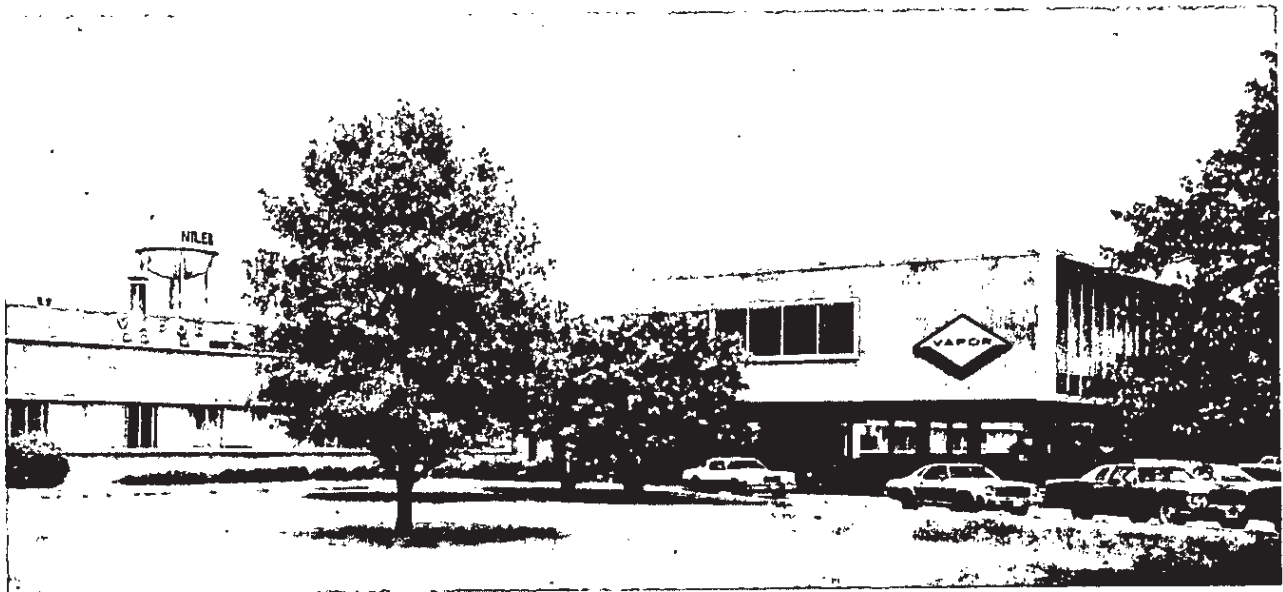


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Operation and Maintenance Instructions
For
Vapor Door System Equipment
Used On
Amtrak Amfleet Coaches
Book No. TWM8-AP-42

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TRANSPORTATION SYSTEMS DIVISION
6420 WEST HOWARD STREET
CHICAGO, ILLINOIS 60648

2.3.1.5 Operation - Emergency

Doors may be operated manually if power is not available. Pull handle in slot in ceiling to unlock. Push up to return to normal operation.

2.3.1.6 Threshold & Door Pocket Heaters

Electric heating elements, operating on 120 V AC, are provided at the threshold and in the door pockets to prevent freezing.

Refer to Section 3.6.3 for operation.

2.3.1.7 Parts

Refer to Figure 2-4 and Vapor Manual for detailed door operation, maintenance and parts information.

2.3.2 Body End Doors - Sliding

2.3.2.1. Description

The end doors between vestibule and passenger section are stainless steel sliding type, actuated by electric door operators at the top. Touch plates are provided for both hand and foot actuation.

The controls are arranged so that opening of side doors on either side automatically opens the body end door for a period longer than the normal time cycle.

Door tracks and hangers are furnished by Morton Manufacturing Company.

Periodic lubrication of track is recommended using Lubriplate-Aero (non-staining) manufactured by Fiske Brothers Refining Co., Newark, N.J.

Lexan installation is as shown in Section 2.4.3.

Door Control Right (Right Side Close)
Door Control Right (Right Side Open)
Conductor Door Closed Light (Employs 2 lines)
Engineman's Door Close Light
Conductor's Signal Buzzer
Door Control Left (Left Side Close)
Door Control Left (Left Side Open)

End door operators are individually controlled by the passenger by means of push or kick plate switch assemblies which are mounted in each end door panel.

C. DOOR OPERATORS

The door operators, one for each door panel, are Vapor electromechanical type which, by means of the linear convertor assembly, open and close each door panel in accordance with the signal received at the operator. (See figure 1-1 for the location of the equipment on the car.) The door operator includes a reduction gear unit which is driven by a small, high torque, 72VDC, series-wound, DC motor. The motor and gear housing assembly is designed with reversible gears so that the door panel may be opened manually in the event an emergency exit is required.

The door operator linkage is designed with an over-center locking feature which is effective when the door panel is closed. This feature prevents the door panel from being opened manually unless the over-center lock is released either electrically, through rotation of the operator motor, or mechanically, through action of the emergency lever, which is an integral part of each side door operator. (See figures 1-2, and 1-3.)

The door operator assemblies have been designed for right and left-hand application, one operator for operating each door panel in the car. There are, therefore, two right-hand door operator assemblies, per car and two left-hand door operator assemblies per car. There are two end door operator assemblies connected to operate mechanically in the left-hand configuration. End door operators, although similar to the side door operators, do not include the over-center locking feature and may be opened manually as required. (See figures 1-4 and 1-5.)

1. Door Operator Motors

The operator motor is identical for all door operators; it is flanged mounted to the gear housing assembly. The motor is designed especially for application to door operators and has the following specifications:

D. KEY SWITCHES

Each car is equipped with four outside crew key switches which are located, one near each side door on the respective car end. These crew key switches, operated with the control key, enable the trainman to open or close the side door panel from the outside of the car at that location. Doors left open by operation of the key switch can also be closed from the master door controller. (See figures 1-7, and 1-8.)

An inside crew switch is located in each vestibule on the wall near the end door. Operated with the control key, these switches enable the trainman to maintain the end doors in the open position. Once the end doors are opened by the control key, they will close only when the key is inserted and turned to the closed position. (See figure 1-1 for the location of the outside and inside crew key switches.)

E. DOOR CLOSING WARNING BELL, PN 57020383-01

Four door closing warning bells are provided per car, one at each side door location. The warning bell will sound for two seconds when the door close button is pressed to close the doors. The door panel will close one second later. (See drawing No. 57020383.)

F. DOOR CONTROL RELAY PANELS, PN 57446093 ("A" END), 57446094 ("B" END)

Components of the door control and signalling system are wired to various system relays which are mounted on the relay panels, located in the header area above each end door. (See figure 1-1.) Four mounting holes are provided for securing the panel in place with 1/4 inch mounting screws.

Door control relay panel No. 57446093 is located at the "A" end of the car. The relays on this panel include the following:

<u>Item</u>	<u>Circuit Reference</u>	<u>Part Number</u>
Closing Time Delay Relay, "A" Door	TDR-A	56720318-01
Closing Time Delay Relay, "D" Door	TDR-D	56720318-01
Opening Time Delay Relay, "A" End Door	TDR-1A	97411034
Opening Time Delay Relay, "A" End Door	TDR-2A	97411034-01
Opening Time Delay Relay, "A" End Door	TDR-3A	97411034
Door Control Latch Relay, "A" Door	DCLR-A	37130117-51
Door Control Latch Relay, "D" Door	DCLR-D	37130117-51
Magnetic Valve Speed Relay	MVSR	36530117-04
Signal Light Relay	SLR-A	37330540-02

<u>Description</u>	<u>Drawing No.</u>
Door Operator Assembly, RH, Side Door	57366581
List of Parts, RH Side Door Operator	P/L 57366581
Door Operator Assembly, LH, Side Door	57366582
List of Parts, LH Side Door Operator	P/L 57366582
Door Operator Assembly, End Door	57366711
List of Parts, LH End Door Operator	P/L 57366711
Operator Application, RH and LH Side Doors	57407033
Operator Application, LH End Doors	57307321
Operator Connection Wiring Diagram for Side Doors	57405165
Operator Connection Wiring Diagram for End Doors	57403146
System Schematic Wiring Diagram	57406045

H. OPERATION GENERAL

For normal operation, side door opening and closing signals are originated at a master door controller located at each side door

Each master door controller panel is fitted with six push buttons, arranged in three vertical rows of two push buttons each. One pair of push buttons open and close the side entrance doors in the section of the train forward of the active control position; one pair of push buttons open and close the side entrance doors in the section of the train rearward of the active control position; and the third (center) pair of push buttons open and close the door at that position. The section of the train that each pair of push buttons controls is suggested by their location. Each section is clearly indicated by the use of arrows and the center-push buttons are marked with the words "THIS DOOR ONLY." (See figures 1-9, and 1-10.)

The control buttons are inoperative unless the master door control key switch (MDKS) is actuated. The key switch is located on the master door controller panel adjacent to the six control buttons. Power to this unit is supplied through the speed sensor* contacts when the train is stopped or traveling at a speed below two miles per hour.

The master door controller panel is fitted with a lamp test button which is located directly above the key switch. When this push button is pressed, power is applied to the three indicating lamps that are located one each above the three rows of control buttons. The lamps located above the forward and rearward controls are fitted with blue lenses and are lit when all

* = Not by Vapor

MASTER DOOR CONTROL
KEY SWITCH

INDICATOR LAMPS (3)

LAMP
TEST
BUTTON

WIRING
ENTRANCE

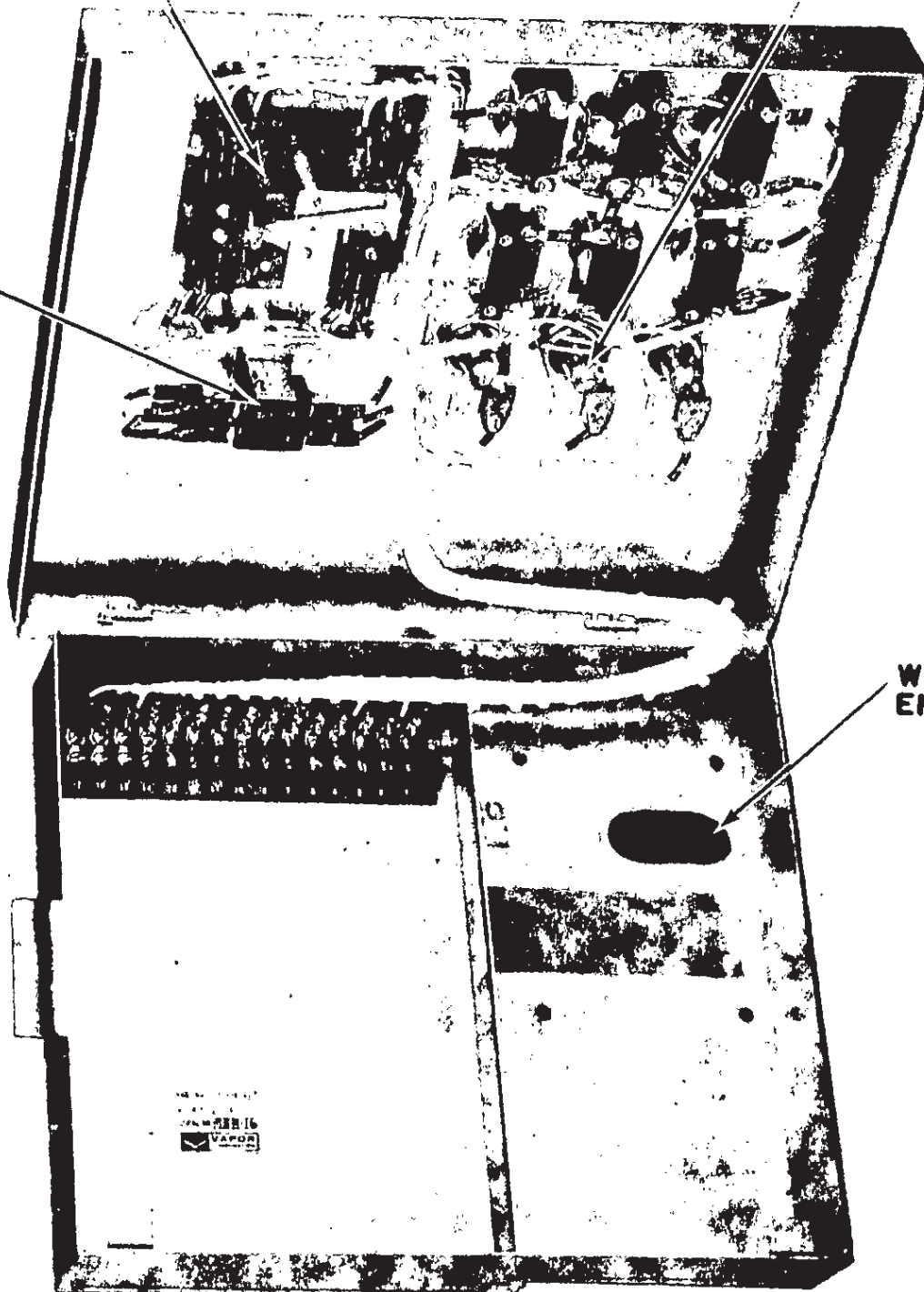


Figure 1-10. Master Door Controller, PN57436090 - Open View - Typical

of the side doors in that control zone are closed. The lamp located above the "local" side door controls is fitted with a red lense and is lit when any door on that side of the train is opened. (See figure 1-10 for layout of each item located on the master door controller panel.)

One outside signal light (red) is located above each side door. When a side door is open, the light above it is lit.

1. Body End Doors

Each end door is provided with two push or kick plate assemblies, one on either side for hand or foot actuation of the door operator. Controls for the end doors are set to hold the door normally-opened for 15 seconds once the push or kick plate is actuated.

Opening of the side doors on either side of the car automatically opens the end door on that end for 45 seconds. The longer time cycle will prevail so long as side entrance doors are opened. The leading edge of each end door is fitted with a sensitive door edge mechanism which reinstates the door opening cycle when an obstruction prevents the door from closing. There is no mechanical locking system on the end doors and they are easily opened manually in case of emergency.

2. Side Door Obstruction Sensing

An obstruction sensor switch (OSS) is located on the door operator and is mechanically actuated when the leading edge of the door is obstructed. When the switch is actuated, an obstruction sensor relay (OSR) is energized and signals the door to open. The door will fully open and immediately attempt to close and will recycle until the obstruction is removed.

3. Speed Sensor*

The side doors can only be operated when the car is stopped, or its speed is below 2 miles per hour. A speed relay (SR) is energized at speeds below two miles per hour; its contacts transfer and power is supplied to the side door controllers and opening power is restored to the operators. The speed relay does not remove closing power from the operators. It is located on the "B" end relay panel.

* = Not by Vapor

C. DOOR OPENING - EMERGENCY OPERATION

Each side door operator is provided with a manually operated lever for opening its related door panel at that location in the event an emergency exit is required. Moving the lever from its normal (in service) position will release the over-center locking feature and partially open that door panel. The door panel may then be fully opened manually.

Simultaneously, as the lever is actuated to open the door, a normally-open emergency switch (EMS) is deactuated. (see figure 2-1.) The contacts of this switch are opened to interrupt the power in the operator motor circuit. This prevents the operator motor from starting and closing the door during the emergency opening since the cam operated limit switch LSI would normally close and complete the motor circuit as the door was manually opened.

D. OPERATION OF THE END DOORS

When the push or kick plate of an end door is actuated, B+ is fed to the operator and a 15 second time delay relay is energized. The door opens for 15 seconds then closes. The end doors are also opened when side doors are opened by the master door controller. (See paragraph B.) Because the end doors have no over-center locking feature, they can be easily opened manually in the event of power failure, etc. The end doors are also equipped with a service switch which can remove power from the operator.

The leading edge of each end door is equipped with a sensitive edge switch (SES) arrangement. When an obstruction actuates the SES switch, B+ is fed to the time delay relay (TDR) that initiated the end door opening cycle. The total time from when the end door starts to open, because of an obstruction, until it begins the closing cycle, is equal to the amount of time delay caused by the initiating TDR relay.

Each end door position can be controlled by the inside crew switch which is located in the vestibule at that location. By activating the crew switch with the standard AMTRAK coach key, the end door can be maintained in the open position. The key may be removed while the door is in the open position.

E. OPERATING SIDE DOORS BY MEANS OF THE OUTSIDE CREW SWITCH

Each side door has an outside crew switch whose location is shown in figure 1-1. The crew switch is operated by the standard AMTRAK coach key. Inserting the key and turning it 90 degrees clockwise will activate the "OPEN" switch in the assembly and applies B+ to the door control latch relay (DCLR).