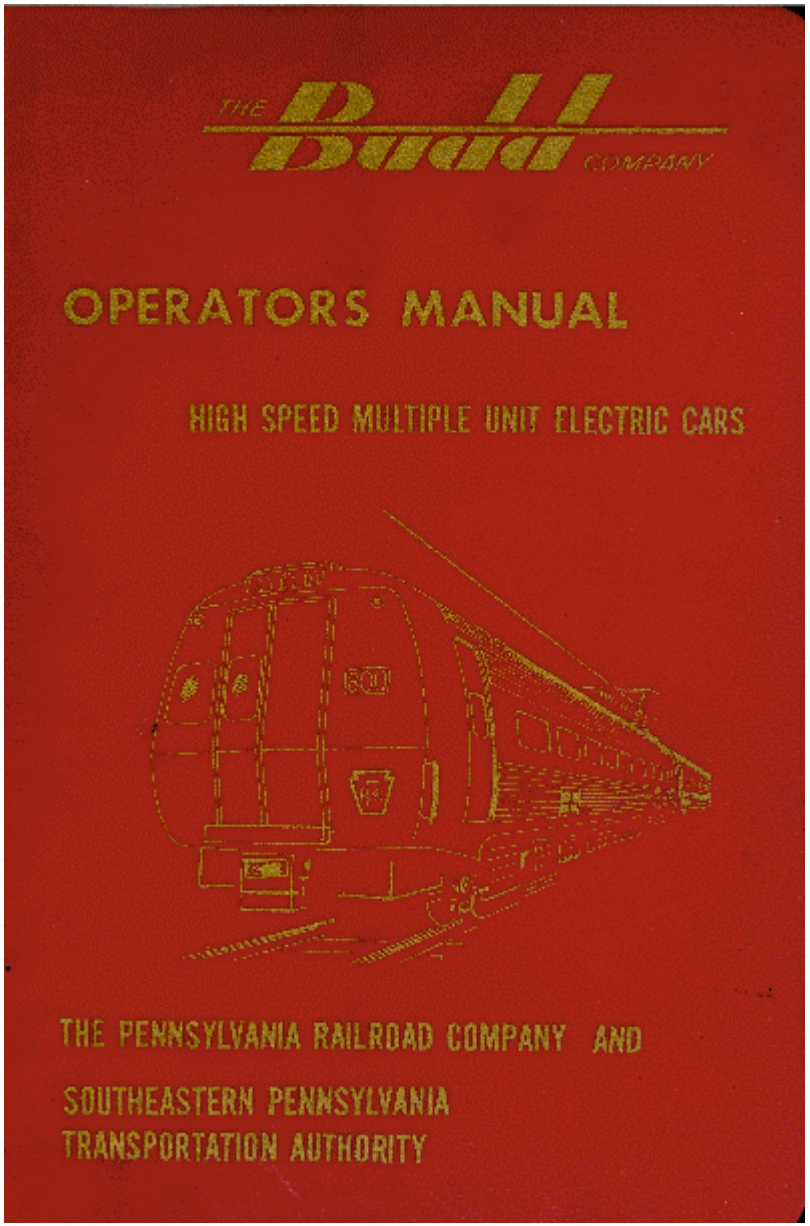

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THE Budd COMPANY
RAILWAY DIVISION

OPERATORS MANUAL

HIGH SPEED MULTIPLE UNIT ELECTRIC CARS

THE PENNSYLVANIA RAILROAD COMPANY AND

SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY

THE BUDD COMPANY

CUSTOMER SERVICE DEPARTMENT

RED LION PLANT

PHILADELPHIA, PENNA.

N O T I C E

The data contained in this manual is offered to familiarize the operator with the equipment available for use during operation.

Some equipment requires descriptive and detailed explanation to provide a basic understanding o£ its function. Such descriptive text is not intended to be dictative for operation.

All rules and instructions covering operation are issued by The Pennsylvania Railroad Company.

The information contained in this manual is based on data available when released for printing.

GENERAL DATA

CAR TYPE & DESIGNATION

Coach	800 - 830	MP85E4
Snack Bar	850 - 869	MPC85E5
Parlor	880 - 889	MPP85E5

TRACTION MOTORS	W.E.Co.	G.E.Co.
Model	1461-A	1254-A1
Type	D.C.	D.C.
H.P. Rating	300	255
Number	4	4

WHEELS	
Diameter	36"
Tread	A.A.R. G-4 1963 Tapered
Class	CR
JOURNALS	6 1/2"- Roller-Type-SC
AIR BRAKES RT5-B	
AIR COMPRESSOR	D-3
Type	2 Cylinder 2 Stage
Capacity	33 CFM @ 1750 RPM
STORAGE BATTERIES	N.I.A.
Cells	50
Voltage	64
Rating	112 AMP 5 HR
MAJOR DIMENSIONS	
Length Between Coupler Faces	85'
Width (Maximum)	10'-6"
Height (Pan Locked Down)	14'-10"
WEIGHT ON RAILS (APPROX.)	166,000 Lbs.

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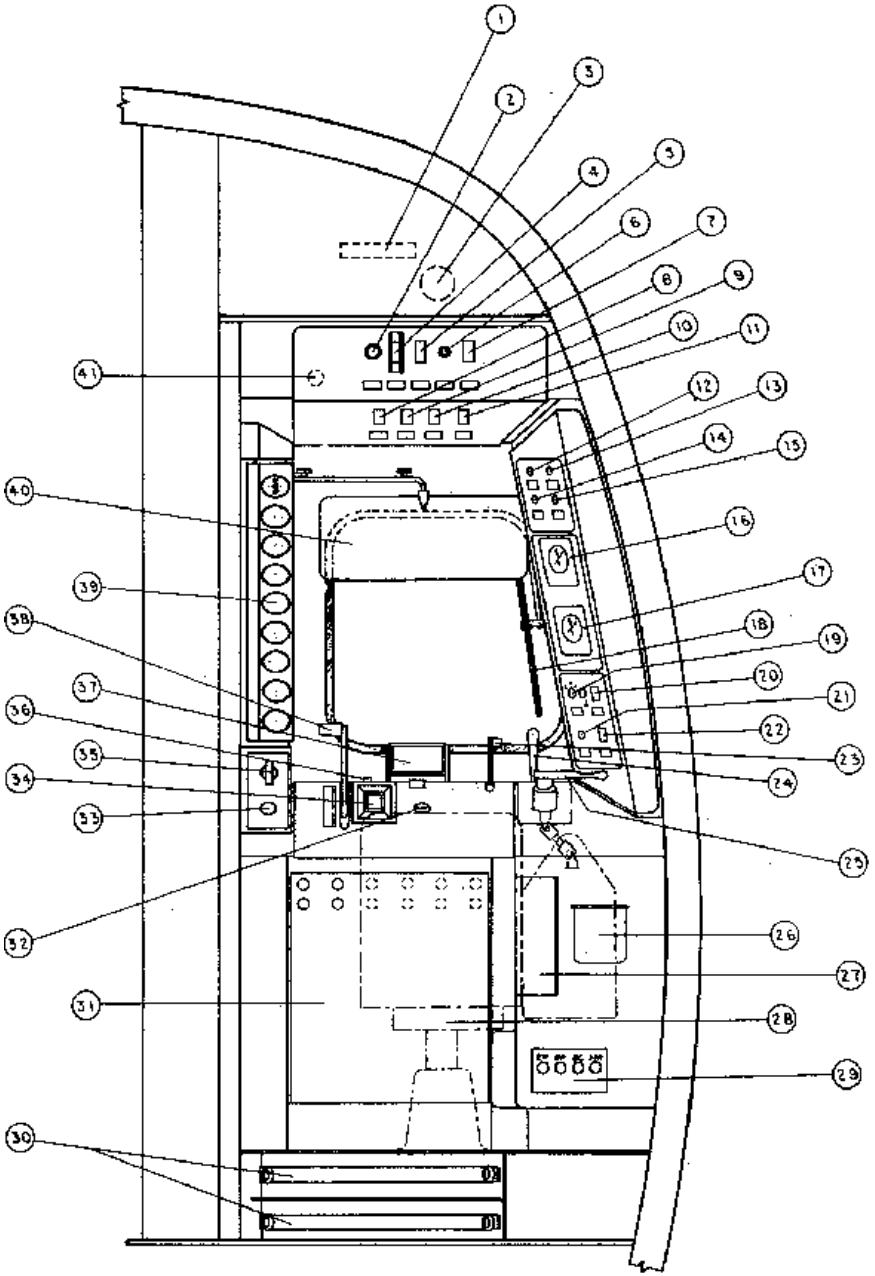


FIG. I
CAB FRONT END

FIGURE 1 - CAB FRONT END
FIGURE 2 - CAB RIGHT SIDE
FIGURE 3 - CAB LEFT SIDE

1.	Resistor - Windshield Wiper	
2.	Pantograph Raise Push Button	Hold to Operate
3.	Marker Light	
4.	Pantograph Lower Switch with	Off - Down Protective Cover
5.	Airline Blowout Switch	Push to Blow out
6.	Coupled Indicating Light	Green
7.	Uncoupling Switch with Protective Cover	Hold to Operate
8.	Oscillating Light Switch	Off - On
9.	Defroster Switch	Off - On
10.	Snow Brake Switch	Off - On
11.	Buzzer Cutout Switch	Cutout - On
12.	Brakes Released Indicating Light	Green
13.	Brakes Applied Indicating Light	Amber
14.	Door Closed Indicating Light	Blue
15.	Fault Indicating Light	Amber
16.	Air Brake Gauge Red Pointer - Main Reservoir White Pointer - Equalizing Reservoir	
17.	Air Brake Gauge Red Pointer - Brake Cylinder White Pointer - Brake Pipe	
18.	Windshield Wiper	
19.	Windshield Wiper Control	Park-off High-how
20.	Time Table Light Switch	Off-On
21.	Indicating Lights Dimmer Control	Off-On-Low-High
22.	Headlight Switch	Bright-Off-Dim
23.	Reverser Control Handle (Removable)	
24.	Horn Control Handle	

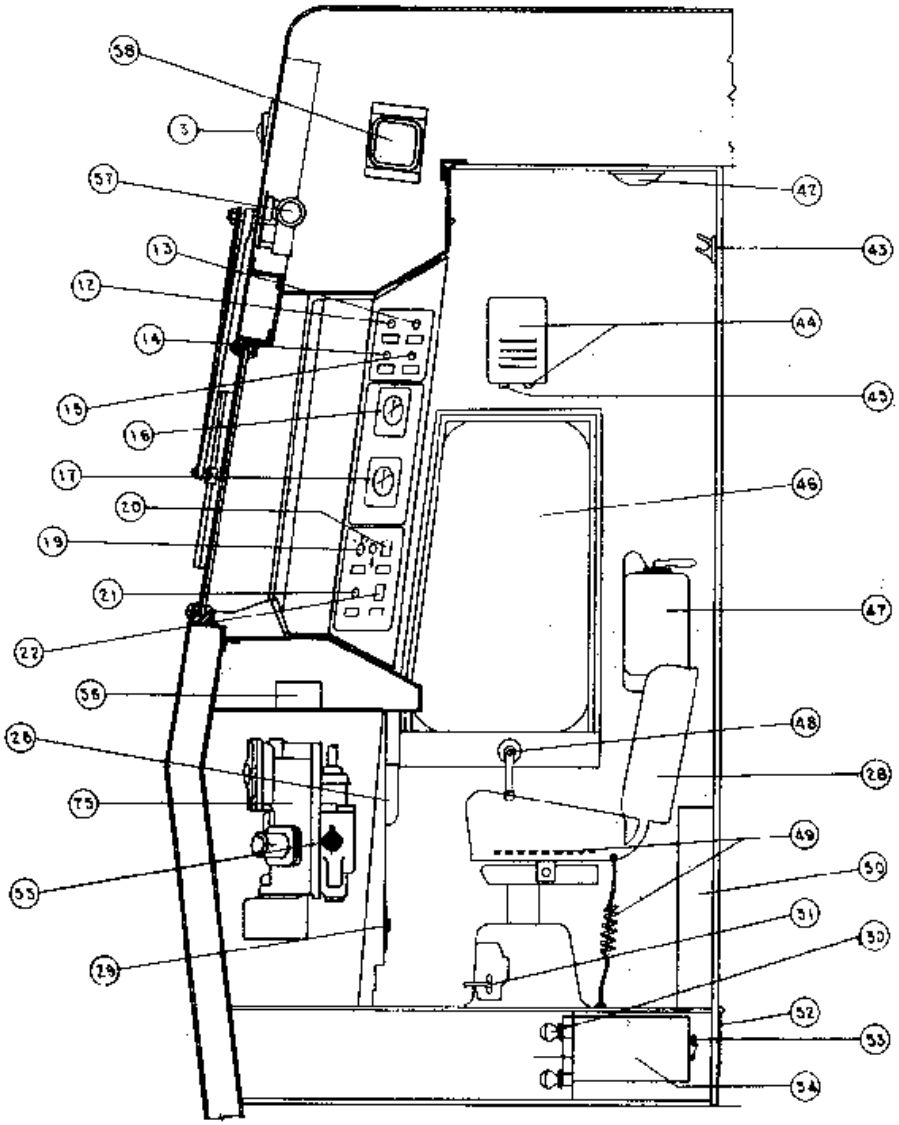


FIG. 2
CAB RIGHT SIDE

25.	26-B-1 Air Brake Valve Handle (Removable)	
26.	Ash Receptacle	
27.	Access Door to Brake Valve Cut-off Valve	
28.	Engineman's Seat	
29.	Air Brake Gauge Test Fittings, (ER, BP, BC, MR)	
30.	Cab Heaters	
31.	Speed Maintaining Control Box (W.E. cars only)	
32.	Cab Signal Acknowledging Button	
33.	Control Reset Receptacle	
34.	Speed Selector Dial	
35.	Control Plug - Control Position	
36.	Conductor's Signal Buzzer Button	
37.	Speed Indicator	
38.	Master Controller Handle	
39.	Cab Signal Indicating Panel	
40.	Sun Visor	
41.	Windshield Thermostat - on end sheet	
42.	Cab Ceiling Light,	
43.	Coat Hook	
44.	Alertor Warning Alarm & Indicator Light (Red)	
45.	Alertor Acknowledging Button	
46.	Drop Sash Window	
47.	Speed Control Switch	Rev. - Normal
48.	Drop Sash Window Crank	
49.	Alertor Antenna and Cable	
50.	Pressure Switch Panel (Ref. Fig. 19)	
51.	Engineman's Seat Position Adjuster	
52.	Access Door to Alertor Emergency override	
53.	Alertor Emergency Override	Sealed in Open Position
54.	Alertor - 65 Control Box	
55.	26-B-1 Brake Valve Cut-off Valve	cut-out cut-in

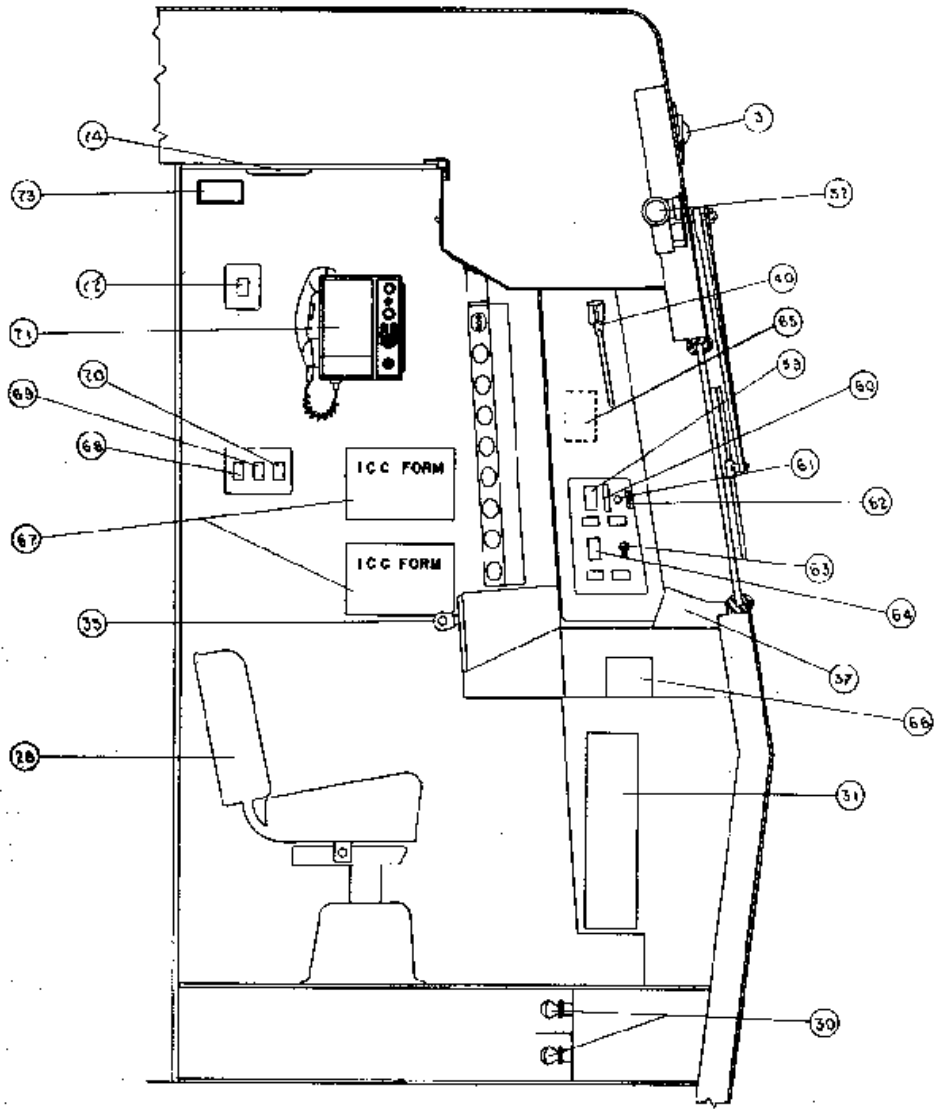


FIG. 3 CAB LEFT SIDE

56.	Cab Signal Alarm Buzzer	
57.	Windshield Wiper Motor	
58.	Conductor's Signal Buzzer	
59.	Emergency Changeover Switch with cover	Manual-Normal
60.	Dynamic Brake cutout switch Sealed Normal	Normal-Cutout
61.	Dynamic Brake Cutout Indicating Light	Red
62.	Indicating Light Shade	
63.	Door Bypass Circuit Breaker Sealed open	Open-Closed
64.	Cab Heater Switch	High-Off-Low
65.	Stop Insuring Relay	
66.	Emergency Changeover Relay	
67.	Display Cases for Blue & White Forms	
68.	Sign Light switch	off-on
69.	Cove Light Switch	off-on
70.	Cab Light Switch	off-On
71.	Train Radio & Public Address Unit	
72.	Diaphragm Actuator Switch - Shielded	Extend-Retract
73.	Car Number Plate	
74.	Cab Air Anemostat	
75.	26-B-1 Brake Valve Unit	

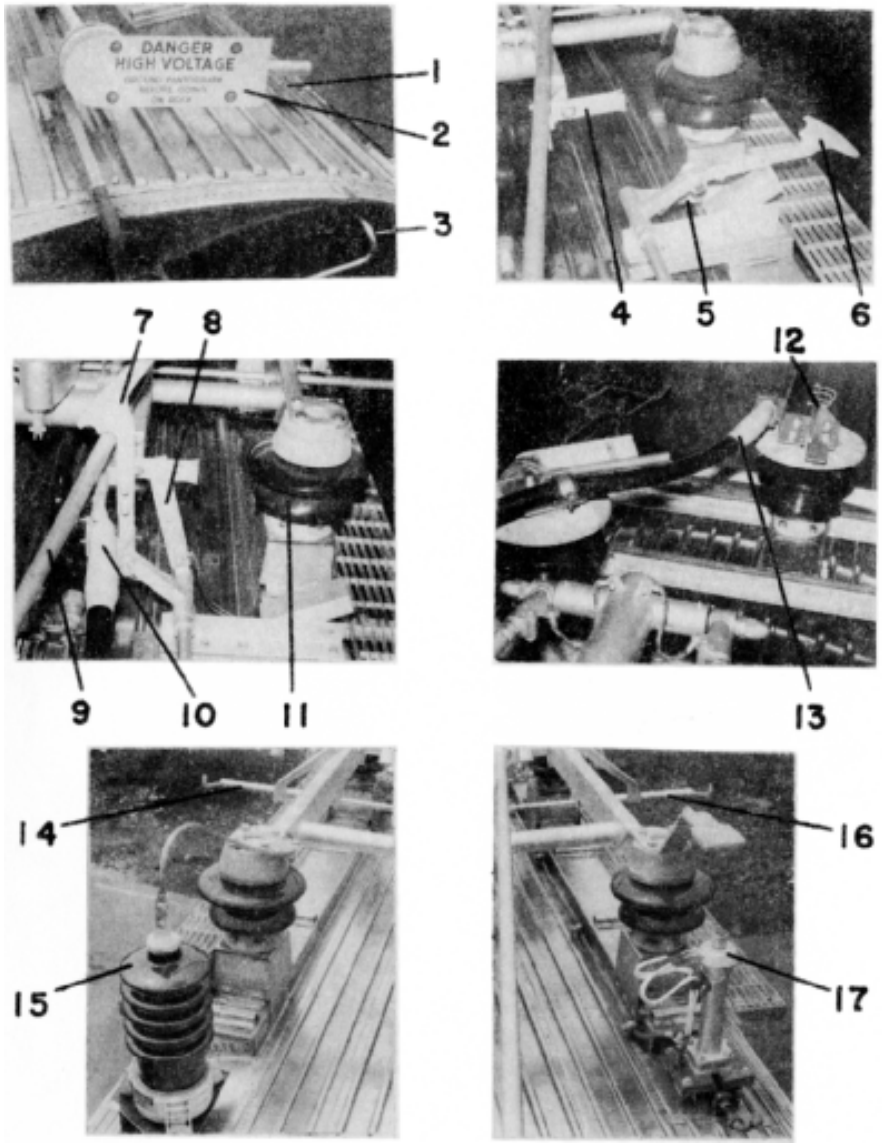


FIG. 4
PANTOGRAPH ARRANGEMENT
W. E. CO. E EQUIPPED CARS - SHOWN
G.E. CO. EQUIPPED CARS-SIMILAR COMPONENTS

FIGURE 4

PANTOGRAPH ARRANGEMENT

WESTINGHOUSE ELECTRIC CO. EQUIPPED CARS - SHOWN

GENERAL ELECTRIC CO. EQUIPPED CARS - SIMILAR COMPONENTS

1. Roof Hand Hold
2. Manual Ground Switch Handle and Obstacle Plate
3. Ladder, B-END of Car
4. Manual Ground Switch Jaw
5. Manual Ground Switch Blade - Fully Open Position
6. Manual Lockdown Hook - Fully Open Position
7. Manual Lockdown Hook - Locked Down Position
8. Manual Ground Switch Blade - Grounded Position
9. Pantograph Tube Assembly
10. High Voltage Bus Jumper Extension Connection
11. Insulator
12. Bus Jumper Connection to Adjacent Car
13. High Voltage Bus Jumper Extension Connection
14. Mechanical Unlock Lever - Cab Side
15. Lighting Arrestor
16. Mechanical unlock Lever - Non-cab Side
17. Pneumatic Ground Switch

NOTES

SECTION I - PANTOGRAPH EQUIPMENT ARRANGEMENT & OPERATION

A. GENERAL INFORMATION

The pantograph is designed for high speed operation. It is insulated and mounted on roof at 'B' end of each car. Maximum height is 25'6" above running rail.

Pantograph is raised by spring tension when a lockdown latch is pneumatically operated and lowered by linkage arrangement controlled by an air cylinder.

Pantographs adjacent to each other at the 'B' ends on a pair of coupled cars, have a high voltage (11,000 V. 25 cycle) bus jumper cable connected to each pantograph for a positive power source from the opposite car in the event of pantograph bounce (12) Fig. 4.

Other components are:

- Lighting Arrestor (15) Fig. 4
- Pneumatic Ground Switch (17) Fig. 4
- Manual Ground Switch (5-8) Fig. 4
- Manual Lockdown Hook (6-7) Fig. 4
- Current Transformer
- Insulators (11) Fig. 4

Westinghouse Electric Corp. equipped cars have the Stemmann pantograph. General Electric Company equipped cars have the Faiveley pantograph.

CAUTION; REFER TO PENNSYLVANIA RAILROAD's C.T. #290 ELECTRICAL OPERATING INSTRUCTIONS, WHEN DOING ANY WORK ON ELECTRICAL EQUIPMENT.

B. MANUAL GROUND SWITCH AND LOCKDOWN DEVICE

When it is necessary to keep pantograph down in the event of damage to pantograph or high voltage equipment, each pantograph on a pair of cars should be manually locked down and grounded. The Manual Ground Switch Handle (2) Fig. 4 is accessible from each 'B' end car ladder (3) Fig. 4. For further instructions refer to C.T. 290 Electrical Operating Instructions.

A danger warning plate, located between the third and fourth ladder rungs, on 'B' End Frame, reads;

D A N G E R
11,000 VOLTS ROOF BUS CONNECTOR

BEFORE WORKING ON ROOF OR POWER CIRCUITS, B0TH PANTOGRAPHS OF ADJACENT CARS MUST BE LOWERED & GROUNDED

The Manual Ground Switch Handle when open presents an obstruction to anyone trying to get on the roof of the car. The obstacle plate reads:- "DANGER - HIGH VOLTAGE, GROUND PANTOGRAPH BEFORE GOING ON ROOF."

Another warning' sign on roof gutter reads:- "DANGER - DO NOT TOUCH - 11,000 VOLTS ROOF BUS."

Turn each handle (2) Fig. 4 in a counter clockwise direction to manually lock down and ground each pantograph

C. MECHANICAL UNLATCH MECHANISM

A fiberglass pantograph pole and carrier are located under side sill towards 'B' end of car (63) Fig. 22, GE (65) Fig. 23. It is used to manipulate pantograph during an emergency situation.

Pantograph may be raised by means of engaging pole to mechanical unlock lever (14-16) Fig. 4 on either side of car. Pulling downward on lever will unlock mechanism. Pantograph will rise under spring tension.

To lower pantograph with pole, hook pole to end brace, and pull down to engage lock mechanism.

WARNING: Pole must not be handled between red band and hook when hook is in contact with high voltage equipment.

D. PANTOGRAPH HAND PUMP

Pantograph hand pump (26) Fig. 22, GE (60) Fig. 23, will unlock and raise pantograph on car when there is no air pressure available.

To operate, turn pantograph three-way valve (24) Fig. 22, GE (57) Fig. 23, in clockwise direction. Operate hand pump handle up and down until air pressure unlocks latch.

NOTE: - Three-way valve- must be turned counter clockwise direction for electric pneumatic operation.

E. PANTOGRAPH SWITCH OPERATION IN ELECTRIC LOCKER

Pantograph Switch (3) Fig. 13 should normally be in TRAINLINE position.

Pantograph may be lowered and remain locked down on a local car only, by placing switch to DOWN position.

F. PANTOGRAPH SWITCH OPERATION IN CAB

To raise pantographs on all cars in train consist:

a. Insert control. plug (35) Fig. to CONTROL position.

b. Press and hold pantograph Raise Push Botton (2) Fig. 1 until all pantographs are against the catenary.

To lower pantographs on all cars in train consist:Lift up protective cover and place Pantograph Lower Switch (4) Fig. 1 to DOWN position.

NOTE: Control Plug (35) Fig. 1 need not be inserted in control position to lower pantographs.

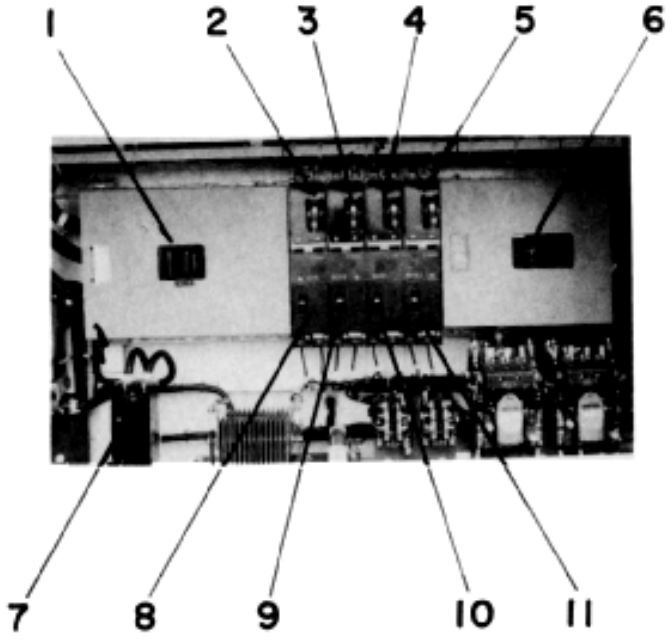


FIG. 5

W.E. CO. EQUIPPED CAR AUXILIARY CONTROL BOX

1.	"TFB"	Transformer Main Auxiliary Breaker	OFF-ON
2.	"FHB1"	Floor Heat Breaker	OFF-ON
3.	"FHB2"	Floor Heat Breaker	OFF-ON
4.	"EHB1"	Overhead Heat Breaker	OFF-ON
5.	"EHB2"	Overhead Heat Breaker	OFF-ON
6.	"DCB"	D.C. Motor Breaker for Motor Alternator	OFF-ON
7.	"LRB"	IN-LINE Regulator Breaker	OFF-ON
8.		Spare Breaker	
9.	"DCFB"	Motor Alternator, D.C. Field Breaker	OFF-ON
10.	"CHB"	Cab Heat Breaker	OFF-ON
11.	"WHB1"	Water Heater Breaker	OFF-ON

SECTION II - AUXILIARY EQUIPMENT OPERATION – Westinghouse ELECTRIC CO. EQUIPPED CARS

A. GENERAL INFORMATION

Auxiliary Control Box (67) Fig. 22, located in the underfloor equipment group, houses all auxiliary control circuit breakers. They receive power direct from a separate secondary tap on the Transformer (64) Fig. 22.

All auxiliary circuits are protected by Transformer Main Auxiliary Breaker "TFB" (1) Fig. 5.

B. MOTOR ALTERNATOR SET

The Motor Alternator Set (69) Fig. 22 must operate at all times when car is on catenary voltage. The following breakers supply current to the motor portion of the alternator:

Transformer Auxiliary Breaker "TFB" (1) Fig. 5. ON

DC Motor Breaker for Alternator "DCB" (6) Fig. 5 ON

Motor Alternator DC Field Breaker "DCFB" (9) Fig. 5. ON

The alternator output of 220 V AC, 60 cycles, 3 phase, feeds auxiliaries through Motor Alternator Breaker "ALB" (1) Fig. 8, which must be in the ON position.. The auxiliaries are sequentially started through timedelayy relays.

C. AUXILIARIES SUPPLIED BY ALTERNATOR

Auxiliaries supplied by alternator output of 220 V AC are protected by circuit breakers as designated:

1. Blower Motor (Equipment) Breaker "BMB1"(7) Fig. 7 ON

2. Blower Motor (Traction) Breaker "BMB2" and "M3" (8-9) Fig. 7. ON

3. Transformer Pump & Fan Motor Breaker "PMB" (1) Fig. 7. ON

4. Coupler Control Box Heater Breaker "CCB" (11) Fig. 7. ON (when required)

5. Battery Charging Input Breaker "BCB1" (10) Fig. 7 ON

6. Battery Charging Output Breaker "BCB2" (12)Fig. 7 ON

7. In Line Regulator Breaker "LRB" (7) Fig. 5 ON

8. Battery Trainline Breaker "BTB" (6) Fig. 7 ON

9. Air Compressor Breaker "Ace (4) Fig. 7 ON

10. Fluorescent Light Breaker "FIB" (3) Fig. 7 ON

11. Water Cooler Breaker "WCB" (5) Fig. 7 ON

12. AC-115V Breaker "AC1B" (2) Fig. 7 ON

D. AUXILIARIES SUPPLIED BY TRANSFORMER SECONDARY 440V AC

Auxiliaries supplied by transformer secondary winding are protected by the following circuit breakers:

1. Floor Heat Breaker "FHB1" (2) Fig. 5 ON

2. Floor Heat Breaker "FHB2" (3) Fig. 5 ON

3. Overhead Heat Breaker "EHB1" (4) Fig. 5 ON

4. Overhead Heat Breaker "EHB2" (5) Fig. 5 ON

5. Cab Heater Breaker "CHB" (10) Fig. 5 ON

6. Water Heater Breaker "WHB1-2" (11) Fig. 5 ON

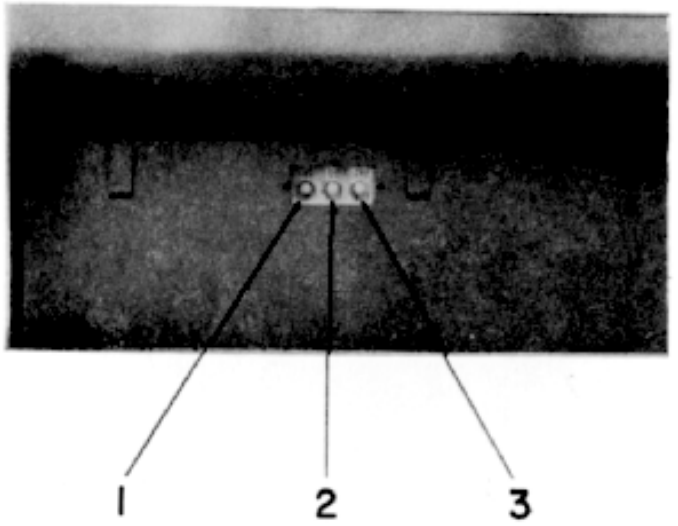


FIG: 6

W.E. CO.. EQUIPPED CAR

FAULT INDICATION LIGHTS

1. "GND" Ground Fault Imdicating Lights

2. "OL" Overload Fault Indicating Light

3. "TRF HOT" Hot, Transformer Indicating Light.

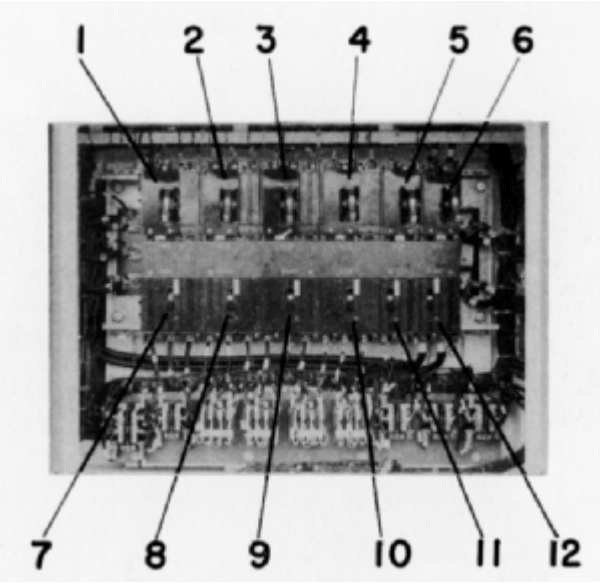


FIG. 7

W.E. CO.. EQUIPPED CAR AUXILIARY CONTROL BOX

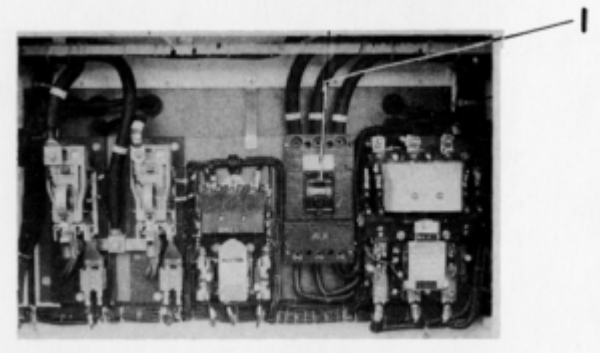


FIG. 8

W.E. CO.. EQUIPPED CAR AUXILIARY CONTROL BOX

FIGURE 7

WESTINGHOUSE ELECTRIC CO. EQUIPPED CARS

AUXILIARY CONTROL BOX

1.	“PMB” Transformer Pump & Fan Motor Breaker	OFF-ON
2.	"AClB" AC-115V Breaker	OFF-ON
3.	"FIB" Fluorescent. Light Breaker	OFF-ON
4.	"ACB" Air Compressor Breaker	OFF-ON
5.	"WCB" Water Cooler Breaker	OFF-ON
6.	"BTB" Battery Tramline Breaker	OFF-ON
7.	"BMB1" Blower Motor (Equipment) Breaker	OFF-ON
8.	"BMB2 Blower Motor (Traction) Breaker	OFF-ON
9.	"BMB3" Blower Motor (Traction) Breaker	OFF-ON
10.	"BCBl" Battery Charging Input Breaker	OFF-ON
11.	"CCB" Coupler Control Box Heater Breaker	OFF-ON
12.	"BCB2" Battery Charging Output Breaker	OFF-ON

FIGURE 8

WESTINGHOUSE ELECTRIC CO. EQUIPPED CALLS

AUXILIARY CONTROL BOX

1.	"ALB" Motor Alternator Breaker	OFF-ON

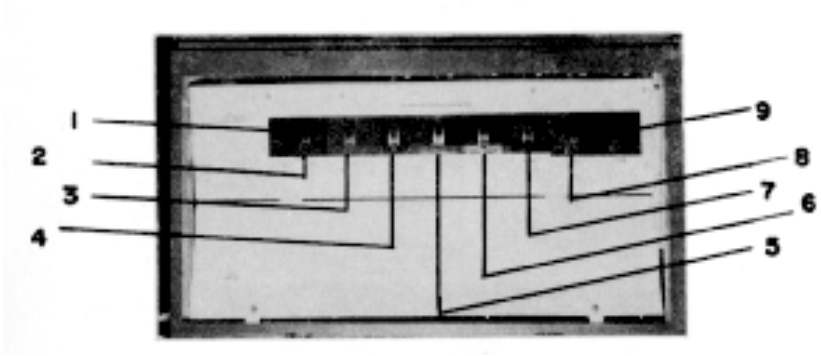


FIG. 9
G.E CO. EQUIPPED CARS

MAIN CONTROL GROUP BOX

FIG. 10
W.E. CO. EQUIPPED CARS

MAIN CONTROL GROUP BOX

FIGURE 9
GENERAL ELECTRIC CO. EQUIPPED CARS
MAIN CONTROL GROUP

1.	"RB"	Rectifier Breaker	OFF-ON
2.	"MCB"	Traction Control Breaker	OFF-ON
3.	"AM"	Air Compressor Breaker	OFF-ON
4.	"RTB"	Rectifier Transformer Breaker	OFF-ON
5.	"OTB"	Outlet Transformer Breaker for 110 V. AC	OFF-ON
6.	"FLB"	Fluorescent Light Breaker	OFF-ON
7.	"GABl"	Galley Breaker	OFF-On
8.	"BMB"	Blower Motor Breaker	OFF-ON
9.	"ACAB"	Air Conditioning Alternator Breaker	OFF-ON

FIGURE 10
GENERAL ELECTRIC CO. EQUIPPED CARS
MAIN CONTROL GROUP

1.	"GABS"	Galley Breaker	OFF-ON
2.	"MAB"	Motor Alternator Breaker	OFF-ON
3.	"FHB1"	Floor Heater Breaker	OFF-ON
4.	"FHB2"	Floor Heater Breaker	OFF-ON
5.	"OHB1"	Overhead Heater Baker	OFF-ON
6.	"OHB2"	Overhead Heater Breaker	OFF-ON
7.	"CHWB"	Cab Heater Breaker	OFF-ON
8.	"GAB2"	Galley Breaker	OFF-ON
9.	"PPB"	Pyranol Pump Breaker	OFF-ON
10.	"mil	Water Heater Breaker	OFF-ON
11.		Ammeter Jack	
12.	"HR"	Transformer Thermal Overload Relay	Push Button to reset
13.	" PLR"	Pantograph Lowering Relay	Manual reset
14.	"GR"	Ground Relay	Push Button to reset

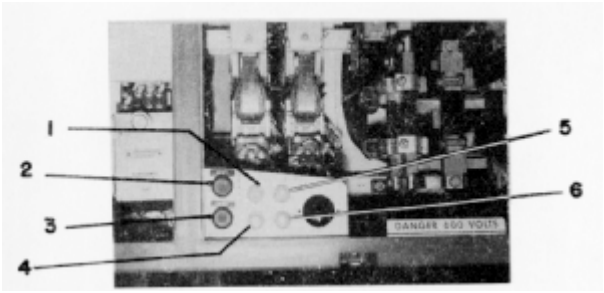


FIG . 11

G.E. CO. EQUIPPED CARS
MAIN CONTROL GROUP BOX
INDICATING LIGHTS & RESET

1. Ground Light
2. Hot Transformer Reset
3. Overload Reset
4. Auxiliary Ground Relay Light
5. Overheated Transformer Light
6. Overload Light

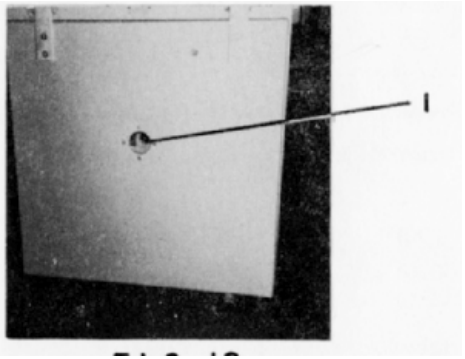


FIG.12
G.E. COM EQUIPPED CARS
SPEED MAINTAINING GROUP BOX
ATD INDICATING LIGHT

1. ATO (Automatic Train Operation) Light

SECTION IIA - AUXILIARY EQUIPMENT OPERATION
- GENERAL ELECTRIC CO. EQUIPPED CARS

A. GENERAL INFORMATION

Auxiliary control circuit breakers are located in the underfloor equipment Main Control Group Box (27) Fig. 23. They receive power direct from Transformer (24) Fig. 23 Auxiliary 4 4 8 Volts, single phase, 25 cycle, AC windings. B.

B. MOTOR ALTERNATOR SET

The motor Alternator Set (5 5) Fig. 23 must operate at all times when car is on catenary voltage.

Motor Alternator Breaker "MAB" (2) Fig. 10 in the ON position supplies transformer current to the motor side of the alternator. The alternator supplies 220 volt, 3 phase, 60 cycle power for a group of auxiliaries.

C. AUXILIARIES SUPPLIED BY ALTERNATOR

The following group of underfloor equipment blower motors are supplied by the Alternator output of 220 V AC and are protected by "BMB" Blower Motor Breaker (8) Fig. 9.

1. Transformer Blower No. 1 & No. 2 (24) Fig. 23:
2. Traction Motor Blower (69).Fig. 23.
3. Dynamic Braking Resistor Blower (17) Fig. 23.

Another group of auxiliaries supplied by the Alternator output are protected by "ACAS" Air Conditioning Alternator Breaker (9) Fig. 9.

This group includes all car body exhaust fans and air conditioning equipment motors. Each motor is protected by separate circuit breakers and/or fusses. Current for Air Brake Compressor Motor (15) Fig. 23 is supplied through the "ACAS" breaker and is protected by "ACS" Air Compressor Breaker (3) Fig. 9.

These auxiliaries are sequentially started delay relays.

In addition, the following auxiliaries are protected by circuit breakers. Refer to Figure 9 .

"GAB1"	Galley Breaker (7)	ON
"FLB"	Fluorescent Light Breaker (6)	ON
"OTB"	Outlet Transformer for 110 V.AC (5)	ON
"RIB"	Rectifier Transformer Breaker for DC output (4)	ON
"RB"	Rectifier Breaker (1)	ON
"MCB"	Traction Control Breaker (2)	ON

D. AUXILIARIES SUPPLIED BY TRANSFORMER SECONDARY

Auxiliaries supplied by transformer secondary 448 V AC are protected by the following circuit breakers. Refer to Figure 10.

"M11	Pyranol Pump Breaker (9)	ON
"GAB2"	Galley Breaker (8)	ON
"GAB3"	Galley Breaker (1)	ON
"FHB1"	Floor Heat Breaker (3)	ON
"FHB2"	Floor Heat Breaker (4)	ON
"OHB1"	Overhead Heat Breaker (5)	ON
"OHB2"	Overhead Heat Breaker (6)	ON
"CBWB"	Cab Heat Breaker (7)	ON
"WHB"	Water Heater Breaker (10)	ON

SECTION III - ELECTRIC LOCKER EQUIPMENT

A. GENERAL INFORMATION

The electric locker circuit breaker and switch panel have name plates indicating their respective circuits. Refer to Figure 13.

B. NORMAL POSITION OF CIRCUIT BREAKER AND SWITCHES EACH CAR

1.	110 V. Supply - Circuit Breaker	ON
2.	Heat and Air Conditioning Circuit Breaker	ON
3.	Pantograph Switch	TRAINLINE
4.	Cove Light Circuit Breaker (Lower Row, Both Sides)	ON
5.	Cove Light. Circuit Breaker (Upper Left side)	ON
6.	Cove Light Circuit Breaker (Upper Right Side)	ON
7.	Headlight Circuit Breaker	ON
8.	Back-up and Marker Light Circuit Breaker	ON
9.	Car Number Sign, Windshield Wiper and Gauge Light Circuit Breaker	ON
10.	Door Operator Circuit Breaker	ON
11.	Defroster, Windshield. and Threshold Heater Circuit Breaker, as required.	ON
12.	Air Compressor Control Circuit' Breaker	ON
13.	Illuminating Signs Circuit Breaker (No Smoking, Exit & Entrance Signs)	ON
14.	Communication System Circuit Breaker (P.A.)	ON
15.	Cab Signal System Circuit Breaker'	ON
16.	Dynamic Brake OUT Red Pilot Light	
17.	Dynamic Brake Switch	IN
18.	Battery Disconnect Circuit Breaker	ON
19.	Traction Control Circuit Breaker	ON
20.	Traction Motor Cutout Switch	ALL IN
21.	Aisle and Reading Lights Circuit Breaker	ON
22.	Aisle and Reading Lights Circuit Breaker	ON

23.	Aisle and Reading Light Circuit Breaker	ON
24.	Oscillating Headlight Circuit Breaker	ON
25.	Vestibule & Cab Light Circuit Breaker (Vestibule, Cab Ceiling & Electric Locker)	ON
26.	Emergency Light Circuit Breaker	ON
27.	Door Control & Signal System Circuit Breaker	ON
28.	Drain Anti-Freeze Circuit Breaker (Air Reservoir, Lavatory, Water Cooler, Air Compressor & Air Filters) as required.	ON
29.	Toilet and Low Ceiling Area Circuit Breaker (Toilet, Low Ceiling, Hopper Flush and Receptacles)	ON
30.	Alertor Circuit Breaker (Alertor and Speed Recorder)	ON
31.	Console Light Circuit Breaker (Cab Console & Timetable Lights)	ON
32.	Door Control Trainline Cutout Toggle Switch Non-Cab Side (For Deadheading)	ON
33.	Door Control Trainline Cutout Toggle Switch Cab Side (For Deadheading)	ON
34.	Test Jack for Transformer Primary Current	
35.	Ammeter Jack for Dynamic Brake Current	
36.	Ammeter Jack for Traction Motor Current	

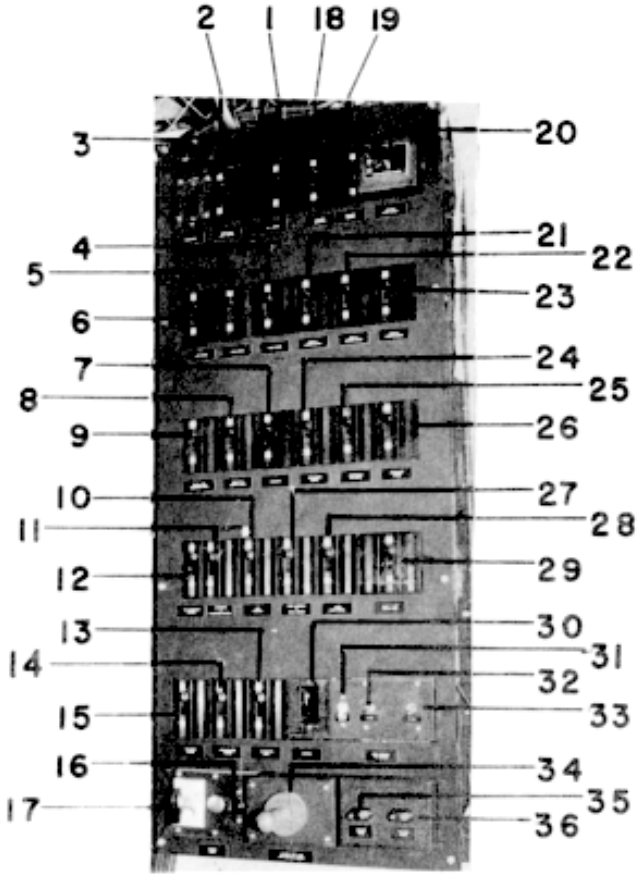


FIG. FIG. 13

ELECTRIC LOCKER
CIRCUIT B R E A K E R
S W I T C H P A N E L

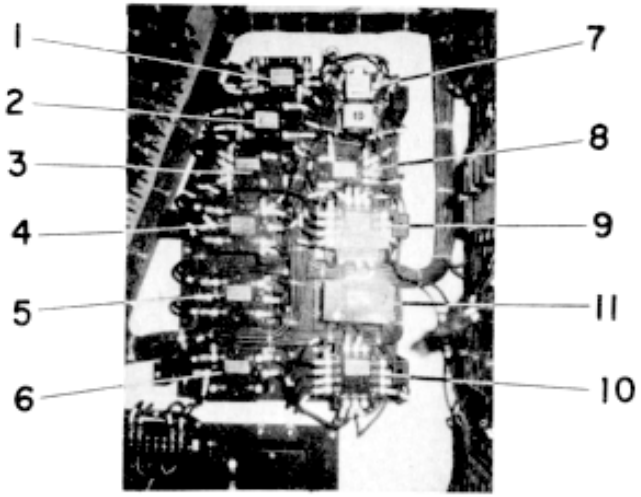


FIG. 14

RELAY PANEL, (COVER REMOVED IN ELECTRIC LOCKER

1. Wheel Slide K/O Relay
2. Zero Speed Relay
3. Cove Light Trainline Relay
4. Headlight Bright Relay
5. Headlight Dim Relay
6. Oscillating Light Relay
7. Threshold Heater Relay
8. Signs Trainline Relay
9. Plug Switch No. 1 Relay
10. Plug Switch No. 2 Relay
11. Power Interlock Relay

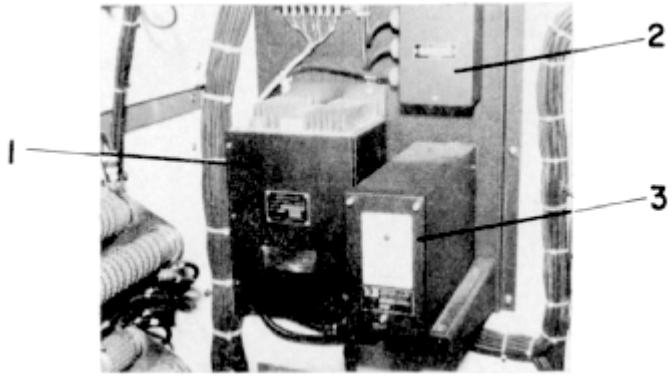


FIG. 15

SPEED LOG

1. Speed-Log Control Box
2. Sensor Isolation Transformer
3. Speed Recorder with 15,000 Mile Capacity Tape

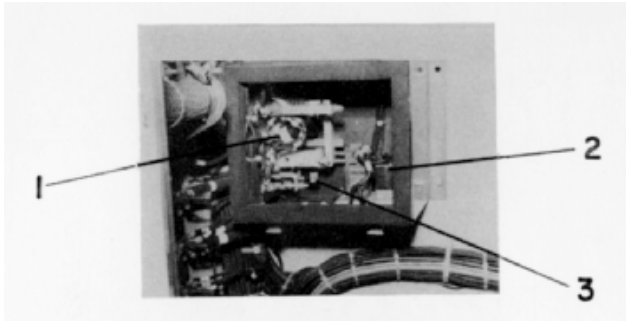


FIG: 16
PANTOGRAPH LOWERING RELAY
W.E. CO.. EQUIPPED CAR

1. Pantograph Lowering R e l a y
2. Thermal Relay
3. Reset Relay — Manual Reset

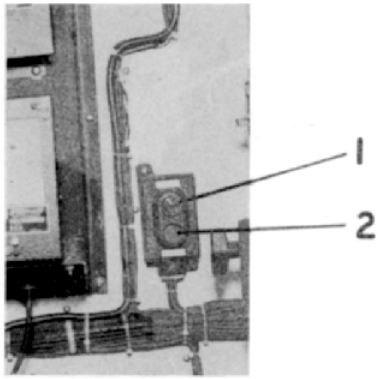


FIG. 17
AIR BRAKE FAULT LIGHT
AND RESET BUTTON

1. Air Brake Fault Light (Red)
2. Reset Push Button — Push to Reset

SECTION IV - SETTING UP OPERATING CAB

A. SWITCH AND CIRCUIT BREAKER POSITIONS

Before setting up the controls, cab switches and circuit breakers should be checked and positioned as required:

1.	Cab Light Switch (70) Fig. 3	ON or OFF
2.	Cove Light Switch (69) Fig. 3	ON or OFF
3.	Sign Light switch (68) Fig. 3	ON or OFF
4.	Cab Heater Switch (64) Fig. 3	HIGH-OFF-LOW
5.	Speed Control Switch (47) Fig. 2	NORMAL
6.	Emergency Changeover Switch (59) Fig. 3 (each car)	NORMAL
7.	Dynamic Brake cutout switch (60) Fig. 3 (each car)	SEALED IN NORMAL
8.	Door Bypass Circuit Breaker (63) Fig. 3	SEALED OPEN
9.	Oscillating Light Switch (8) Fig. 1	ON or OFF
10.	Snow Brake Switch (30) Fig. 1	ON or OFF
11.	Buzzer Cutout Switch (11) Fig. 1	ON
12.	Fault Indicating Amber Light (15) Fig. 1	OUT
13.	Headlight Switch (22) Fig. 1	BRIGHT-OFF-DIM
14.	Door Close Indicating "Blue" Light	DOORS OPEN-OFF DOORS CLOSED-ON
15.	Cab Signal System Circuit Breaker	ON

B. INSTALLATION OF CONTROL HANDLES

1. Open access door (27) Fig. 1. Position 26-B-1 brake valve Cut-Off valve (55) Fig. 2 to Cut-In position, pointed upward (handle down).
2. Insert control plug (35) Fig. 1 to CONTROL position.
3. Insert Reverser Handle (23) Fig. 1 in NEUTRAL Position

NOTE:- Master Controller Handle (38) Fig. 1 must be in Emergency quadrant position (GE cars in OFF quadrant position).

4. Insert 26-B-1 Brake Valve Handle (25) Fig. 1 in handle OFF, move to EMERGENCY, insert fully, then move handle to SUPPRESSION position, until brake pipe pressure gauge (17) Fig. 1 reads 40 PSI or-bore.

The brake valve handle operates through the following:

Release Position
Minimum Reduction Position
Service Position
Suppression Position
Handle-Off Position
Emergency Position

5. Acknowledge, then place brake valve handle in full release position. Check air brake gauge readings:

M.R.	125	to	140 PSI (16)	Fig. 1
E.R.			110 PSI (16	Fig. 1
B.P.			110 PSI (17)	Fig. 1
B.C.	80	to	90 PSI (17)	Fig. 1

This is due to the fact that master controller handle is in EMERGENCY (GE in OFF) position.

Air Compressor control unit (38) Fig. 22, GE (25) Fig. 23, cuts out Air Compressor at 140 PSI main reservoir pressure and cuts in at 130 PSI.

SECTION V - MASTER CONTROLLER HANDLE OPERATION, IN SPEED MAINTAINING QUADRANT POSITION

A. GENERAL INFORMATION

The speed maintaining feature of Master Controller is in the movement of Master Controller Handle (38) Fig. 1, between ZERO and 160 MPH range as shown on Speed Selector dial (34) Fig. 1.

The Master Controller Handle setting produces a propulsion or braking signal that is modulated by a speed maintaining feature. The signal will sense any error between setting and train speed. In other words, the signal modulation will produce a speed proportional to master controller handle setting regardless of load, wind or grade within a 2 to 3 MPH error.

B. OPERATION OF MASTER CONTROLLER HANDLE FOR PROPULSION

1. Move Reverser Control Handle (23) Fig. 1 to FORWARD or REVERSE as desired.

2. Move master controller handle to ZERO quadrant position. Brake cylinder pressure will be at service brake pressure to hold train.

3. For yard movement, move master controller handle forward between ZERO and 20 MPH dial setting.

   The acceleration rate will be low enough to allow ease of control for yard switching and train make-up operation. This position has an initial low acceleration rate

   Any handle movement above 20 MPH dial setting provides full acceleration rate

   NOTE: Changing train directional movement requires that train be stopped. Then position master controller handle to EMERGENCY (GE cars to OFF), then move the reverser handle to position of intended direction.

4. Train will automatically accelerate or brake to selected speed as indicated on dial. No further action is required to hold. train at selected. speed. To increase train speed, move handle forward to selected higher MPH setting. To reduce train speed, move handle back to select a lower MPH

N O T E S

SECTION VI - OPERATION OF ELECTRO-PNEUMATIC, DYNAMIC AND PNEUMATIC BRAKING SYSTEM

A. GENERAL INFORMATION

The braking system is basically an analog controlled electro-pneumatic system in coordination with dynamic brake system, set up by Master Controller Handle (38) Fig. 1 operation.

Dynamic braking is an electrical arrangement used to change some of the mechanical power developed by the momentum of a moving train into electrical power by the action of changing traction motors into generators. Since it takes power to rotate a generator, this action retards the speed of the train.

The dynamic is effective from maximum speed to approximately 30 MPH fade point, with air supplement automatically blended as required to maintain selected rate of deceleration. An initial inshot of air is admitted to the brake cylinders when dynamic brakes are in operation, to bring brake shoes in contact with wheel tread and to assist in synchronizing and blending of the air with dynamic brakes when dynamic fades out.

When a brake rate is selected beyond the capability of dynamic brake, the dynamic will be automatically supplemented by electro-pneumatic air brake system. In the event of partial or complete dynamic brake failure of a cap, the electro-pneumatic air will be blended to produce the required rate.

A complete conventional pneumatic service and emergency brake system independent of dynamic and electro-pneumatic is controlled by 26-B-1 Brake Valve (q5) Fig. 2, responding to manual movement of Brake Valve Handle (25) Fig. 1. When using the pneumatic brake system, the dynamic brake system is nullified.

A brake pipe emergency application can be initiated by positioning the 26-B-1 brake valve handle in emergency position regardless of the master controller handle position.

B. SETTING UP AIR BRAKE SYSTEM AND INITIAL CHARGING OF BRAKE PIPE

1. UNDERFLOOR EQUIPMENT

The following is normal position of associated air brake cocks for each car in train consist:

a. G-3 Pneumatic Operating Unit Selector cook (34) Fig. 22, GE (50) Fig. 23, IN position (toward outside of

b. Brake Cylinder Vented Cutout Cock (12 & 32) Fig. 22, GE (13 & 32) Fig. 23, OPEN position (handle downward,

c. Main Reservoir Cutout Cocks (31) Fig. 22, GE (33) Fig. 23, OPEN position (crosswise of piping).

d. Brake Pipe Shutoff Cock (44) Fig. 22, GE (42) Fig. 23, and Main Reservoir Shutoff Cock (45) Fig. 22, GE (41) Fig. 23, at "B" end of car in OPEN position.

e. Air Compressor Motor Breaker "ACB" (4) Fig. 7, GE (3) Fig. 9, ON position. Ref. Section II and IIA on Auxiliary Equipment operation.

2. ELECTRIC-LOCKER (each car)

Refer to Section III ELECTRIC LOCKER EQUIPMENT for position of circuit breakers and switches associated with the brake system.

3. OPERATING CAB

Refer to Section IV SETTING UP OPERATING CAB

C. AIR BRAKE SYSTEM TESTS

la. Initial terminal tests of both the electric-pneumatic and the pneumatic brake systems, must be *made* in accordance with the Rules and Regulations as outlined by the Pennsylvania Railroad.

lb. Running tests will be mode Is! accordance with procedure outlined by the Pennsylvania Railroad.

2. Brake Signal Indicating System

Brake signal indicating system is provided in operating cab which gives engineman an indication that all brakes in the train consist are applied or released.

The "Brake Applied" Indicating Amber Light (13) Fig. 1, is illuminated when ALL brakes are applied in train consist. The "Brake Released" Indicating Green Light (12) Fig. 1 is illuminated when All brakes are released.

If brake on one or more trucks fail to apply or release, indicating light will. not light.

NOTE: Indicating lights have a PRESS-TO-TEST safety feature for testing lamps. If the lamp fails to light when pressed in, it is defective and must be reported for replacement.

In order to make a rapid determination. of a car with faulty brake operation, each car is equipped with outside brake signal indicating lights. These-are located, on each side of 'B' ends of each car, below the car number sign.

"Brake Applied" indicating amber light (2) Fig. 20 is illuminated when braises are applied. "Brake Released" indicating green light (1) Fig. 20 is illuminated when brakes are released on the individual: car.

D. SNOW BRAKE

1. GENERAL INFORMATION

A "Snow Brake" switch is provided on each car which, when ON, will maintain a 6 to 8 PSI brake cylinder pressure for the purpose of holding the brake slice against the wheel tread. This brake cylinder pressure may be observed on the gage (17) Fig. 1.

E. AIR BRAKE FAULT LIGHT AND

1. GENERAL INFORMATION

The Air Brake Fault "Red" Indicating Light (1) Fig. 17, located in each electric locker, when illuminated indicates a fault in the eletrtr0uio circuit of the A-1-A Electric Operating Unit (36) Fig 22, GN (51) Fig. 23, which renders the elects-pneumatic brakes inoperative on that car.

Push "Reset Push Button" (2) Fig. 17 to reset A-1-A electric operating unit. 'It wait resets "Red" indicating light will go cut.

If the Battery Disconnect Circuit Breaker (18) Fig. 13 is tripped or in OFF position, when reset or placed to ON position, the air brake fault "Red" indicating light will be illuminated. In order to energize A-1-A Electronic Operating Chit, push reset button (2) Fig. 17.

F. NORMAL OPERATION OF BRAKING EQUIPMENT WITH MASTER CONTROLLER HANDLE

1. SPEED MAINTAINING QUADRANT POSITION

All normal operations are accomplished with 26-B-1 brake valve handle (25) Fig. 1, in full release position. Air brake pressure gage readings should be- as follows:

Main Reservoir Air Pressure -	125 to 140 PSI
Equalising Reservoir Air Pressure -	110 PSI
Brake Pipe Pressure -	110 PSI

With the Master Controller Handle (38) Fig. 1 in any position within the Speed Maintaining Zone, the Speed Maintaining Circuit will sense any error between master controller handle speed setting, as indicated an Speed Selector, (34) Fig. 1 and actual train speed. A brake application (F.lectro-Pneumatic and Dynamic) will aatomatically be applied if train speed is higher them requested speed.

2. ZERO QUADRANT POSITION

To make a normal train stop, move the master controller handle back to ZERO position (for zero MPH train speed). The brake agstem will provide a medium service brake application (Eleetro-Pneumatic and Dynamic).

To release brakes and proceed, move Master Controller Handle forward direction to Speed Maintaining Zone. When brake cylinder pressure drops below 25 PEI, traction power will be initiated.

3. SUB-ZERO QUADANT POSITION

Movement; of Master Controller Handle back to SUB-ZERO position will provide the maximum service brake application (Electro-Pneumatic and Dynamic) thus decelerating the train at a higher rate than that obtained in the ZERO position.

Zero and Sub-Zero position is also the Nester Controller Suppression position to prevent a speed control penalty application.

To release brakes and proceed, move Master Controller Handle forward to Speed Maintaining Zone. When brake cylinder pressure drops below 25 PSI traction poorer will be initiated.

NOTE: If service application is made by movement of the 26-B-1 brake valve handle (25) Fig. 1, while master controller handle (38) Fig. 1 is in Zero or sub-Zero position, dynamic brakes will be nullified. Dynamic Brake Cutout indicator "Red" Light (6l) Fig. 3, will go out.

A double check valve on the G-3 Pneumatic Operating Unit (34) Fig. 22, GE (50) Fig. 23s vhi& separates the Pneumatic and the Electro-Pneumatic system will determine which air brake application (E'lectroPneumatic or Pneumatic): will be effective, depending upon the rate and amount of control. pipe.-buildup.

Traction power will be cat off when brake cylinder pressure reaches 25 PSI.

All electro-pneumatic brake applications are made without reducing Brake Pipe Pressure. Therefore, no indications are observed on the Brake Pipe Air Gage (17) Fig. 1 white pointer. However, brake cylinder pressure is indicated an Brake Cylinder Pressure Gage (17) Fig. 1, red pointer.

4. MANUAL BRAKE QUADRANT POSITION

Movement of the neater controller handle backward to just beyond the SUB-ZOO position is the coast and/or electro-pneumatic brake release position.

NOTE DIFFERENCE:

On Westingbouse Electric Co. equipped cars this quadrant position is at the first Brake REL marking at the vertex of the red pyramid.

On General Electric Co. equipped cars this position is indicated at RL quadrant position.

It must be remembered, the master controller handle in this position releases the electro-pneumatic brakes on each car of train consist.

Movement of master controller handle beyond. the brake release zone between BRAKE and MAX. BRAKE quadrant position provides manual braking which is a self-lapping service brake zone. This gives the operator full manual control over electro-pneumatic and dynamic brake application proportional to the position of the handle.

To release brakes, move master controller handle forward to Brake Release position. When brake cylinder pressure drops below 25 PSI, traction purer circuits will be available.

NOTE: If a service application is made by movement of the 26-B-1 Brake Valve Handle (25) Fig. 1, while Master Controller Handle (38) Fig. 1, is in the manual brake quadrant position, dynamic brakes will be nullified. Dynamic Brake Cutout "Red" Indicating Light (61) Fig. 3, will go out.

A double check valve on the G-3 Pneumatic Operating Unit (34) Fig. 22, GE (50) Fig. 23, will choose the highest brake cylinder pressure between electropneumatic and automatic air system.

To release the brakes, first place 26-B-1 brake valve handle to full release position before the Master Controller Handle is set to the desired brake or power position.

5. MANUAL EMERGENCY QUADRANT POSITION

Electro-pneumatic emergency brake application is obtained by pulling Master Controller Handle full back to EMERGENCY position. Noticeable effort is required to by pass detent on the controller to get in this position.

The OFF quadrant position on General Electric Co. equipped car is also an Emergency position.

During this emergency application, propulsion and dynamic brakes are automatically locked out. Dynamic Brake Cutout "Red" Indicating Light (61) Fig. 3 will go out. Brake pipe pressure remains at 110 PSI.

G. EMERGENCY BRAKE APPLICATION PRODUCED BY REDUCTION OF BRAKE PIPE

1. 26-B-1 BRAKE VALVE

A brake pipe emergency application is initiated by positioning the 26-B-1 Brake Valve Handle (25) Fig. 1 in emergency position-to exhaust Brake Pipe air. This can be accomplished regardless of Master Controller Handle , (38) Fig. 1 position.

The emergency brake application once in effect cannot be recovered until the train speed is reduced to 2 MPH or stopped.

Once the emergency is initiated, the Master Controller Handle should be moved to SUB-ZERO position.

2. CONDUCTOR'S B-3-B EMERGENCY VALVE

Each car has conductor's B-3-B Emergency Valves located in the passenger section at each end of car.

Emergency brake application is initiated by manually pulling Red Handle (1) Fig. 21 DOWN. Dynamic brakes are nullified and "Red" Indicating Light (61) Fig. 3, will not be illuminated. Traction power is cut off when brake cylinder pressure reaches 25 PSI.

When this emergency occurs, place Master Controller Handle to SUB-ZERO position.

When train has stopped, move Brake Valve Handle to Emergency position.

Investigate cause of Conductor's Valve Emergency. Reset Conductor's B-3-B Valve by manually pushing upward.

To recover this emergency brake application after train has stopped, move 26-B-1 Brake Valve to Suppression position until 40 PSI or better Brake Pipe reading is obtained, then move to release position.

NOTE: Wheel Slip-Slide Protection end Dynamic Brake Systems are nullified. Dynamic Brake Cutout "Red" Indicating Light (61) Fig. 3 will not be illuminated.
To recover this emergency brake application after the train has stopped, move 26-B-1 brake handle to Suppression position until 40 PSI or more is obtained on brake pipe gage, then to release position.

3. ALERTOR (CONTROL) SYSTEM

Refer to Section VII ALERTOR (DEAD MAN CONTROL) SYSTEM.

H. EMERGENCY BRAKE STOP INSURING SYSTEM

1. GENERAL INFORMATION

The Stop Insuring System requires train speed to be zero or approximately 2 MPH after a brake pipe initiated emergency brake application before engineman can recharge brake pipe to release brakes.

The following emergency brake applications are included in this group:

Brake Valve Emergency
Alertor (Dead Man) Emergency
Conductor's B-3-B Emergency
Train Control Overspeed Emergency
Break-in-two (train parting) Emergency

2. STOP INSURING CIRCUITY

The stop insuring circuity is associated with cab Signal Control Equipment Box (83) Fig. 22, GE (23) Fig. 23; Speed Governor Control Box (74) Fig. 22, GE (22) Fig 23; Stop Insuring Pressure Switches (1-3) Fig. 19; Stop Insuring Relay (65) Fig. 3; and FA-4 Magnet Valve (1) Fig. 18.

I. WHEEL SLIP-SLIDE PROTECTION SYSTEM

l. GENERAL INFORMATION

Wheel Slip-Slide system detects wheel slip and slide. This is accomplished by comparing axle RPM on each truck.

2. PROTECTION DURING ACCELERATION AND BRAKING

When a slip occurs during acceleration, traction motor power is partially reduced on car with the slip. After condition is corrected, traction power is slowly reapplied. This control is independent of the engineman.

When a slip occurs during deceleration and car is in Dynamic braking, braking effort will be reduced sufficiently to stop sliding condition. If air brake supplementation is in effect, the brake cylinder pressure will be released on the truck on which the slide is occurring, by means of the Decelostat valve. When slide is corrected the brake cylinder pressure will be restored to to the same value.

When slip occurs during deceleration and car is in Dynamic braking, braking effort will be reduced sufficiently to stop sliding condition. If air brake supplementation is in effect, the brake cylinder pressure will be released on the truck on which the slide is occurring, by means of the Decelostat valve. When slide is corrected the brake cylinder pressure will be restored to the same value.

The circuit is designed to give wheel protection during all brake applications except a 26-B-1 Automatic Brake Valve Emergency. In this position the system is nullified

3. SPEED CONTROL PENALTY EMERGENCY

If a Train Control Overspeed condition is not properly acknowledged and/or corrected, an emergency brake application will occur through an FA-4 Magnet
Valve (1) Fig. 18 (located in the 'A' end overhead plenum above vestibule ceiling).

Dynamic brakes are nullifed, "Red" Cutout Indicating Light (61) Fig. 3 will not be illuminated. Traction power is cut off. Train must came to a stop before the emergency can be recovered.

When this emergency occurs, place Master Controller Handle to SUB-ZERO and move brake valve handle to emergency position.

To recover after train has stopped, move 26-B-1 brake valve handle to Suppression position until 40 PSI or more brake pipe pressure is obtained. Aclmowledge,
then eve handle to release position.

J. DYNAMIC BRAKE CUTOUT PROCEDURE

1. FROM OPERATING CAB CONSOLE PANEL

When required, trainline dynamic brake circuit may be cut out on all cars in train consist from engineman's console switch panel.

Break seal on Dynamic Brake Cutout Switch (60) Fig. 3. Place switch to cutout position. Dynamic Brake cutout indicating "Red" Light (61) Fig. 3 still not be illuminated, indicating, all dynamic brakes are cut out on train consist.

NOTE: Indicating light has a positive PRESS-TO-TEST safety feature to test lamps.

Electro-pneumatic brakes on train consist will operate at higher brake cylinder pressure to supplement the loss of dynamic brakes.

2. FROM ELECTRIC LOCKER

Dynamic brakes may be cut out locally in each electric locker on an individual car of train consist when required.

Turn Dynamic Brake Switch (1.7) Fig. 13 to OUT position. Dynamic Brake Out "Red" Pilot Light (16) Fig. 13 will be illuminated, indicating dynamic brakes are cut off on the individual car.

Electro-pneumatic brakes on the individual car will operate at higher brake cylinder pressure to supplement the loss of dynamic brakes.

K. SETTING UP PNEUMATIC BRAKE BACK-UP SYSTEM

1. GENERAL INFORMATION

In the event current supply for the analog wires which control the propulsion and electro-pneumatic braking is lost for any reason, the system will fail safe. Electro-pneumatic emergency brakes will be applied automatically regardless of Master Controller Handle position. Dynamic brakes are locked out under this condition.

2. CORRECTIVE ACTION

The emergency cannot be released until the following corrective action is taken.

a. Move Master Controller Handle to EMERGENCY position. G.E. cars to-OFF position. Place Reverser Handle to neutral position and remove.

b. Move 26-B-1 brake valve handle to EMERGENCY position.

c. Turn Selector Valve (2) Fig. 24 (vented) to OUT position. This is located on G-3 Pneumatic Operating Unit (34) Fig. 22, GE (50) Fig. 23, an each car in train consist. In the OUT position, air from the application magnet valve is blocked at the cutout cock and air between cutout cock and double check valve is vented to atmosphere.

d. Head end cab only. Lift up safety cover on Emergency Changeover Switch (59) Fig. 3, and press switch to MANUAL position. This will energize the Emergency Changeover Relay (66) Fig- 3.

e. Move 26-B-1 brake valve handle to Suppression position until 40 PSI or better is obtained, on the brake pipe air gage; then move handle to full service position

3. EMERGENCY POWER POSITION

To set train in motion:

a. Place Reverser Control Handle (23) Fig. l to desired direction.

b. Place 26-B-1 Brake Valve Handle to release position.

c. Move Master Controller Heodle to POWER LOW SPEED or HIGH SPEED zone as indicated by name plate an left side of water controller cover.

This restricts traction power to the first two power points. Emergency Power in Low Speed is from Zero to 34 MPH and High Speed is approximately 79 MPH maximum.

Train speed in,Emergency Power is controlled by movement of Master Controller Handle to either position:

NOTE:- Speed Selector (34) Fig. 1 should not be used for control speed reference. Engineman must observe train speed on Speed Indicator (37) Fig .1.

SPECIAL WARNING: -

1. Speed maintaining system is cut out.
2. Dynamic brakes are cut out.
3. Electro-pneumatic brakes are cut out.
4. Master Controller, supression of a speed control application is nullified.

4. SERVICE BRAKE APPLICATION, PNEUMATIC BACK-UP SYSTEM

a. Return Master Controller Handle to SUB-ZERO position. This cuts off electric traction power.

b. Move 26-B-1 brake valve handle to Service or Full service position for desired brake pipe reduction to obtain desired brake cylinder pressure. A Full Service application reduces brake pipe pressure from 110 PSI to 85 PSI. Corresponding brake cylinder pressure will be deveoped. Observe air brake pressure gages (16-17) Fig. 1, fir readings.

c. Brake cylinder pressure is released by moving 26-B-1 brake valve handle to release position. Brake pipe pressure will be recovered to 110 PSI.

As brakes are releasing, position the Master Controller Handle to Emergency Power.

5. EMERGENCY BRAKE APPLICATION - PNEUMATIC BACK-UP SYSTEM

Movement of the 26-B-1 brake valve handle into the emergency zone will produce an emergency application by exhausting the brake pipe pressure to Zero at an emergency rate. Brake cylinder pressure will be developed at an emergency rate.

The emergency application, once in effect cannot be released until train is at a stop. This is controlled by the Stop Insuring System.

To recover this emergency application, move 26-B-1 brake valve handle to Suppression position until 40 PSI or better is obtained on brake pipe gage. Then move handle to full release position. Brake pipe will charge to 110 PSI.

6. SPEED CONTROL SUPPRESSION

When operating under the Pneumatic Back-up System, a speed control penalty application is suppressed by placing 26-B-1 Brake Valve to SUPPRESSION positon within 5 seconds to reduce speed of train, then press the Cab Signal Ackknowledging Button (32) Fig. 1.

NOTE: No temporary suppression.

SECTION VII - ALERTOR (DEAD MAN CONTROL) SYSTEM

A. GENERAL INFORMATION

The Alertor dead man control is a device which detects and responds to operational movement, or lack of movement, on the part of the engineman.

It actuates the braking system when normal movement of the engineman is not detected, within a predetermined time limit.

B. CONTROL COMPONENTS

Components of the system are as follows:

1. Alertor Circuit Breaker (30) Fig. 13, located in Electric Locker.

2. Control Plug (35) Fig. 1, inserted in CONTROL position.

3. Alertor Control Box (54) Fig. 2, located underneath engineman's seat base.

4. Alertor antenna and cable to cab set (49) Fig. 2.

5. Alertor Warning Alarm and Indicating Light (Red) (44) Fig. 2,

6. Alertor Acknowledging' Push Button (45) Fig. 2.

7. Alertor Pressure Switch (4) Fig. 19:

8. Alertor Magnet Valve (4) Fig, 8.

C. ALERTOR OPERATION .

If operational movement of the engineman is not detected in 20 seconds, the Alertor will respond by actuating a 10-second warning alarm signal (44) Fig. 2 of modulated tone and flashing red warning light. If movement" is still not detected at the end of the 10-second time period,' the Alertor will initiate a penalty brake application.

If engineman's normal operational movement is detected by touching the Master Controller Handle, Reverser Handle, Brake Valve Handle, or any metal part in the cab, within a 20-second time period, it will respond by resetting itself for another 20-second period.

The acknowledging push button switch (45) Fig. 2 alloys the engineman to manually reset the Alertor when he is not seated at the controls. It must be reset within each 10second alarm period. The button cannot be held in a depressed position for more than one timing cycle, as this in itself will cause a penalty brake application.

Anytime twenty-five pounds or more of brake cylinder pressure is developed, an Alertor pressure switch (4) Fig. 19 will be actuated to nullify the Alertor. The Alertor will again resume its operation when brake cylinder pressure is released. During an Alertor emergency brake application, Dynamic Brakes are nullified. Traction power is cut off when brake cylinder pressure reaches 25 PSI.

During a penalty Alertor emergency application, move Master Controller Handle (38) Fig. 1 to SUB-ZERO quadrant handle (25) Fig.tl to Suppression position ntil 40 PSI brake pipe pressure is obtained, then move handle to release position. The Alertor will automatically reset itself for another cycle when it detects operational movement on the part of the engineman.

FIGURE 18

OVERSPEED AND ALERTOR MAGNET VALVES

1. FA-4 Magnet Valve - Overspeed
2. Cutout Cock Sealed - Open Position (Alertor Magnet Valve)
3. Cutout Cock Sealed - Open Position (FA-4 Magnet valve)
4. Magnet Valve - Alertor

SECTION VIII - SPEED CONTROL SYSTEM & OVERSPEND DETECTION

A. GENERAL INFORMATION

The cab signal system presently used is a 4-indication, 3-speed coded twin control system with overspeed protection in low, medium and high speed limits, which permits maximum allowable speed in accordance with cab signal indication.

B. EQUIPMENT LOCATION

The electrical. Equipment comprises the following units:

1. Cab Signal Circuit Breaker (15). Fig. 13.
2. Track Receiver (7) Fig. 22, GE (8) Fig. 23
3. Cab Signal Control Equipment Box (83) Fig. 22, GE (23) Fig- 23.
4. Speed Governor Control Equipment Box (74) Fig. 22, GE (22) Fig. 23
5. Cab Signal Indicator Box (39) Fig. 1
6. Cab Signal Acknowledge Button (32) Fig. 1.
7. Speed Control Cutout Switch (47) Fig. 2
8. Cab Signal Alarm Buzzer (6) Fig. 2.
9. FA-4 Magnet Valve (1) Fig. 18.
10. Magnetic Pick-up on Gear Box Housing.

C. SPEED CONTROL

When entering a track on which cab signals rules are on efect for the direction the train is moving, Speed Control Switch (47) Fig. 2 must immediately by placed in NORMAL position.

D. TRAIN CONTROL OPERATION

On a more restrictive change in cab signal indications, the Cab Signal Alarm Buzzer (56) Fig. 2 will give an alarm. This requires the engineman to acknowledge by depressing Cab Signal Acknowledge Button (32) Fig. 1, if the train is within the new speed limit.

When there is an upward change in indication to denote a less restrictive traffic condition, there is no sounding of the Cab Signal Alarm Buzzer, and acknowledgment is not required.

E. OVERSPEED DETECTION

Overspeed detection is in effect when train speed is in excess of signal requirements. When this condition occurs the Cab Signal Alarm Buzzer will give an alarm.

A penalty application is suppressed by placing Master Controller Handle to ZERO or SUB-ZERO quadrant position. This applies electro-pneumatic brakes to reduce train speed. At the same time the FA-4 Magnet Valve (1) Fig. 18 remains energized.

When operating under the Pneumatic Back-up System, a train Control Overspeed penalty application is suppressed by placing the 26-B-1 Brake Valve in SUPPRESSION position to redace speed o£ train, then press the Cab Signal Acknowledging Button (32) Fig. 1.

When train has reached correct speed, acknowledge by pressing Cab Signal Acknowledging Button (32) Fig. 1, anci reapply paver accordingly.

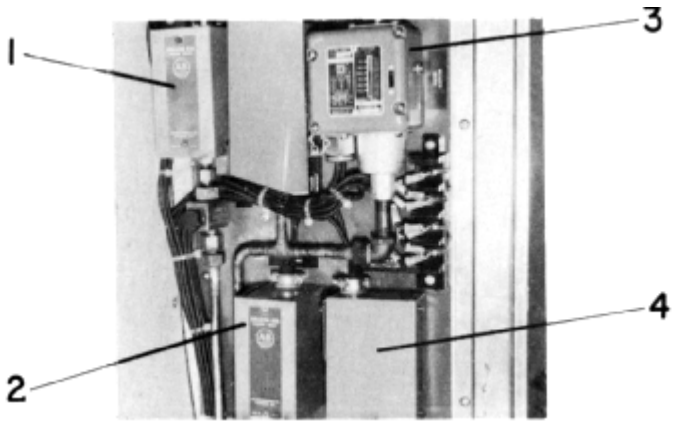


FIGURE 19
PRESSURE SWITCH PANEL
LOCATION, REF. FIG. 2, ITEM 50

1. Stop Insuring Pressure Switch
2. Stop insuring Pressure Switch
3. Alertor Pressure Switch
4. Slip Slide Pressure Switch

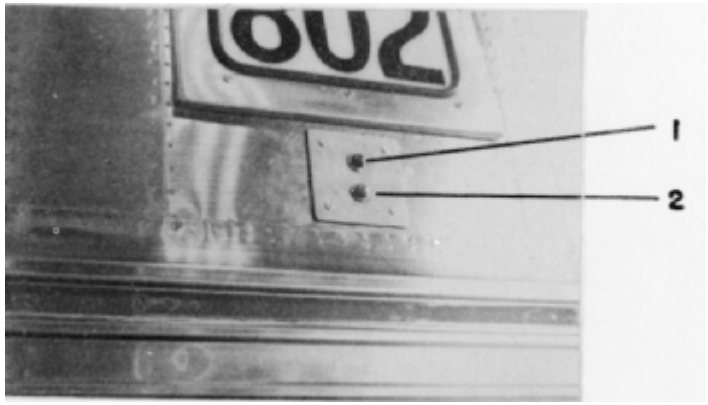


FIG 20
BRAKE APPLIED &RELEASED
INDICATING LIGHTS

1. Brakes Released (Green) Light
2. Brakes Applied (Amber) Light

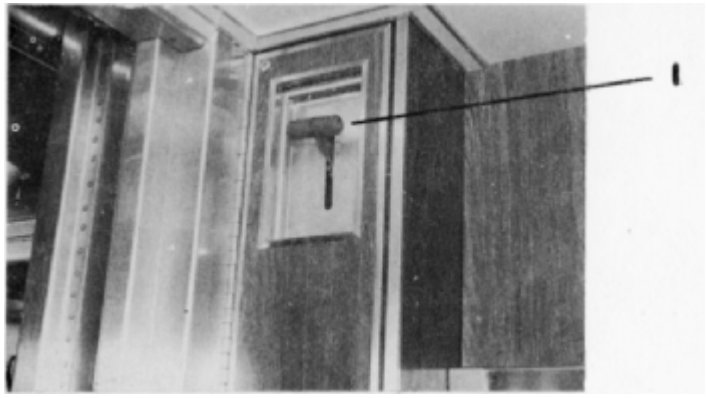
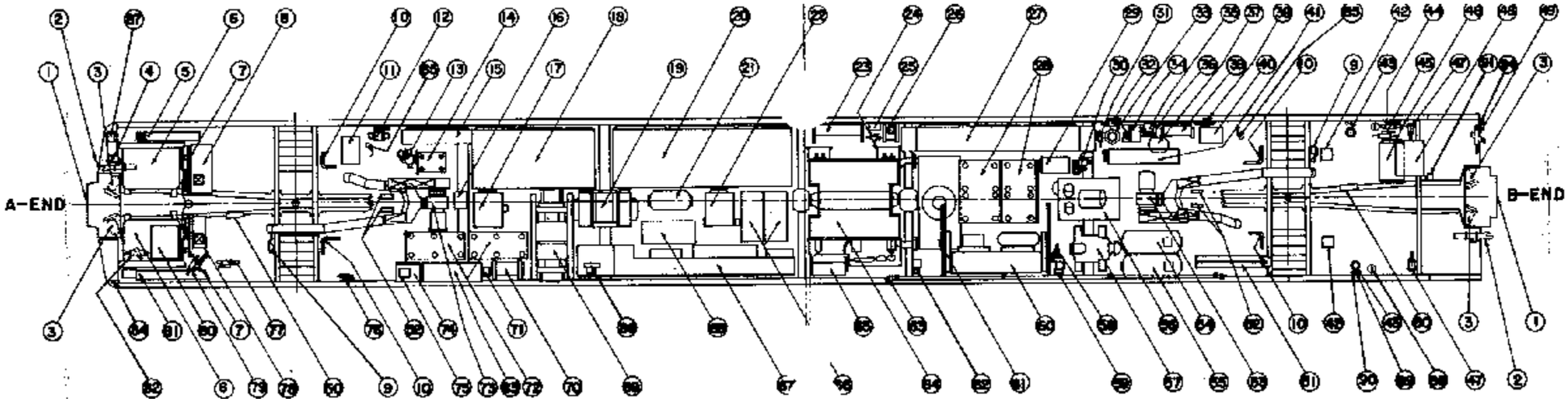


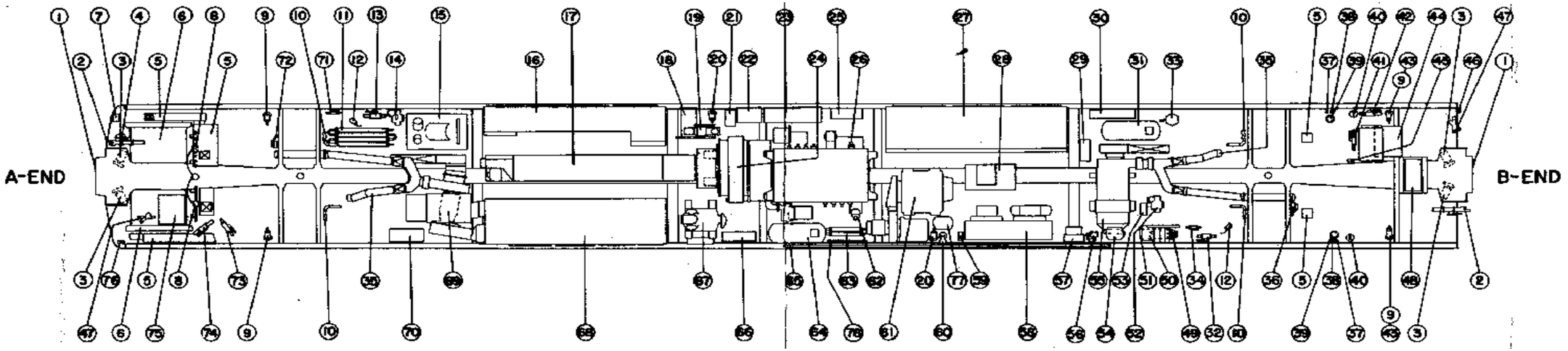
FIG.21
B-3-8 EMERGENCY VALVE

1. Conductor's Valve end Pull Handle



1. SW-800 Automatic Coupler end Electrical Head
2. Brake Pipe Bypass Cock with Locking Handle and Hose Coupling.
3. Coupler Centering Device
4. Equalizing Reservoir
5. Pull Box
6. Battery Boxes
7. Cab Signal Track Receiver Bars
8. Pull Box
9. Leveling Valve - Truck Air Springs
10. Brake Cylinder Hose Connection
11. Pull Box
12. Brake Cylinder Cutout Vented Cock - 'A' Truck
13. B-3-0 Decelostat Valve - 'A' Truck
14. Motor Alternator Resistors
15. Card Control Box
16. Static Converter
17. Motoring Reactor
18. Line Switch and Thyristor Box
19. Motor Blower for Line Switch and Thyristor Box
20. Line Switch and Mode Box
21. Auxiliary Air Control Reservoir
22. Motoring Reactor
23. Car Body Temperature Control Box
24. Pantograph Three-Way Valve
25. Pantograph Magnet Valves
26. Pantograph Hand Pump
27. Main Control Group
28. Dynamic Brake Resistors
29. Pull Box
30. B-3-C Decelostat Valve - 'B' End
31. Main Reservoir Cutout Cock with Plain Handle
32. Brake Cylinder Cutout Vented Cock - 'B' Truck
33. Air Filter
34. G-3 Pneumatic Operating Unit and Selector Cock
35. J-1 Relay Valve
36. A-1-A Electronic Operating Unit
37. 900 Cu. In. Control Reservoir (G-3 unit)
38. AS-2360 Air compressor control Unit
39. Leveling Valve Shutoff Cock - 'B' Track
40. Pull Box
41. B-4-46 Aftercooler Unit
42. Pun Box
43. Toilet Service Drain Andrews Connection
44. Brake Pipe Shutoff Cock with Locking Handle - 'B' end
45. Main Reservoir Shutoff Cock with Plain Handle - 'H' end
46. Pull Box
47. Water Tank Fill Housing and Spud
48. Coupler Electro-Pneumatic Control Box
49. .Manual Shutoff Valve for Coupler Centering Device
50. Motor Lead Disconnect Support
51. Auxiliary Air Cooler
52. Motor Lead Disconnect Support
53. Blower Motor, Intake & Discharge Ducts for Traction motors.
54. No. 2 Main Air Reservoir W/Automatic Drain
55. No. 1 Main Air Reservoir W/Automatic Drain
56. D-3 Air Brake Comp essor
57. Air Conditioning Compressor
58. Auxiliary Air Cut Cock
59. Centrifugal Air Filter and Electric Drain Valve
60. Air Conditioning Condenser Unit
61. Transformer Oil Cooler
62. A-2 Reduction Relay Valve
63. Pantograph Pole an Carrier
64. Transformer
65. Air Conditioning Control Box
66. Brake Reactors
67. Auxiliary Control Group Box
68. Auxiliary Reactor
69. Motor Alternator
70. Motor Alternator C trop Box
71. Pull Box
72. Dynamic Brake Resistors ors
73. Blower Motor, Intake & Discharge Ducts for Traction Motors.
74. Speed Governor Control of Equipment Box
75. Pun Box
76. Leveling Valve Shutoff Cock - 'A' end
77. Main Reservoir Shutoff Cock with Plan Handle –
78. Pun Box
79. Brake Pipe Shutoff Cock with Locking Handle
80. Coupler Electro-Pneumatic Control Box
81. Wire Duct Assembly
82. Manual Shutoff Valve for Coupler Centering Devi
83. Cab Signal Control Equipment Box
84. Uncoupling Push Button Located on Pilot
85. Brake Cylinder Pressure Switch for Indicating L
86. NS-1 Reduction Valve for Auxiliary Air Controls
87. Coupler Adapter Carrier
88. Toilet Service Drain Pull Cable
89. Toilet Service Flush Andrews Connection
90. Toilet Overflow Emergency Drain Tube
91. E-3 Brake Application Valve

FIGURE 22
PLAN OF UNDERFLOOR EQUIPMENT WESTINGHOUSE EQUIPPED CARS



1 SW-800 Automatic Coupler and Electric Head
2. Brake Pipe ByPass Cock with Locking Handle & Hose Coupling.
3. Coupler Centering Device 4. Equalizing Reservoir
5. Electric Pull Boxes 6. Battery Boxes
7. Coupler Adapter Carrier
8. Cab Signal Track Receiver Bars
9. Water Tank Fill Housing and Spurt - Parlor Cars 'A' & 'B' Ends
10. Brake Cylinder Hose Connections
11. Air Compressor Aftercooler
12. Brake Cylinder Pressure Switch for Indicating Lights
13. Brake Cylinder Cutout Vented Cock- 'A' Truck
14. B-3-C Decelostat Valve - 'A' Truck
15. D-3 Air Brake Compressor
16. Braking Control Group Box (Dynamic)
17. Dynamic Braking Resistors & Blower Motor
18. Surge Resistor
19. A-2 Reduction Relay Valve
20. Water Tank Fill Housing and Spud - Snack Bar Cars
21. F-40 Convertor
22. Speed Governor Control Equipment Box
23. Cab Signal Control Equipment Box
24. Transformer & Liquid Cooler
25. AS-2360 Air Compressor Control Unit
26. Transformer Ground Bushing
27. Main Control Group Box
28. M.A. Smoothing Reactor, Automatic Transformer
29. M.A. Starting Resistor
30. Car Body Temperature Control Box
31. Main Reservoir #2, with Autamatic Drain Valve
32. Brake Cylinder Cutofit Vented Cock - 'B' Truck
33. Air Filter and Main Reservoir Cutout Cock
34. Leveling Valve Shutoff Cock - 'B' Truck
35. Traction Motor Air Supply Ducts
36. Leveling Valve - 'B' Truck Air Springs
37. Toilet Overflow Emergency Drain Pipe
38. Toilet Service Flush Andrews Connection
39. Toilet Service Drain Andrews Connection
40. Toilet Service Drain Pull Cable
41. Main Reservoir Shutoff Valve with Plain Handle - 'B' End
42. Brake Pipe Shuttoff Valve with Locking Handle - 'B' End
43. Water Tank F Housing & Spud - Snack Bar Cars
44. Coupler E.P. Control Box -'B' End
45. E-3 Brake Application Device
46. Uncoupling Button - Outside
47. Manual Shutoff Valve for Coupler Centering Device
48. Tuneable Train a Coil - Telephone System
49. J-1 Rely Valve
50. G-3 Pneumatic Operating Unit and Selector Cock
51. A-1-A Electronic c Operating Unit
52. B-3-C Decelostat t Valve - ' '
53. Voltage Regulator or - A-1-A E.O. Unit
54. Reservoir 900 Cu. In. (G-3 Unit)
55. Motor Alternator r & Traction Motor Blower
56. Centrifugal A Filter & Electric Drain Valve
57. Pantograph Valves & Three-Way Valve
58. Air Conditioning Condenser
59. NS-1 Reducing Valve, Auxiliary Air
60. Pantograph Hand Pump
61. Main Smoothing Reactor and Blower Motor
62. Transformer High Voltage Bushing
63. Auxiliary Air Cooler
64. Main Reservoir #1 with Automatic Drain Valve
65. Pantograph Retrieving Pole & Carrier
66. Air Conditioning Control Box
67. Air Conditioning Compressor
68. Rectifier Control Group
69. Blower Motor for Rectifier & Traction Motor Blower
70. Speed Maintaining Group Box
71. Leveling Valve Shutoff Cock - 'A' Truck
72. Leveling Valve- 'A' Air Spring
73. Main Reservoir Shutoff with Plain Handle – ‘A’ End
74. Brake Pipe Shutoff Cock with Locking Handle – ‘A’ End
75. Coupler E.P. Control Box - 'A' End
76. Uncoupling Push Button outside on Pilot
77. Reservoir, Control Air
78. Transformer High Voltage Protective Screen

FIGURE 23
PLAN OF UNDERFLOOR EQUIPMENT
GENERAL ELECTRIC EQUIPPED CARS

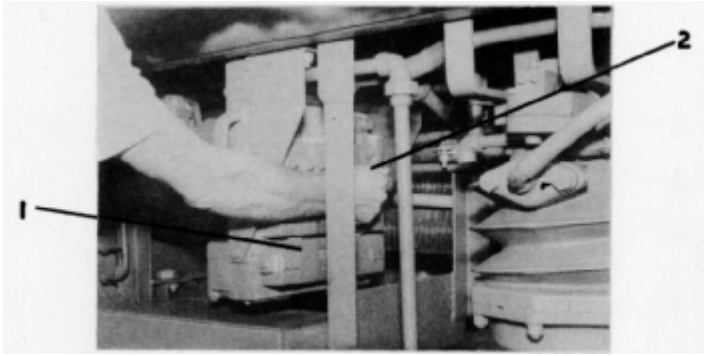


FIG. 24
G-3 PNEUMATIC OPERATING UN I T

1. UNIT SHOWN ON MOUNTING BRACKET.

2. LOCATION OF SELECTOR COCK
IN-TOWARD CAR SIDE
OUT-TOWARD CAR CENTER SILL

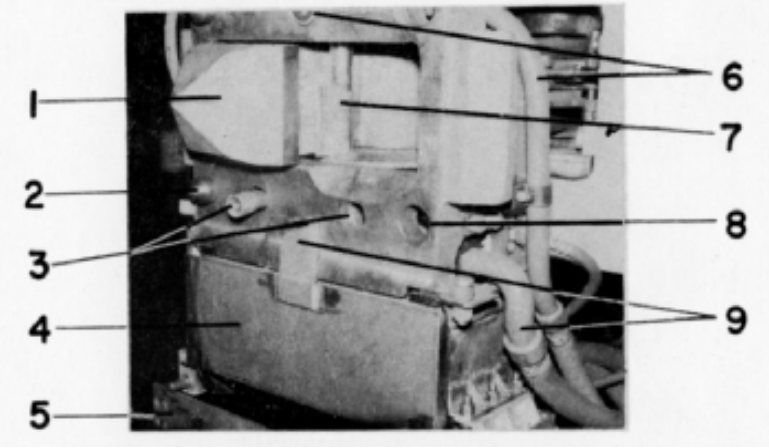
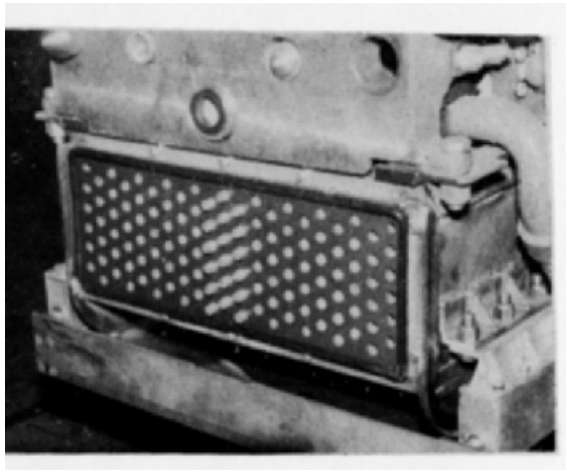


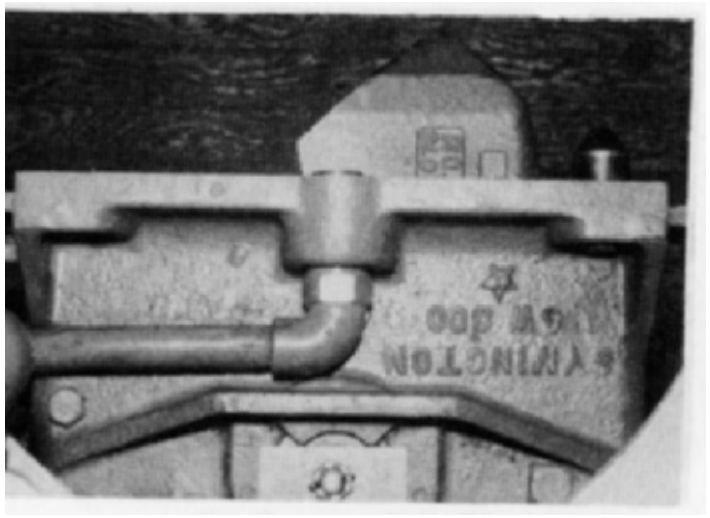
FIG. 25

SW-800 AUTOMATIC COUPLER AND ELECTRIC COUPLER BOX

1 .Hook
2. Alignment Pin
3. Bell Crank Parallelogram Linkage
4. Electric Coupler Box Cover
5. Push Plate - To Retract Cover
6. Main Reservoir Line end Air Coupling
7. Cam Lock Assembly
8. Alignment Pin Hushed Holes
9. Brake Pipeline, Air. Coupling and Cover Tab



UNCOUPLED
HOOK IN OPEN POSITION



COUPLED
HOOK IN CLOSED POSITION

FIG. 26

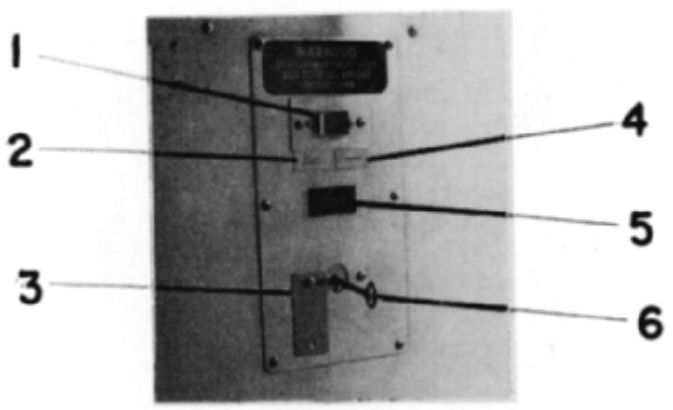


FIG.27

COUPLER KEY SWITCH & PUSH BUTTON 'B' END VESTIBULE

1. Switch Push Button
2. Air Line Blowout - Press Left Side
3. Key Switch Cover Plate
4. Uncoupling - Press Right Side
5. Coupling indicating Light - Green
6. Key

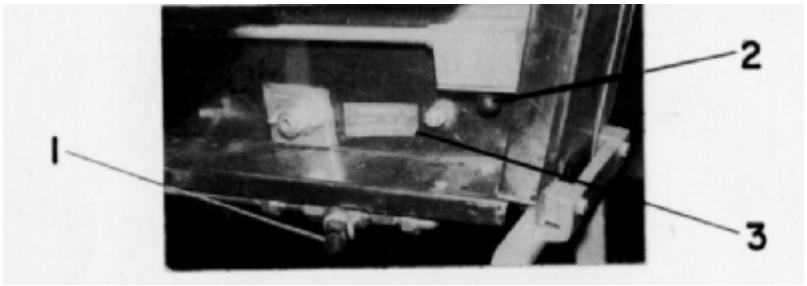


FIG. 28
EXTERIOR UNCOUPLING PUSH BUTTON

1. Manual Shutoff Valve - Coupler Centering Device
2. Exterior Uncoupling Push Button
3. Warning Plate

SECTION IX - COUPLING AND UNCOUPLING PROCEDURES

A. GENERAL INFORMATION

The SW-800 Automatic Coupler is a flat faced, hook type unit, located at each end of the car (1) Fig. 22-23. It is fully automatic in making mechanical, pneumatic and electrical connection between cars. The principal components are shown in Fig. 25.

The automatic feature is controlled by means of Coupler Electro-Pneumatic Control Box (48-8o) Fig. 22 and GE (44-75) Fig. 23.

Its function is to swing open the hooks Fig. 26 for uncoupling, open or close brake pipe and main reservoir lines, operate coupler centering device, and make or break electrical head trainline contacts. These operations are automatically timed.

Cars may also be mechanically uncoupled from ground level.

B. COUPLING CYCLE PROCEDURE FROM CAB 'A' END OF CAR

SPECIAL NOTE: Before coupling 'A' ends of cars, the FRONT DOORS of each section must be locked in an open position and diaphragm fully extended on each car.

Refer to SECTION X - DIAPHRAGM OPERATION, EXTENSION AND RE_ TRACTION PROCEDURES.

NOTE: When necessary, coupler manual alignment may be obtained by exhausting pressure from Coupler Centering Device (3) Fig. 22-23. This is accomplished by PUSH IN handle on Manual Shutoff valve (82), Fig. 22, GE (47) Fig. 23. After cars are coupled, PULL OUT handle on Manual Shutoff Valve.

1. Refer to Railroad Instructions for Handbrake Setting on parked car to be coupled.

2. Momentarily press (maximum 2 seconds) Air Line Blow-Out Switch (5) Fig. 1 in operating cab. Immediately lift up protection cover and press Uncouple Switch (7) Fig. 1, and hold for 5 seconds. Hooks will be open for 17 seconds.

NOTE: It is important to energize the uncoupling switch circuit immediately after air line blow-out circuit is energized. This is to prevent excessive exhausting of brake pipe and loss of main reservoir air pressure

CAUTION - Observe that no one is standing in front of coupler during air line blow-out.

3. Make coupling at approximately 2 MPH speed with a continuous buff action to compress diaphragms (compression of 2 inches on each unit)

WARNING:- HOOK MUST BE IN CLOSED POSITION BEFORE MAKING MECHANICAL COUPLING. Ref. Fig. 23.

The following sequence of operation occurs:

a. Push Plates (5) Fig. 25 will retract Electric Coupler Box Cover (4) Fig. 25.

b. Hooks (1) Fig. 25 will be mechanically forced open as car is coupling, then close.

c. Flow of air between cars in the brake pipe (9) Fig. 25 and main reservoir (6) Fig. 25 will occur.

d. Retracted contact pins in electric coupler boxes will extend, thereby completing electric trainline circuits.

e. Air is exhausted from cylinders of coupler centering devices (3) Fig. 22-23, leaving the coupler free to move.

f. When mechanical coupling and trainline is complete, the coupled Indicating Light "Green" (6) Fig. 1 (Press to Test) will be illuminated in each car for its respective coupler.

NOTE: Indication of complete coupling for each car can be seen from the ground by observing that the Lock Indicator Extension (5) Fig. 46 is in the positive lock position. Also that the coupler box electric contact pins are extended for trainlining by the fact that the plunger at rear of coupler box is in the IN position; only the yellow tip is showing. In retracted position plunger rods will show yellow tip and natural metal finish.

C. COUPLING CYCLE PROCEDURE FROM 'B' END VESTIBULE

Coupling 'B' end of cars will be chiefly a Yard or Shop function due to connection of the high voltage bus jumper between the 'B' ends of adjacent cars. Wherever this function occurs, the procedure below should be followed:

NOTE:- When necessary, coupler manual alignment may be obtained by exhausting air pressure from Coupler Centering Device (3), Fig. 22-23. This is accomplished by push in handle on Manual Shutoff Valve (1) Fig. 28, to exhaust air from cylinders. After the cars are coupled, pull out handle on Manual Shutoff Valve.

1. Set handbrake on parked car.

2. To blow out air lines, remove cover plate from Key Switch (3) Fig. 27. Insert key and turn clockwise direction. Hold key in this position to close switch. Momentarily press Switch to Air Line Blow-Out position. (2), Fig. 27 (maximum 2 seconds to blow out air lines). Immediately press switch to Uncoupled Position (4) Fig. 27 and hold for 5 seconds. Allow key to return to OFF position and remove. Cover plate should be re-applied.

3. Give engineman a buff signal by depressing Signal Push Button (4) Fig. 42.

4. Mechanical coupling cycle will be made same as listed in Coupling Cycle Procedure for 'A' end, item 3.

   When mechanical coupling and trainlining is completed, Coupled Indicating Light "Green" (5) Fig. 27 (Press to Test) will be illuminated in each car for respective coupler.

5. With pantographs lowered and manual ground switches closed on BOTH cars install high voltage bus jumper.

6. Release all hand brakes.

D. UNCOUPLING CYCLE PROCEDURE FROM CAB 'A' END OF CAR

1. Refer to Railroad Instruction for application of handbrake on section of train to be cut off.

2. Lift up protective cover on Uncoupling Switch (7) Fig. 1. Press switch and hold for 5 seconds minimum.

The following sequence of operation will occur automatically on both cars. Traction power to buff and separate the cars must be applied at described sequence.

a. Brake pipe and main reservoir air will be automatically shut off at Coupler Electro-Pneumatic Control Box (80) Fig. 22, GE (75) Fig. 23

b. At same time, contact pins in electric coupler head will be retracted to disconnect trainline circuit, then Coupler Indicating Light "Green" (6) Fig. 1, will go out. The parked section of train Will immediately go into electro-pneumatic emergency brake application.

c. The uncoupling air cylinder will be actuated. Immediately buff the cars; the hooks will throw to open position, Fig. 26. Place reverser handle in opposite direction, apply traction power and separate the cars.

d. The electric coupler box covers will close (4) Fig. 25 as the cars are separating. The hooks will return to their normal closed position, Fig. 26, by spring tension.

e. After 60 seconds, the coupler centering device (3) Fig. 22-23 is actuated to hold coupler in center position.

CAUTION

If operator fails to uncouple cars within the 17 seconds the hooks are held open, the Uncoupling Switch swat again be pushed and held for 5 seconds to repeat the uncoupling cycle.

3. Retract diaphragm on each car. Refer to SECTION X, DIAPHRAGM OPERATION, EXTENSION & RETRACTION PROCEDURE.

E. UNCOUPLING CYCLE PROCEDURE FROM 'B' END VESTIBULE

Uncoupling 'B' ends of cars will be chiefly a Yard or Shop function due to connection of the high voltage bus jumper between the 'B' ends of adjacent cars. Wherever this function occurs, the following procedure must be followed:

1. Apply handbrake to car to be cut off.

2. With pantographs lowered and manual ground switches closed on BOTH cars, disconnect high voltage bus jumpers between cars. The following DANGER & WARNING signs are conspicuously displayed on 'B' ends of cars:

DANGER

11000 VOLTS ROOF BUS CONNECTOR

BEFORE WORKING ON ROOF OR POWER CIRCUITS
BOTH PANTOGRAPHS OF ADJACENT CARS MUST
BE LOWERED AND GROUNDED

DANGER
DO NOT TOUCH - 11000 VOLTS ROOF BUS

WARNING
DISCONNECT 11,000 VOLT
BUS COUPLER BEFORE
UNCOUPLING

3. Remove cover plate from Key Switch (3) Fig. 27. Insert key and turn clockwise direction. Hold key in this position to close switch. Press switch (1) Fig. 27 to Uncouple Position (4) Fig. 27, and hold for 5 seconds **minimum.**

The following sequence of operation will occur automatically on both cars. Traction power to buff and separate the cars must be applied at described sequence.

a. Brake pipe and main reservoir air will be automatically shut off at Coupler Electro-Pneumatic Control Box (48) Fig. 22, GE (44) Fig. 23.

b. At the same time, contact pins in electric coupler head will be retracted to disconnect trainline circuits. Coupler Indicating Light "Green" (5) Fig. 27, will go out. The parked section of train will immediately go into electro-pneumatic emergency brake application.

c. Give Engineman a signal on Signal Push Button (4) Fig. 42 to buff the cars. The Uncoupling Air Cylinder will be actuated.. When hooks are thrown to open position, give engineman a signal to move away to separate the cars.

d. The electric coupler box covers will close as the cars separate. The hooks will return to their normal closed position by spring tension.

e. After 60 seconds the coupler centering device (3) Fig. 22-23 is actuated to hold coupler in center position.

CAUTION

If Operator fails to uncouple cars within the 17 seconds the hooks are held open, the Uncoupling Switch must again be pushed and held for 5 seconds to repeat the uncoupling cycle.

f. Close collision post door.

F. UNCOUPLING FROM OUTSIDE OF CAR

Cars may be uncoupled from outside at ground level by means of push buttons located at each end of car.

At 'A' end the push button is located opposite cab side, inside of pilot at side sill level (84) Fig. 22, GE (76) Fig. 23, and at 'B' end of car the push button is located on end sheet, cab side, just above the loop step (84), Fig. 22 and (2) Fig 28, GE (46) Fig. 23.

The uncoupling cycle procedure is the same timing as described for the Cab and 'B' End Vestibule push button operation. However, hand signals to engineman are required.

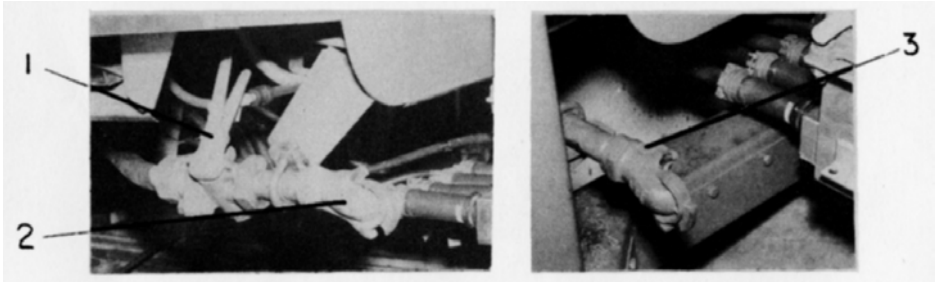


FIGURE 29
BRAKE PIPE BYPASS COCK & HOSE COUPLING

1. Shutoff Cock with Locking Handle
2. Hose Coupling - 'B' End
3. Hose Coupling - 'A' End

FIG. 30
FRONT DOORS A-END

1.RETAINING LINK, LOWER
2. DOOR LATCH, LOWER L.H.
3. HINGE ASSEMMY
4. PULL HANDLE
5. DOOR LATCH, LOWER R.H.
6. DOOR BOLTS, Button
7. DIAPHRAGM, RETRATCED POSITION

FIG. 31
FRONT DOORS-OPEN POSITION

1. SHAFT FOR RETAINING LINKS
2. RETAINING LINK ENGAGED
3. RETAINING PIN ON DOOR
4. SHAFT BRACKET LINK REATINING PIN
5. DOOR LEAF - OPEN POSITION

NOTES

SECTION X - DIAPHRAGM OPERATION, EXTENSION AND RETRACTION PROCEDURE

A. GENERAL INFORMATION

The front end doors must be completely opened, Fig. 31, and secured to outside door supports. Also, retaining links (2) Fig. 31 must be engaged in retaining pins on door leaf (3) Fig. 31 before the diaphragm is extended.

The diaphragm must be fully extended and face plate engaged to lock finger (2) Fig. 34 on buffer sill face plate before coupling 'A' ends of cars.

B. OPENING FRONT END DOORS

Procedure for manually opening the front end bi-parting type doors:

1. Release lower (6) Fig. 30 and upper Door Bolts.
2. Release lower (2-9) Fig. 30 and upper Door Latch.
3. Push doors open from hinge side. Guide door to engage outside door support.
4. Engage Retaining Link (2) Fig. 32 into retaining pin (3) Fig. 31 at end of door.

C. DIAPHRAGM EXTENSION PROCEDURE

Procedure for electrically extending diaphragms

1. Diaphragm Circuit Breaker Fig. 32, located in Electric Locker, in the ON position.
2. Lift up cover on diaphragm Actuator Switch (72) Fig. 3. Press the momentary switch to EXTENDED position.

   An electric motor connected to four screw jacks and mitered gears extend the diaphragm and face plate as required.

   As the diaphragm is extending, make sure the lock fingers on buffer sill engage in pockets (1) Fig. 34 on the diaphragm face plate. This locks the diaphragm and buffer sill together as a unit, similar to the 'B' end diaphragm assembly.

A rotary limit switch connected to the operating mechanism will de-energize the motor circuit when diaphragm is fully extended.

3. For safety reasons, when diaphragm is fully extended, place the Diaphragm Circuit Breaker Fig. 32 to OFF position.

4. Couple cars. Refer to SECTION IX, item B, COUPLING CYCLE PROCEDURE FROM CAB 'A' END OF CAR.

D. DIAPHRAGM RETRACTION PROCEDURE

Procedure for electrically retracting diaphragm:

1. Uncouple cars. Refer to SECTION IX, item D, UNCOUPLING CYCLE PROCEDURE FROM CAB 'A' END OF CAR.

2. Diaphragm Circuit Breaker (Fig. 32) located in Electric Locker ON position.

3. Lift up cover on Diaphragm Actuator Switch (72) Fig. 3. Press the momentary switch to RETRACT position.

4. A rotary limit switch connected to the operating mechanism will de-energize the motor circuit when diaphragm is fully retracted.

5. For safety reasons, when diaphragm is fully retracted place Diaphragm Circuit Breaker Fig. 32 to OFF position.

6. Manually close front end bi-parting doors. Reverse Opening Front End Door procedure, item B of this section. To prevent rattling and movement of retaining links, insert Retaining Links (1) Fig. 30 on Shaft Bracket Pin (4) Fig. 31.

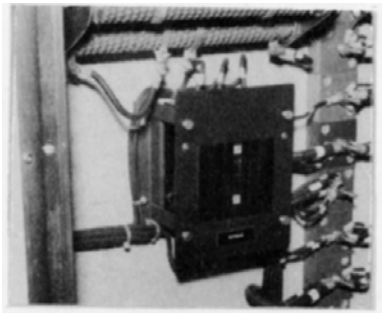


FIG. 32
DIAPHRAGM ACTUATOR CIRCUIT BREAKER

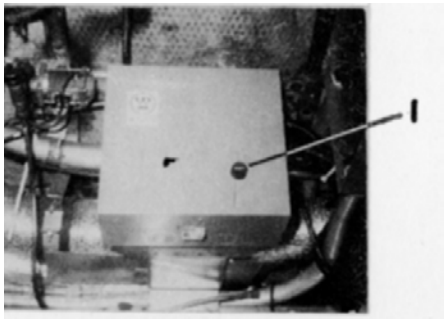


FIG. 33
DIAPHRAGM MOTOR STARTER BOX

1. RESET PUSH BUTTON

FIG. 34
DIAPHRAGM EXTENDED

1. FACE PLATE POCKET
2. BUFFER SILL FINGER

FIG. 35
DIAPHRAGM MANUAL CRANK HANDLE

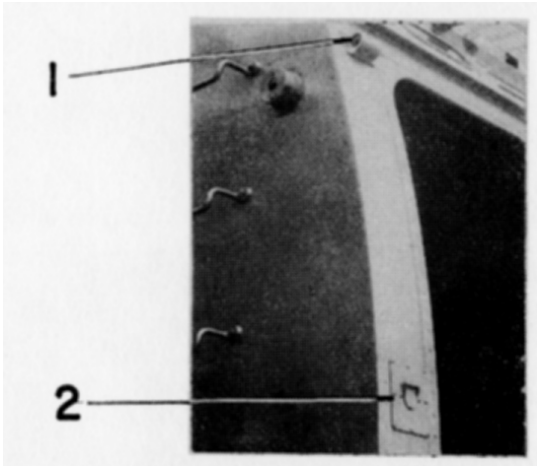


FIG. 36
DOOR OPEN SIGNAL LIGHT
OUTSIDE CREW KEY SWITCH

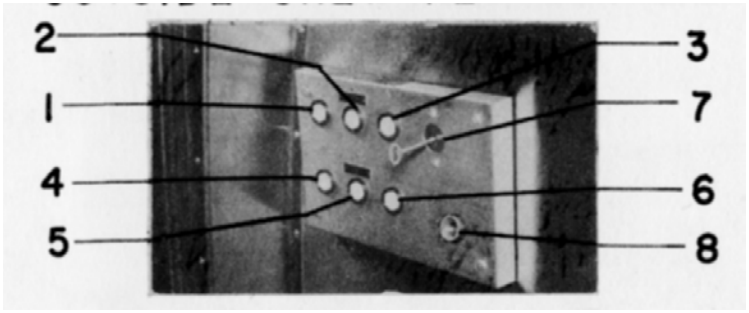


FIG. 37
MASTER DOOR CONTROLLER

1-2-3	Open Buttons	7	Key Switch
4-5-6	close Buttons	8	Signal Light

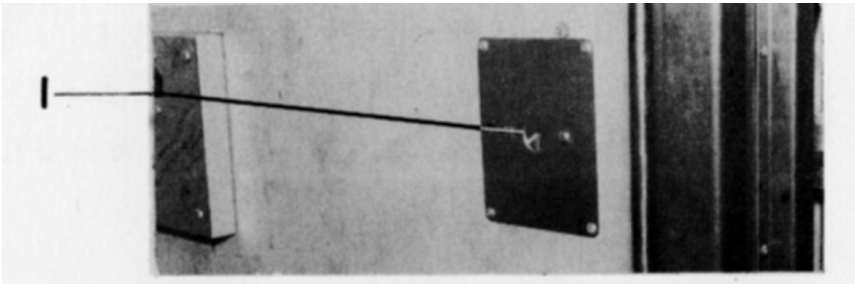


FIG. 38
BODY END DOOR KEY SWITCH

SECTION XI - SIDE ENTRANCE DOORS

All of these doors in a train are operable by push-button stations located at each door. It is required that a coach key be inserted into a controlling push button station for operation.

1. Refer to Fig. 37. To operate doors, insert coach key into lock of the door controller chosen as the operating station, adjacent to station loading platform, and turn key clockwise. This action unlocks all doors and sets up the control circuitry.

2. Note the indicating arrows on the top edge of the push button stations; the left hand arrow points away from the attendant. Pressing this top button will open all doors on that side, from the attendant to the end of the train, in the direction indicated.

   Conversely, pressing the bottom button below this arrow will close all doors on that side, from the attendant to the end of the train, in the direction indicated.

   The right hand arrow points toward the attendant. Pressing the buttons under this arrow operates all doors on that side, from the attendant to the end of the train in that direction.

   The center push buttons, as identified, open and close the door at which the attendant is standing.

3. When operating these doors, press steadily for a moment on the proper button.

4. When the doors are to be closed and the lower button is pressed, a warning bell at each door being closed will sound for a few seconds followed by a pause, then the doors will begin to close.

5. The attendant may leave the door control station if he moves the key from the turned, or unlocked, position. A red signal light will light and the doors will remain open; they may not be closed until the key is again inserted and the close button is pressed.

6. Remove key after all doors are closed.

7. Refer to Fig. 36. This outside red signal light is located on each side of the car. Both outside signal lights are lighted when any Side Entrance door in that car is open. When all doors of a train are open, it follows then that all signal. lights on the train will be lighted for attendant observation.

   A light remaining on indicates a door is open.

8. Refer to Fig. 36. An outside crew switch is provided adjacent to each door for opening that door. The key may be removed through a slot provided in that position. To close door, the key must be reinserted and turned to its original position.

9. Motorman's Signal Light

The Motorman's signal light is located on the Motorman's control console. This light is lit when all side doors in the train are closed and locked.

10. Emergency Mechanisms

All door operators are equipped with emergency pull rods located overhead in the door header area. When this handle is pulled down the door is unlocked and may be opened manually.

11. Door Cut-out - Switches

All Vestibule Side Door operators are provided with a cut-out switch, located on the control box above the swing panel in the door header area. This switch is a three position toggle switch with the positions indicated as ON, OFF and CUT-OUT. If a door becomes inoperative by remaining fully or partly opened:

a. Lower swing panel in door header area.

b. Move the toggle to OFF position (not CUT-OUT position).

WARNING: If toggle switch is moved to cut-out position while the door is open, Motorman will receive a closed indication and train may proceed.

c. Pull door fully closed and make certain the lock is in the latched position.

d. Move toggle switch to cut-out position (this permits Motorman to get indication).

SECTION XII - BODY END DOOR OPERATION

A. GENERAL INFORMATION

Both body end doors are sliding type and are electrically operated to open by touch plates on each door. They automat ally open when vestibule side doors are opened by pressing top OPEN push button Fig. 37 on any Master Door Controller Station (except when THIS DOOR ONLY button is pushed).

B. BODY END DOOR OPENING AND CLOSING CYCLE

All body end door's are automatically timed to open when vestibule side doors are opened. Their closing cycle is timed for 30 seconds after vestibule entrance doors are opened.

If vestibule side doors are closed within 30 seconds after they are opened, the body end doors will immediately close.

Each body end door is opened separately by pressing a touch plate located near the leading edge and approximately half way up the door, or depressing a kick-plate at the bottom portion of the door.

The closing cycle is automatically delayed for 10 seconds after pressure is released from push plates.

During closing cycle, if the door contacts a passenger, or any object, a Sensitive Door Edge will automatically reinstitute the opening cycle.

NOTE: - In the event of complete loss of electrical power to body end door operators, the doors may be manually opened by hand pressure.

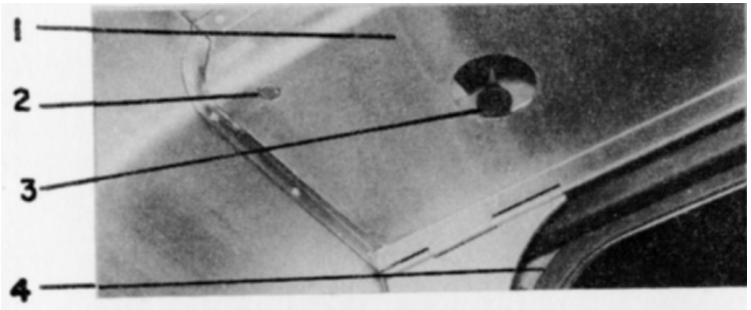


FIG.39
EMERGENCY MANUAL DOOR UNLOCK HANDLE

1. SWING PANEL
2. CAMLOCK PUSHBUTTON
3. MANUAL UNLOCK HANDLE
4. DOOR PNEUMATIC INFLATABLE WEATHERSEAL

Fig.40
DOOR LOCKING MECHANISM

1. LOCK SHAFT FROM SOLENOID
2. LOCK ARM ON DOOR

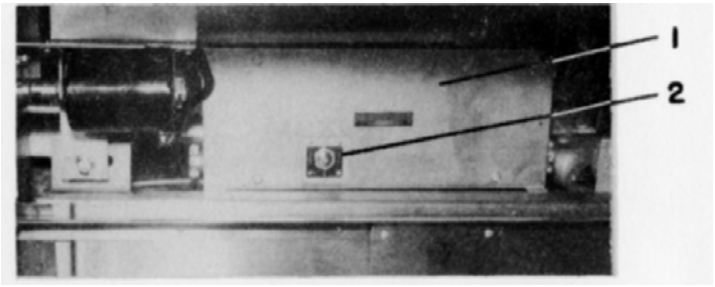


FIG. 41
CONTROL BOX AND CUTOUT SWITCH

l. DOOR CONTROL BOX
2. CUTOUT SWITCH

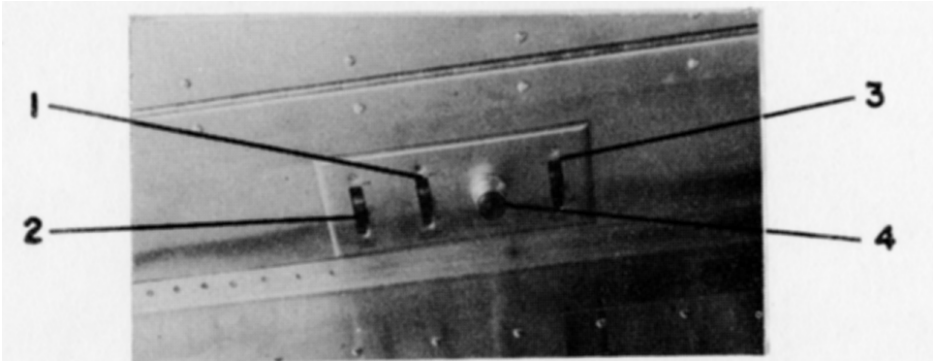


FIG. 42
SWITH PANEL- B-END VESTIBULE

1. Vestibule Ceiling Lights
2. Marker Lights
3. Back-Up Light
4. Conductor's signal

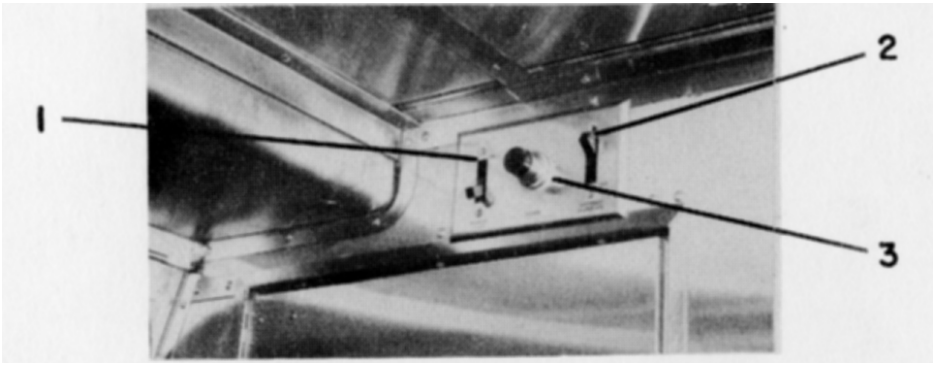


FIG.43
SWITCH PANEL-A-END VESTIBULE

1. Marker Lights
2. Vestibule Ceiling Lights
3. Conductor's signal

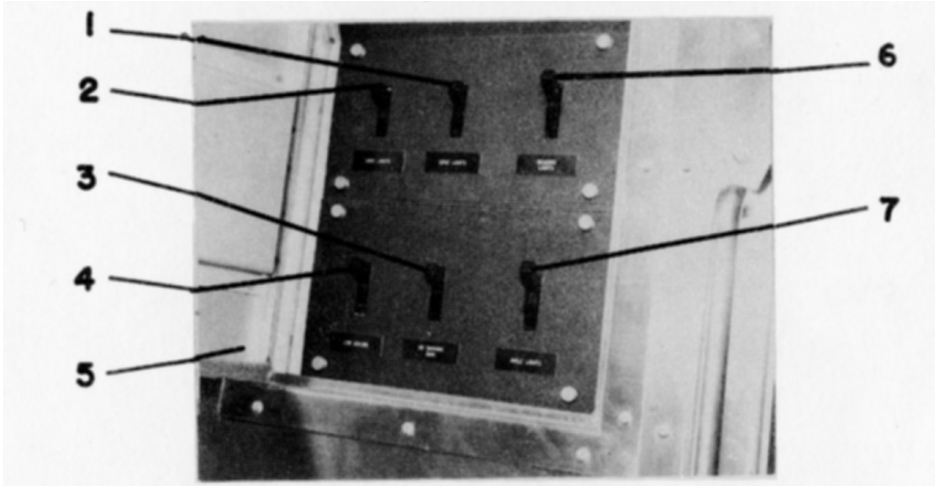


FIG. 44
SWITCH PANEL-CAR LIGHTING CIRCUITS A-END VESTIBULE

1. Cove Lights

2. Cove Lights

3. No Smoking sign

4.Low Ceiling Lights

5. Switch Panel Door

6. Reading Lights

7. Aisle Lights

SECTION XIII - CAR BODY LIGHTING SYSTEM

A. GENERAL INFORMATION

Car lights and illuminated signs are a combination of incandescent and fluorescent lamps. Each system is controlled by circuit breakers and switches operated by the train crew. However, passenger reading lights are controlled by the passengers.

B. CIRCUIT BREAKER PROTECTION

All circuit breakers associated with lights and illuminated signs are located in electric locker on the Circuit Breaker and Switch Panel Fig. 13.

Section III gives information as to location of the Breakers.

These Circuit Breakers should remain ON at all times.

C. LIGHT CONTROL SYSTEM

The lighting system throughout the car is operated as follows:

1. Headlight & Car Number Sign

Headlight Switch (22 Fig. 1, BRIGHT-OFF-DIM, controls a relay (4-5) Fig. 14 in electric locker. This switch also illuminates the Car Number Sign and Gauge Lights on head end car only when the switch is operated in either position.

2. Oscillating Headlight

Oscillating Headlight Switch (8) Fig. 1, OFF-ON, located in cab, controls Oscillating Light Relay (6) Fig. 14 in electric locker. The light is used in conjunction with the two outboard lamps which serve as a conventional headlight. The warning light is mounted on an oscillating plate which gives a beam pattern approximating a compressed or flat ellipse.

3. Cab Ceiling Light

Cab Ceiling Light (42) Fig. 2 is controlled by Cab Light Switch (70) Fig- 3, ON-OFF.

4. Indicating Light Dimmer Control

All cab indicating lights are controlled by Indicating Light Dimmer Control (21) Fig. 1, OFF-ON-LOW-HIGH.

5. Timetable Light

Timetable Light Switch (20) Fig. 1, ON-OFF, is located in cab.

6. Vestibule Ceiling Lights

Vestibule Ceiling Light Switch 'A' end (2) Fig. 43, OFF-ON.

7. Marker Light (Red)

Marker Light Switch is located in each vestibule (2) Fig. 42 for 'B' end, and (1) Fig. 43 for 'A' end.

8. Back-up Light

A single back-up light is provided on the 'B' end of car. It is controlled by Back-up Light switch (3) Fig. 42, OFF-ON.

9. Illuminated Signs

Entrance and Exit Signs, located in passenger section at low ceiling area at 'A' end of car reads EXIT, and at 'B' end ENTRANCE ONLY - EXIT, OTHER END. Exterior signs, above side entrance doors, read at 'A' end EXIT, and at 'B' end ENTRANCE.

These sign lights are trainline illuminated by Sign Light switch (68) Fig. 3, ON-OFF located in cab. This switch energizes a Signal Trainline Relay (8) Fig. 14 for each car in train consist.

10. No Smoking Sign

These signs are located adjacent to Entrance and Exit Signs in the passenger section of the car. They are illuminated by No Smoking Sign Switch (3) Fig. 44, OFF-ON, located in 'A' end vestibule switch panel.

When not illuminated these signs will appear blank.

11. Passenger Lighting

a. Cove Lights (lower row both sides) are trainline controlled by Cove Light Switch (69) Fig. 3, OFFON, located in operating cab. This switch controls a Cove Light Trainline Relay (3) Fig. 14 for each car.

b. Cove Lights (upper row, right side; upper row left .side) are controlled by Cove Light Switch (1-2) Fig. 44, OFF-ON, located at 'A' end of vestibule in car lighting switch panel.

c. Aisle Lights, located at seat base, are controlled by Aisle Light Switch (7) Fig. 44, ON-OFF, in 'A' end vestibule.

d. Reading Lights, located at each passenger seat, are controlled by Reading Light Switch (6) Fig. 44. Each light is individually, push-button operated by the passengers.

e. Low Ceiling Lights are controlled by Low Ceiling Light switch (4) Fig. 44, OFF-ON.

f. Toilet, Hopper Flush and Receptacles. 115V. AC current is supplied to these units at all times by Toilet and Low Ceiling Area Circuit Breaker (29) Fig. 14, located in electric locker.

12. Emergency Lights

There are 18 emergency lights recessed within the various light fixtures throughout the car

These lights are controlled by relays when any of the car body lighting switches are closed; When the source of the car body lighting circuits is interrupted, the emergency lights will be energized from the battery circuit.

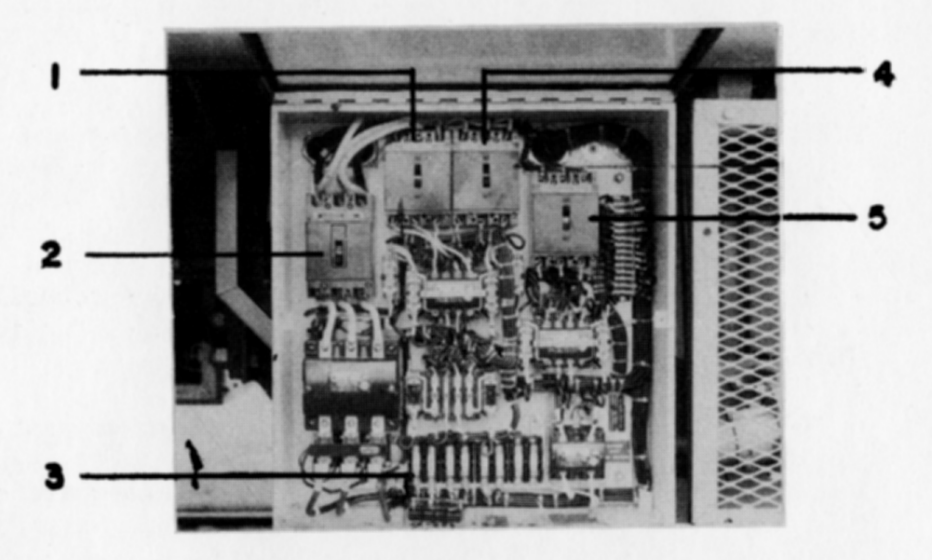


FIG. 4 5
AIR CONDITIONING CONTROL BOX

1. Condenser ran Motor Breaker

2. Compressor Motor Breaker

3. Fuse Block for Exhaust Fens

4. Blower Fen Motor No. 1 Breaker

5. Blower Fan Motor No. 2 Breaker

SECTION XIV - CAR BODY TEMPERATURE CONTROL SYSTEM

A. GENERAL INFORMATION

The heating and air conditioning temperature control system functions completely automatically. It will cycle the heating and cooling equipment ON and OFF in accordance with car temperature requirements.

The Car Body Temperature Control Box (23) Fig. 22, GE (30) Fig. 23, and Air Conditioning Compressor & Condenser units are located in underfloor equipment group.

Inside cooling and heating control thermostats are located behind the return air grille but ahead of the filter unit on the air conditioning unit. Also, fresh air sensing thermostat 20^{F} and 45^{F} are located in the fresh air opening at the air conditioning unit.

During cool weather inside car heating temperature is maintained at 72^{E} through a system of overhead and floor heaters. During warm weather car temperature is maintained at approximately 71E to 75^{F}, depending on the cooling load, by means of two-stage air conditioning system located at each end of car. During cold weather yard layover period, car temperature is automatically maintained at 45°F.

B. HEAT AND AIR CONDITIONING CIRCUIT BREAKERS

Heat and air conditioning circuit breakers, located in Auxiliary Control Box (67) Fig. 22 & Main Control Box (27) Fig. 23, must be ON as described in SECTIONS II & IIA.

In addition, the air Conditioning Control Box (65) Fig. 22, GE (66) Fig. 23, contains a group of circuit breakers as shown in Fig. 45.

Condenser Fan Motor Breaker (1)	ON
Compressor Motor Breaker (2)	ON
Blower Fan Motor No. 1 Breaker (4)	ON
Blower Fan Motor No. 2 Breaker (5)	ON

A 64 V DC Heat and Air Conditioning Circuit Breaker (2) Fig. 13, located in electric locker, in ON position supplies the control circuit for a local car.

NOTE: This circuit Breaker must be ON at all times for LAYOVER HEATING.

C. HEAT AND AIR CONDITIONING OPERATION

1. Normal Train Service

The Control Plug (35) Fig. 1 installed in CONTROL position sets up the trainline control circuit for operating the system on all cars in train consist.

2. Precooling or Heating Control

Precooling or heating is obtained during yard or terminal layover period by insertion of a SPECIAL PLUG in control plug receptacle in CONTROL position (35) Fig. 1. This plug will energize the cooling or heating relays in all cars in train consist without energizing any of the other circuits.

3. Layover floor heat is initiated automatically when trainline plug is removed, providing the inside car temperature is below 45°F.

SECTION XV - MISCELLANEOUS OPERATING EQUIPMENT

A. CONDUCTOR'S SIGNAL BUZZER

The conductor's signal buzzer circuit is trainlined. Buzzer is located in each operating cab (58) Fig. 2.

Push button control panels are located in each vestibule, one at the 'B' end (4) Fig. 42 and the other at 'A' end (3) Fig. 43 above electric locker door. Also, a push button is located on each console panel (36) Fig. 1.

A buzzer Cutout Switch (11) Fig. 1, ON - CUTOUT, is located in each operating cab, for cutting out buzzer in its compartment.

B. AIR WHISTLE

Type "S" large and small chime tone air whistle is operated by movement of Horn Control Handle (24) Fig. 1 to forward position.

A manual shutoff air valve is located under cab shelf just above 26-B-1 brake valve. Access to valve is through Access Door (27) Fig. 1.

C. WINDSHIELD WIPER

A heavy duty variable speed electric windshield wiper motor (57) Fig. 2 is operated by Windshield Wiper Control (19) Fig. 1 in PARK-OFF-HIGH-LOW positions. The motor circuit is protected by Car Number Sign, Windshield Wiper and Gage Light Circuit Breaker (9) Fig. 13, in electric locker.

D. ELECTRICALLY HEATED WINDSHIELD

Windshield defrosting is accomplished by an electrically heated windshield.

Control Plug (35) Fig. 1 must be in CONTROL position and Defroster Switch (9) Fig. 1 OFF-ON sets up the circuit. A thermostat mounted on the car end sheet is pre-set to close at 50^F outside temperature, to apply heat to the windshield. At 65^F the thermostat will open.

Defroster, Windshield and Threshold Heater Circuit Breaker (11) Fig. 13, located in electric locker, protects the circuit.

E. CAB HEATER

Cab Heaters (30) Fig. 1 are protected by Heat and Air Conditioning Circuit Breaker (2) Fig. 13, OFF-ON, located in electric locker.

Cab Heater Switch (64) Fig. 3, HIGH-OFF-LAW, is located on left-hand side of cab.

F. THRESHOLD HEATERS

The threshold heaters receive their circuit feed from Defroster, Windshield and Threshold Heater Circuit Breaker (11) Fig. 13, OFF-ON, located in electric locker, through a Threshold Heater Relay (7) Fig. 14, located in electric locker. This relay is energized when Drain Anti-Freeze Circuit Breaker (28) Fig. 13, located in electric locker, is closed.

G. DRAIN ANTI-FREEZE CIRCUITS

The Drain Anti-Freeze Circuit Breaker (28) Fig. 13, located in electric locker, should be in ON position during cold weather periods.

This circuit breaker supplies drain anti-freeze protection for the following units:

Air Reservoirs	Air Filter Drain Valve
Lavatory	Air Filter Sump
Water Cooler	
Air Compressor	

NOTE: These Anti-Freeze Drain Circuits are not thermostatically controlled.

SECTION XVI - SERVICE WATER FILL & DRAINING INSTRUCTIONS

A. To fill water tanks

1. Position valves below sinks and water coolers to full open.

2. Position toilet fill valve (adjacent to unit) to full close.

3. At temperatures below freezing, make certain car heating is functioning.

4. Apply supply water hose to fill spuds at following locations;

   COACH: At car B end, both sides, inboard of stepwells - 80 gallon tank.

   SNACK BAR: At car B end, both sides, inboard of stepwells, At car center, both sides – two 80 gallon tanks.

   PARLOR: At all four corners of car, inboard of side entrance doors - 40 gallon tank at A end, 80 gallon tank at B end.

5. Fill tanks until overflow appears at spud on opposite side of car.

B. To drain water tanks

1. Hold open all sink faucets

2. Hold open water cooler faucets

3. Position valves below sinks and. water coolers to full open.

4. Position toilet fill valves (adjacent to unit) to full close.

NOTE: The car is equipped with automatic drain valves, positioned about the toilets and galleys. Thermostatic control initiates the water draining when the inside car temperature falls to 38°F.

N O T E S

SECTION XVII - TROUBLE SHOOTING

This section is devoted to operational problems that may be encountered on the road and the steps that can be taken to determine their cause and, if possible, make the necessary corrections. No attempt is made to provide detailed explanations of the equipment functions concerned.

Troubles occurring on the road and the resulting delays can be minimized through proper inspection, maintenance and operation. When operating problems do occur, however, it is important that they be quickly eliminated. Toward that end, a thorough understanding of the equipment function is helpful. This basic knowledge, together with the suggestions given in this section should provide the necessary means for achieving optimum performance.

GENERAL

Safety devices in the form of circuit breakers, thermal overloads or fuses protect the equipment in cause of faulty operation of almost any component.

Operating difficulties are usually indicated by a signal light but some other faults are not signaled.

Experience with the equipment will prove to be of value in the diagnosis of a problem.

A. FAULT LIGHT INDICATION & RESET PROCEDURE

1. When the fault light in the operating cab is lighted, corrective action should be taken as soon as possible to provide maximum protection of equipment.

2. The fault light will light in all operators' cabs if any of the following abnormal conditions occur in any car:

   a. Overload in main transformer circuit.

   b. Overheated main transformer.

   c. Sustained transformer overload, too small to trip primary overload.

   d. Overload in traction motor circuit.
   e. Ground relay operation.

   f. Auxiliary ground relay operation (AGR)

   g. Differential relay operation during braking.

3. To Reset following a Fault Indication.

The following steps permit the resetting of train overload protective relays, except an AGR fault.

a. Remove control plug from operating receptacle.

b. Insert control plug into reset receptacle.

c. While running, this method of reset can be accomplished within a 10-second time period without penalty.

d. Cab fault light will go out when protective relays are reset. If master controller handle has not been moved and ground relay has not been operated, control equipment should sequence back to original point.

e. Remove control plug and re-insert into operating receptacle.

f. If the fault was a ground relay operation, the faulty car will be limited to operating at the first power point of traction power, and will not brake dynamically.

g. If the fault light remains lighted after reset procedure, the problem must be adjudged as requiring shop attention. REPORT FAULT AND BE-LATED INFORMATION TO PROPER SUPERVISOR AS SOON AS POSSIBLE.

4. Ground Relay Operation

A ground relay indication originating from a fault within the traction motor circuitry, may be circumvented by cutting out traction motors in sequence using the Traction Motor Cutout Switch (Fig. 13, #20) in the electric locker.

a. Cut out one pair of motors, reset fault light and resume operation.

b. If the fault light again lights, cut in the pair of motors that were cut out, and cut out the second pair of motors, reset fault light and resume operation.

c. If the fault light again lights, cut out both pair of motors, reset fault light and resume operation.

d. REPORT FAULT TO PROPER SUPERVISOR.

5. Pantograph Lowering Relay Operation

There are events associated with a fault operating the PLR:

a. Catenary will be automatically grounded and sub-station circuit breakers will open.

b. Pantograph will then lower on the faulty car.

c. All power except emergency lights, will be lost on faulty car.

d. Check for visual signs of failure, as smoke arising from damaged equipment.

e. REPORT FAULT TO PROPER SUPERVISOR

f. Instructions to reset the PLR and raising the pantograph should be received from proper authority.

6. In the reporting of ALL fault indications that occur on the road, include any pertinent information that will assist your shop maintenance people to properly diagnose the cause of the problem.

The electrical equipment manufacturers have prepared and provided your shop personnel with detailed data and text related to testing all component parts of operation.

B. COUPLER ADAPTER

The SW800 coupler is not compatible with any existing couplers; so an adapter is provided for emergency coupling with knuckle type couplers. When using this coupler adapter, the maximum allowable towed load is six cars, each having a gross weight of 180,000 pounds, and negotiating no more than 1%, ascending grade.

1. An adapter is stowed behind the pilot on each car, F end. A Manual Coupler operating tool is stowed on the collision post on each car, B or pantograph end.

2. To install the Adapter, refer to Fig. 46.

a. Position the levered end of the Manual operating tool over the end of the coupler Lock Indicating Rod. Pull the tool and rod away from the car to open the coupler hook, then swing the swiveled Toggle Lock Lever into the Indicating Rod slot.

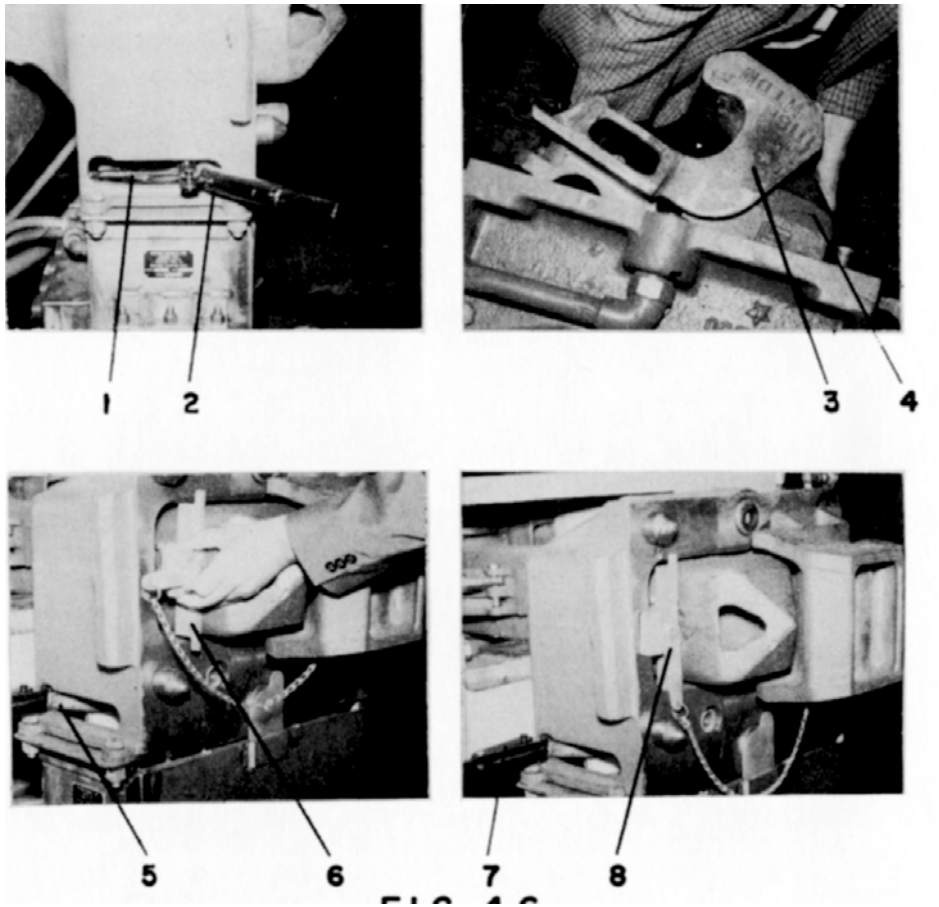


FIG. 46
SW-800 AUTOMATIC COUPLER ADAPTER APPLICATION

1. Toggle Lock Lever - Lock Position
2. Manual Coupler Operating Tool - Uncouple Position
3. installing Adapter
4. Hook - Uncoupled Position
5. Positive Lock Rod Indicator - Coupled Position
6. Application of Hook lack
7. Toggle Lock Lever - Released Position
8. Hook secured by Hook Lock.

b. With the coupler hook locked open, the Adapter may be inserted into the coupler.

c. Again, pull the Manual Operating tool away from the car and swing the swiveled link out of the Indicating Rod slot.

Ease the operating tool back toward the car to unload the spring tension of the coupler hook, returning it to its coupled position. The adapter is then secured.

d. The Adapter is locked in place by insertion of the Hook Lock. This lock is positioned between the coupler hook and frame, and secured by a levered arm.

CAUTION: DO NOT ATTEMPT MANUAL OPERATION WHILE COUPLING CYCLE IS IN ITS AUTOMATIC OPERATION.

3. Turn Main Reservoir and Brake Pipe shutoff cock handles to their OUT position.

Apply trainline Brake Pipe hose.

C. TOWING CARS

The cars may be towed by equipment with standard knuckle type couplers, when using the Coupler Adapter as described under paragraph B of this Section.

As the cars have no steam as signal train lines, they must be towed at the rear of trains.

1. WITH PANTOGRAPH UP AND ON THE CATENARY:

a. Place the Traction Motor cutout switch (Fig. 13 #20) to ALL OUT position.

b. Place Air Compressor Control switch (Fig. 13 #12) to OFF position.

c. Remove all Control Plugs.

d. Place cut-off valves to CUTOUT position on the 26-B-1 Brake Valves.

e. Place Selector Valve to OUT position (toward center of car) on the G-3 Pneumatic Operating limit (Fig. 24)

f. Allow Motor Alternator to run to provide car lighting , and temperature control.

2. WITH PANTOGRAPH DOWN

a. Place cut-off valves to CUT-OUT position on the 26-B-1 Brake Valves

b. Place Selector Valve to OUT position (toward center of car) on the G-3 Pneumatic Operating Unit.

c. Place Battery Switch and Marker Light Switch to the ON position on the trailing car for battery voltage to supply marker lights.

3. SETTING UP.AIR LINES

a. Place cut-off valves to CUT-OUT position on the 26-B-1 Brake valves.

b. Place Selector Valve to OUT position (toward center of car) on the G-3 Pneumatic Operating Unit.

c. The Main Reservoir system must be pumped up to open Brake Pipe valves in the Electro-Pneumatic box for each coupler to permit air to flow from car to car.

1) Attach Brake Pipe trainline hose to towing equipment.

2) Crack Brake Pipe angle cock to allow a small amount of air flow until 50 p.s.i. is shown on the B.P. gauge.

3) Open Brake Pipe angle cock fully to complete charge. This will be a slow charging rate.

NOTE: WITH NO ELECTRICAL POWER AVAILABLE, ALL COUPLERS MUST BE BY-PASSED WITH AUXILIARY B.P. HOSES THROUGH THE ANGLE COCKS.

D. MANUAL COUPLER OPERATION

The cars may be uncoupled manually by using the Manual Coupler Operating tool as described under B of this section.

a. Position the Main Reservoir and Brake Pipe shutoff cocks to the OUT position on both cars being uncoupled.

b. Both coupler hooks will open when the Manual Coupler Operating tool (2 Fig. 46) is used on either coupler

c. Following manual coupling, the Coupler Indicating light in the vestibules should be lighted.

1) If this light fails to light, check the lamp by pressing the test push button.

2) Check the position of the air line cocks.

3) Check the coupling by stretching the train.

4) Check the fuse in the Electro-Pneumatic Control Box.

E. PUNCTURED WEATHERSTRIP SEAL ON SIDE ENTRANCE DOORS

Should the Pneumatic Inflatable Weatherseal on a side entrance door be punctured, it will blow air and provide an exhaust from the Main Reservoir supply.

The air lines to these seals are valved at each end of the car in the overhead plenum. Refer to Figure 47. In the event of a leak, the controlling cock should be cut out.

F. EXTENSIBLE DIAPHRAGM

Should this diaphragm fail to operate electrically, check the following items:

a. Diaphragm Actuator Circuit Breaker (Fig. 32) in electric locker, to be ON.

b. Diaphragm Motor Starter Box (Fig. 33) in overhead plenum in Coaches or in electric locker in Snack Bar or Parlor Cars, press RESET button.

c. If the electrical failure persists, the Diaphragm may be operated manually by using a hand crank. This crank is stored in the utility locker, inside the passenger area diagonally opposite the operator's cab.

The crank is inserted as shown in Fig. 35, and rotated to operate the diaphragm.

When the diaphragm is extended, check that the Fingers on the top edge of the Buffer Sill enter the Pockets on the bottom edge of the Diaphragm. See Figure 34.

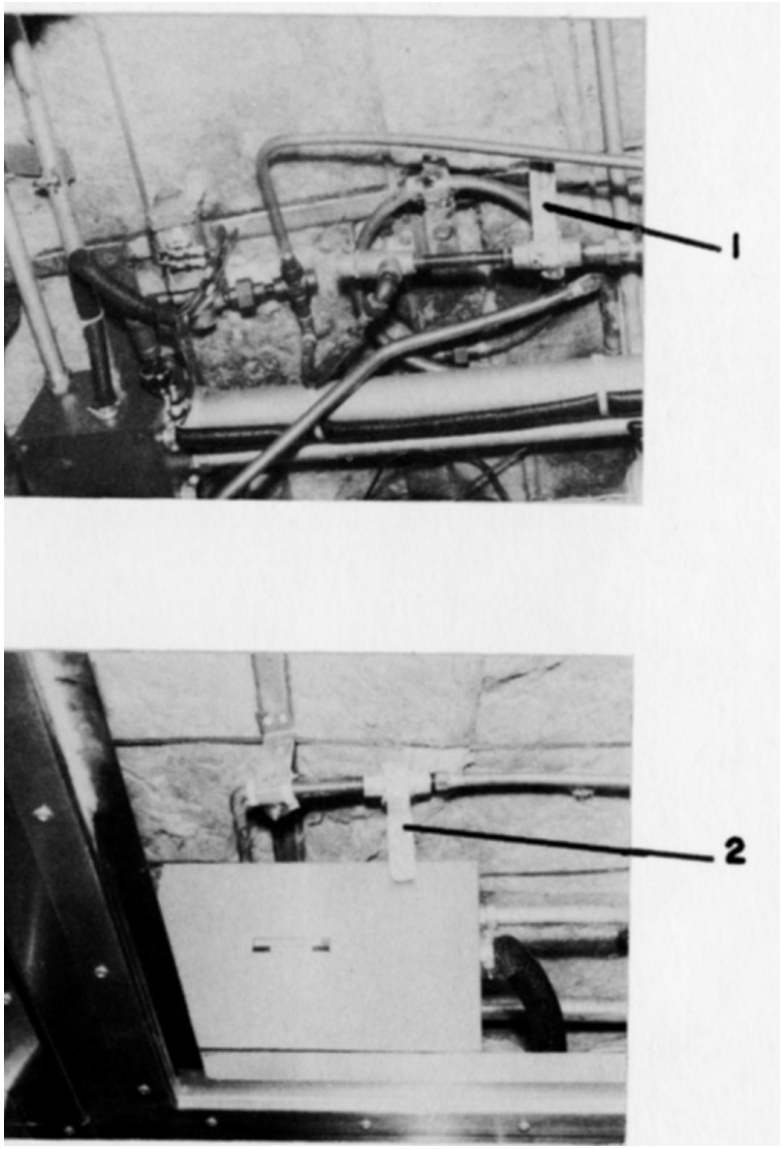


FIG. 47
CUTOUT COCK FOR DOOR PNEUMATIC INFLATABLE WEATHERSEAL

1. CUTOUT COCK - 'A' END
2. CUTOUT COCK - 'B' END