays are de-energized, the close direction setup is cleared and the LU relay is de-energized and in turn the RO relay de-energizes The control is available for a close initiation.

e. The Phase II ON initiation from the elevator control is to remain effective until the elevator car is at the designated landing with the doors open and emergency in-car switch turned OFF.

f. When the Emergency In-car Switch is turned to HOLD and with the doors open (X15-X16) signal to the elevator controller effective, the elevator control shall provide an isolated Phase II HOLD initiation to the door control. The door control registers this signal and renders power door closing inoperative.

i. The elevator control HOLD initiation received through interconnection at door controller terminals X!0 and X14 will energize relay HO.

ii. Contact HO-1NC opens and locks out the close door direction relays and contact HO-2NC performs the same function on a Line C controller through direct interconnection.

g. When the Emergency In-car Switch is turned to OFF with the doors open (X15-X16 signal to the elevator controller) <u>and with Phase I effective</u>, the doors will close or may be closed per Item D.1.b.i or ii above. When the doors are closed, elevator recall to the Designated/Alternate Landing shall take place

and door automatic opening initiation shall be present.

h. When the Emergency In-car Switch is turned to OFF with the doors open (X15-X16 signal to the elevator controller) and with Phase I not effective, the door control registers this condition and renders power door closing inoperative.

i. When an elevator control Phase II OFF initiation is received through interconnection at door control terminals X10 and X18; a) the circuit allows door close operation (see Item 3.c. above) and if Phase I is effective, a Phase I recall should result when the doors are closed, and b) if Phase I has been turned off, contact FS-1NC is closed and relay HO will energize preventing door closing on Line A and Line C (see Item f.i. and ii. above).

i. Where necessary for the elevator control to know that the door and gate are open, the door control provides an open door isolated initiation to the elevator controller through door controller terminals X15 and X16.

j. This completes Firefighters' Service Phase II. Normal operation can be restored with the elevator at the designated landing with the door open.

OPTIONAL - AUTOMATIC TIME CLOSING

Based on: Schematic #277638 rev. 10/14/94 single line or line A of a double line
Schematic #277648 rev. 10/14/94 line C of a double line
Schematic #277641 rev. 10/14/94 staggered openings double line

Controllers of the 2776 series set up with Automatic Time Closing are provided with the timers and relays necessary to automatically close the car gate(s) and associated door(s) after being open a predetermined time. Some Firefighters' Service changes and/or additions are required and are included in the Automatic Close series of schematics.

The Peelle control arrangements above cover the automatic time closing requirements of the Elevator Code ASME/ANSI A17.1 paragraph 112.3d, applied to power doors on automatic or continuous-pressure operation elevators.

A. Code Requirements

1. A warning bell mounted on the car which sounds 5 seconds before the hoistway landing door/car gate start to close automatically and continues to sound until the hoistway door reaches the DCL slow speed switch and is checked to slow speed (hoistway door substantially closed).
2. Sequence closing of hoistway landing door and adjacent car gate (refer to Sequence Operation Section) is furnished. Sequence Opening is also furnished.
3. A car gate Sensor Beam reopening device and associated relays are furnished.
4. Momentary pressure stop-and-reopen is provided through operation of a (landing or car) door open pushbutton when the door and gate are in automatic time closing operation.
5. Average closing speed for automatic time closing is the same as regular operating speed with the high speed run being approximately code average and the slow speed below average. The average closing speed can be adjusted through change in the length of the slow speed zone with the normal limit setting providing an approved average.
6. **Other Features**
7. The Automatic time closing initiation is self-contained within the Peelle controller and optional elevator control initiation is needed only for Override or Hold-Open (see Paragraph C below).
8. Continuous pressure door close push button operation in the car or at the landing is always available without time delay.
9. Resetting the time delay to full allowance of open-door-time prior to or during automatic time closing is available by operation of the door open push button in the car or at the landing.
10. In the event the Sensor Beam reopening device senses an obstruction causing reversal (reopening) during an automatic time closing operation, a full time delay will be experienced prior to allowance of a new automatic time closing or remote automatic time closing override.

B. Additional to Code Provisions:

1. Provision is made to receive an initiation from the elevator controller, allowing an override to the automatic time closing delay. When this initiation is received, the warning bell will ring for the required 5 seconds, and then the car gate and door will close sequentially without the necessity of waiting for the full predetermined time (25-256 seconds). See Peelle manual 202 (sheet W20), for initiation requirements. The purpose of this feature, in conjunction with the appropriate elevator controller, is to permit closing of a remote door and car gate (if open) and calling of the elevator to the floor of the initiation registry.
2. Provision is also made to receive a Hold-Open initiation from the elevator controller that will

render the automatic time closing operation inoperative when desired. See Peelle Manual 202 Sheet W20. The purpose of this feature is to provide an extended period of loading and unloading when desired.

C. Detailed Operation

1. After an open initiation of the door and gate through automatic-opening upon elevator arrival or by door push button, and when the gate has moved sufficiently to allow gate slow speed close limit GCL-1 to close, timer TG is energized through NC contacts CR-3, TAC-2, ZL-3, ESA-2, AC-2 and GA-1.
   a. After the preset time (25 to 256 seconds), TG timer operates and contact TG-1NO closes energizing relay GA and timer TAC, which commences timing.
   b. Contact GA-1NC opens de-energizing TG timer, allowing it to recycle. NO contacts GA-1 and GA-2 close, to establish a holding circuit from feeder wire number 4 through NC contacts OA-2, DL-4, GR-2 and AC-2,(contacts ZL-3 and ESA-2 only function in Firefighters' Service). Contact GA-3NO closes, energizing warning bell or buzzer B through previously closed contact DS-3NO.
   c. After 5 seconds (minimum preset), TAC timer (3-32 seconds) operates and contact TAC-1NO closes, thus initiating close direction operation (see Sequence Operation item 2. Closing Direction) while contact TAC-2NC opens and isolates the GS relay from the timing circuit.
   d. When the close operation proceeds to the point of door slow speed, contact DL-4NC opens interrupting the timing holding circuit, de-energizing relay GA and allowing TAC timer to recycle. Completion of the close direction from slow speed is the same as the Sequence Operation arrangement without automatic time closing. (See Sequence Operation item 2. Closing Direction).
2. In the event an obstruction in the path of a car gate is read by the Sensor Beam during the sequence close operation, relay GRA is energized closing contact GRA-1NO which energizes reopening relay GR. Reversing to open operation takes place causing door and gate to reopen, setting up a new time cycle for closing.
   a. Contact GR-1NC opens which drops out the close direction relays, contact GR-2NC opens dropping out the timing holding circuit while contact GR-2NO closes energizes relay GB.
   b. With the close direction de-energized, reopening initiation through closed contact CR-2NO takes place immediately.
   c. Contact GB-1NO closes to self hold relay GB through timer contact TG-2NC and contact GB-2NC opens to lockout an override attempt until a full TG time expires.
   d. The only close operation available until the full TG time expires is by continuous pressure pushbutton close.
3. During the automatic time close timing by the TG timer, from the first energization of TG to the point closing travel motion begins, momentary pressure on the door open push button will energize open control relay AC, causing contact AC-2NC to open, which will cause a reset of the timing to full time.
4. During the automatic time closing operation, from the beginning of closing travel motion to the beginning of hoistway landing door slow speed, momentary pressure on the open push button will energize open control relay AC, causing AC-2NC to open, which interrupt's the timing holding circuit de-energizing relays TAC and GA. This, in turn, causes de-energization of the close direction relays and automatic reopening is initiated. (See Sequence Operation item 3. Automatic Reopening).
5. When the door and car gate are closed by operating the door close push button (on the elevator car or associated landing button) before the warning bell rings, sequence continuous pressure close operation is attained. (Note: See Sequence Operation item 2. Closing Direction.)
6. In the event the door close push button is operated with continuous pressure after the warning bell sounds but before commencement of the close on automatic (closing of TAC-1NO), normal closing operation will occur but the warning bell will continue to ring. To provide proper close operation, contact CR-3NC opens and isolates the GS relay from the timing circuit, affording a normal GS function. Note that the timing circuit remains operative in this situation and the automatic time closing will be effective after TAC-1NO closes. Should the door close push button be released prior to establishment of the automatic time closing, automatic reopening (see Sequence Operation item 3. Automatic Reopening) is immediately initiated and the subsequent opening of OA-2NC will interrupt the time holding circuit.
7. Remote initiation of the warning bell, followed 5 seconds later by the closing operation, will take place when the elevator controller provides an automatic time closing override initiation, closing the timing circuits between points DO-6 and DO-7 for the front line (line A), and DO-60 and DO-70

for the rear line (line C), except after a reopening device operation (see 2.c. and d. above).

8. With the door and gate open, opening the circuit between DO-8 and DO-9 (DO-80 and DO-90 for the rear line) by operation of an elevator control Hold-Open initiation, disconnects the timing circuit and allows the door and gate to remain open for an indefinite period, although closing is operable by door close push button.
9. One warning bell is provided for either Single Line or Double Line operation. In a single line arrangement, the warning bell is energized when contact GA-3NO closes. In a Double Line arrangement, the bell is energized by the line "A" controller (contact GA-3NO) when line "A" alone or line "A" and line "C" together are calling for a warning ring (line "C" initiation is locked out by GA-3NC), and by line "C" controller when line "C" only is calling for a warning ring.

D. <u>Firefighters' Service with Automatic Closing</u>

When Firefighters' service is initiated through elevator controller to door controller interconnects, the action is the same as covered under Section D. Firefighters' Service with the modifications below.

1. On receipt of a Phase I initiation, when the FS and FSA relays are energized, contact FSA-2NO closes to bypass the TG time relay and immediately energizes the warning timer TAC and relay GA.
   a. Contact GA-1NC opens to lock out the TG timer, contact GA-2NO closes to seal in the GA relay and contact GA-3NO closes to ring the warning bell.
   b. After the TAC timer activates (5 sec. minimum), contact TAC-1NO closes to energize the close direction relays to full close travel.
   c. With the doors closed, the elevator returns to the designated/alternate landing and on reaching the landing an initiation to the door controller terminals X10 and X12 is required during the period the elevator is at this location.
   d. Receipt of this initiation energizes relay ZL, and the initiation is only to be present while the elevator is at the designated/alternate landing.
   e. Contacts ZL-1NC and ZL-3NC act in concert to deactivate the automatic close and warning bell circuitry. Contact ZL-2NC is transferred to a Line C (if included) and closes to perform a similar function on Line C.
   f. This completes the Phase I recall with the elevator at the designated/alternate landing with the doors open but available for a continuous pressure pushbutton close.
2. On receipt of a Phase II initiation, The TG timer and TAC timer circuitry are continued in a deactivated state and continuous pressure close pushbutton operation is available.
   a. Phase II door functions as outlined in Section D. Firefighters' Service are effective.
   b. When the Phase II key is turned to OFF at a floor away from the designated/alternate landing and;
      i. Phase I is effective, relay ESO is energized and the doors will automatically close after a TAC time warning bell and Phase I recall will take place.
      ii. Phase I is OFF, relay HO is energized and the close direction relays are locked out. The doors will stay open or open under continuous pressure and then stay open.
   c. Phase II shall remain effective until the elevator is returned to the designated/alternate landing where normal operation can be restored.

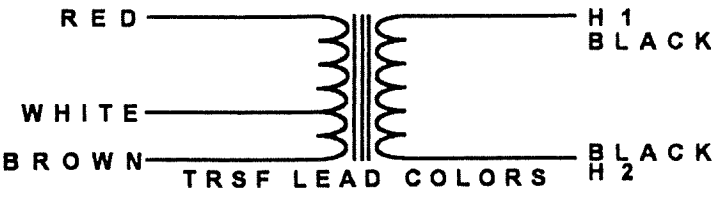
POWER OPERATED FREIGHT ELEVATOR DOOR AND GATE CONTROLLER SERIES 2776

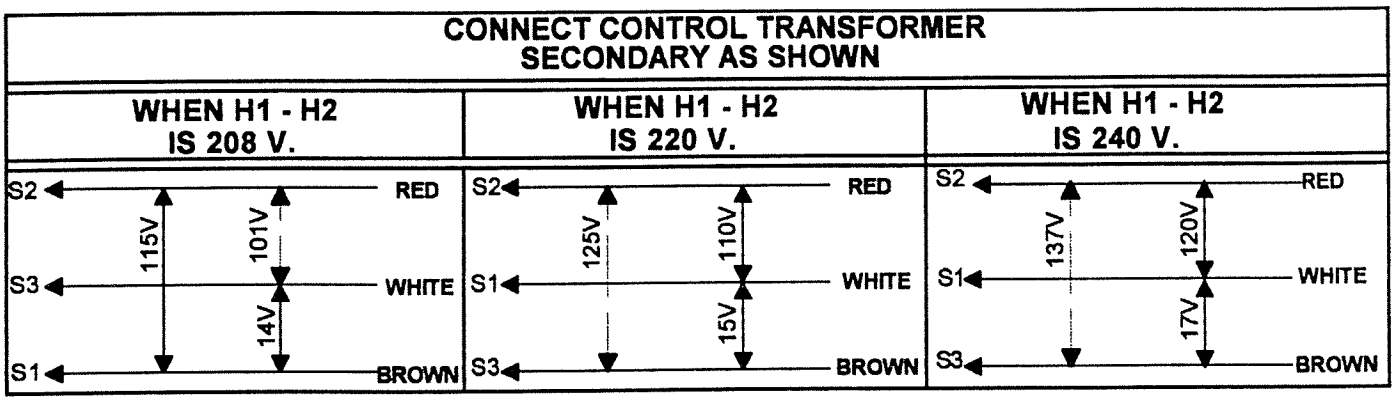
FINAL LIMITS CUT-OFF		CONTROL TYPE	CONTROLLER NUMBERS				
OPEN	CLOSE		REOPENING DEVICE	FIREFIGHTERS' SERVICE	SINGLE OR FRONT LINE "A" OF	REAR LINE "C" OF DOUBLE LINE	DOUBLE LINE STAGGERED
GEARED (DOOR/ GATE LIMIT)	TIME (TIMER ON CONTROLLER)	SIMULTANEOUS OPERATION	W	W	X277632	X277642	X277635
				W/O	X277662	X277672	X277665
			W/O	W	277634	277644	277637
				W/O	X277664	X277674	X277667
		SEQUENCE OPERATION	W	W	X277633	X277643	X277636
				W/O	X277663	X277673	X277666
			W/O	W	277652	277654	277653
				W/O	X277688	X277698	277675
		AUTOMATIC TIME CLOSING	W	W	X277638	X277648	X277641
				W/O	X277668	X277678	X277671
TIME (ALT.)	TIME	SIMULTANEOUS OPERATION	W	W	277639	277649	277645
				W/O	X277690	X277691	277692
			W/O	W	277655	277656	277657
				W/O	277693	277694	277695
		SEQUENCE OPERATION	W	W	X277640	X277650	X277651
				W/O	X277670	X277680	X277682
			W/O	W			
				W/O			
		AUTOMATIC TIME CLOSING	W	W	X277658	X277659	X277660
				W/O	X277676	X277686	X277684

NOTE: X INDICATES DRAWING IN FILE

CONTROL TRANSFORMER - CONNECTIONS (USED NOV. 1969 TO DEC. 1994)

THE CONTROL TRANSFORMER 'TRSF' IS FACTORY CONNECTED TO SUIT THE CONTROLLER NAMEPLATE VOLTAGE. CONNECTION IS THE SAME WHEN APPLIED VOLTAGE IS 220/240 VOLT. IF APPLIED VOLTAGE IS 208 AND NAMEPLATE SHOWS 220 OR 240 VOLT, FIELD EXCHANGE THE WHITE AND BROWN TRANSFORMER LEADS AT CONNECTION POINT S1 AND S3 (SEE CHART BELOW). CONTROL VOLTAGE SHOULD BE BETWEEN 110V AND 125V - NO LOAD.





POWER TRANSFORMER - CONNECTIONS (USED PRIOR TO DEC. 1988)

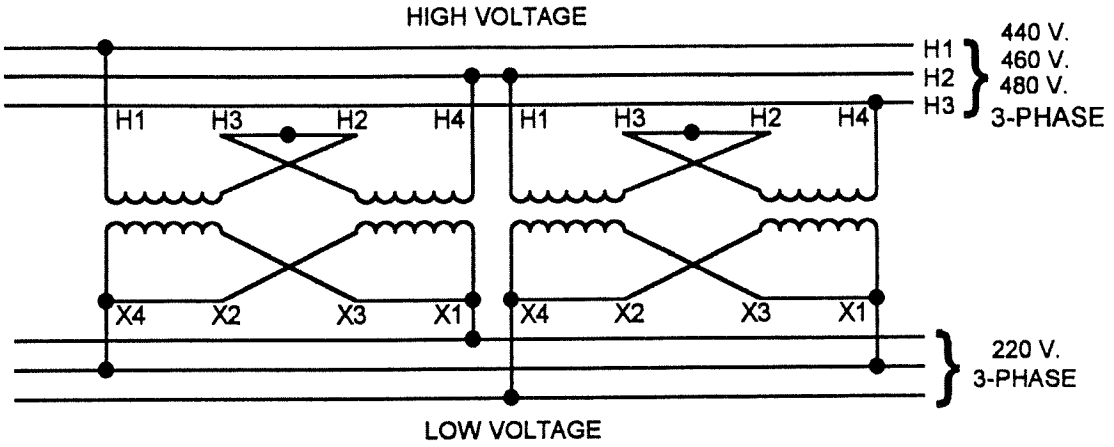
THE POWER TRANSFORMER 'TRSF2' IS FACTORY WIRED TO SUIT THE SPECIFIED JOB VOLTAGE. IF ACTUAL JOB VOLTAGE VARIES FROM FACTORY WIRED VOLTAGE, CHANGE CONNECTIONS AS SHOWN IN CHART BELOW.

		CONNECT HIGH VOLTAGE LINES TO H1,H2 & H3		
	VOLTAGE	WIRE CONNECTIONS		
LINE	480	H1 TO H6	H2 TO H4	H3 TO H5
	460	H1 TO H9	H2 TO H7	H3 TO H8
	440	H1 TO H12	H2 TO H10	H3 TO H11
SECONDARY	220	CONNECT LOAD LINES TO X1,X2 & X3		

NOTE:
INDIVIDUALLY INSULATE EACH END OF THE REMAINING SIX WIRES.

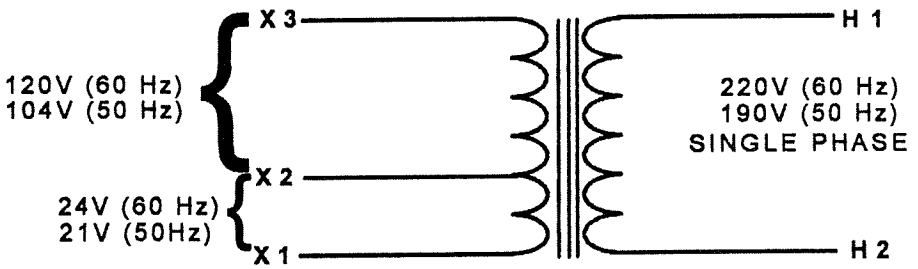
POWER TRANSFORMER - CONNECTIONS (USED AFTER DEC. 1988)

THE POWER TRANSFORMER 'TRSF2' IS FACTORY WIRED FOR JOB VOLTAGES RANGING FROM 440V. TO 480V. THEY ARE TWO SINGLE-PHASE TRANSFORMERS CONNECTED IN OPEN DELTA TO A THREE-PHASE CIRCUIT.



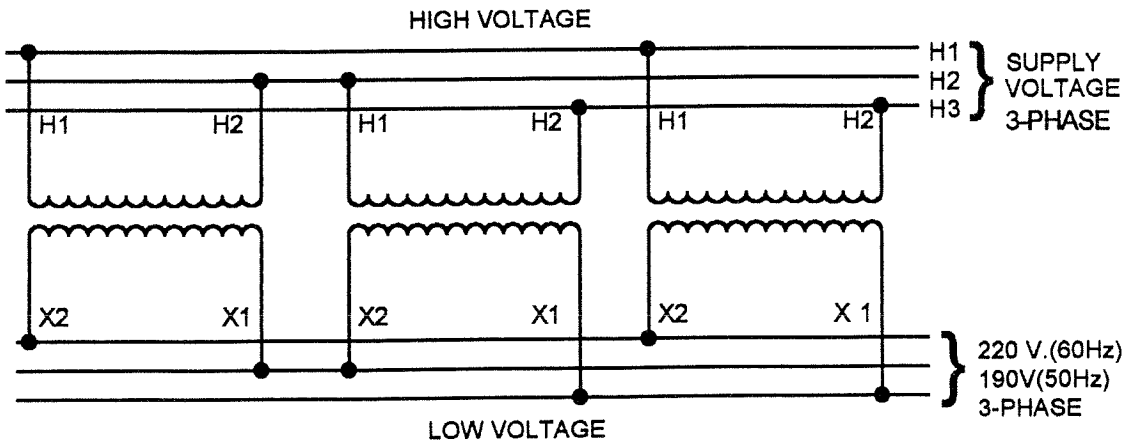
CONTROL TRANSFORMER - CONNECTIONS (USED AFTER JANUARY 1995)

THE CONTROL TRANSFORMER 'TRSF' IS FACTORY WIRED FOR 220V/120V-24V (60HZ). IF APPLIED VOLTAGE IS 208V THE CONTROL VOLTAGE WILL BE 114 VOLTS. NO WIRING CHANGES ARE REQUIRE
D.



POWER TRANSFORMER - CONNECTIONS (USED AFTER MAY 1995)

THE POWER TRANSFORMER 'TRSF2' IS FACTORY WIRED FOR JOB VOLTAGES RANGING FROM 380V. TO 600V. FOR 50Hz OR 60Hz DEPENDING ON LOCATION. THERE ARE THREE SINGLE-PHASE TRANS FORME RS CONNE CTED IN CLOSE DELTA TO A THREE-PHASE CIRCUI T.



PEELLE MOTOR DATA - FOR DOOR AND GATE AND RETIRING CAM MOTORS

MOTORS - 220 VAC, 3 PHASE, 60 Hz. TORQUE TYPE SQUIRREL CAGE INDUCTION HIGH SLIP						TORQUE MOTOR FULL LOAD VALUES (LOCKED ROTOR)					
TYPE	TORQUE	ENCLOSURE	ASSEMBLY OPERATOR PART NO.	MOTOR & PINION PART NO.	MOTOR PART NO.	CURRENT AMPS. HI	CURRENT AMPS. LO	NOMINAL TORQUE LBS. IN.	DUTY RATING MINUTES	MAXIMUM TIME ON %	PHASE RESIST - OHMS
HOISTWAY DOOR 900/450 SYN. RPM MOTOR	STANDARD TORQUE	TENV.	0560	056921		1.2	0.6	15	5	14	100 / 186
		EXPL. RESIS.	0594	059421		1.0	0.6				
		MOIST. RESIS.	0560M	056921M		1.2	0.6	15	5	14	
	HIGH TORQUE	TENV.	0569	056910		1.6	0.8	20	5	14	67 / 138
		EXPL. RESIS.	0595	059521		1.8	1.1				
		MOIST. RESIS.	0569M	056910M		1.6	0.8	20	5	14	
CAR GATE 900/300 SYN. RPM MOTOR NOTE: PRIOR TO 1994 SYN. RPM WAS 1200/300. LISTED UNITS ARE INTERCHANGEABLE REPLACEMENT	STANDARD TORQUE	TENV.	2518	25182	251821	1.6	2.0	15	5	16.5	59 / 74
		EXPL. RESIS.	2528	25282	252821	0.7	2.2				
		MOIST. RESIS.	2548	25482	254821	1.6	2.0				
	HIGH TORQUE	TENV.	2517	25172	251721	1.5	2.0	20	5	16.5	53 / 46
		EXPL. RESIS.	2527	25272	252721	0.8	2.8				
		MOIST. RESIS.	2547	25472	254721	1.5	2.0				
RET. CAM 600 SYN. RPM MOTOR	STANDARD	TENV.	233020		033050	0.5		10	30	50.0	85
		EXPL. RESIS.	23306		233048						
		MOIST. RESIS.	233065		233060						