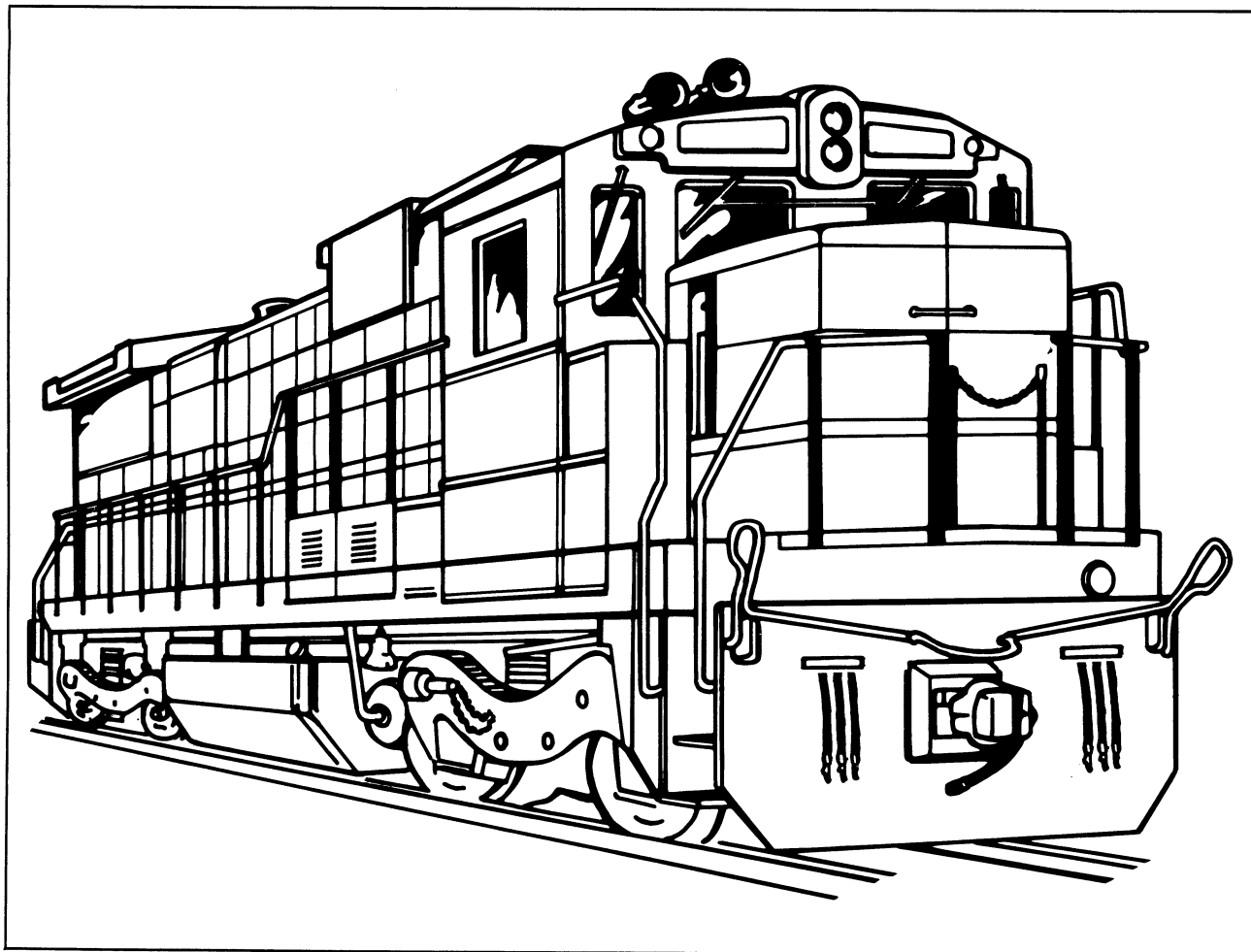




SERIES-8 HANDBOOK



GENERAL  ELECTRIC

FOREWORD

This HANDBOOK is arranged in (3) sections. The first section is labelled INTRODUCTION. This section describes the layout of the locomotives, general data and the overall differences between models.

The second section is labelled ORIENTATION & SERVICING. This section consists of a twice walk-around inspection of the locomotive.

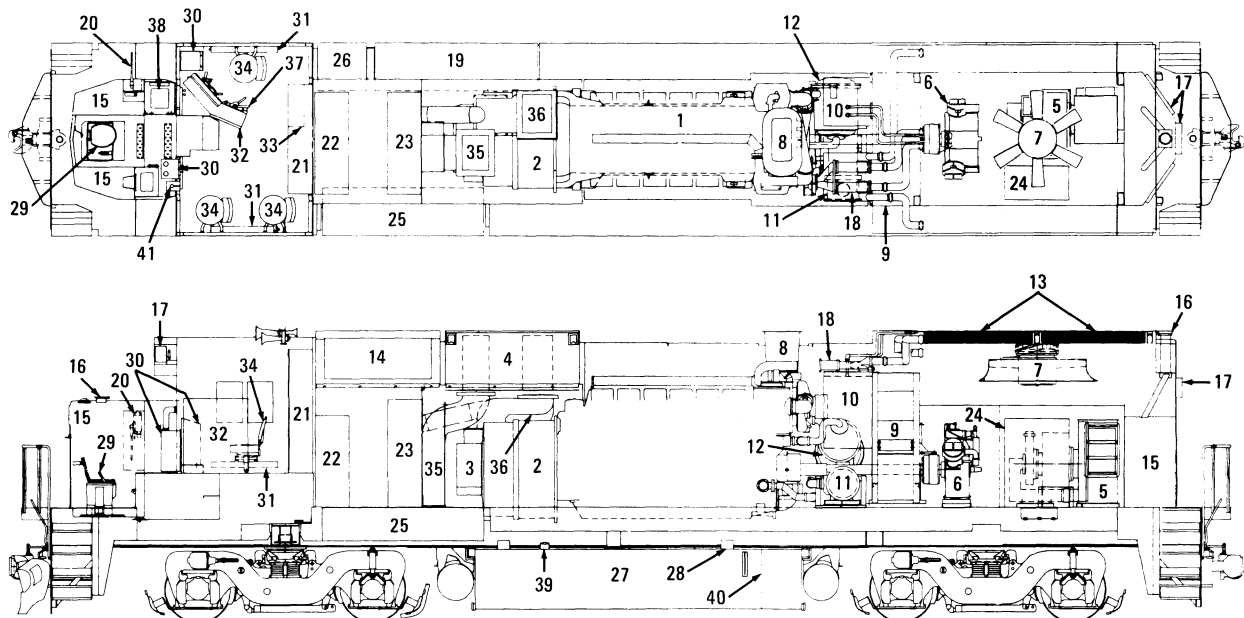
The third section is labelled OPERATION. This section proceeds from starting up the diesel engine to operating on a train.

This book represents the field test SERIES-8 Locomotives being shipped in early 1984. Comments will be appreciated. Please pass any inputs to your local GE representative or mail to:

GENERAL ELECTRIC CO.
2901 East Lake Rd.
Erie, Pa. 16531
Attn: Mgr. Customer Support
Bldg. 14-440

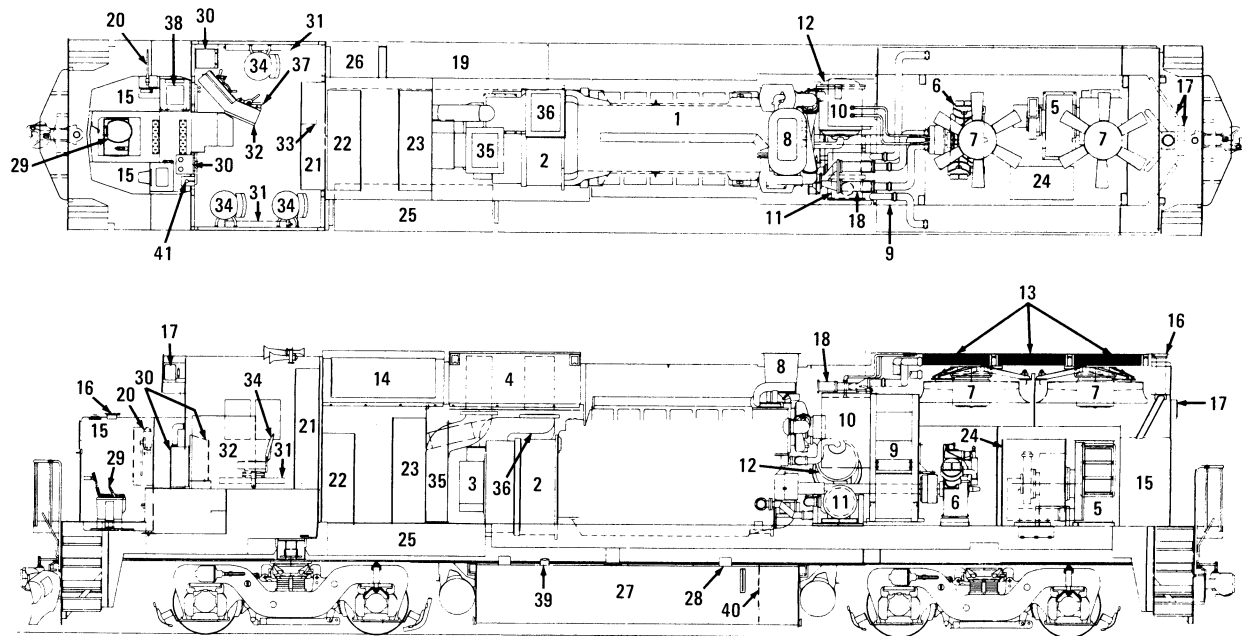
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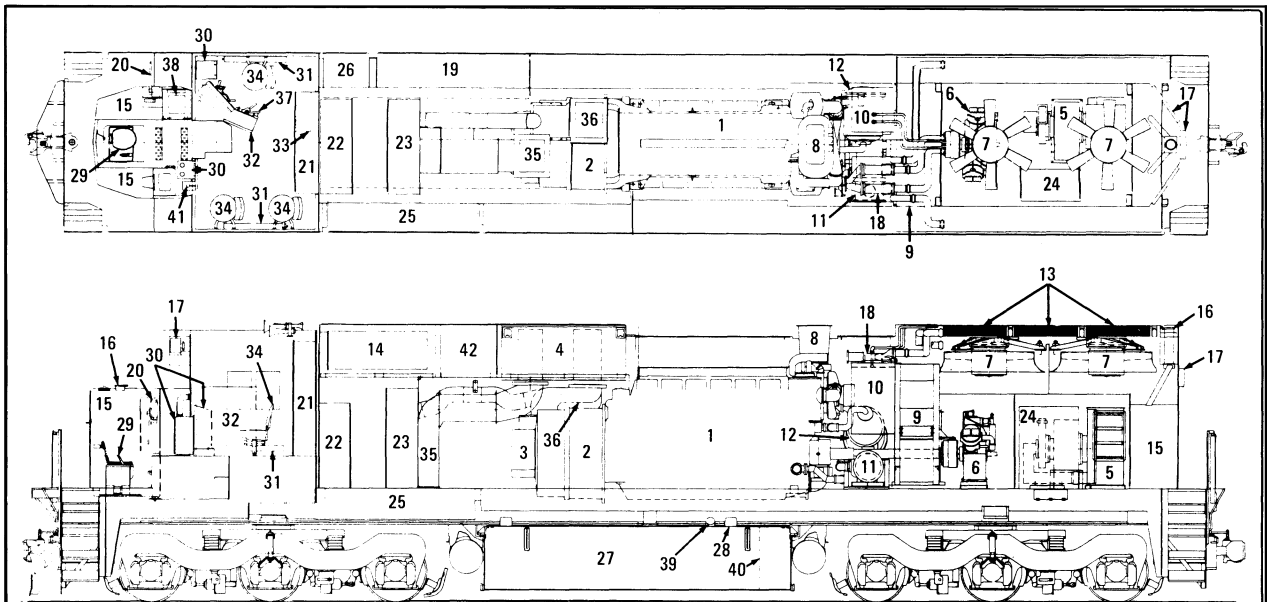
REF.	DESCRIPTION	REF.	DESCRIPTION
1	ENGINE - GE MODEL 7FDL12	22	CONTROL COMPARTMENT NO. 2
2	MAIN ALTERNATOR	23	CONTROL COMPARTMENT NO. 3
3	AUXILIARY ALTERNATOR	24	CONTROL COMPARTMENT NO. 4
4	EQUIPMENT BLOWER BOX	25	CONTROL COMPARTMENT NO. 7
5	NO. 2 END BLOWER BOX	26	CONTROL COMPARTMENT NO. 8
6	AIR COMPRESSOR	27	FUEL TANK
7	RADIATOR FAN	28	FUEL FILLER
8	ENGINE MUFFLER	29	TOILET
9	ENGINE AIR FILTER COMPARTMENT	30	ELECTRIC HEATER AND DEFROSTER
10	ENGINE WATER TANK	31	SIDE STRIP HEATER
11	LUBE OIL COOLER HOUSING	32	CONTROL CONSOLE
12	LUBE OIL FILTER HOUSING	33	ENGINE CONTROL PANEL
13	RADIATORS	34	SLIDING SEAT
14	DYNAMIC BRAKING BOX	35	AIR DUCT - TRACTION MOTOR BLOWER
15	SAND BOX	36	AIR DUCT - ALTERNATOR BLOWER
16	SAND FILLER	37	AIR BRAKE VALVE
17	HEADLIGHT/NO. LIGHT BOX	38	REFRIGERATOR
18	FLUID AMPLIFIER	39	FUEL GAGE
19	BATTERY BOX	40	RETENSION TANK
20	HAND BRAKE	41	EMERGENCY BRAKE VALVE
21	CONTROL COMPARTMENT NO. 1		

FIG. 1. LOCATION OF APPARATUS B23-8.



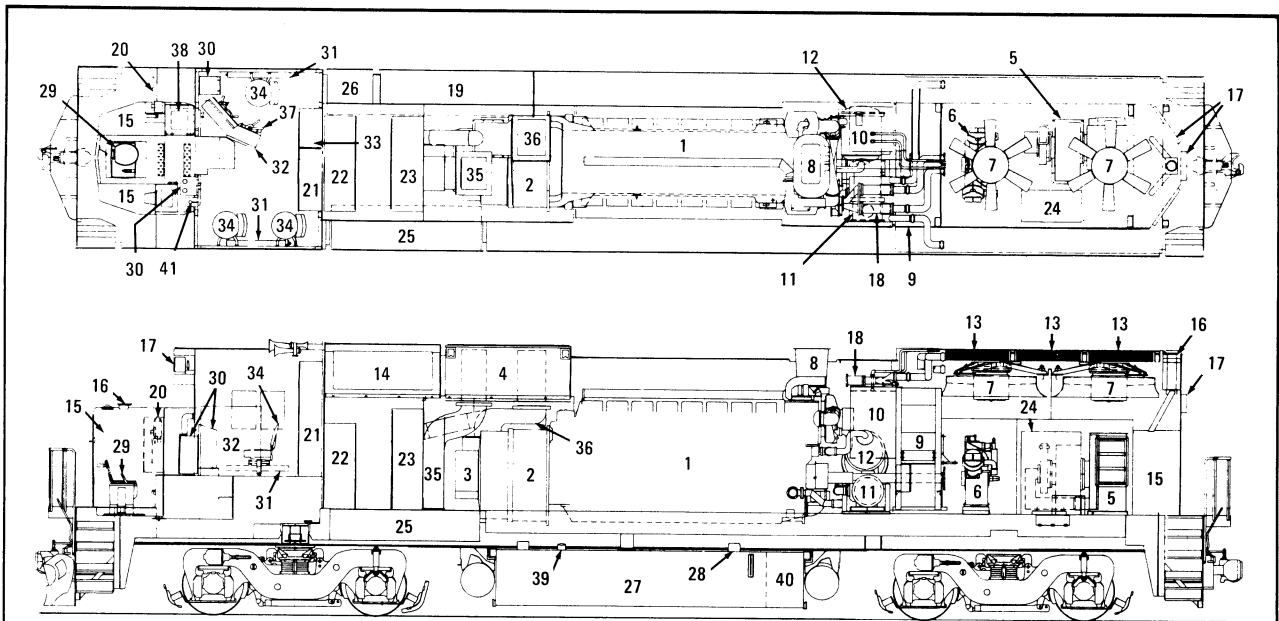
REF.	DESCRIPTION	REF.	DESCRIPTION
1	ENGINE - GE MODEL 7FDL12	22	CONTROL COMPARTMENT NO. 2
2	MAIN ALTERNATOR	23	CONTROL COMPARTMENT NO. 3
3	AUXILIARY ALTERNATOR	24	CONTROL COMPARTMENT NO. 4
4	EQUIPMENT BLOWER BOX	25	CONTROL COMPARTMENT NO. 7
5	NO. 2 END BLOWER BOX	26	CONTROL COMPARTMENT NO. 8
6	AIR COMPRESSOR	27	FUEL TANK
7	RADIATOR FAN	28	FUEL FILLER
8	ENGINE MUFFLER	29	TOILET
9	ENGINE AIR FILTER COMPARTMENT	30	ELECTRIC HEATER AND DEFROSTER
10	ENGINE WATER TANK	31	SIDE STRIP HEATER
11	LUBE OIL COOLER HOUSING	32	CONTROL CONSOLE
12	LUBE OIL FILTER HOUSING	33	ENGINE CONTROL PANEL
13	RADIATORS	34	SLIDING SEAT
14	DYNAMIC BRAKING BOX	35	AIR DUCT - TRACTION MOTOR BLOWER
15	SAND BOX	36	AIR DUCT - ALTERNATOR BLOWER
16	SAND FILLER	37	AIR BRAKE VALVE
17	HEADLIGHT/NO. LIGHT BOX	38	REFRIGERATOR
18	FLUID AMPLIFIER	39	FUEL GAGE
19	BATTERY BOX	40	RETENSION TANK
20	HAND BRAKE	41	EMERGENCY BRAKE VALVE
21	CONTROL COMPARTMENT NO. 1		

FIG. 2. LOCATION OF APPARATUS B32-8.



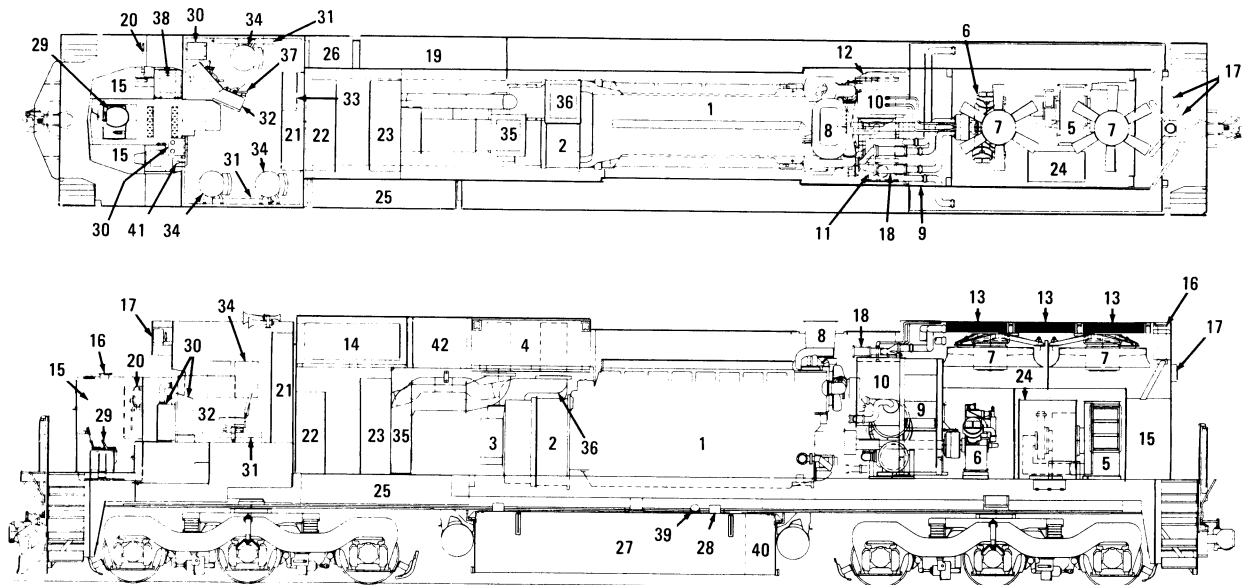
REF.	DESCRIPTION	REF.	DESCRIPTION
1	ENGINE - GE MODEL 7FDL12	22	CONTROL COMPARTMENT NO. 2
2	MAIN ALTERNATOR	23	CONTROL COMPARTMENT NO. 3
3	AUXILIARY ALTERNATOR	24	CONTROL COMPARTMENT NO. 4
4	EQUIPMENT BLOWER BOX	25	CONTROL COMPARTMENT NO. 7
5	NO. 2 END BLOWER BOX	26	CONTROL COMPARTMENT NO. 8
6	AIR COMPRESSOR	27	FUEL TANK
7	RADIATOR FAN	28	FUEL FILLER
8	ENGINE MUFFLER	29	TOILET
9	ENGINE AIR FILTER COMPARTMENT	30	ELECTRIC HEATER AND DEFROSTER
10	ENGINE WATER TANK	31	SIDE STRIP HEATER
11	LUBE OIL COOLER HOUSING	32	CONTROL CONSOLE
12	LUBE OIL FILTER HOUSING	33	ENGINE CONTROL PANEL
13	RADIATORS	34	SLIDING SEAT
14	DYNAMIC BRAKING BOX	35	AIR DUCT - TRACTION MOTOR BLOWER
15	SAND BOX	36	AIR DUCT - ALTERNATOR BLOWER
16	SAND FILLER	37	AIR BRAKE VALVE
17	HEADLIGHT/NO. LIGHT BOX	38	REFRIGERATOR
18	FLUID AMPLIFIER	39	FUEL GAGE
19	BATTERY BOX	40	RETENSION TANK
20	HAND BRAKE	41	EMERGENCY BRAKE VALVE
21	CONTROL COMPARTMENT NO. 1	42	DYNAMIC BRAKING FILLER BOX

FIG. 3. LOCATION OF APPARATUS C32-8.



REF.	DESCRIPTION	REF.	DESCRIPTION
1	ENGINE - GE MODEL 7FDL16	22	CONTROL COMPARTMENT NO. 2
2	MAIN ALTERNATOR	23	CONTROL COMPARTMENT NO. 3
3	AUXILIARY ALTERNATOR	24	CONTROL COMPARTMENT NO. 4
4	EQUIPMENT BLOWER BOX	25	CONTROL COMPARTMENT NO. 7
5	NO. 2 END BLOWER BOX	26	CONTROL COMPARTMENT NO. 8
6	AIR COMPRESSOR	27	FUEL TANK
7	RADIATOR FAN	28	FUEL FILLER
8	ENGINE MUFFLER	29	TOILET
9	ENGINE AIR FILTER COMPARTMENT	30	ELECTRIC HEATER AND DEFROSTER
10	ENGINE WATER TANK	31	SIDE STRIP HEATER
11	LUBE OIL COOLER HOUSING	32	CONTROL CONSOLE
12	LUBE OIL FILTER HOUSING	33	ENGINE CONTROL PANEL
13	RADIATORS	34	SLIDING SEAT
14	DYNAMIC BRAKING BOX	35	AIR DUCT - TRACTION MOTOR BLOWER
15	SAND BOX	36	AIR DUCT - ALTERNATOR BLOWER
16	SAND FILLER	37	AIR BRAKE VALVE
17	HEADLIGHT/NO. LIGHT BOX	38	REFRIGERATOR
18	FLUID AMPLIFIER	39	FUEL GAGE
19	BATTERY BOX	40	RETENSION TANK
20	HAND BRAKE	41	EMERGENCY BRAKE VALVE
21	CONTROL COMPARTMENT NO. 1		

FIG. 4. LOCATION OF APPARATUS B39-8.



REF.	DESCRIPTION	REF.	DESCRIPTION
1	ENGINE - GE MODEL 7FDL16	22	CONTROL COMPARTMENT NO. 2
2	MAIN ALTERNATOR	23	CONTROL COMPARTMENT NO. 3
3	AUXILIARY ALTERNATOR	24	CONTROL COMPARTMENT NO. 4
4	EQUIPMENT BLOWER BOX	25	CONTROL COMPARTMENT NO. 7
5	NO. 2 END BLOWER BOX	26	CONTROL COMPARTMENT NO. 8
6	AIR COMPRESSOR	27	FUEL TANK
7	RADIATOR FAN	28	FUEL FILLER
8	ENGINE MUFFLER	29	TOILET
9	ENGINE AIR FILTER COMPARTMENT	30	ELECTRIC HEATER AND DEFROSTER
10	ENGINE WATER TANK	31	SIDE STRIP HEATER
11	LUBE OIL COOLER HOUSING	32	CONTROL CONSOLE
12	LUBE OIL FILTER HOUSING	33	ENGINE CONTROL PANEL
13	RADIATORS	34	SLIDING SEAT
14	DYNAMIC BRAKING BOX	35	AIR DUCT - TRACTION MOTOR BLOWER
15	SAND BOX	36	AIR DUCT - ALTERNATOR BLOWER
16	SAND FILLER	37	AIR BRAKE VALVE
17	HEADLIGHT/NO. LIGHT BOX	38	REFRIGERATOR
18	FLUID AMPLIFIER	39	FUEL GAGE
19	BATTERY BOX	40	RETENSION TANK
20	HAND BRAKE	41	EMERGENCY BRAKE VALVE
21	CONTROL COMPARTMENT NO. 1	42	DYNAMIC BRAKING FILLER BOX

FIG. 5. LOCATION OF APPARATUS C39-8.

GENERAL DATA

	B23-8	B32-8	C32-8	B39-8	C39-8
Operating Cab & Controls	General Purpose	General Purpose	General Purpose	General Purpose	General Purpose
Wheel Arrangement	B-B 0-4-4-0	B-B 0-4-4-0	C-C 0-6-6-0	B-B 0-4-4-0	C-C 0-6-6-0
Engine Data:					
Horsepower - Traction	2300	3150	3150	3900	3900
Number of Cylinders	12	12	12	16	16
Model	GE FDL12	GE FDL12	GE FDL12	GE FDL16	GE FDL16
Bore and Stroke, In.	9 x 10-1/2	9 x 10-1/2	9 x 10-1/2	9 x 10-1/2	9 x 10-1/2
R.P.M.	1050	1050	1050	1050	1050
Compression Ratio	12.7:1	12.7:1	12.7:1	12.7:1	12.7:1
Cycle	4	4	4	4	4
Turbocharged	Yes	Yes	Yes	Yes	Yes
Engine Cooling Fan	1	2	2	2	2
Engine Cooling Fan Drive	AC Motor	AC Motor	AC Motor	AC Motor	AC Motor
Traction Equipment:					
Main Generator	GMG 186	GMG 186	GMG 187	GMG 186	GMG 187
Traction Motor	4-GE752	4-GE752	6-GE752	4-GE752	6-GE752
Traction Motor Blowers	2	2	2	2	2
Blower Drive	AC Motor	AC Motor	AC Motor	AC Motor	AC Motor
Air Brake Schedule	26L	26L	26L	26L	26L
Major Dimensions:					
Length	63' 7"	63' 7"	67' 11"	66' 4"	70' 8"
Height	14' 11.5"	14' 11.5"	15' 4.5"	14' 11.5"	15' 4.5"
Width	10' 1.75"	10' 1.75"	10' 1.75"	10' 1.75"	10' 1.75"
Bolster Centers	36' 7"	36' 7"	40' 7"	39' 4"	43' 4"
Truck Wheel Base	9' 0"	9' 0"	13' 7"	9' 0"	13' 7"
Minimum Track Curvature					
Rad. & Deg.					
(1) For Single Unit	150'/39°	150'/39°	273'/21°	150'/39°	273'/21°
(2) For MU	195'/29°	195'/29°	273'/21°	195'/29°	273'/21°
Driving Wheel Diameter	40"	40"	40"	40"	40"
Weight					
On Drivers - No. Min.					
and Max.	63,575/70,000	65,725/70,000	57,717/70,000	68,500/70,000	60,850/70,000
Total Min. and Max.	254,300/280,000	262,900/280,000	346,300/420,000	274,000/280,000	365,100/420,000
Tractive Effort					
Starting at 25% adhesion					
for Min. & Max. weight	63,575/70,000	65,725/70,000	86,575/105,000	68,500/70,000	71,275/105,000
Cont. Tractive Effort & Speed MPH					
(1) For Smallest Pinion	71,890 @ 9.2	70,140 @ 13.9	108,360 @ 8.2	68,100 @ 18.3	106,790 @ 10.9
(2) For Largest Pinion	57,030 @ 11.6	55,640 @ 17.5	85,960 @ 10.3	54,020 @ 23.1	84,710 @ 13.7
Gear Ratio and					
Max. Speed MPH					
Smallest Pinion	83/20 - 70	83/20 - 70	83/20 - 70	83/20 - 70	83/20 - 70
Intermediate Pinion	81/22 - 79	81/22 - 79	81/22 - 79	81/22 - 79	81/22 - 79
Largest Pinion	79/24 - 88	79/24 - 88	79/24 - 88	79/24 - 88	79/24 - 88

GENERAL DATA (Cont'd.)

	B23-8	B32-8	C32-8	B39-8	C39-8
Supplies					
Fuel-Gal.					
Tank	2150	3150	3900	3150	4600
Coolant - Gal.	350	350	350	410	410
Lube Oil - Gal.	300	300	300	400	400
Sand - Cu. Ft.	40	40	40	40	40 ⁸
Compressor, Air CFM					
Max. Delivery	296	296	296	296	296
Type of Cooling	Air or Water	Air or Water	Air or Water	Air or Water	Air or Water
Draft Gear	NC391	NC391	NC391	NC391	NC391
Air Filtering Devices					
Primary	Vortex Self-Cleaning	Vortex Self-Cleaning	Vortex Self-Cleaning	Vortex Self-Cleaning	Vortex Self-Cleaning
Secondary Engine					
Air Intake	GE Paper	GE Paper	GE Paper	GE Paper	GE Paper
Engine Room Pressurized . . .	Yes	Yes	Yes	Yes	Yes
Main Generator					
Pressurized	Yes	Yes	Yes	Yes	Yes

ORIENTATION & SERVICING

This section is a photographic walk-around inspection of a SERIES-8 locomotive. You start your inspection trip on the ground at the left front of the unit. As you walk around the locomotive the pictures in the book represent what you see on the unit. On the bottom of each photograph is a check list of what items should be looked at. Once the inspection is completed on the ground, you must perform an operators cab and platform level inspection. See the illustration on next page.

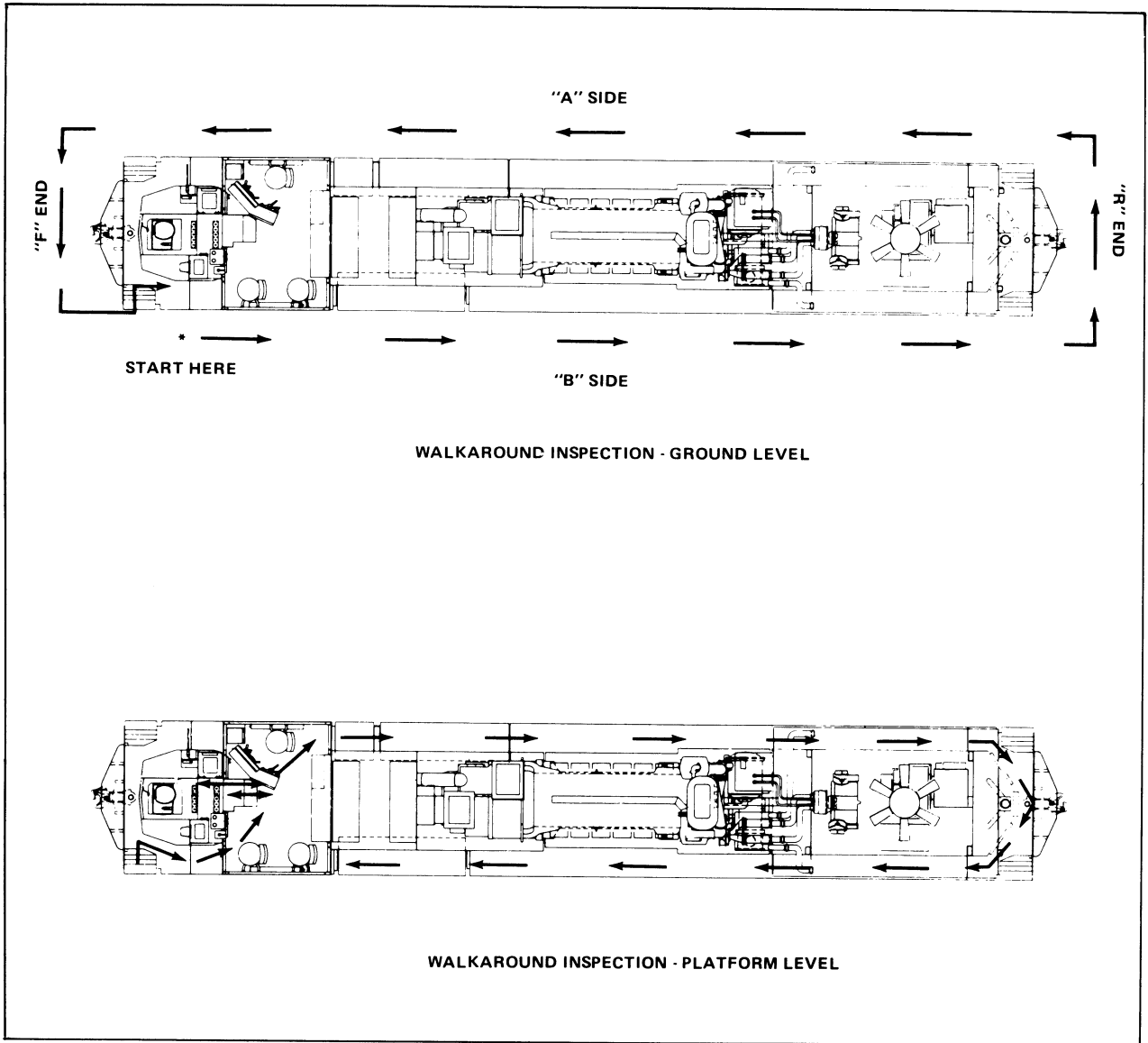
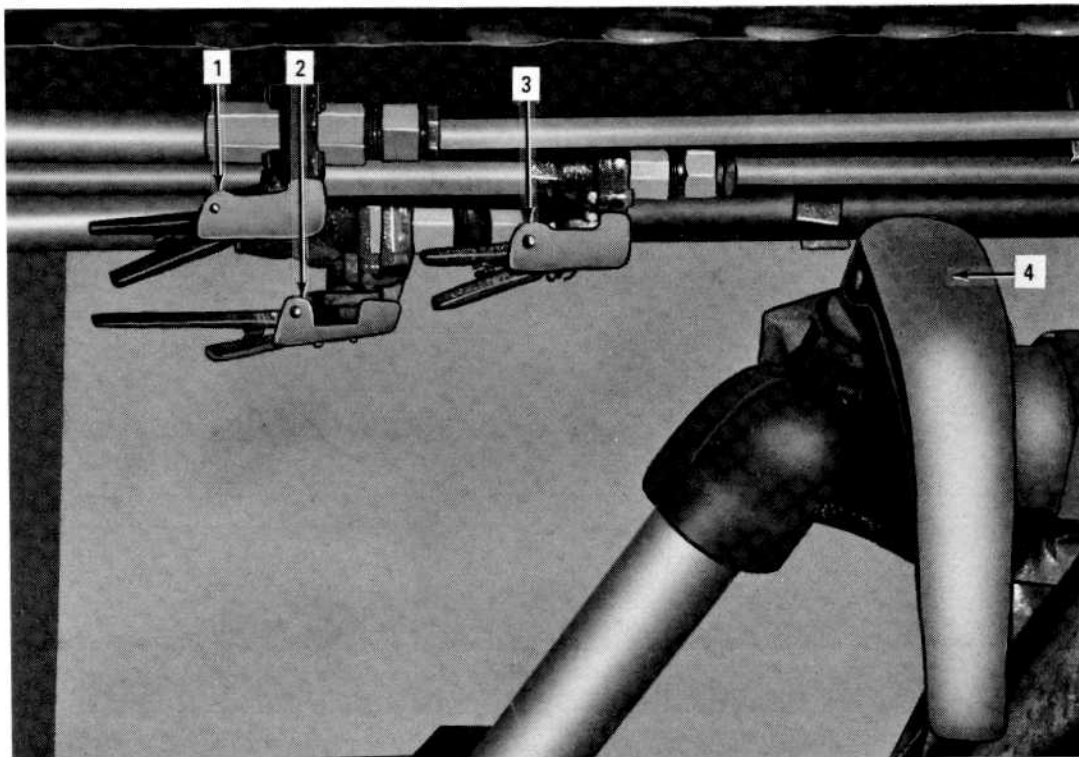
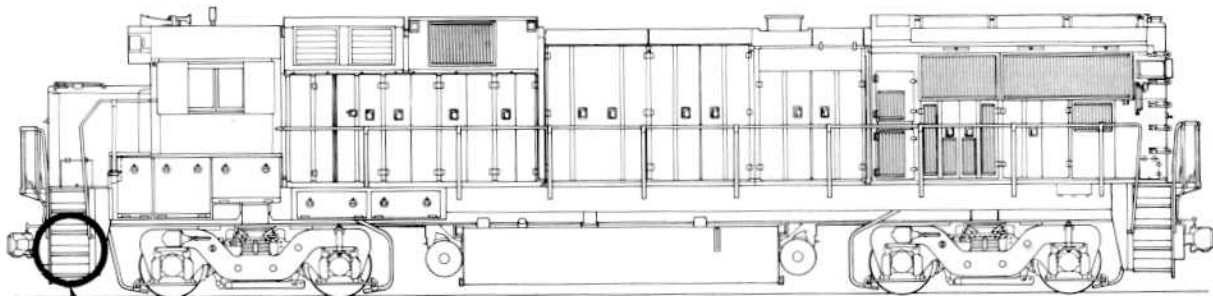


FIG. 6.

FIG. 7, E-31315



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	APPLICATION PIPE CUT-OUT COCK	POSITION			
2	MAIN RESERVOIR PIPE CUT-OUT COCK	POSITION			
3	ACTUATING PIPE CUT-OUT COCK	POSITION			
4	BRAKE PIPE CUT-OUT COCK	POSITION			

FIG. 7. "B" SIDE, F END UNDER STEP.

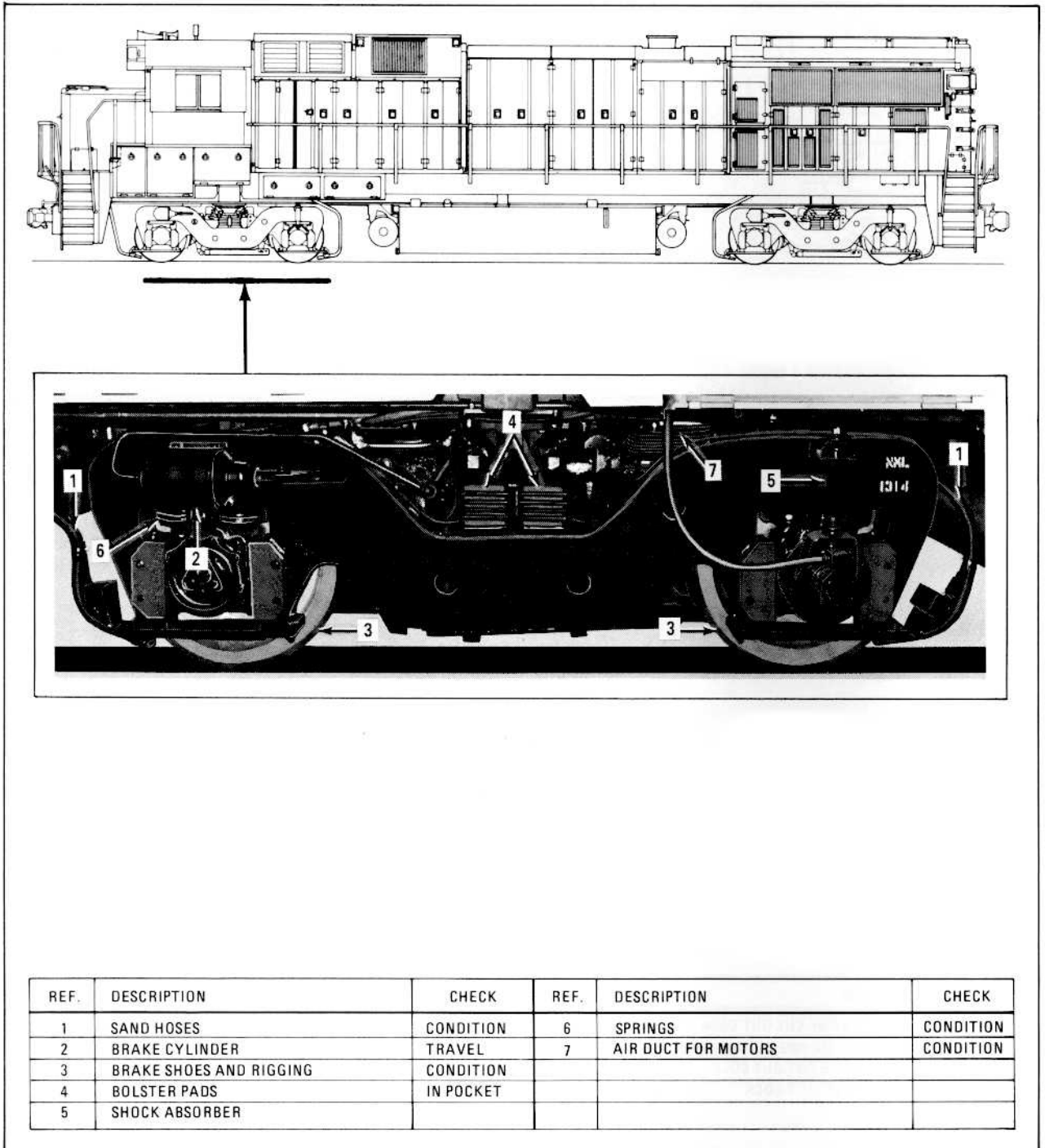
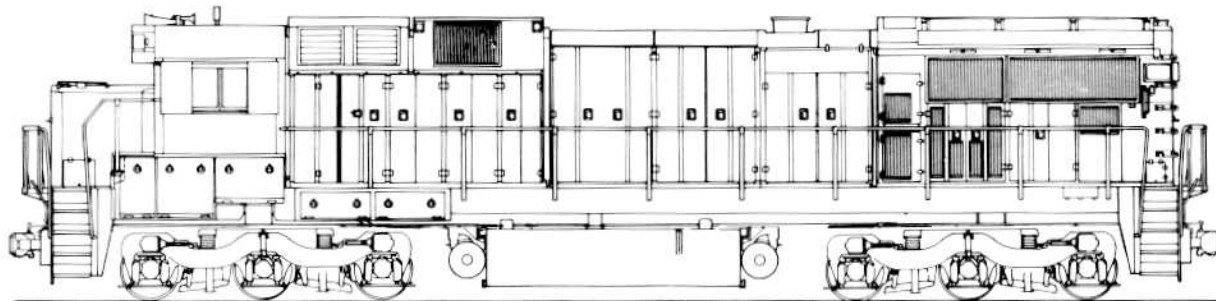


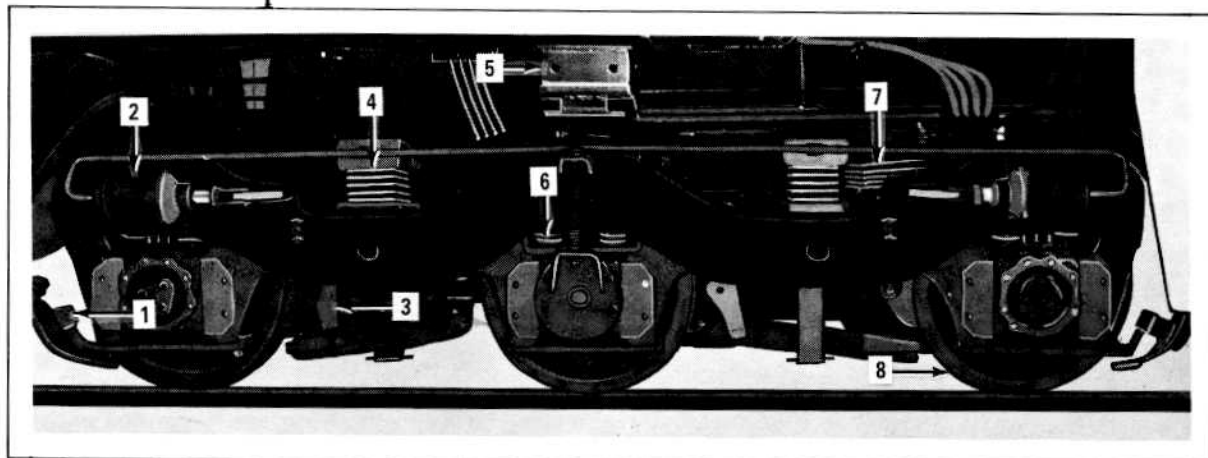
FIG. 8, E-3155

REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND HOSES	CONDITION	6	SPRINGS	CONDITION
2	BRAKE CYLINDER	TRAVEL	7	AIR DUCT FOR MOTORS	CONDITION
3	BRAKE SHOES AND RIGGING	CONDITION			
4	BOLSTER PADS	IN POCKET			
5	SHOCK ABSORBER				

FIG. 8. "B" SIDE F END TRUCK.

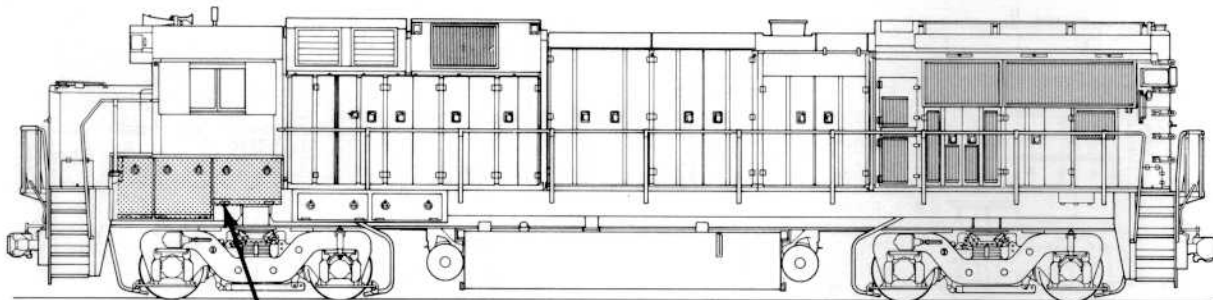


NOTE: FOR 6 AXLE LOCOMOTIVE, TYPICAL OF 4 LOCATIONS.

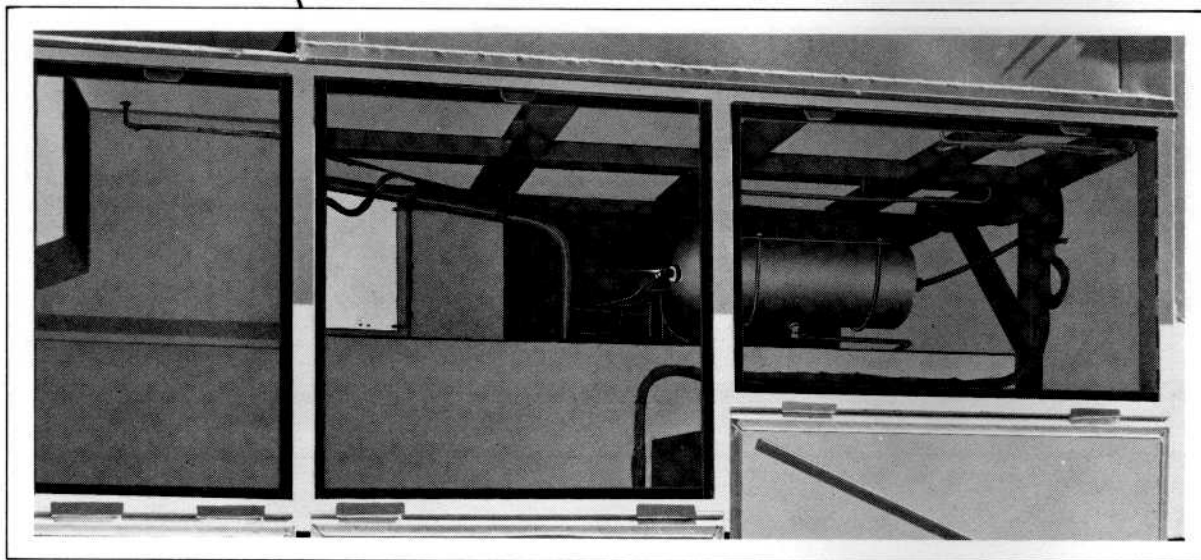


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND HOSE	CONDITION	6	SPRINGS	CONDITION
2	BRAKE CYLINDER	TRAVEL	7	AIR DUCT FOR MOTOR	CONDITION
3	BRAKE SHOES AND RIGGING	CONDITION			
4	BOLSTER PAD	IN POCKET			
5	LIFTING ARRANGEMENT				

FIG. 9. 3 WHEEL TRUCK, 6 AXLE LOCOMOTIVE.



NOTE: SPACE FOR CAB SIGNAL OR TRAIN CONTROL EQUIPMENT

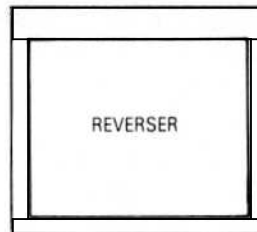
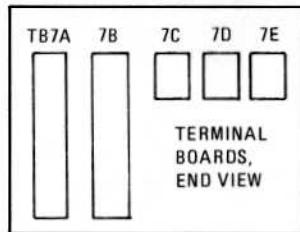
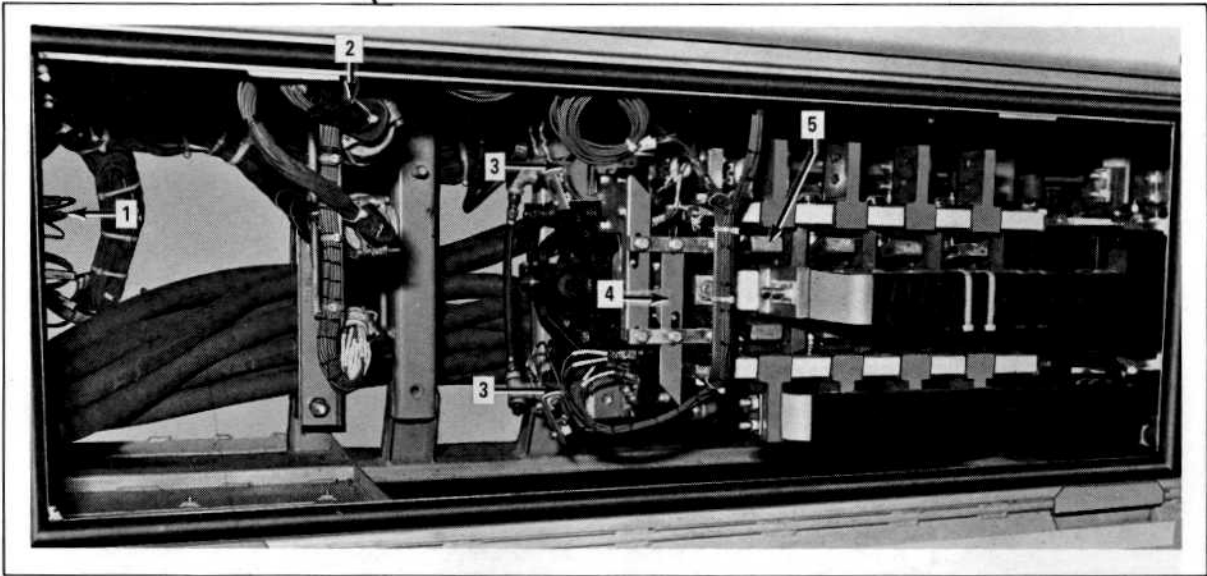
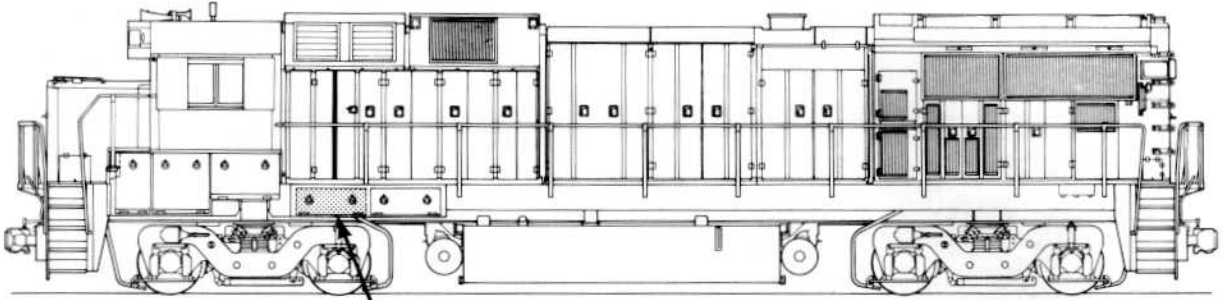


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK

FIG. 10. CONTROL COMPARTMENT NO. 9.

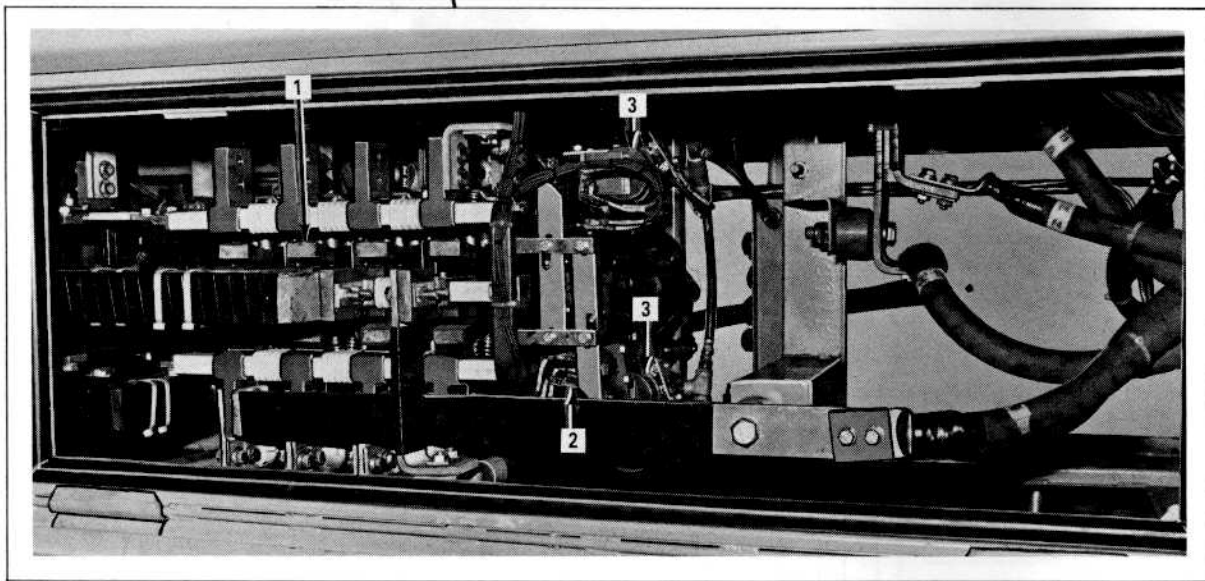
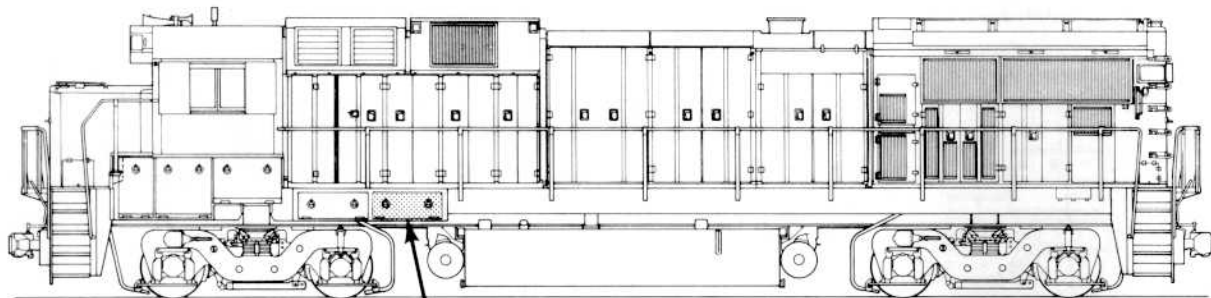
FIG. 10, E-31317

FIG. 11, E-31421



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	TERMINAL BOARDS	CONDITION			
2	WIRING PLUGS	TIGHTNESS			
3	MAGNET VALVES	CONDITION			
4	POSITION SENSOR	WIRES			
5	MAIN CONTACTS	CONDITION			

FIG. 11. CONTROL COMPARTMENT NO. 7.

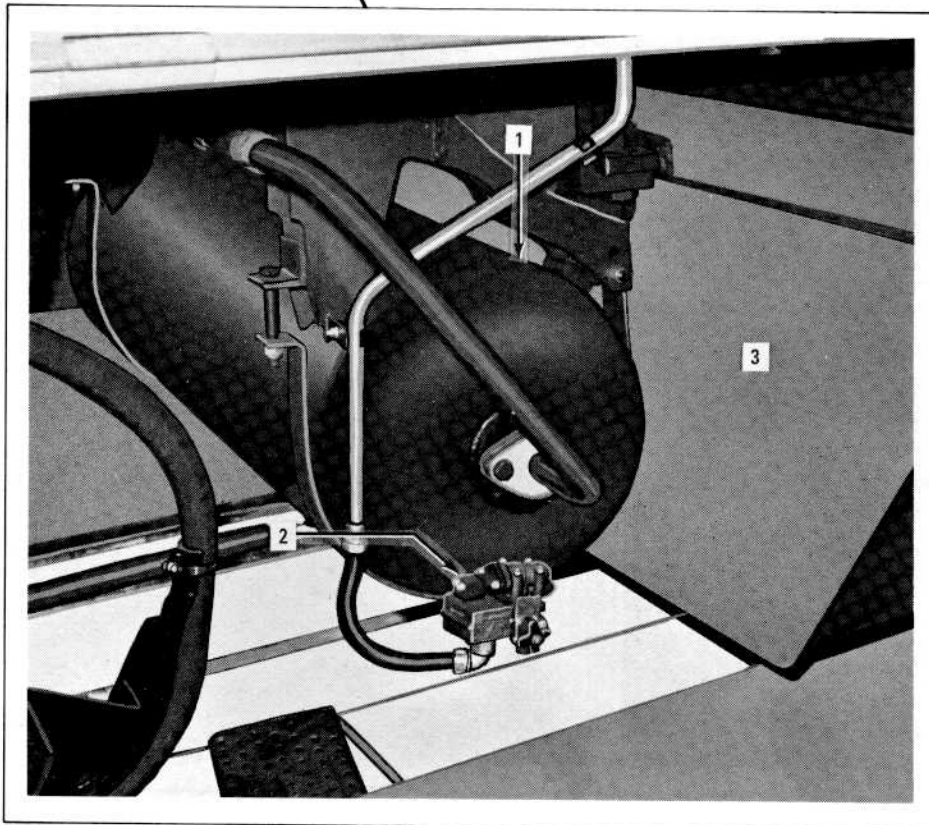
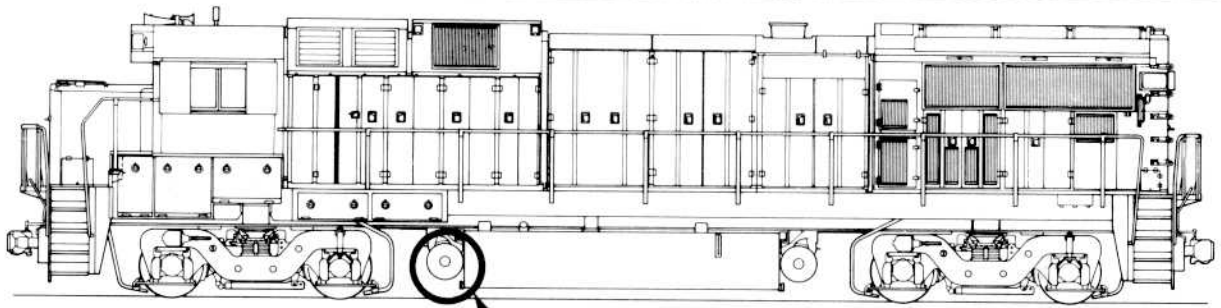


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	BRAKING SWITCH	TIPS			
2	POSITION SENSOR	WIRES			
3	MAGNET VALVES	CONDITION			

FIG. 12. CONTROL COMPARTMENT NO. 7.

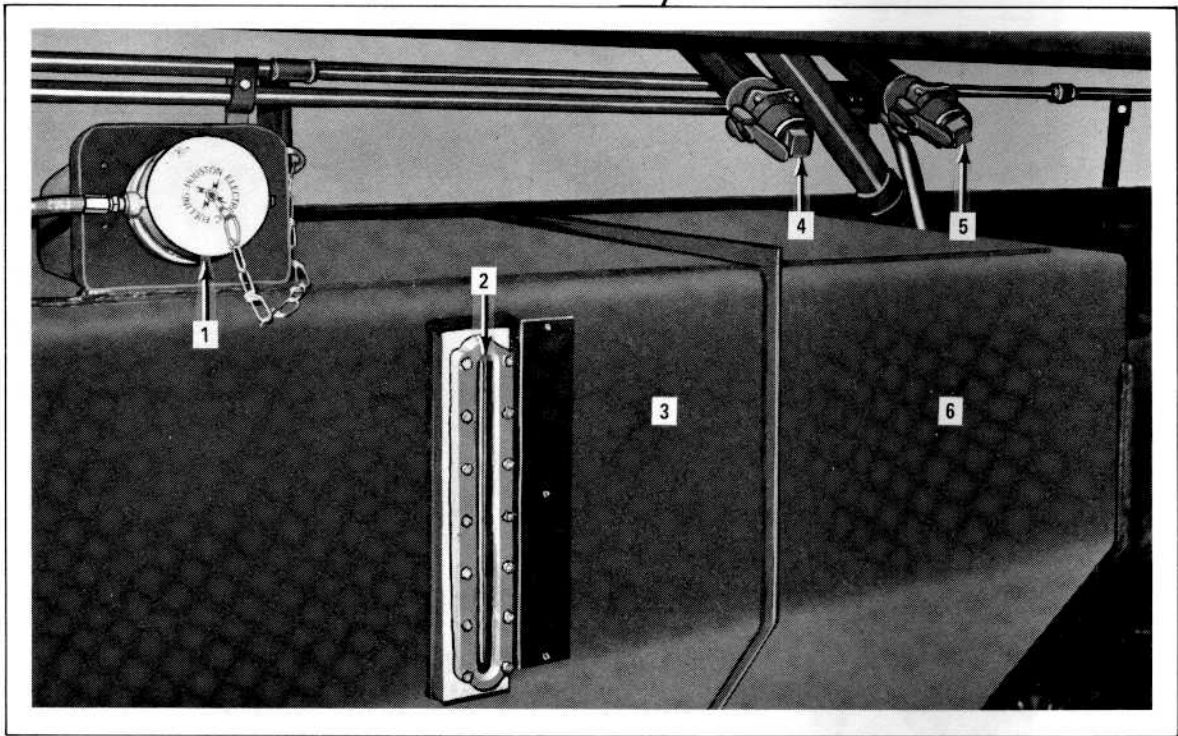
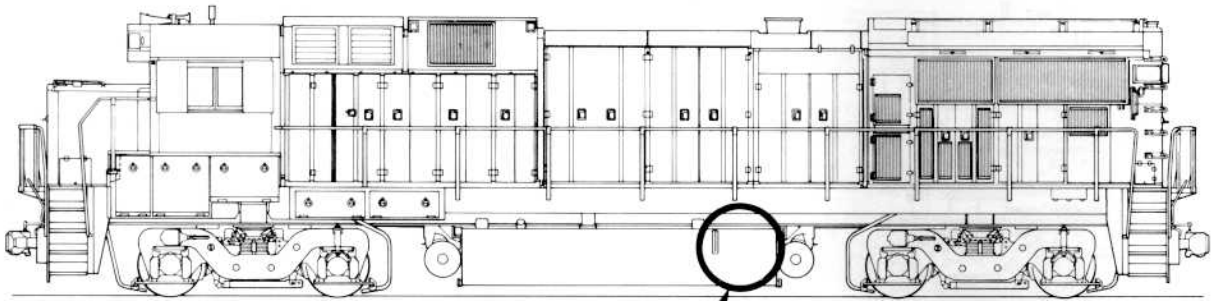
FIG. 12, E-31420

FIG. 13, E-31419



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	AIR RESERVOIR				
2	DRAIN VALVE	SCREW OUT			
3	FUEL TANK	LEVEL			

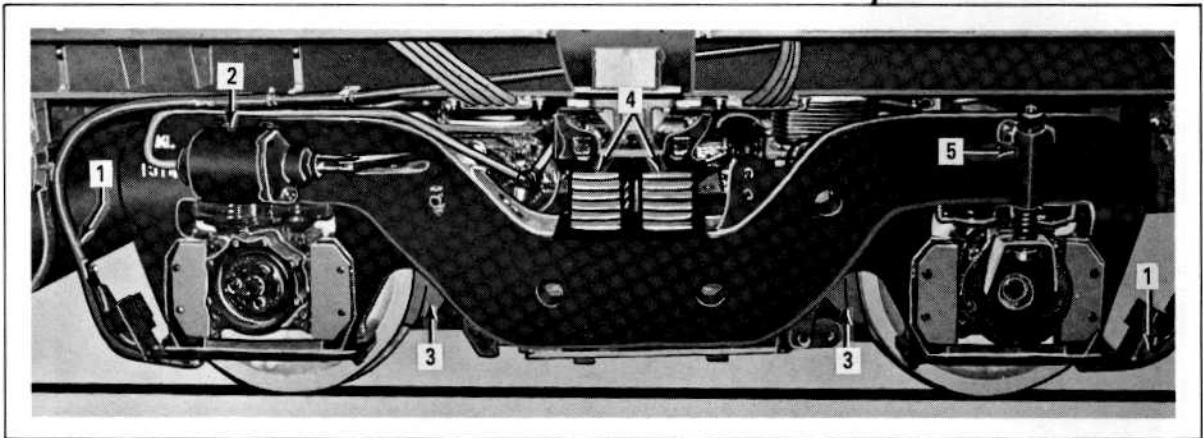
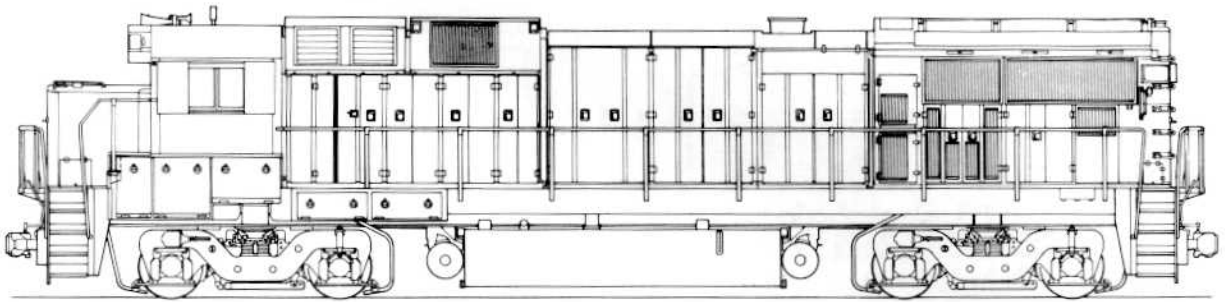
FIG. 13. "B" SIDE FUEL TANK.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	FULL FILL	CAP ON	6	RETENTION TANK	LEVEL
2	FUEL SIGHT GLASS	LEVEL			
3	FUEL TANK	LEVEL			
4	LUBE OIL DRAIN VALVE	CLOSED			
5	LUBE OIL DRAIN VALVE	CLOSED			

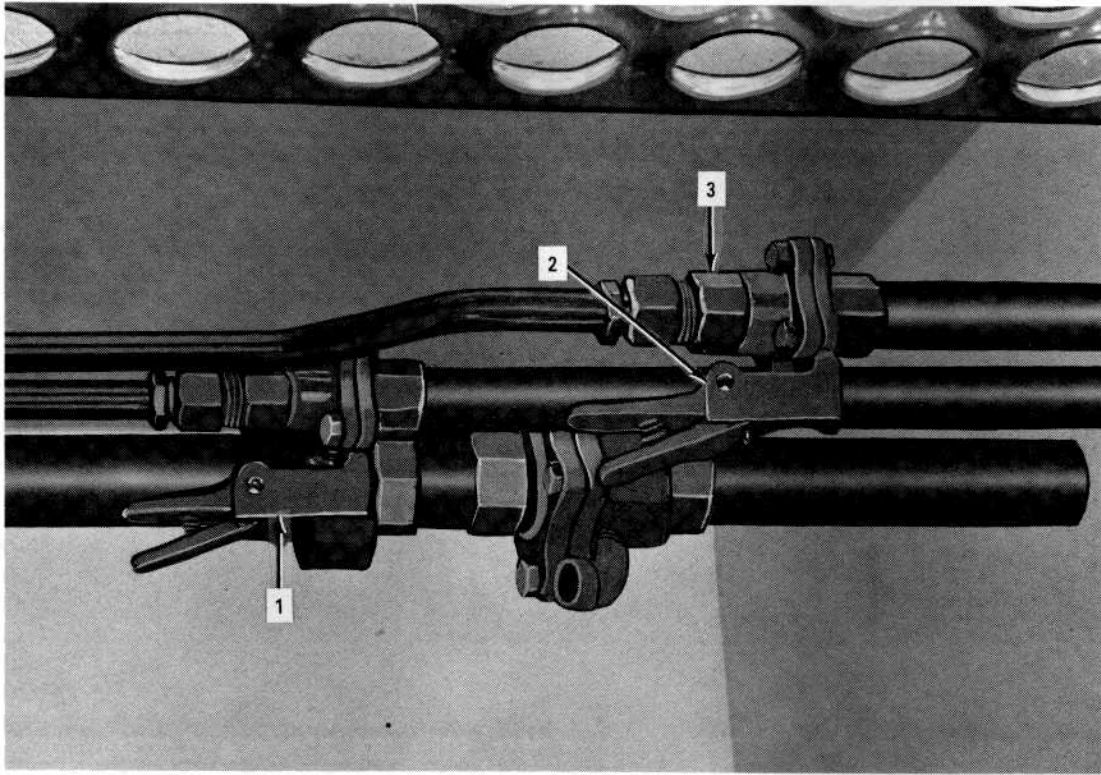
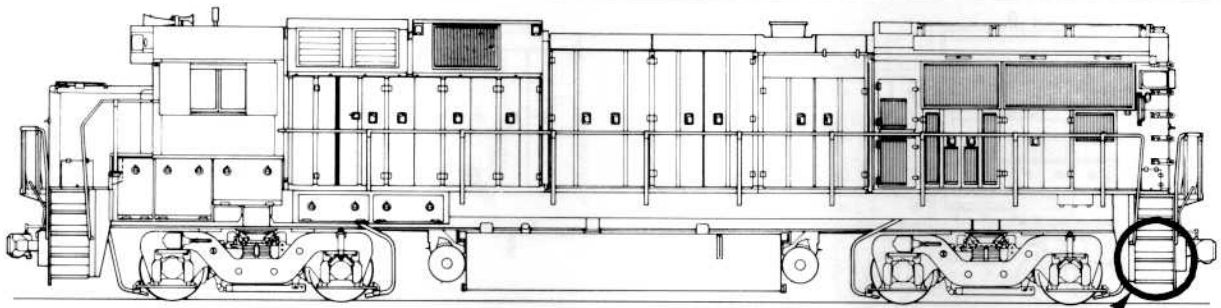
FIG. 14. "B" SIDE FUEL TANK.

FIG. 15, E-31556



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND HOSES	CONDITION			
2	BRAKE CYLINDER	TRAVEL			
3	BRAKE SHOES AND RIGGING	CONDITION			
4	BOLSTER PADS	IN POCKET			
5	SHOCK ABSORBER				

FIG. 15. "B" SIDE R END TRUCK.

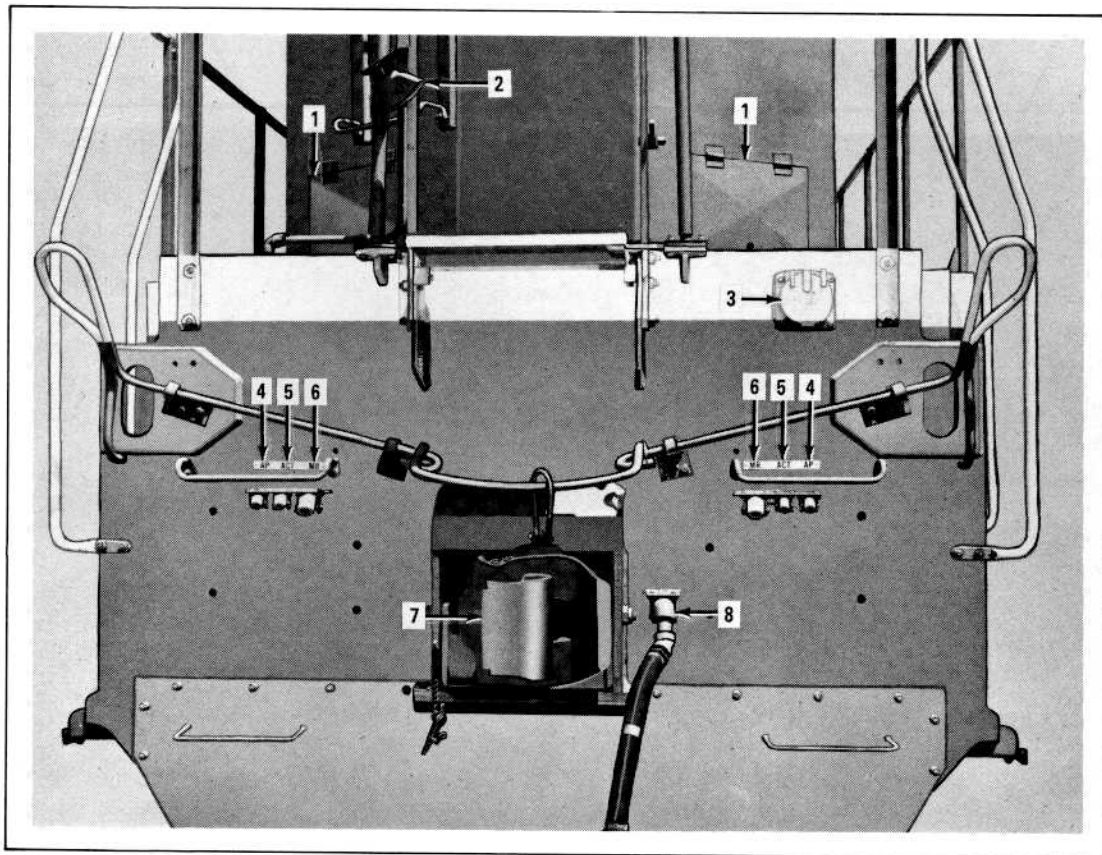
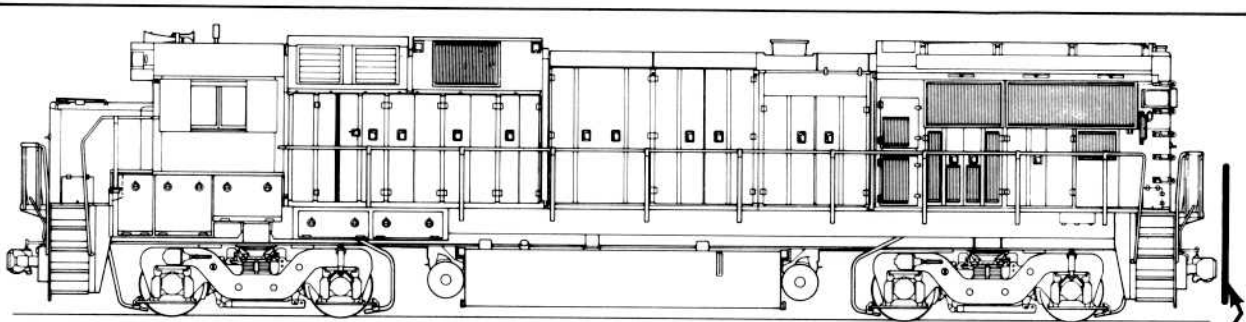


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	MAIN RESERVOIR PIPE CUT-OUT COCK	POSITION			
2	ACTUATING PIPE CUT-OUT COCK	POSITION			
3	APPLICATION PIPE CUT-OUT COCK	POSITION			

FIG. 16. "B" SIDE R END UNDER STEPS.

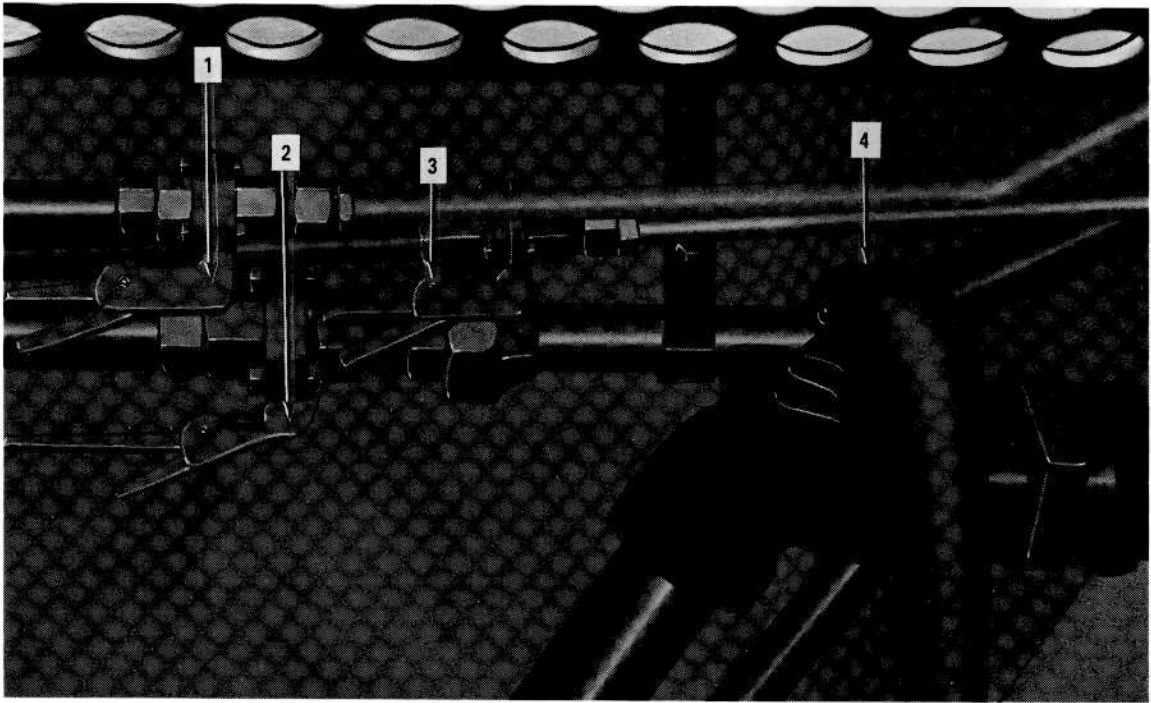
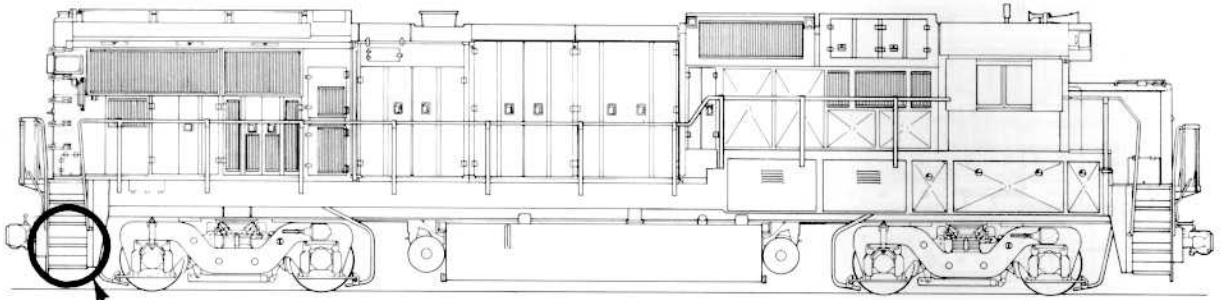
FIG. 16, E-31318

FIG. 17, E-31319



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND BOX TRAP/CUT-OUT	POSITION	6	MAIN RESERVOIR PIPE	
2	CROSSWALK LIGHT	WORKS	7	COUPLER	CRACKS
3	MU RECEPTACLE	PINS	8	BRAKE PIPE HOSE	
4	APPLICATION PIPE				
5	ACTUATING PIPE				

FIG. 17. "R" END PLATFORM.

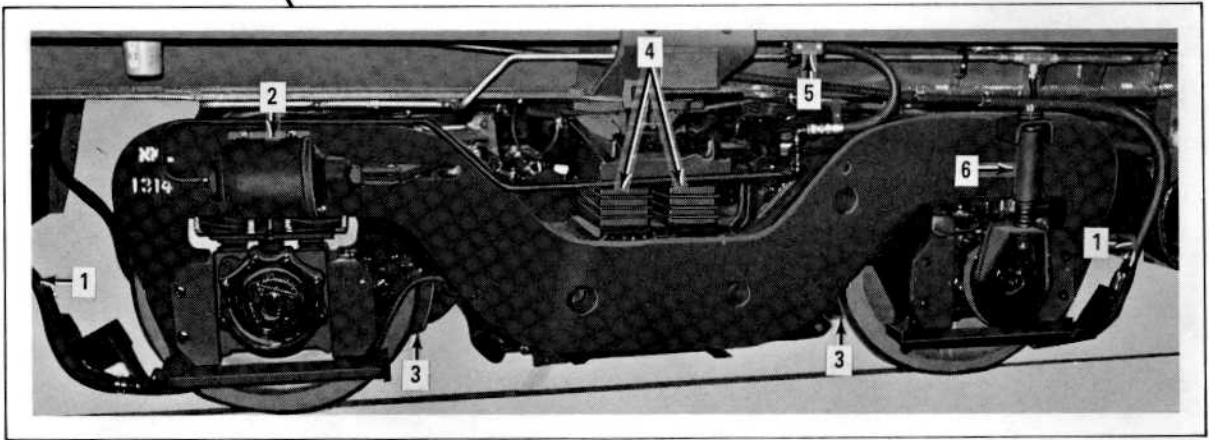
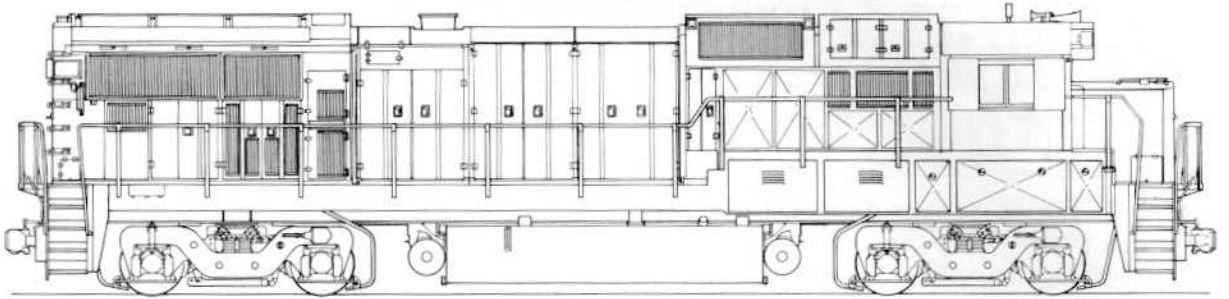


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	APPLICATION PIPE CUT-OUT COCK	POSITION			
2	MAIN RESERVOIR PIPE CUT-OUT COCK	POSITION			
3	ACTUATING PIPE CUT-OUT COCK	POSITION			
4	BRAKE PIPE CUT OUT COCK	POSITION			

FIG. 18. "A" SIDE R END UNDER STEPS.

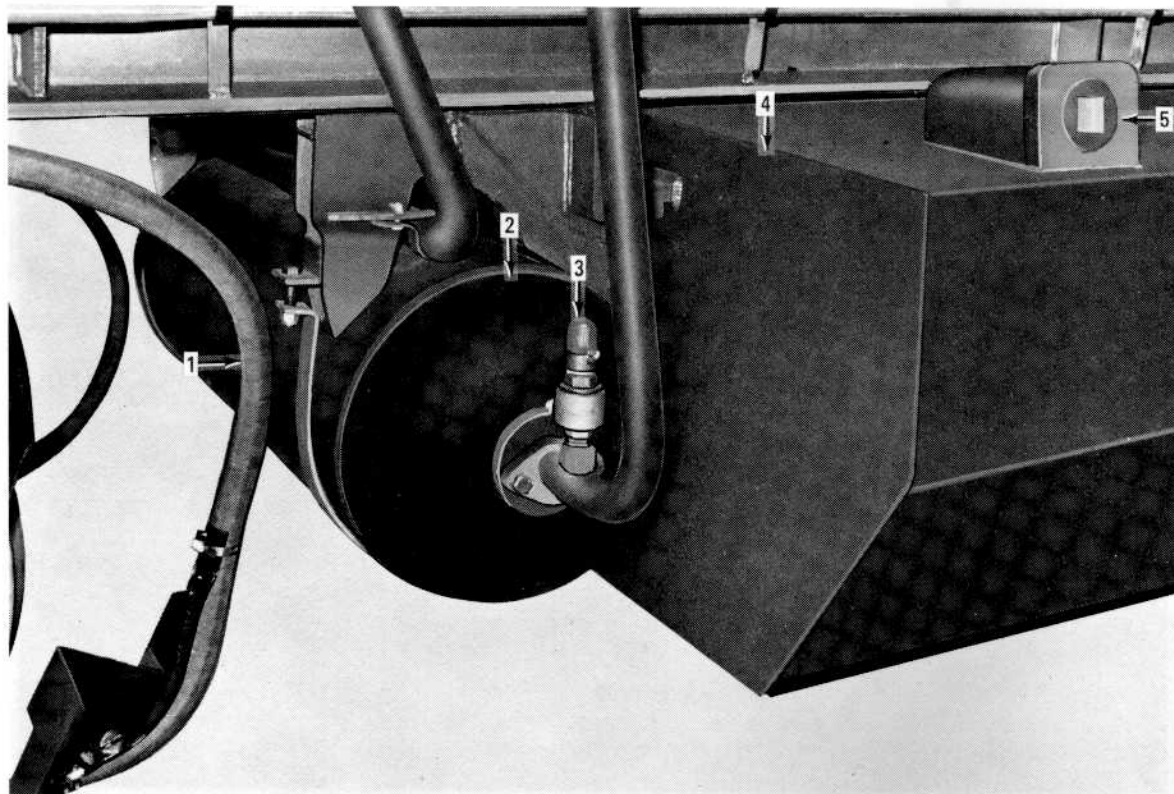
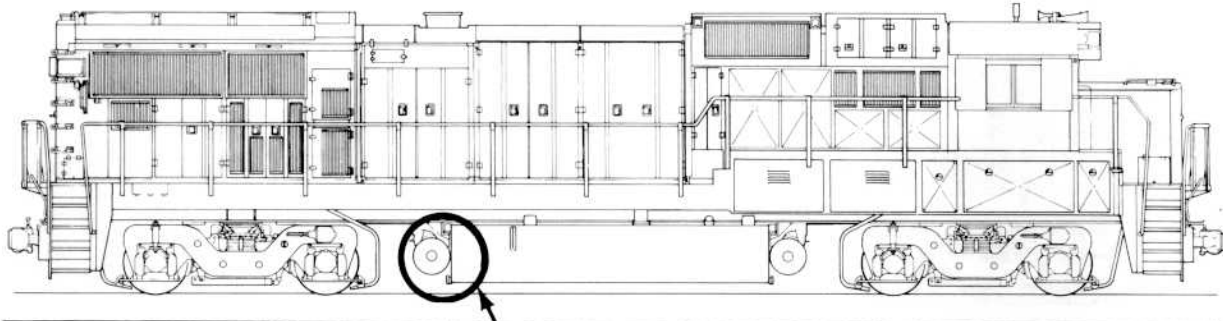
FIG. 18, E-31320

FIG. 19, E-31557



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND HOSES	CONDITION	6	SHOCK ABSORBER	CONDITION
2	BRAKE CYLINDER	TRAVEL			
3	BRAKE SHOES AND RIGGING	CONDITION			
4	BOLSTER PADS	IN POCKET			
5	AIR BRAKE CUT-OUT COCK	POSITION			

FIG. 19. "A" SIDE R END TRUCK.

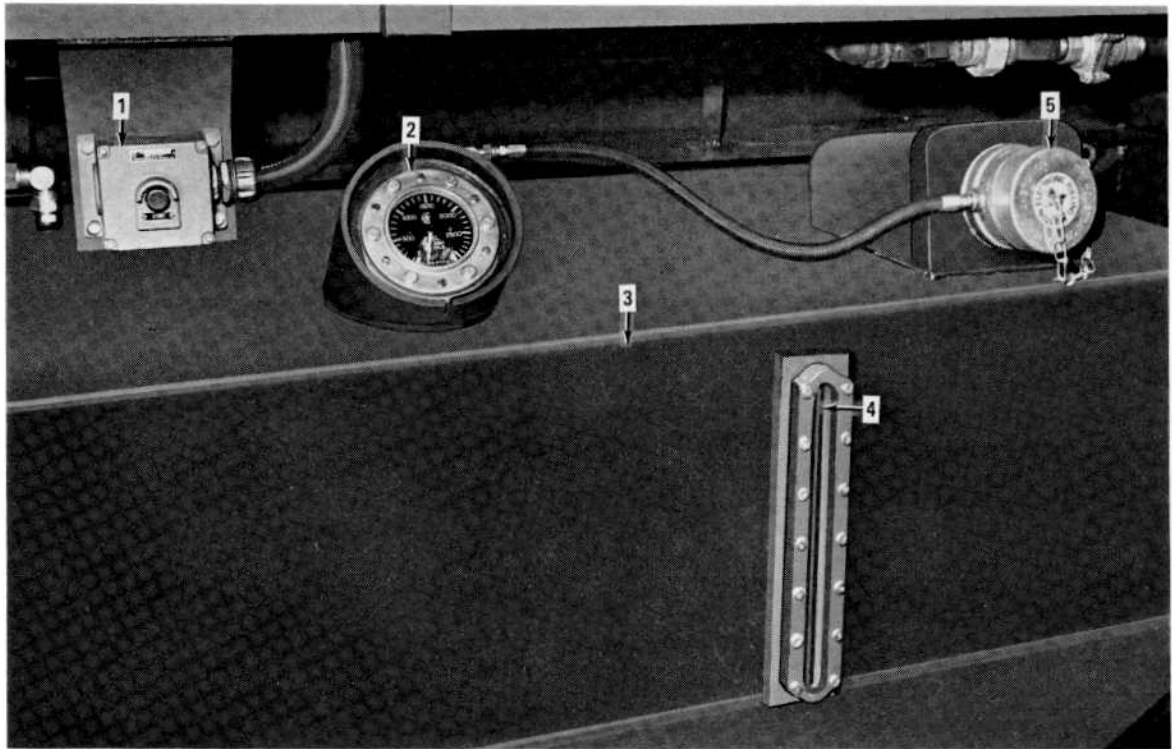
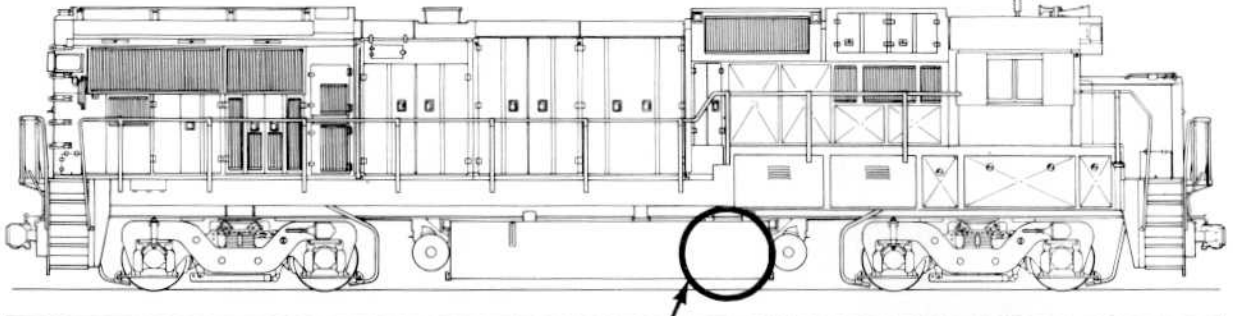


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND HOSE	CRACKS			
2	AIR RESERVOIR				
3	SAFETY VALVE				
4	FUEL TANK	LEVEL			
5	FUEL TANK FILL (OPTIONAL)				

FIG. 20. "A" SIDE FUEL TANK.

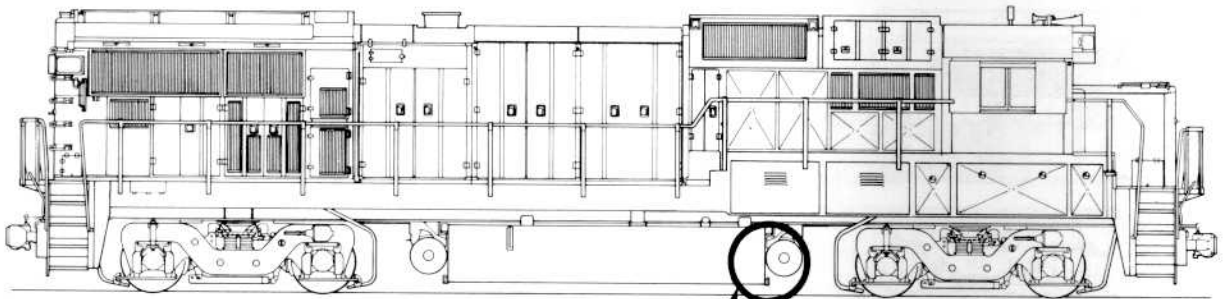
FIG. 20, E-31321

FIG. 21, E-31422



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	FUEL EMERGENCY CUT-OFF BUTTON				
2	FUEL GAGE	AMOUNT			
3	FUEL TANK	LEVEL			
4	FUEL SIGHT GLASS	LEVEL			
5	FUEL FILL	CAP ON			

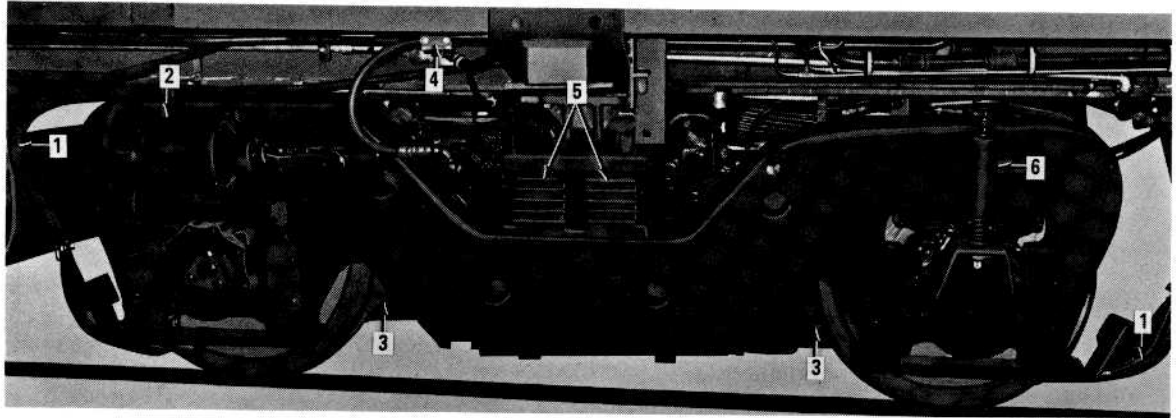
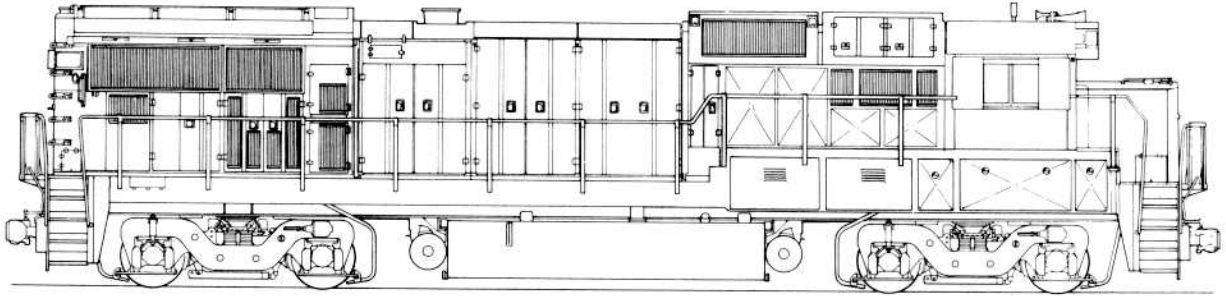
FIG. 21. "A" SIDE FUEL TANK.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	FUEL TANK	LEVEL	6	AIR FILTER	
2	AIR FILTER WITH AUTO DRAIN	OPERATION	7	AIR RESERVOIR	
3	BELL	OPERATION	8	SAND HOSE	CONDITION
4	MAIN RESERVOIR CUT-OUT COCK	OPERATION	9	TRUCK FRAME	
5	ELECTRIC BLOWDOWN VALVE	OPERATION			

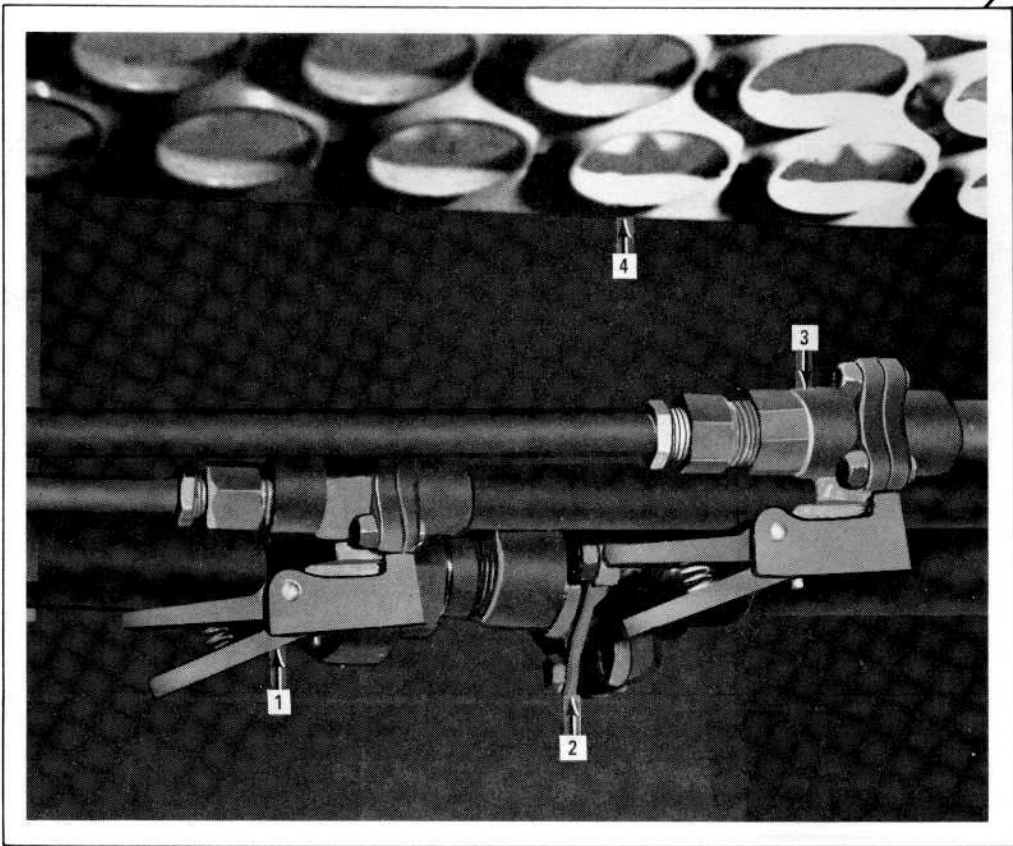
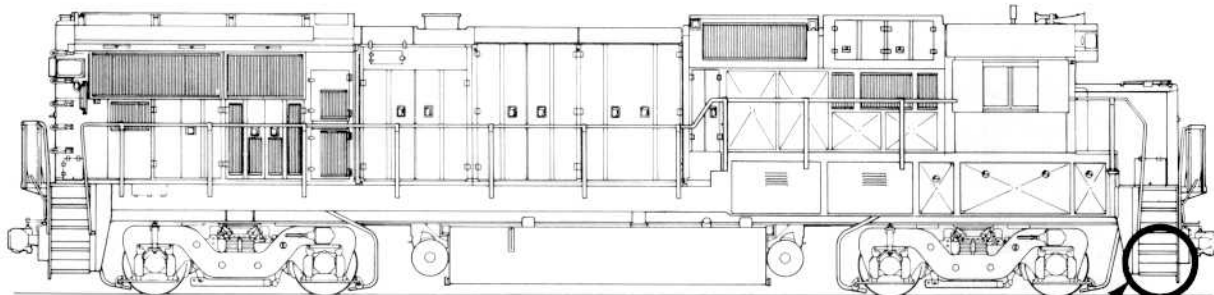
FIG. 22. "A" SIDE FUEL TANK.

FIG. 23, E-31558



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	SAND HOSES	CONDITION			
2	BRAKE CYLINDER	TRAVEL			
3	BRAKE SHOES AND RIGGING	CONDITION			
4	AIR BRAKE CUT-OUT COCK	POSITION			
5	BOLSTER PADS	IN POCKET			

FIG. 23. "A" SIDE F END TRUCK.

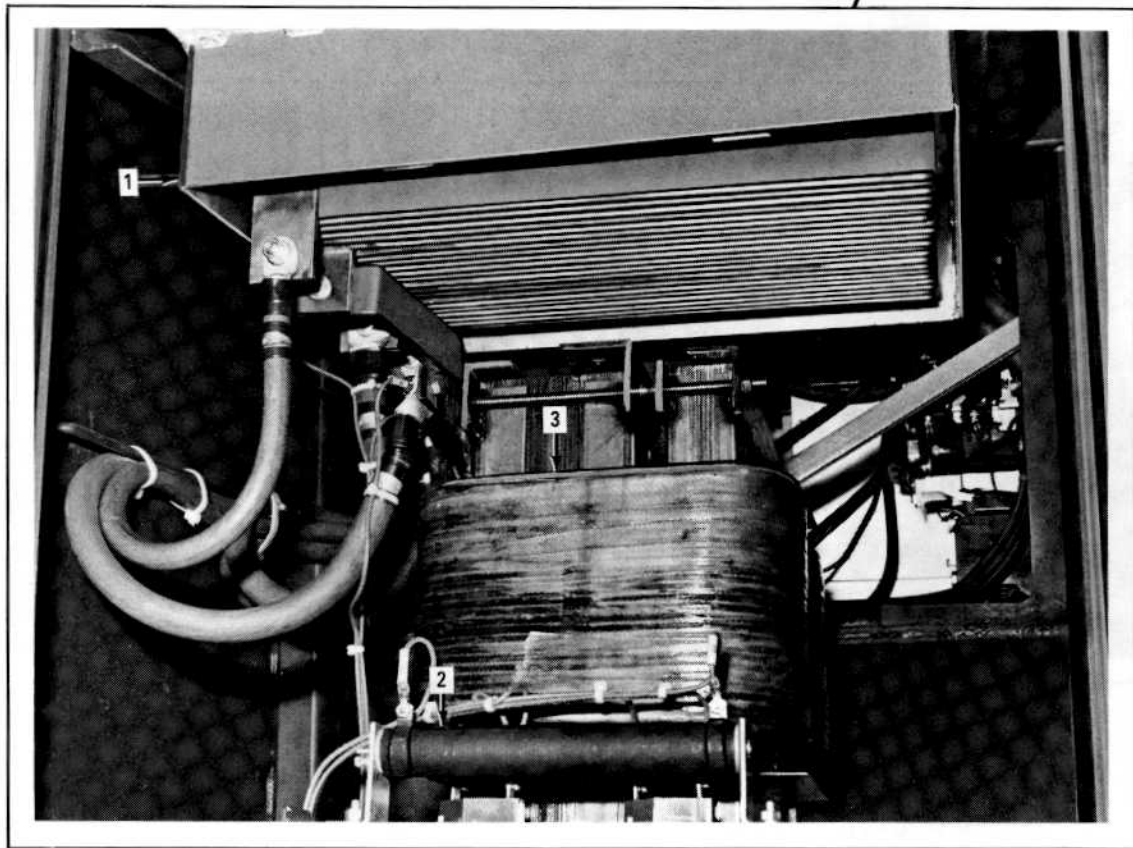
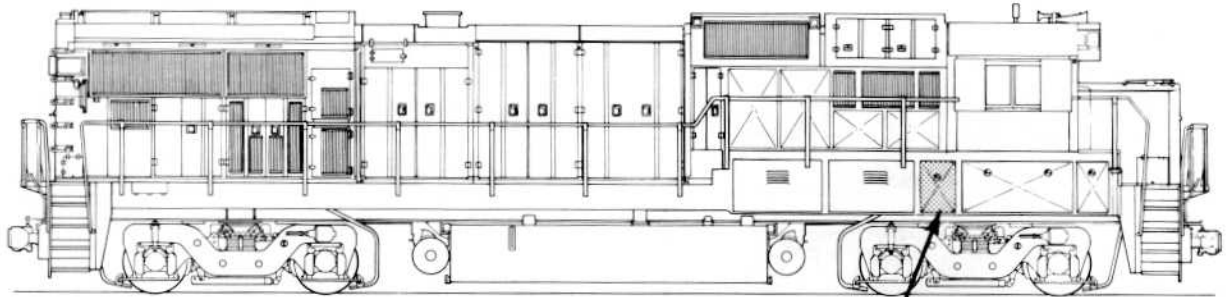


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	ACTUATING PIPE CUT-OUT COCK	POSITION			
2	MAIN RESERVOIR CUT-OUT COCK	POSITION			
3	APPLICATION PIPE CUT-OUT COCK	POSITION			
4	STEP				

FIG. 24. "A" SIDE F END UNDER STEPS.

FIG. 24, E-31322

FIG. 25, E-31359



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	(R3) CRANK RESISTOR	CONDITION			
2	(CRC) CRANK REACTOR CLIPPER	CONDITION			
3	(LS) CRANK/BATTERY CHARGE REACTOR	CONDITION			

FIG. 25. CONTROL COMPARTMENT NO. 8.

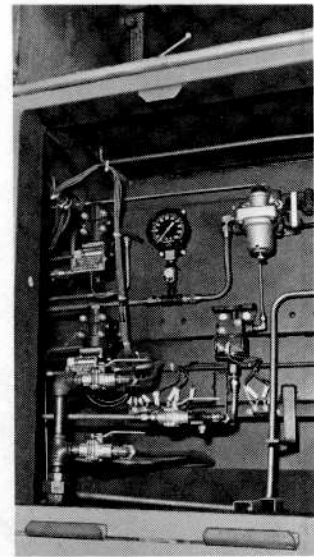
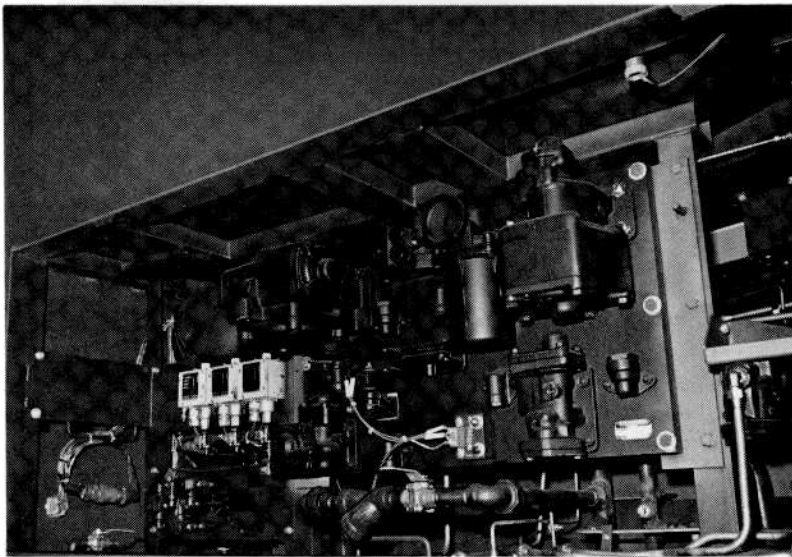
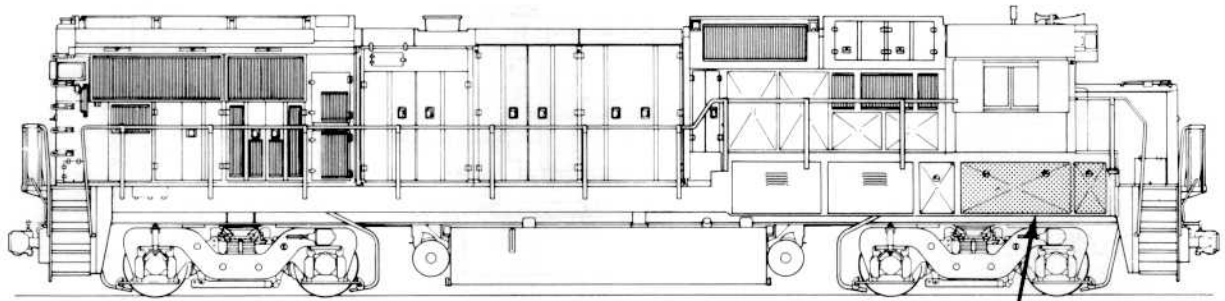
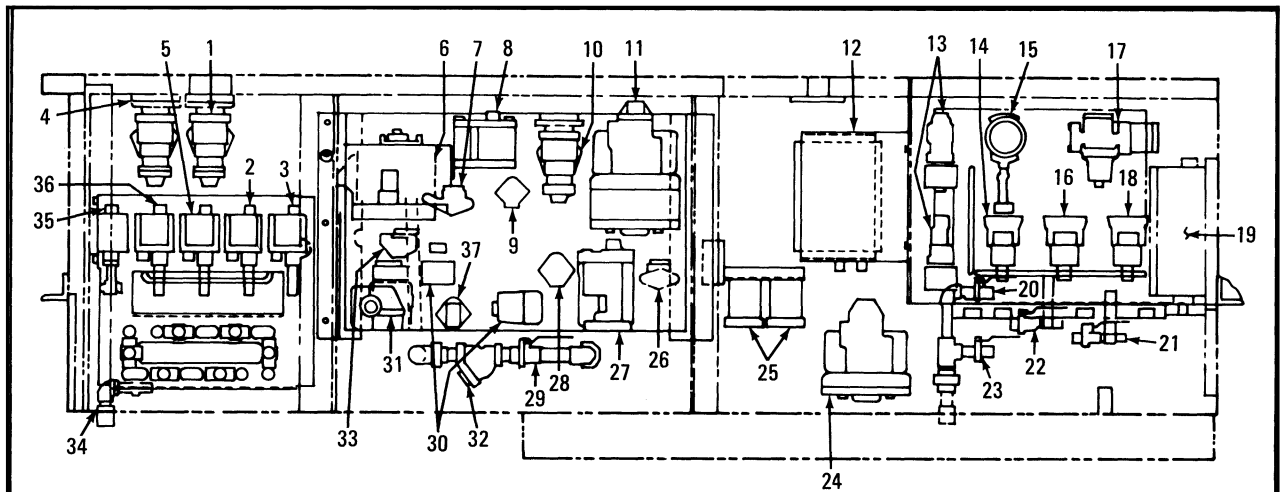


FIG. 26, E-31559

FIG. 26. AIR BRAKE COMPARTMENT.



REF.	DESCRIPTION	REF.	DESCRIPTION
1	DELAYED PENALTY RELAY	21	SCMV CUT-OUT COCK
2	(SPS) SAND PRESSURE SWITCH	22	OSV CUT-OUT COCK
3	(SPS) SAND PRESSURE SWITCH	23	HORN BELL (CUT-OUT COCK)
4	MU 6BL EQUIP. RELAY VALVE	24	J1 RELAY
5	(IBS) INDEPENDENT BRAKE PRESSURE SWITCH	25	NO. 13 AND NO. 20 PIPE FILTERS
6	26F CONTROL VALVE	26	NO. 8 PIPE CHECK VALVE OR BLANK PLATE
7	DEAD ENGINE CHECK VALVE	27	P2A OR BYPASS PLATE
8	A1 CHG. CUT-OFF PILOT VALVE	28	NO. 16 PIPE DOUBLE CHECK VALVE OR BYPASS PLATE
9	SUPPRESSION DOUBLE CHECK VALVE OR BLK. PLT.	29	BP CUT-OUT COCK
10	RESTRICTED EMERGENCY BRAKE CYL. PRESS. RELAY VALVE OR BY-PASS PLATE	30	NO. 13 AND NO. 16 PIPE DYN. BR. MAG. VALVE AND BYPASS PLATE AND DIODE OR BLANKING PLATE
11	J RELAY	31	Z6F QUICK RELEASE VALVE PORTION
12	AIR MANIFOLD	32	B.P. FILTER
13	F END SAND CONTROL MAGNET VALVES	33	DEAD ENGINE CUT-OUT COCK
14	(OSSV) OVERSPEED MAGNET VALVE	34	CONT. RES. DR. COCK
15	CONTROL AIR GAUGE	35	(BBS) BLENDED BRAKE SWITCH
16	(OSV) OVERSPEED MAGNET VALVE	36	(DBC0) DYNAMIC BRAKE PRESSURE SWITCH
17	NS-1 CONTROL AIR REDUCING VALVE	37	DYN. BR. INT. DOUBLE C.V.
18	(SCMV) SPEED CONTROL MAGNET VALVE		
19	TRAIN SENTRY		
20	FRONT TRUCK SAND MAGNET AND WIPERS CUT-OUT COCK		

FIG. 26. AIR BRAKE COMPARTMENT.

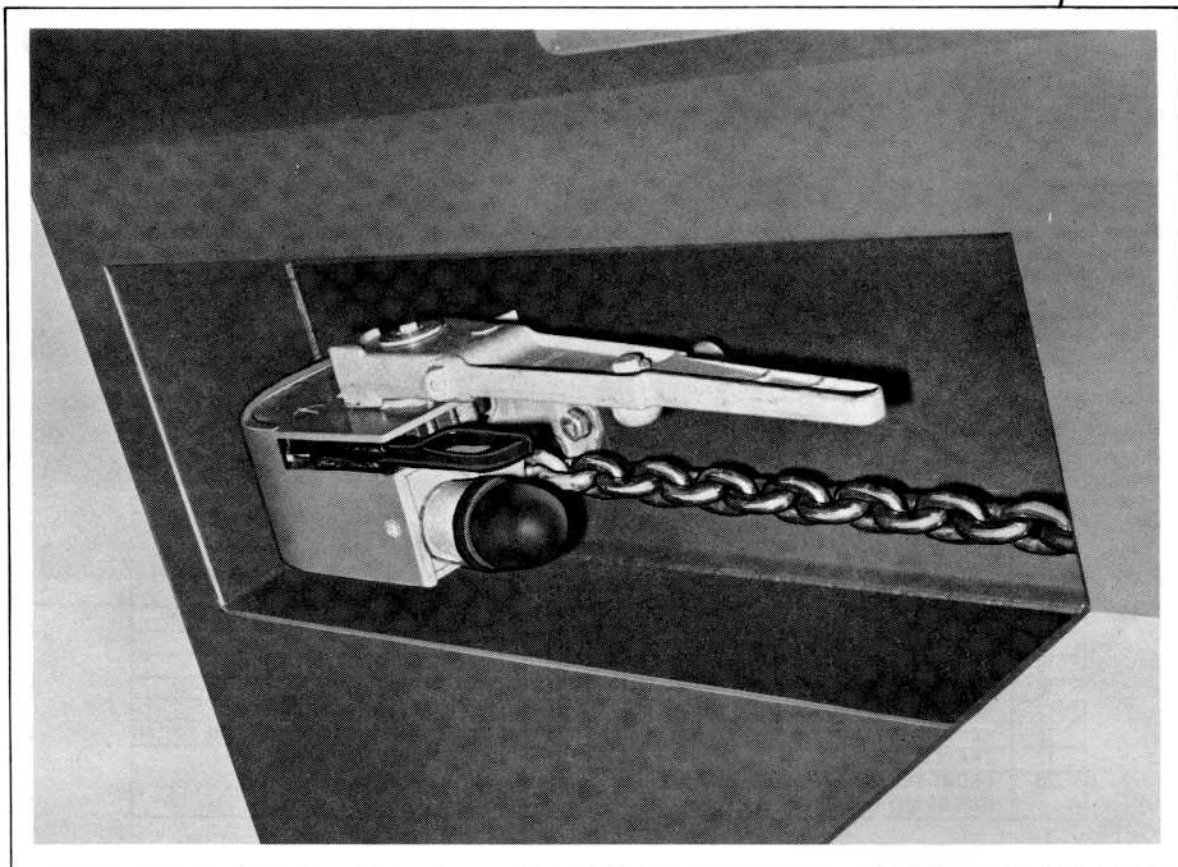
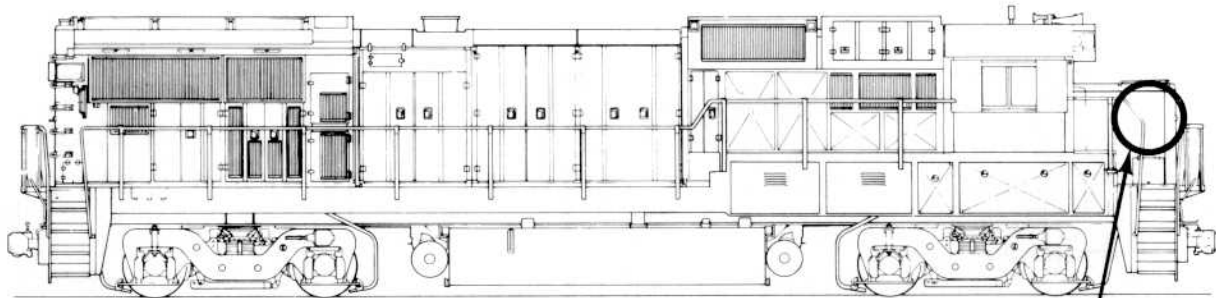
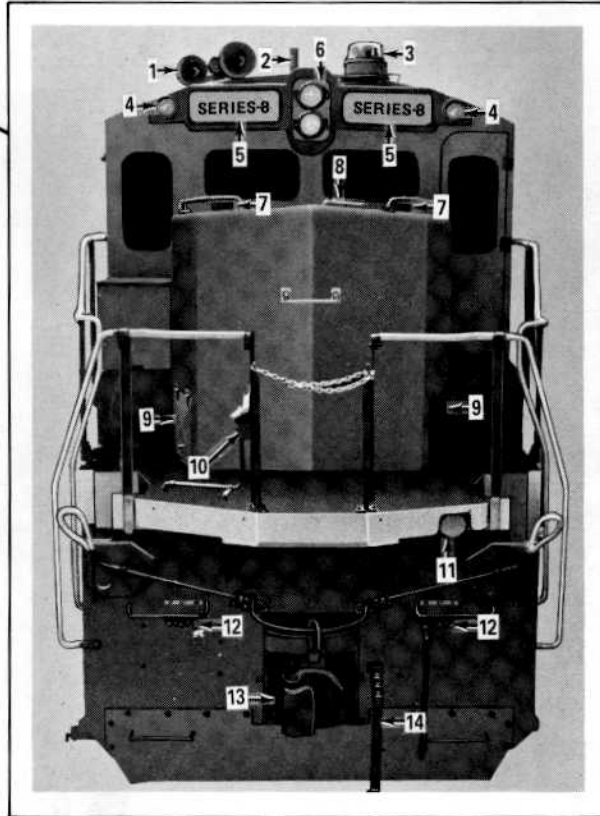
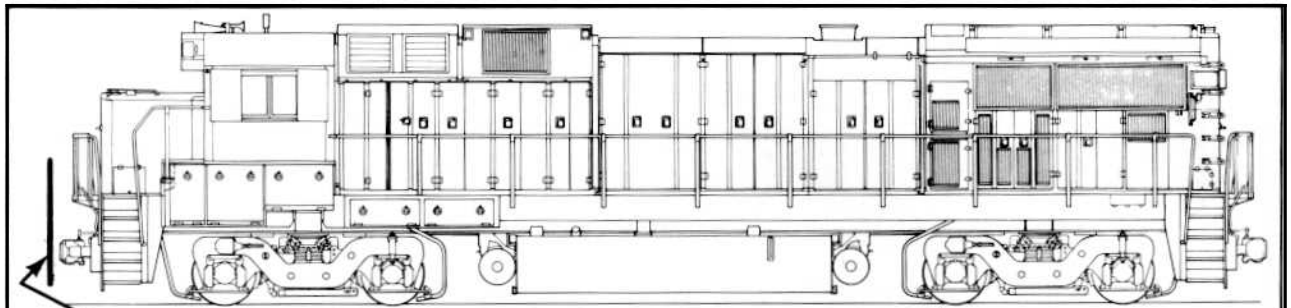


FIG. 27, E-31432

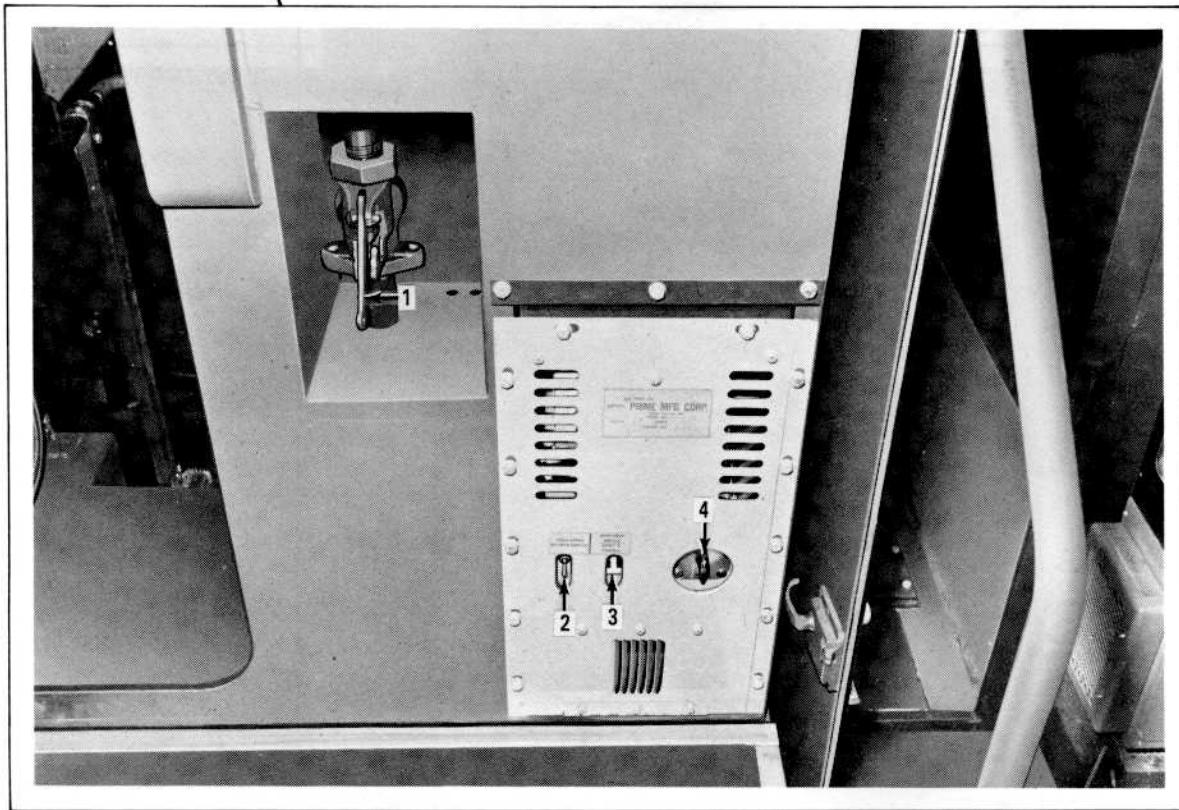
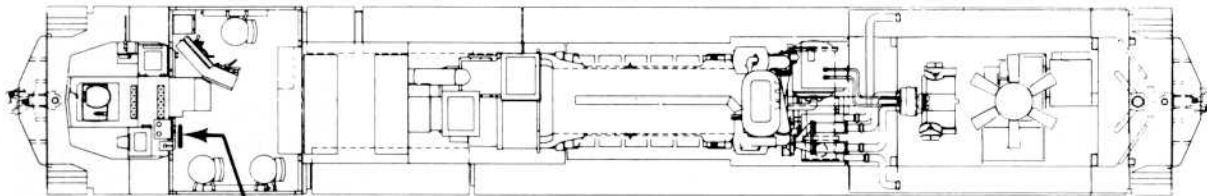
FIG. 27. HANDBRAKE.

FIG. 28, E-31323



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	HORN	OPERATION	8	TOILET COMPARTMENT VENT	
2	RADIO ANTENNA	OPERATION	9	SAND TRAP CUT-OUT	POSITION
3	WARNING LIGHT	OPERATION	10	CROSSWALK LIGHT	WORKS
4	CLASS LIGHTS	OPERATION	11	MU RECEPTACLE	PINS
5	NUMBER LIGHTS	OPERATION	12	MU AIR HOSES	
6	HEADLIGHT	OPERATION	13	COUPLER	CRACKS
7	SAND BOX FILLS	LEVEL	14	BRAKE PIPE HOSE	

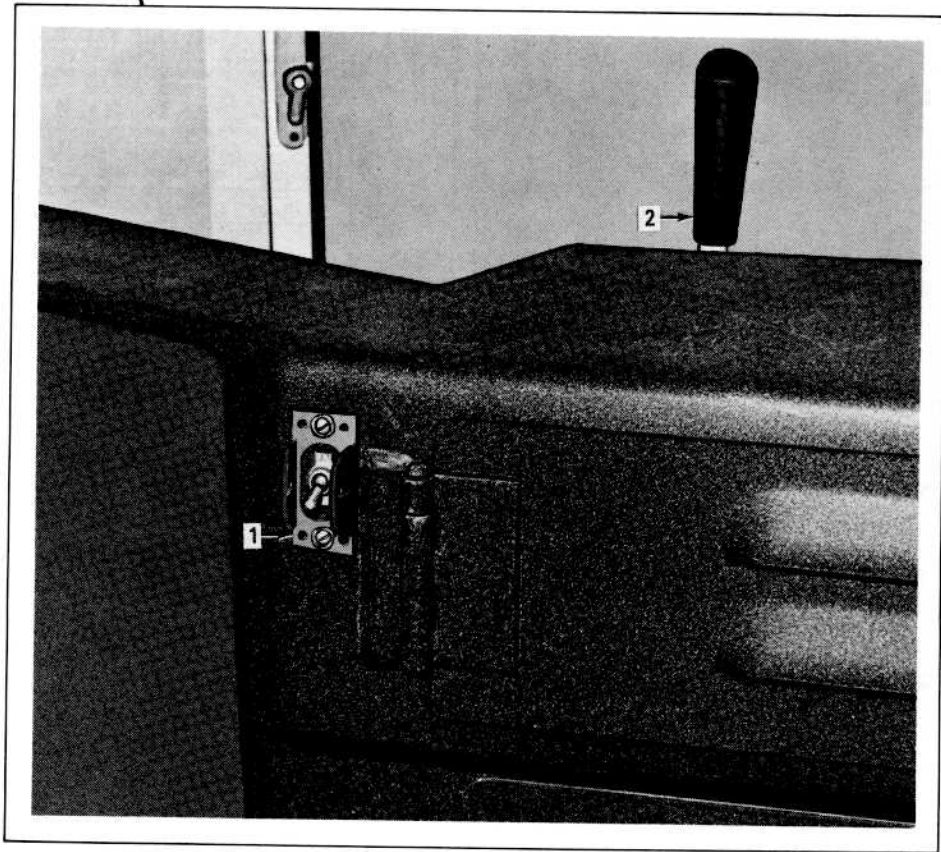
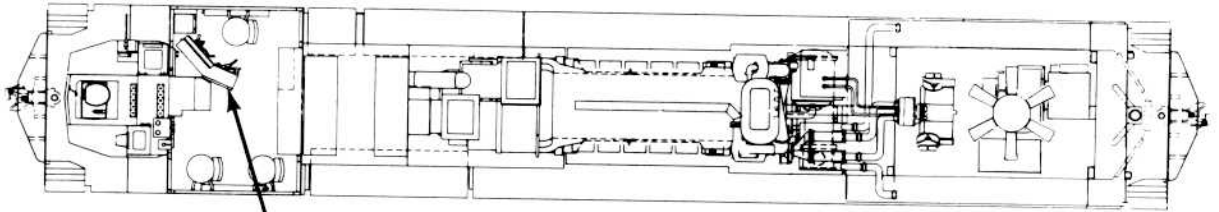
FIG. 28. FRONT END LOCOMOTIVE.



REF.	DESCRIPTION	CHECK			
1	EMERGENCY BRAKE VALVE	POSITION			
2	CAB HEATER BLOWER SWITCH	POSITION			
3	CAB HEATER CIRCUIT BREAKER	POSITION			
4	CAB HEATER TEMPERATURE SWITCH	POSITION			

FIG. 29. OPERATORS CAB MISC. CONTROLS.

FIG. 30, E-31347



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	NOSE CAB LIGHT SWITCH	OPERATION			
2	HORN VALVE	OPERATION			

FIG. 30. BACK OF OPERATORS CONSOLE.

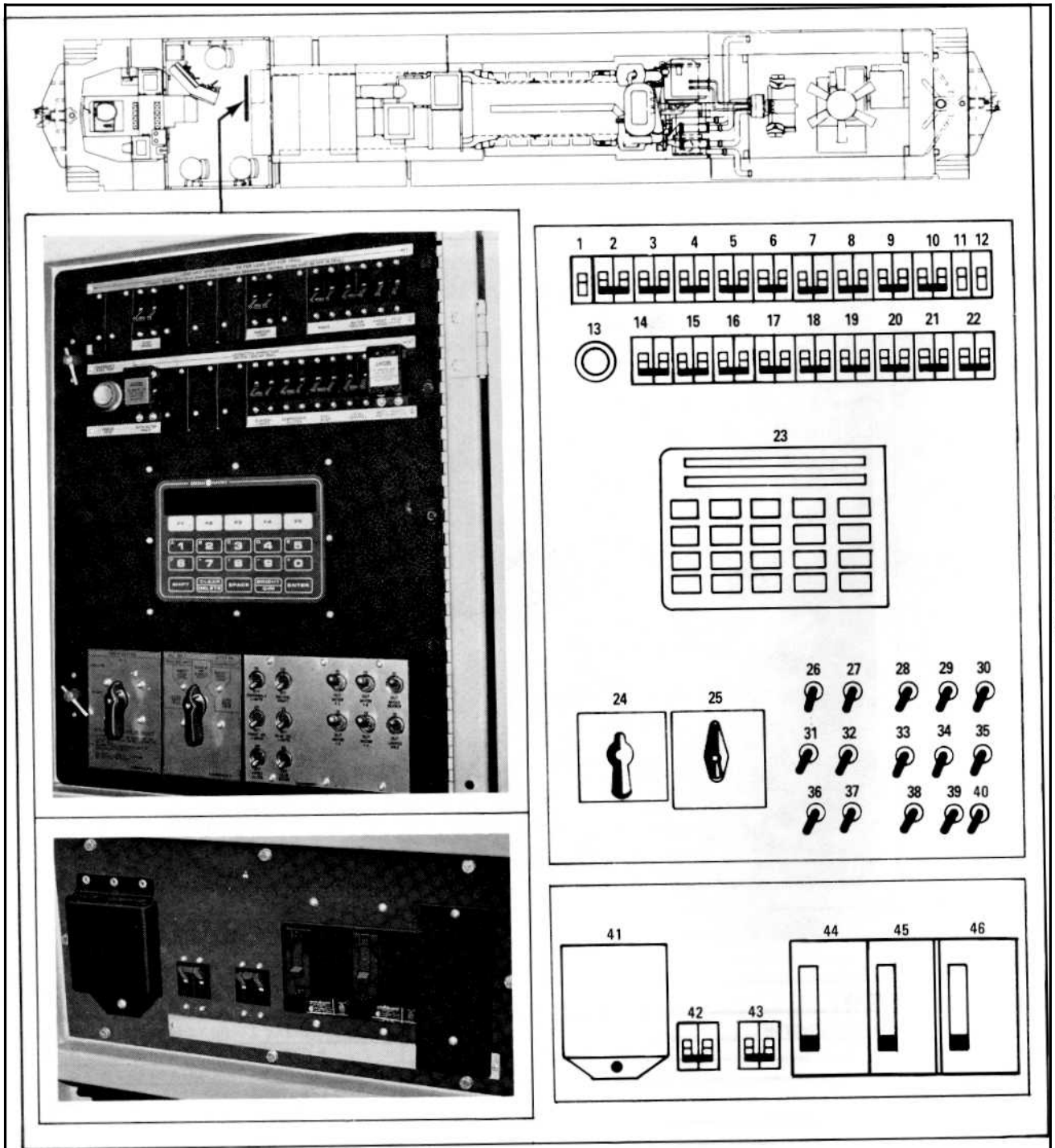


FIG. 31, E-31350

FIG. 31. EC PANEL.

NOTE: SHOWS LOCATION FOR ALL DEVICES WHETHER APPLIED OR NOT.

FIG. 31, E-31350

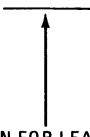


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	PACE SETTER CIRCUIT BREAKER	 ON FOR LEAD	25	MU HEADLIGHT SET-UP SWITCH	 POSITION
2	WINDOW HEATER CIRCUIT BREAKER		26	CROSSWALK LIGHT SWITCH	
3	OVERSPEED CIRCUIT BREAKER		27	CONTROL COMPARTMENT LIGHT SWITCH	
4	LOCOTROL CIRCUIT BREAKER		28	NO. 1 MOTOR CUT-OUT SWITCH – PULL TO THROW	
5	CAB SIGNAL CIRCUIT BREAKER		29	NO. 2 MOTOR CUT-OUT SWITCH – PULL TO THROW	
6	ALERTNESS EQUIPMENT CIRCUIT BREAKER		30	SPEED SENSOR CUT-OUT SWITCH	
7	WARNING LIGHT CIRCUIT BREAKER		31	FRONT NUMBER LIGHTS SWITCH	
8	OSCILLATING LIGHT CIRCUIT BREAKER		32	REAR NUMBER LIGHTS SWITCH	
9	RADIO CIRCUIT BREAKER		33	NO. 3 MOTOR CUT-OUT SWITCH – PULL TO THROW	
10	WATER COOLER CIRCUIT BREAKER		34	NO. 4 MOTOR CUT-OUT SWITCH – PULL TO THROW	
11	FRONT HEADLIGHT CIRCUIT BREAKER		35	LOCKED AXLE CUT-OUT SWITCH	
12	REAR HEADLIGHT CIRCUIT BREAKER		36	FRONT CLASS LIGHT SWITCH	
13	ENGINE STOP PUSHBUTTON		37	REAR CLASS LIGHT SWITCH	
14	AUTOMATIC WATER DRAIN CIRCUIT BREAKER	38	NO. 5 MOTOR CUT-OUT SWITCH (6 AXLE ONLY) – PULL TO THROW		
15	TOILET TANK HEATER CIRCUIT BREAKER	39	NO. 6 MOTOR CUT-OUT SWITCH (6 AXLE ONLY) – PULL TO THROW		
16	BLANK	40	DYNAMIC BRAKE CUT-OUT		
17	BLANK	41	BATTERY CHARGE RECEPTACLE		
18	RUNNING LIGHTS CIRCUIT BREAKER	42	ENGINEERS WALL HEATER	 POSITION	
19	COMPRESSOR CLUTCH CIRCUIT BREAKER	43	HELPERS WALL HEATER		
20	FUEL PUMP CIRCUIT BREAKER	44	ENGINEERS CAB HEATER		
21	LOCAL CONTROL CIRCUIT BREAKER	45	HELPERS CAB HEATER		
22	BATTERY CHARGE AND COMPUTER CIRCUIT BREAKER	46	AIR CONDITIONER		
23	DIAGNOSTIC DISPLAY (DID)				
24	ENGINE (EC) CONTROL SWITCH	DISPLAY POSITION			

FIG. 31. EC PANEL.

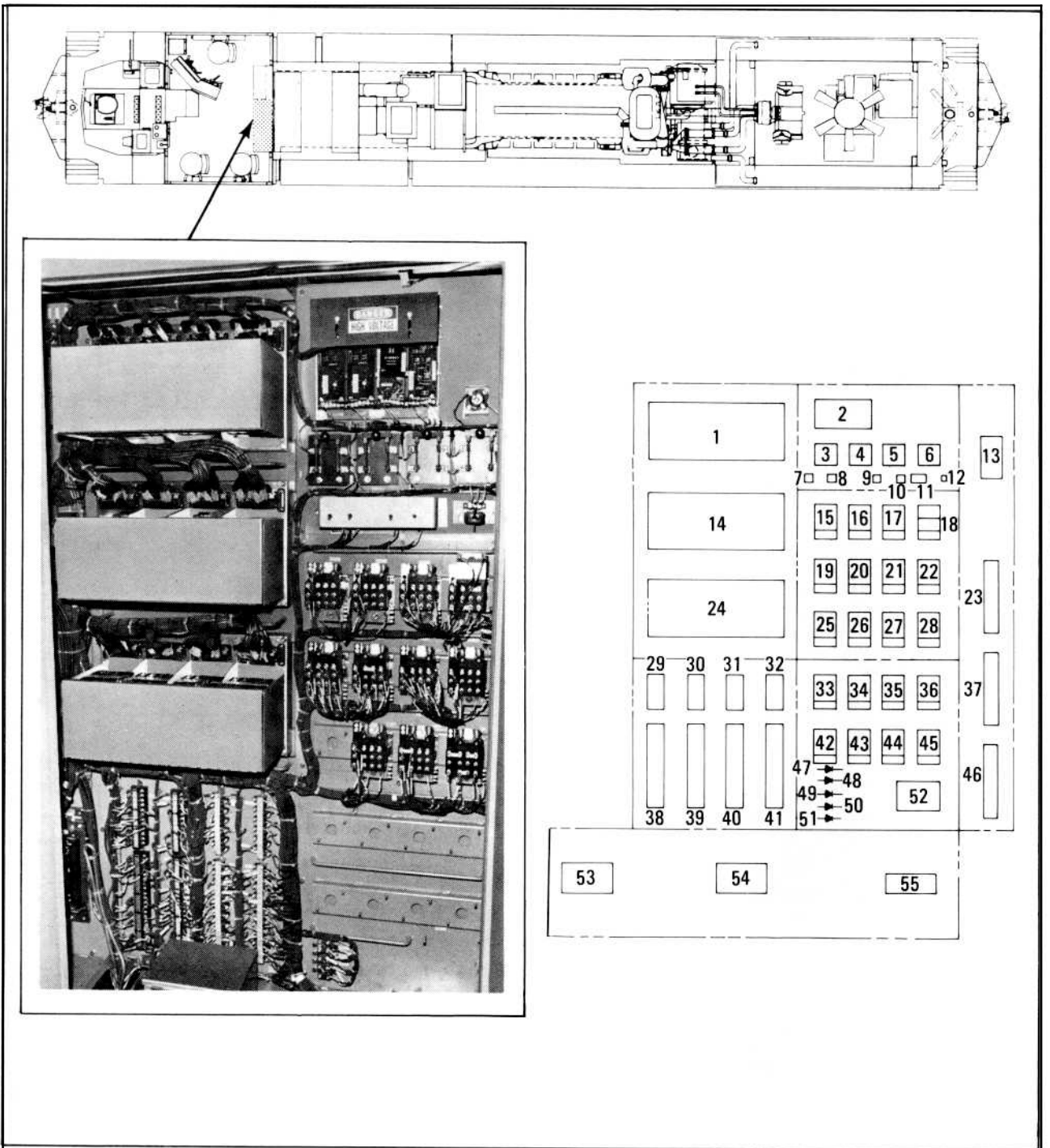


FIG. 32, E-31429

FIG. 32. CONTROL COMPARTMENT NO. 1.

NOTE: SHOWS LOCATION FOR ALL DEVICES WHETHER APPLIED OR NOT.

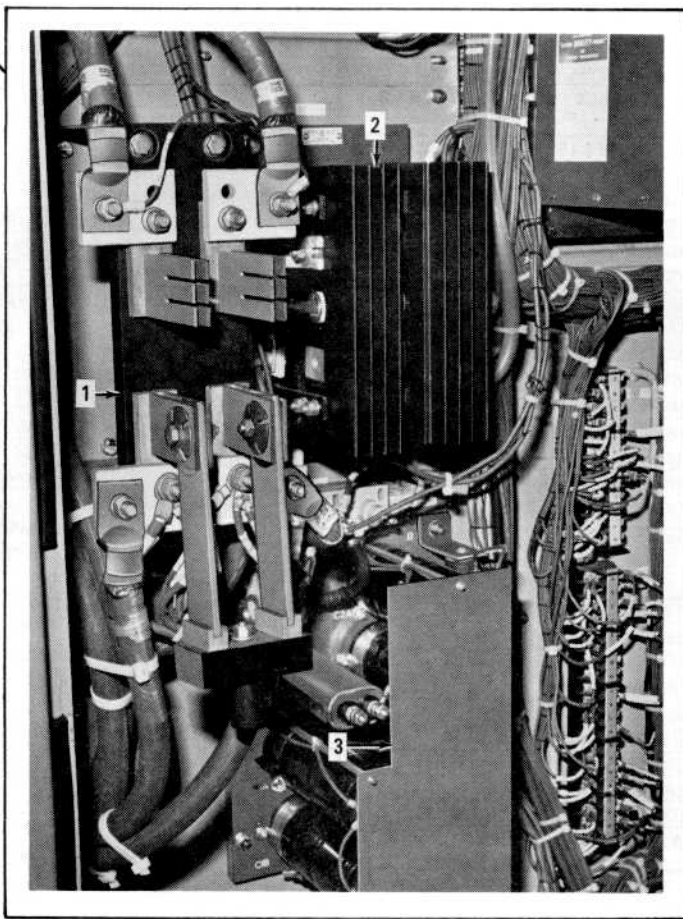
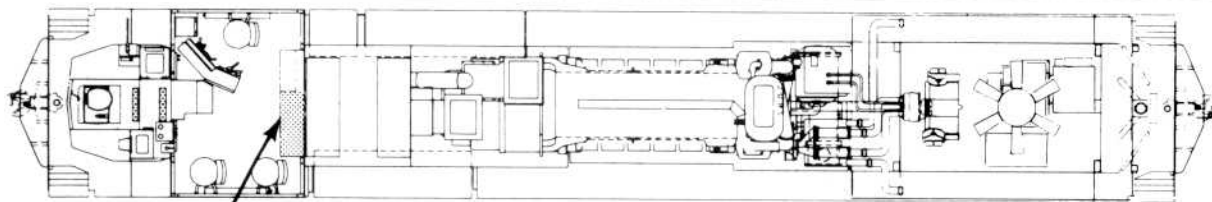
REF.	DESCRIPTION	REF.	DESCRIPTION
1	CAB CONTROLLER (CAB)	26	WHEELSLIP RELAY (WSR)
2	GROUND DETECTION UNIT (GDM)	27	LOCKED AXLE RELAY (LAR)
3	GROUND RELAY CUT-OUT SWITCH NO. 1 (GRC01)	28	COMPRESSOR CLUTCH RELAY (ECR)
4	GROUND RELAY CUT-OUT SWITCH NO. 2 (GRC02)	29	TERMINAL BOARD (TB1H)
		30	TERMINAL BOARD (TB1G)
5	GROUND RELAY CUT-OUT SWITCH NO. 3 (GRC03)	31	TERMINAL BOARD (TB1F)
		32	TERMINAL BOARD (TB1E)
6	GROUND RELAY CUT-OUT SWITCH NO. 4 (GRC04)	33	BATTERY JOG RELAY (JGR)
		34	PACE SETTER RELAY (PSR)
7	LOAD BOX TOGGLE SWITCH (LBTS)	35	PACE SETTER AUXILIARY RELAY (GFA)
8	LOAD BOX SELECTOR SWITCH (LBSS)	36	CAM W RELAY (CWR) REVERSE HANDLE CENTERED
9	AUXILIARY ALTERNATOR FIELD CUT-OUT SWITCH (BFCO)	*37	TERMINAL BOARD (TB1K)
		38	TERMINAL BOARD (TB1D)
10	FAN REVERSE SWITCH (FRB)	39	TERMINAL BOARD (TB1C)
11	BAROMETRIC PRESSURE TRANSDUCER (BPT)	40	TERMINAL BOARD (TB1B)
		41	TERMINAL BOARD (TB1A)
12	GROUND BLOCK (GB)	42	FORWARD DIRECTION RELAY (FDR)
*13	TRAINLINE RESISTOR PANEL (TRP)	43	REVERSE DIRECTION RELAY (RDR)
14	EXCITATION CONTROLLER (EXC)	44	OSCILLATING HEADLIGHT RELAY (AHR)
15	A, B, C SPEED VALVE RELAY (ABCR)	45	AUX. OSCILLATING HEADLIGHT RELAY (AHRA)
16	ALARM BELL RELAY (BLR)		
17	DYNAMIC BRAKE RELAY (BR1)	*46	TERMINAL BOARD (TB1J)
18	COMPRESSOR RELAY (CR)	47	BLOCKING DIODE (RT21)
19	PNEUMATIC POWER CONTROL RELAY (PCR)	48	BLOCKING DIODE (RT22)
		49	BLOCKING DIODE (RT23)
20	FUEL PUMP RELAY (FPR)	50	BLOCKING DIODE (RT24)
21	DV SHUT-DOWN RELAY (DVR)	51	BLOCKING DIODE (RT25)
22	COMPRESSOR LINE RELAY (CRL)	52	PACE SETTER AMPLIFIER PANEL (PAP)
*23	TERMINAL BOARD (TBIL)	**53	STROBE LIGHT EQUIPMENT PANEL (SLEB)
24	AUXILIARY CONTROLLER (AUX)	**54	SPEED RECORDER PANEL (SR)
25	WATER FILL RELAY (WFR)	**55	CREW CALL PANEL (CCP)

* ON RIGHT SIDE WALL

** ON FLOOR

FIG. 32, E-31429

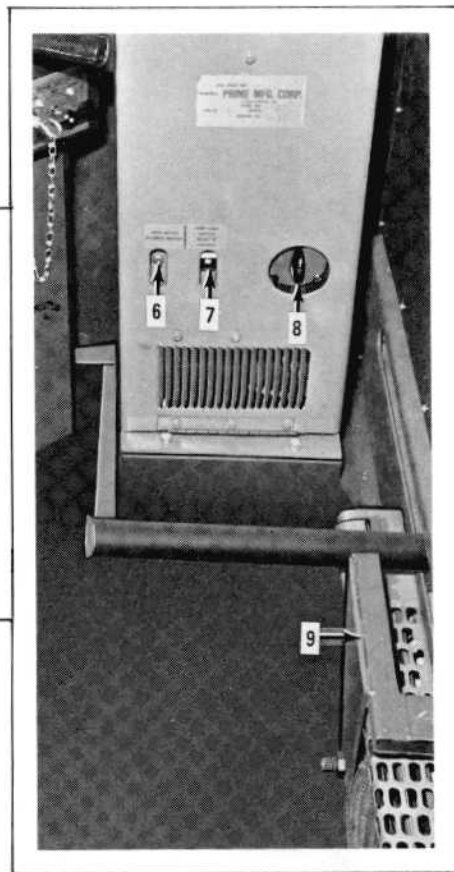
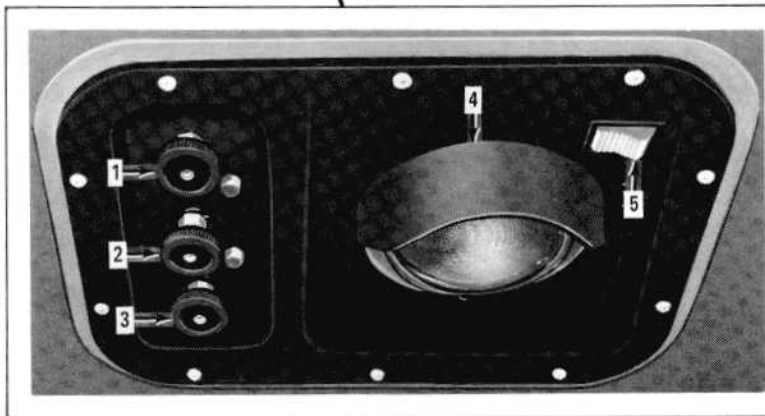
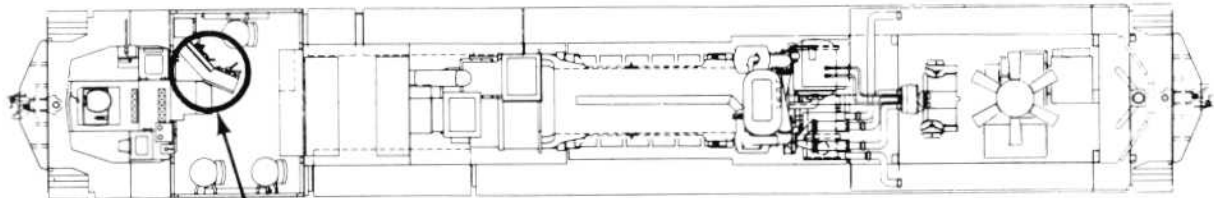
FIG. 32. CONTROL COMPARTMENT NO. 1.



REF.	DESCRIPTION	CHECK
1	BATTERY SWITCH (BS)	POSITION
2	RC DIODE (RC)	
3	COMPUTER POWER SUPPLY (CPF)	

FIG. 33. BATTERY SWITCH.

FIG. 34, E-31562



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	ENGINEERS WINDOW WIPER CONTROL	OPERATION	6	CAB HEATER HIGH SPEED BLOWER SWITCH	POSITION
2	MIDDLE WINDOW WIPER CONTROL	OPERATION	7	CAB HEATER CIRCUIT BREAKER	POSITION
3	ENGINEERS REAR WINDOW WIPER CONTROL	OPERATION	8	CAB HEATER HEAT SELECTOR SWITCH	POSITION
4	DOME LIGHT	OPERATION	9	WALL STRIP HEATER	POSITION
5	DOME LIGHT SWITCH				

FIG. 34. MISCELLANEOUS OPERATORS CONTROLS.

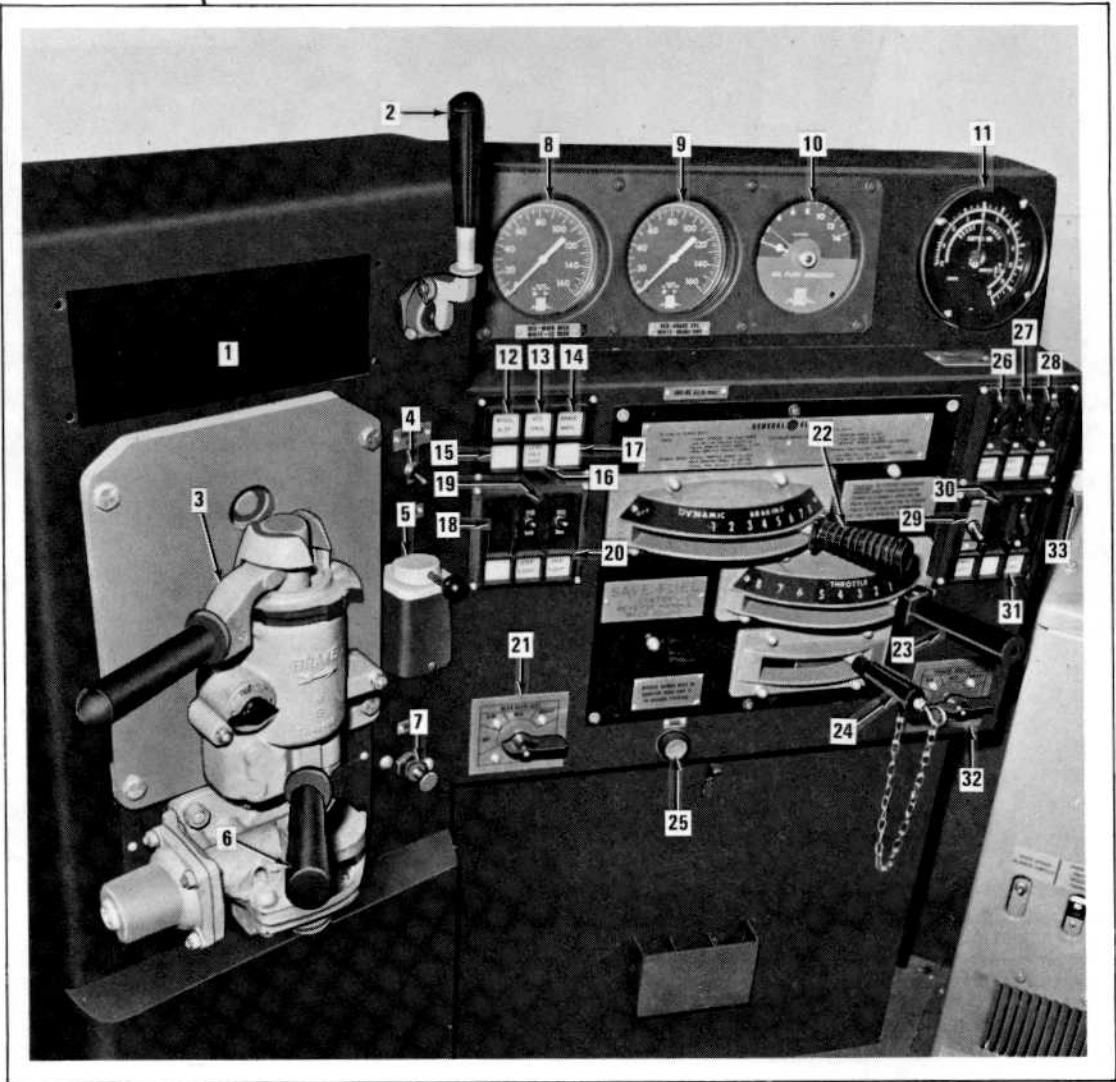
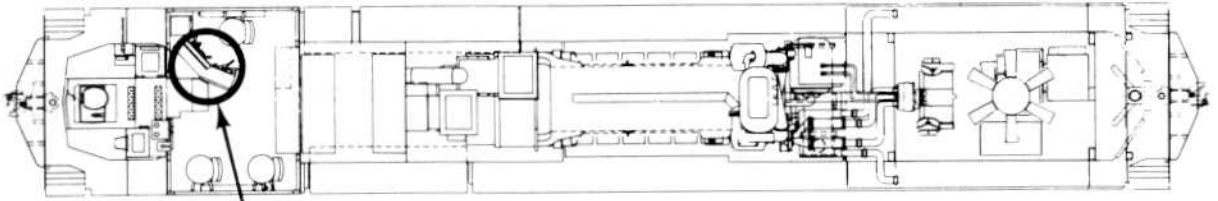
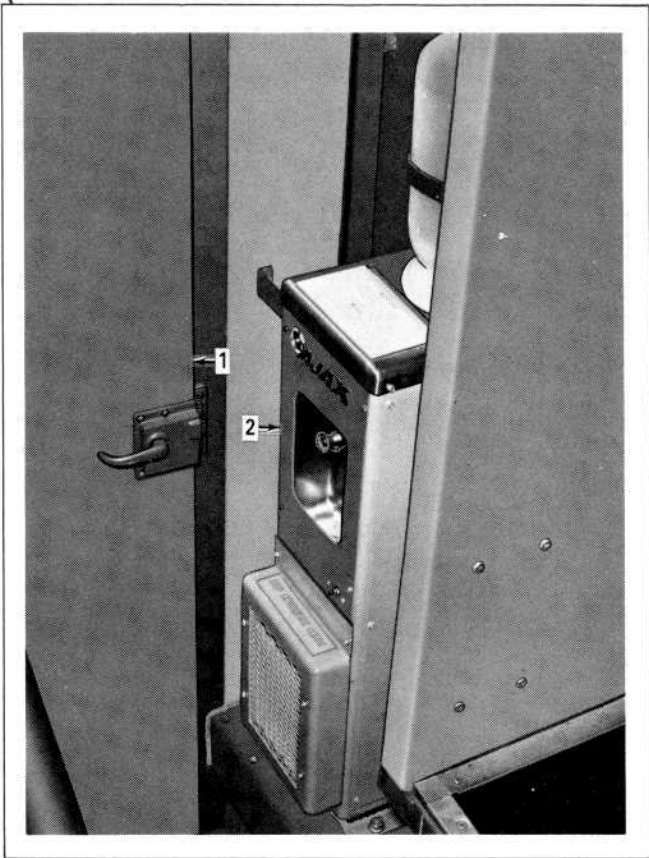
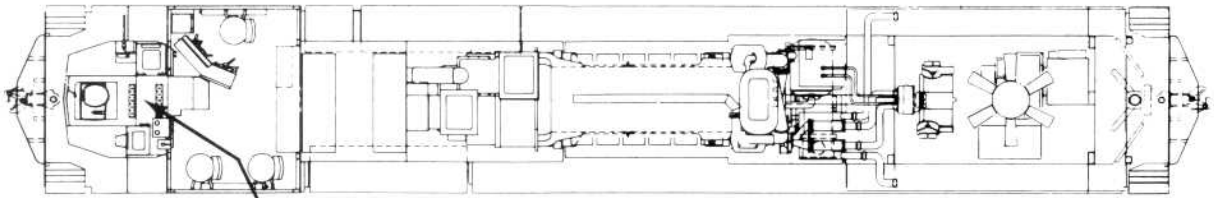


FIG. 35. OPERATORS CONSOLE.

REF.	DESCRIPTION
1	RADIO LOCATION
2	HORN VALVE
3	AUTOMATIC AIR BRAKE VALVE
4	LEAD AXLE SAND SWITCH
5	SAND SWITCH
6	INDEPENDENT AIR BRAKE VALVE
7	BELL VALVE
8	AIR GAGE RED/MAIN RESERVOIR, WHITE/EQUALIZING RESERVOIR
9	AIR GAGE RED/BRAKE CYLINDER, WHITE/BRAKE PIPE
10	BRAKE PIPE FLOW INDICATOR
11	LOAD AMMETER
12	WHEELSLIP LIGHT
13	PCS OPEN LIGHT
14	BRAKE WARNING LIGHT
15	BLANK
16	SAND LIGHT
17	BLANK
18	BLANK
19	STEP LIGHT SWITCH
20	GAGE LIGHT SWITCH
21	REAR HEADLIGHT SWITCH
22	DYNAMIC BRAKE HANDLE
23	THROTTLE HANDLE
24	REVERSE HANDLE
25	CALL PUSHBUTTON
26	ENGINE RUN CIRCUIT BREAKER
27	GENERATOR FIELD CIRCUIT BREAKER
28	CONTROL CIRCUIT BREAKER
29	NOTCH 7 POWER LIMIT SWITCH
30	BLANK
31	DYNAMIC BRAKE CIRCUIT BREAKER
32	FRONT HEADLIGHT SWITCH
33	GAGE LIGHT DIMMER KNOB (ON SIDE)

FIG. 35. OPERATORS CONSOLE.

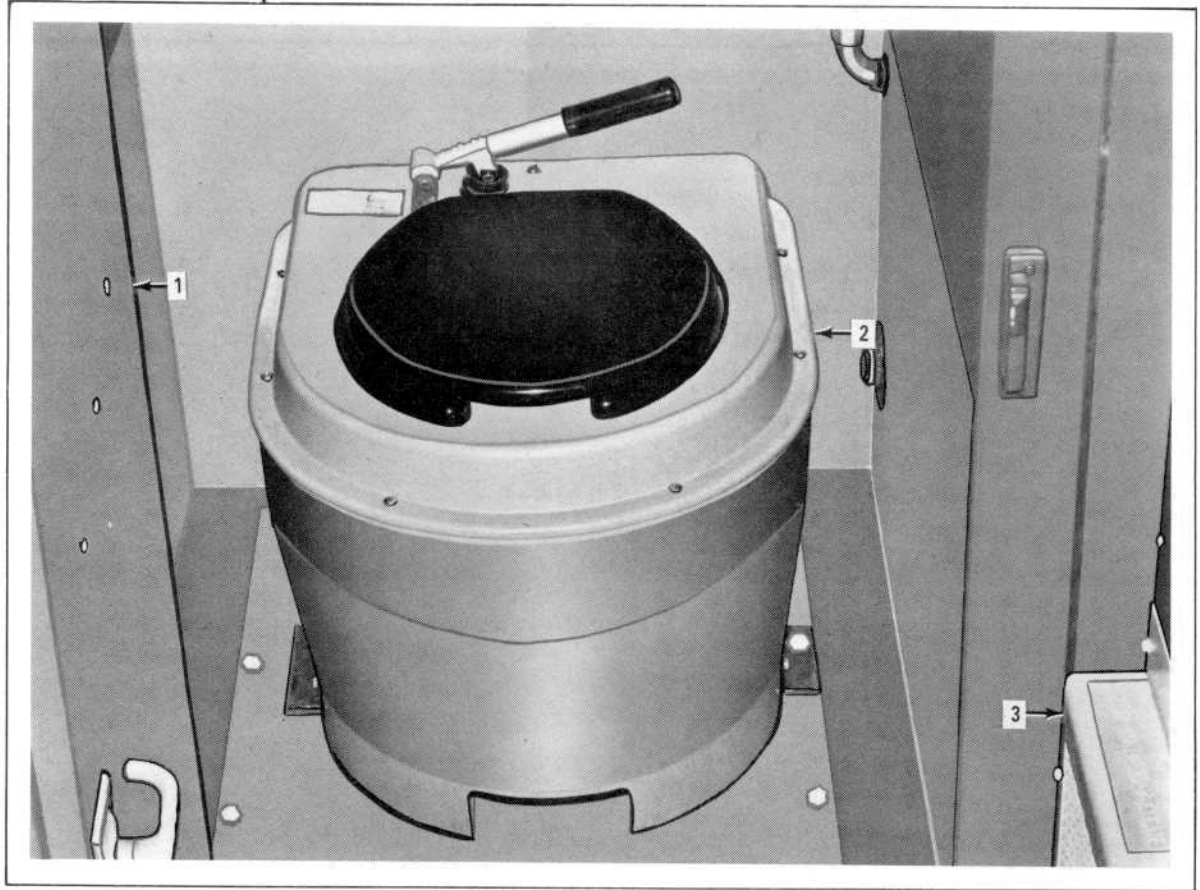
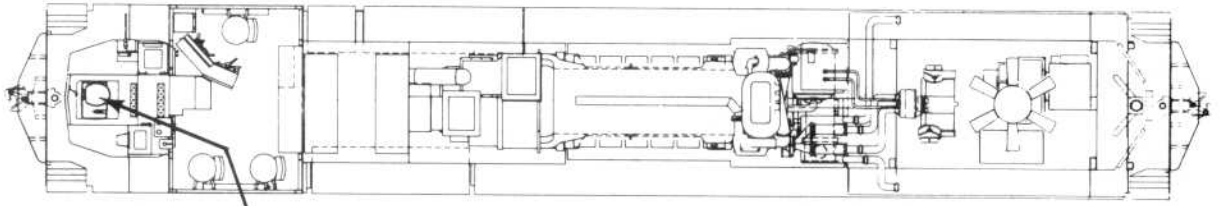


REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	TOILET COMPARTMENT DOOR				
2	WATER COOLER				

FIG. 36, E-31348

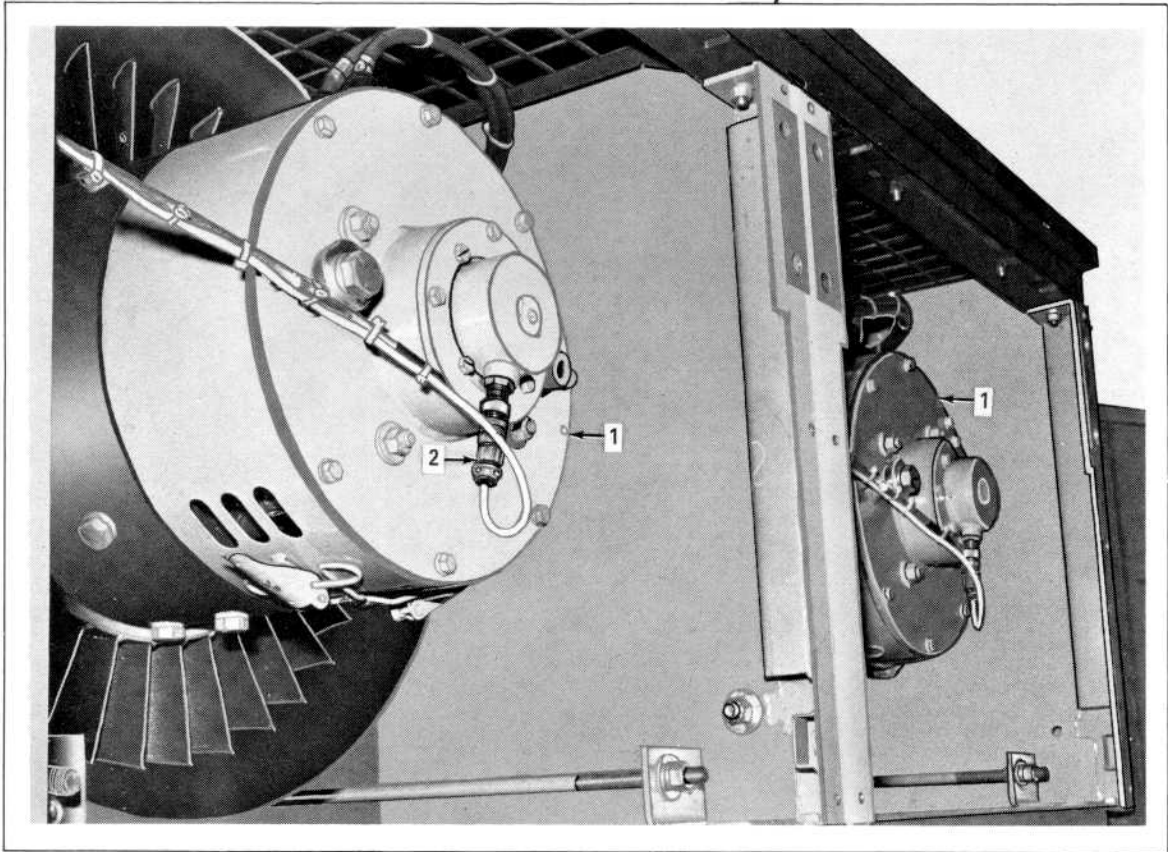
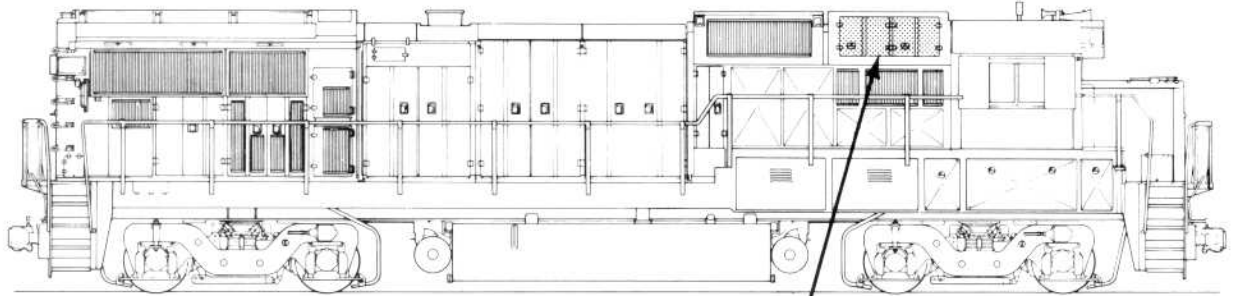
FIG. 36. NOSE CAB.

FIG. 37, E-31349



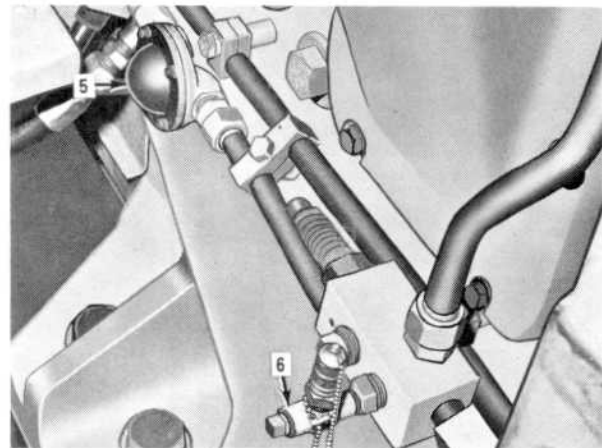
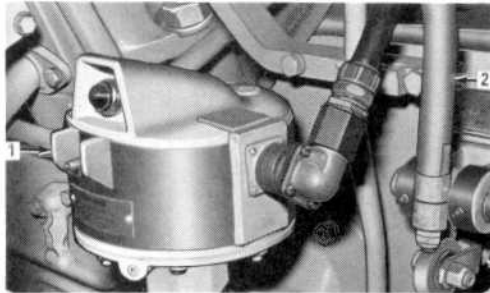
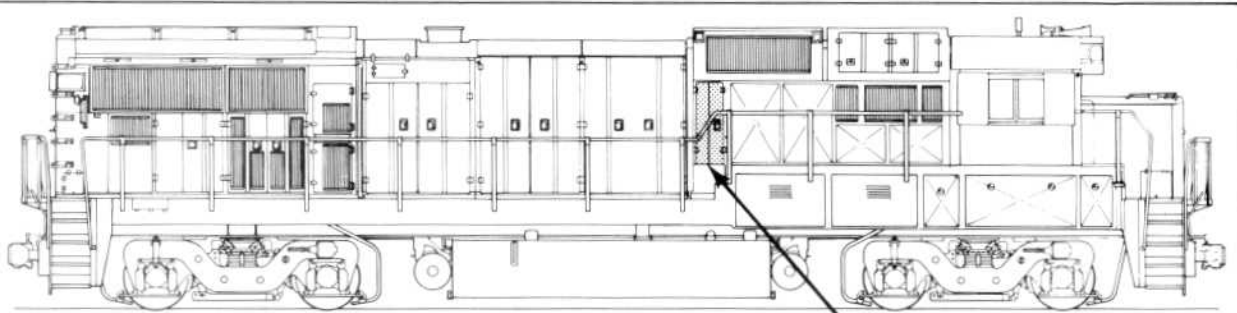
REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	TOILET DOOR				
2	TOILET				
3	WATER COOLER				

FIG. 37. TOILET COMPARTMENT.



REF.	DESCRIPTION	CHECK
1	DYNAMIC BRAKE GRID BLOWER MOTOR	BRUSHES
2	DYNAMIC BRAKE GRID BLOWER MOTOR SPEED SENSOR	

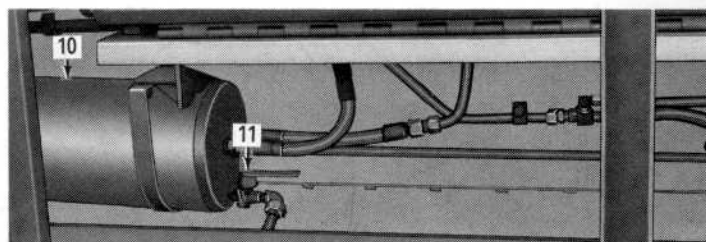
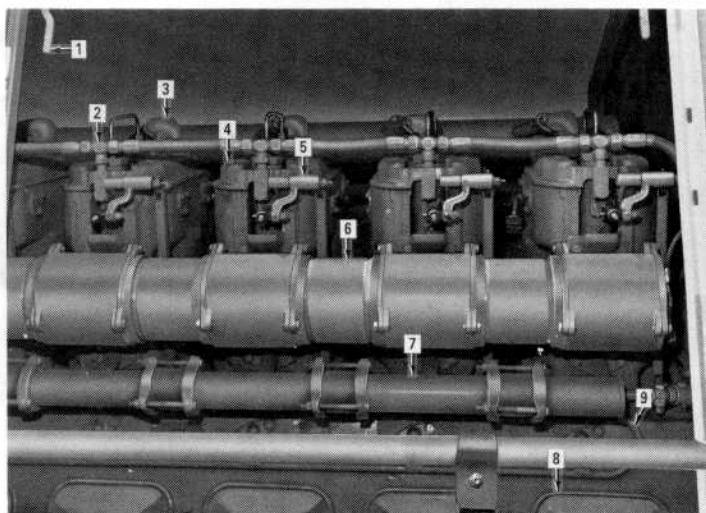
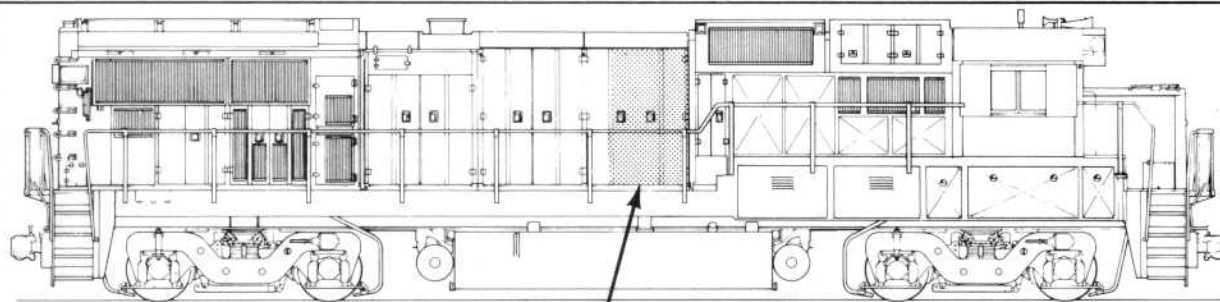
FIG. 38. DYNAMIC BRAKING.



NOTE: AFTER SWITCH IS PUT IN ENGINE CRANK, A FEW SECONDS DELAY UNTIL ENGINE BEGINS ROTATION IS NORMAL.

REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	COP SWITCH	SEALED	6	FUEL PRESSURE TEST FITTING	LEAKS
2	LAY SHAFT LEVER				
3	ENGINE PRIME/START SWITCH				
4	ENGINE STOP PUSHBUTTON				
5	FUEL SIGHT GLASS				

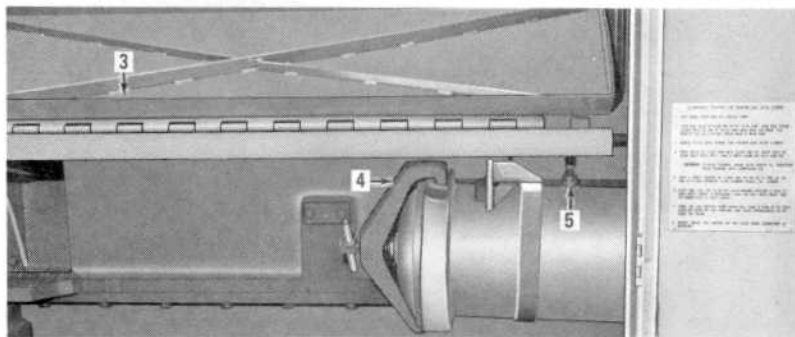
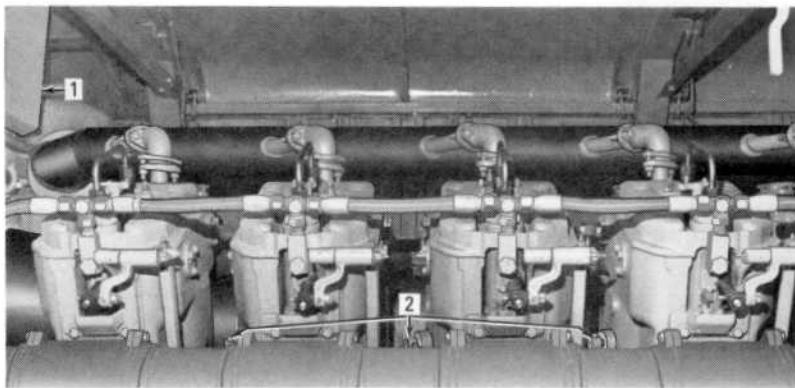
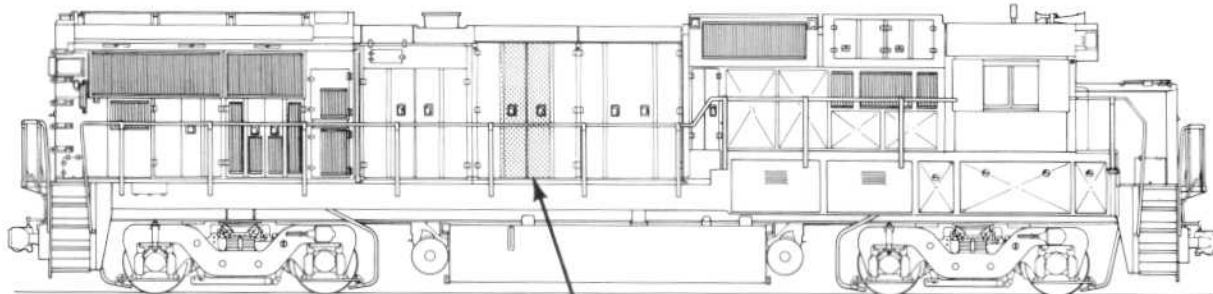
FIG. 39. START STATION.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	HATCH LATCH	LATCH	7	WATER INLET HEADER	LEAKS
2	FUEL HEADER	LEAKS	8	CRANKCASE INSPECTION COVER	LEAKS
3	WATER DISCHARGE HEADER	LEAKS	9	RETURN FUEL LINE	LEAKS
4	CYLINDER	LEAKS	10	FUEL FILTER	LEAKS
5	FUEL LINKAGE	BINDING	11	FUEL FILTER DRAIN VALVE	POSITION
6	AIR MANIFOLD	LEAKS			

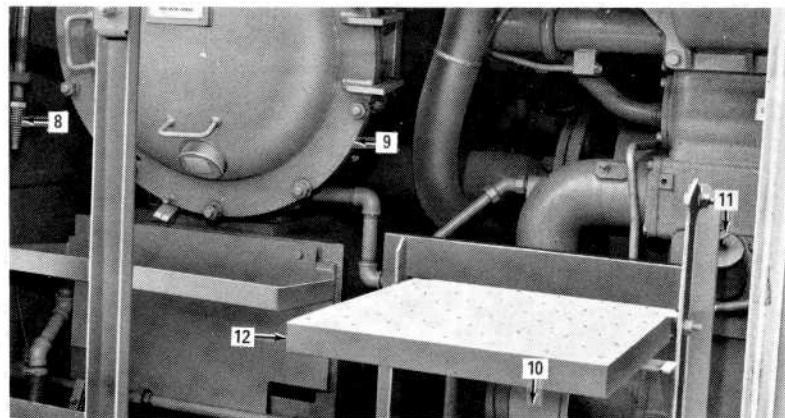
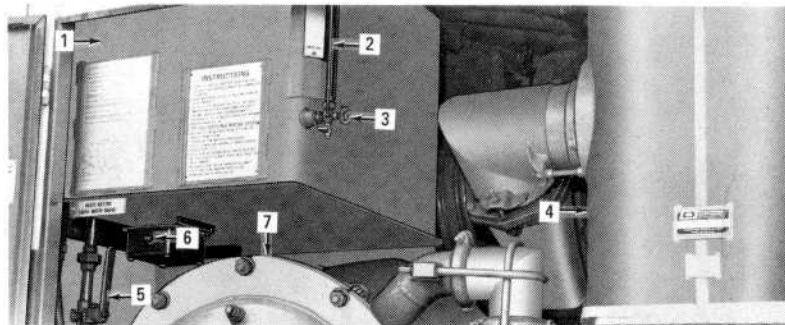
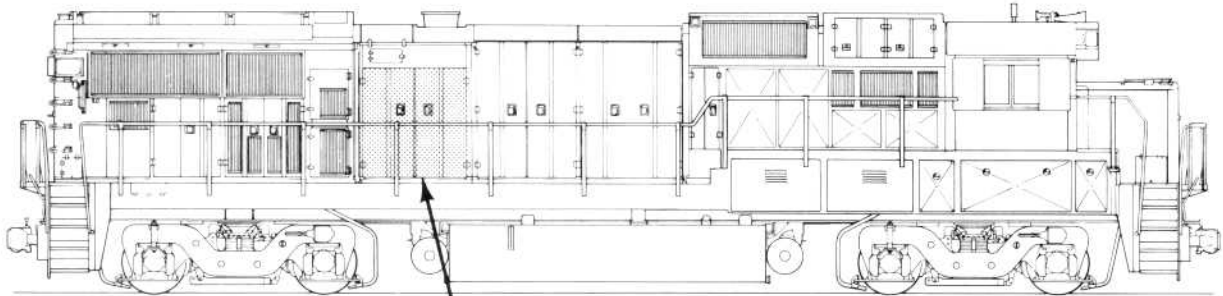
FIG. 40. ENGINE CAB.

FIG. 41, E-31435



REF.	DESCRIPTION	CHECK
1	EXHAUST STACK/MUFFLER	
2	COMPRESSION RELIEF VALVES	CLOSED
3	FOLD-DOWN STEP	
4	FUEL FILTER	LEAKS
5	FILTER VENT VALVE	CLOSED

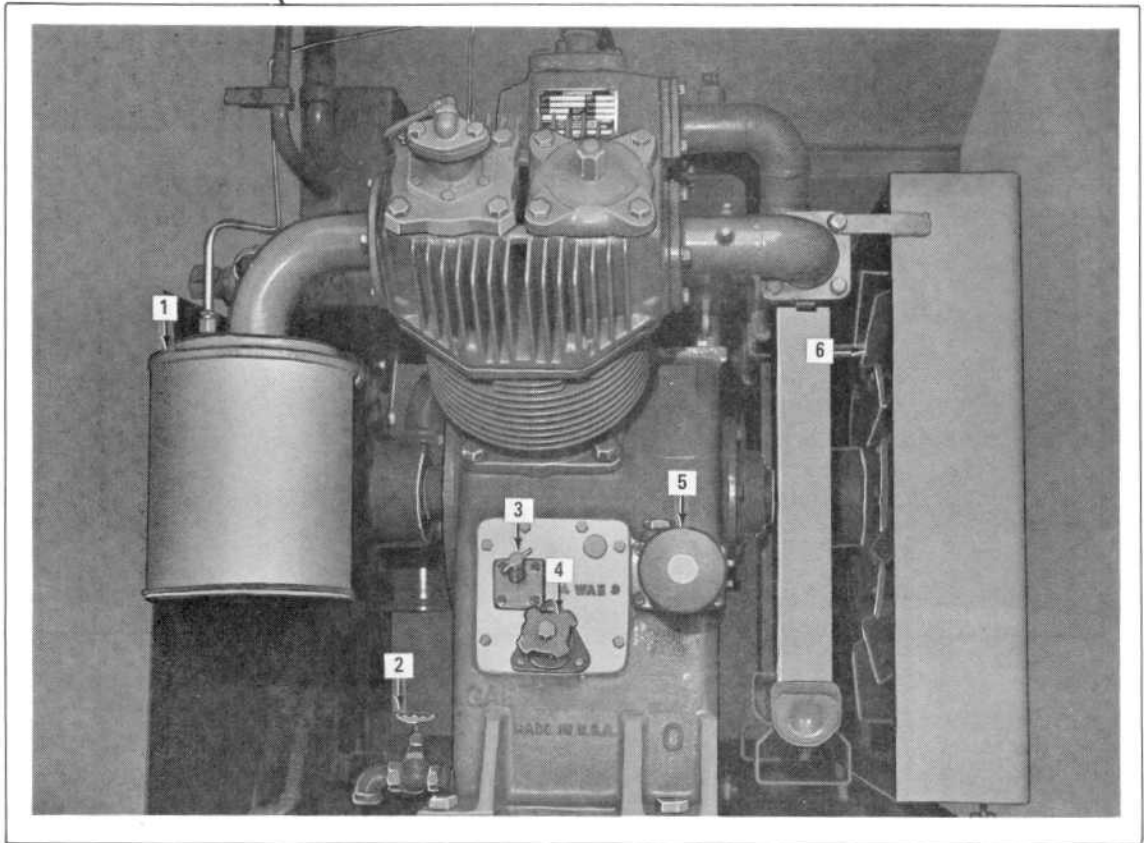
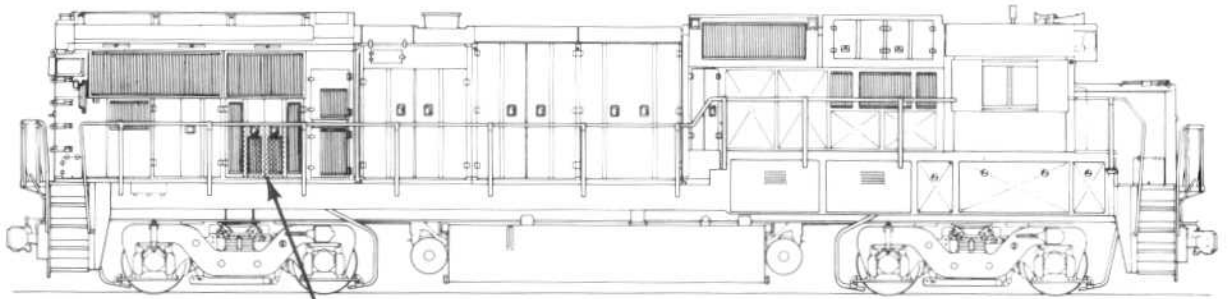
FIG. 41. ENGINE CAB.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	WATER TANK	LEAKS	7	OIL FILTER HOUSING	LEAKS
2	SIGHT GLASS	LEVEL	8	WATER FILL CARROT	
3	SIGHT GLASS SHUTOFF	OPEN	9	OIL FILTER HOUSING	LEAKS
4	AIR INTERCOOLER		10	WATER PUMP	LEAKS
5	WATER FILL SHUTOFF VALVE	POSITION	11	OIL FILL	CAP ON
6	AUTO WATER DRAIN RESET BUTTON		12	FOLD-DOWN STEP	

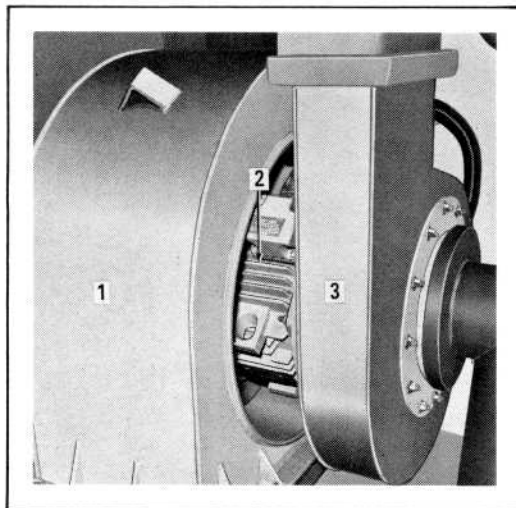
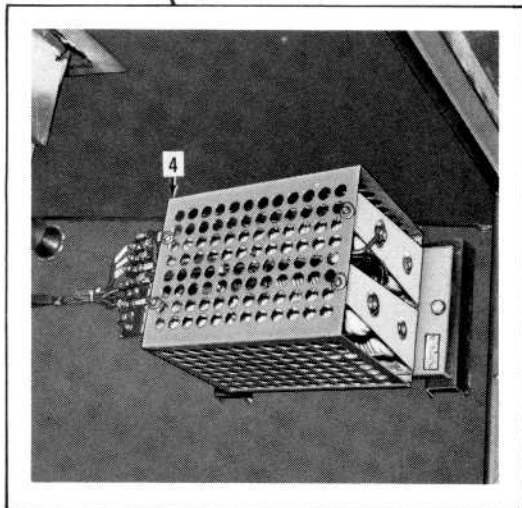
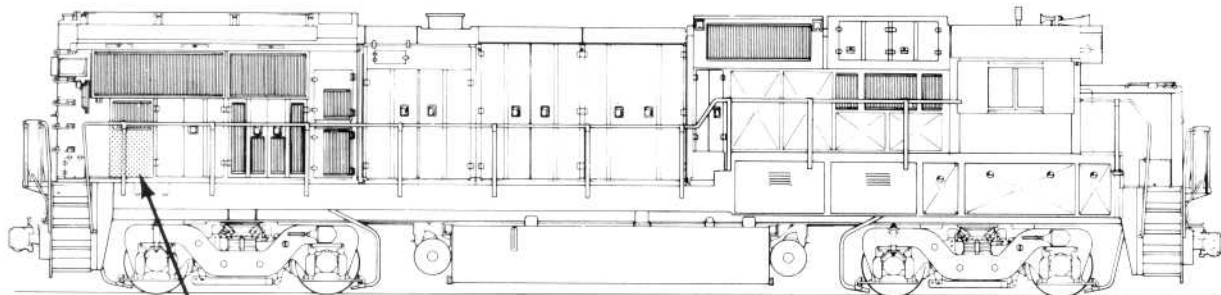
FIG. 42. ENGINE CAB.

FIG. 43, E-31325



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	AIR FILTER	PRESENT	6	FAN BLADES	CONDITION
2	OIL DRAIN VALVE	CLOSED			
3	DIPSTICK	LEVEL			
4	OIL FILL	CAP-ON			
5	OIL FILTER	LEAKS			

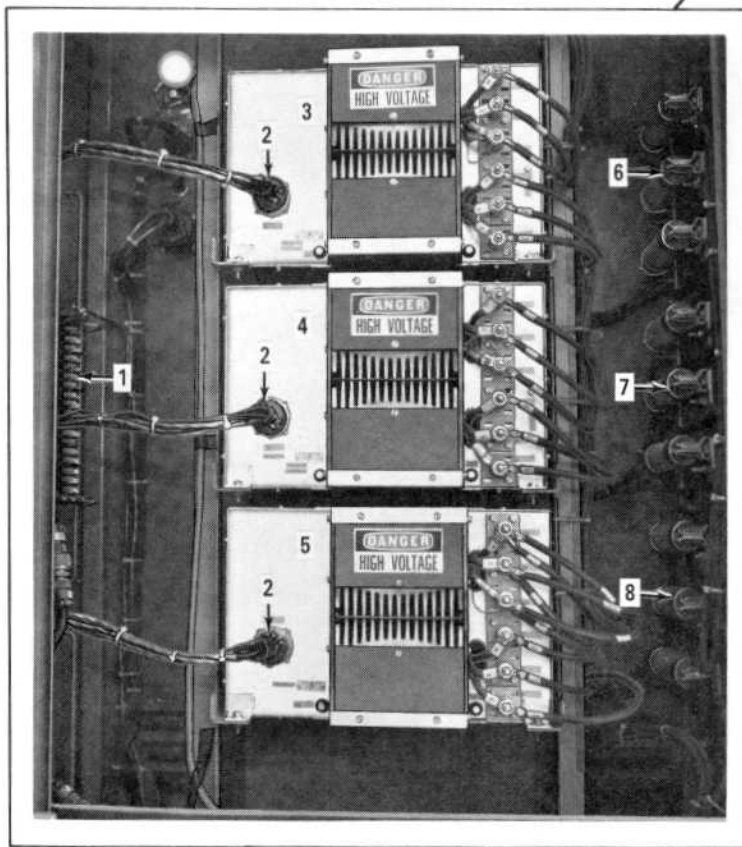
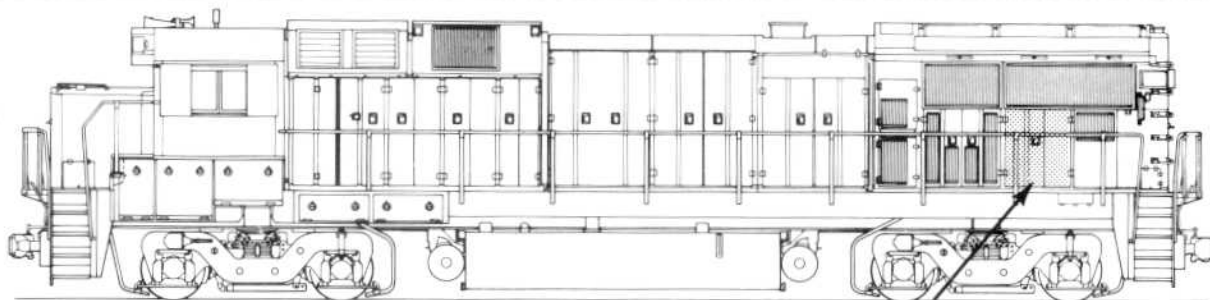
FIG. 43. AIR COMPRESSOR (AIR COOLED).



REF.	DESCRIPTION	CHECK
1	NO. 2 END EQUIPMENT BLOWER	
2	NO. 2 END EQUIPMENT BLOWER MOTOR	
3	NO. 2 END EQUIPMENT EXHAUSTER	
4	REAR HEADLIGHT RESISTORS	

FIG. 44. RADIATOR CAB.

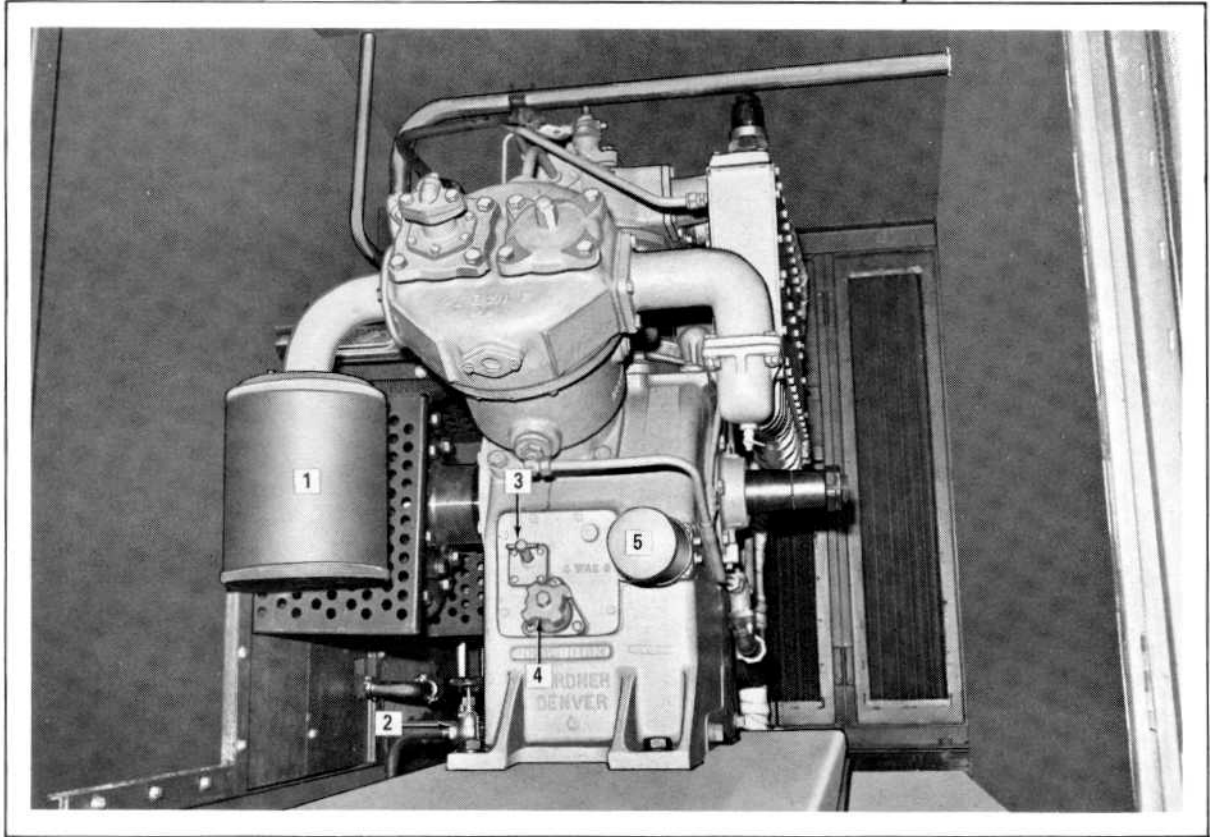
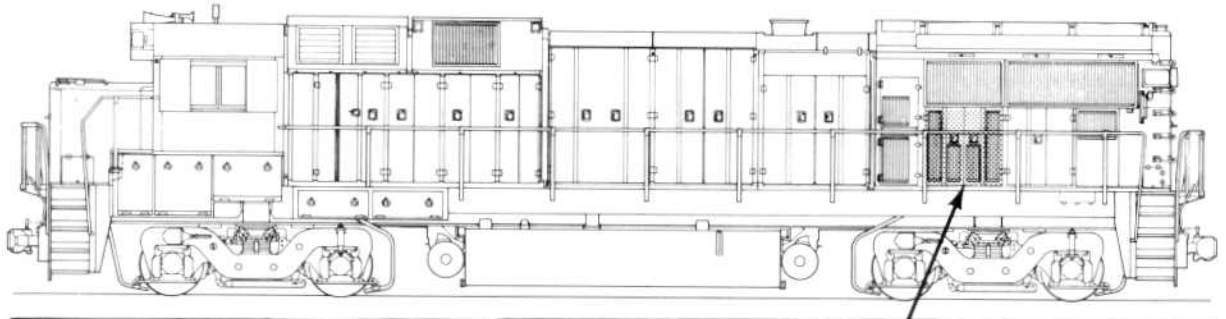
FIG. 45, E-31326



NOTE:
INNER
DOOR
OPEN.

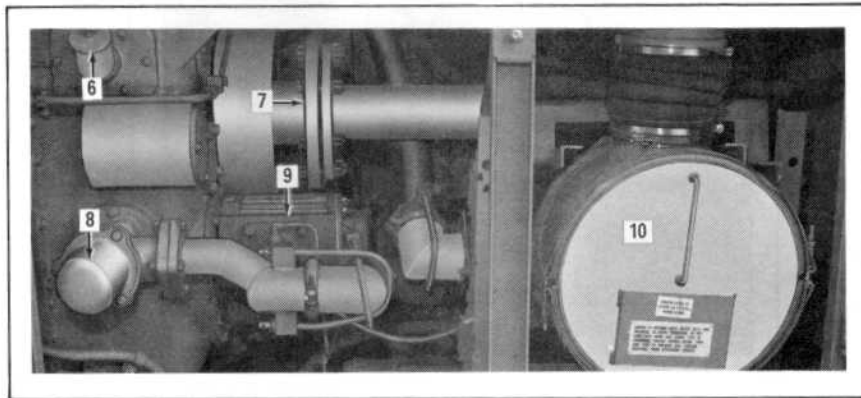
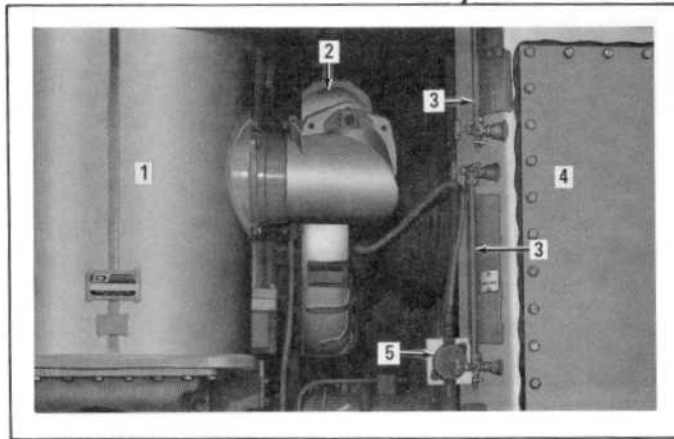
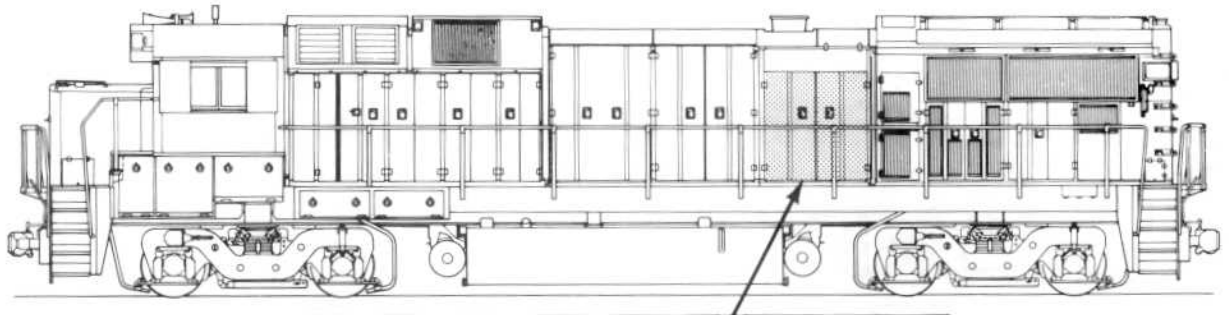
REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	TERMINAL BOARD	CONNECTIONS	6	FUSES	CONDITION
2	ELECTRICAL CONNECTORS	TIGHT	7	FUSES	CONDITION
3	RADIATOR FAN MOTOR DRIVE (RFP2)	CLEAN	8	FUSES	CONDITION
4	RADIATOR FAN MOTOR DRIVE (RFP1)	CLEAN			
5	EQUIPMENT BLOWER DRIVE (ERP)	CLEAN			

FIG. 45. CONTROL COMPARTMENT NO. 4.



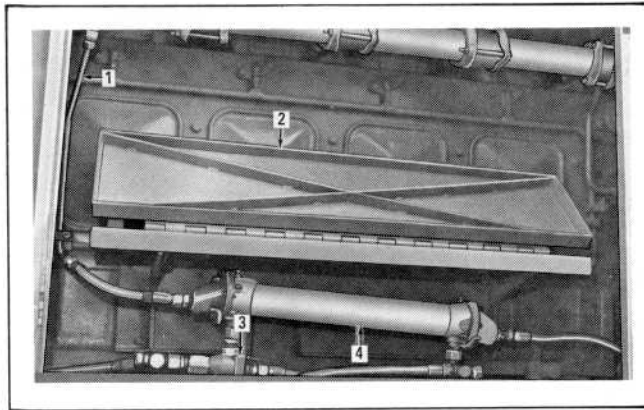
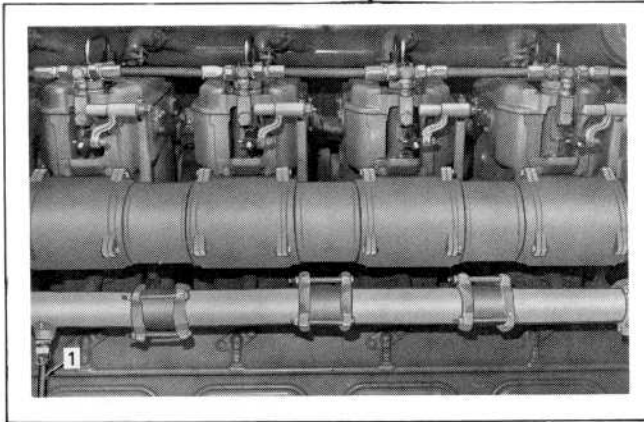
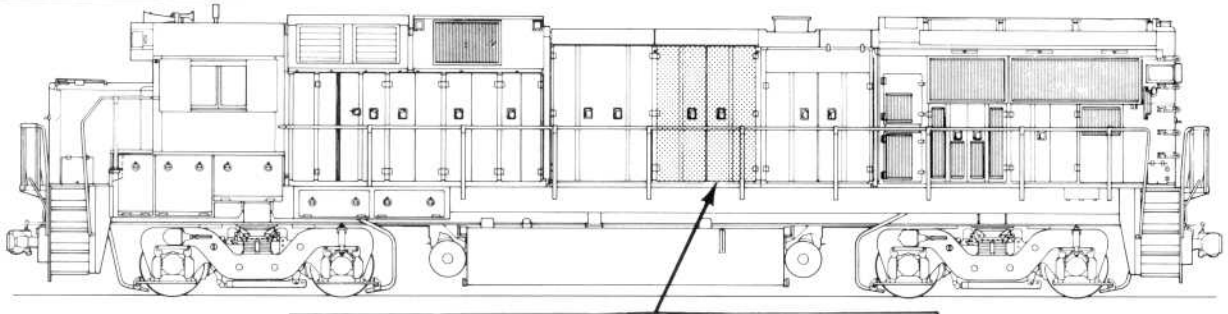
REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	AIR FILTER	PRESENT			
2	OIL DRAIN	CLOSED			
3	DIPSTICK	LEVEL			
4	OIL FILL	CAP ON			
5	OIL FILTER	LEAKS			

FIG. 46. AIR COMPRESSOR (WATER COOLED).



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	AIR INTERCOOLER		6	OIL FILL CAP	ON
2	TURBOCHARGER		7	AIR COMPRESSOR DRIVE SHAFT	
3	WATER SIGHT GLASSES	LEVEL	8	OIL RELIEF VALVE	LEAKS
4	WATER TANK	LEAKS	9	OIL PUMP	LEAKS
5	TURBO SPEED SIGNAL CONNECTION BOX		10	OIL COOLER	LEAKS

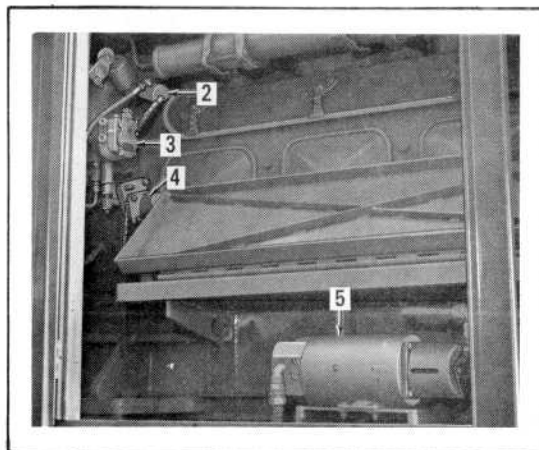
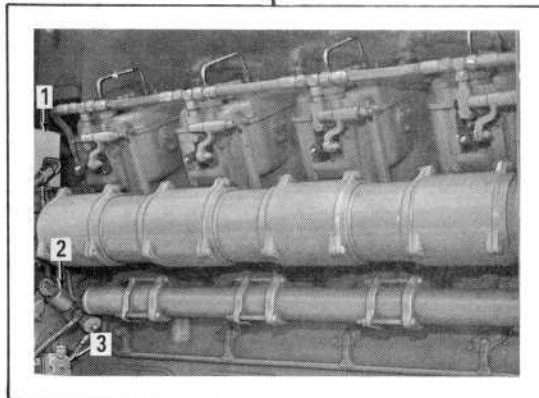
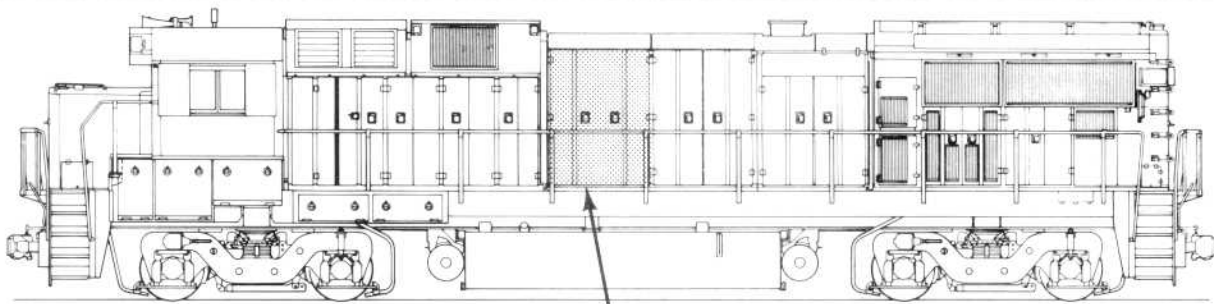
FIG. 47. ENGINE CAB.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	WATER LINE TO FUEL HEATER	LEAKS			
2	FOLD-DOWN STEPS				
3	AMOT HEATER CONTROL VALVE	LEAKS			
4	FUEL OIL HEATER	LEAKS			

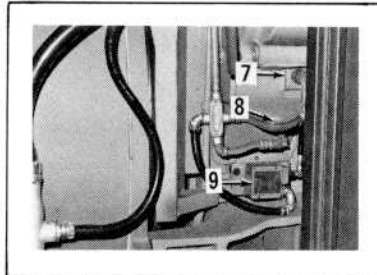
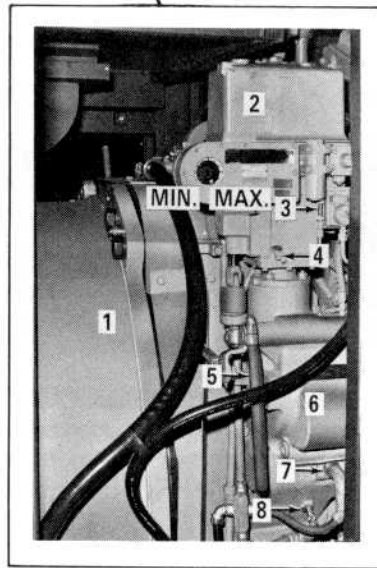
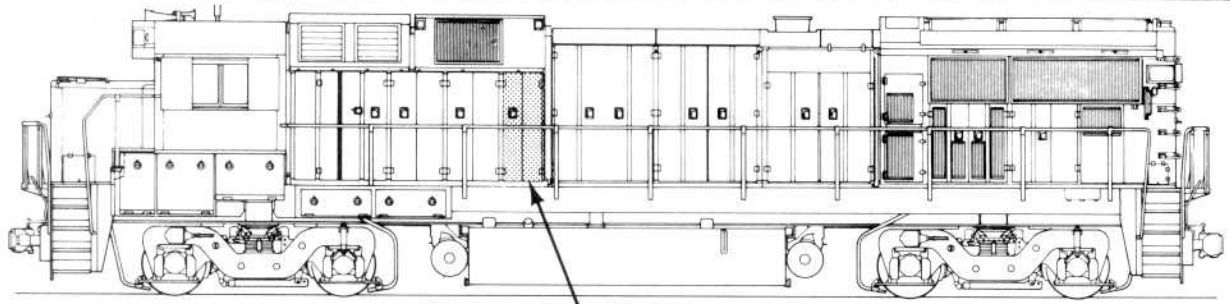
FIG. 48. ENGINE CAB.

FIG. 49, E-31439



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	GOVERNOR	OIL			
2	OVERSPEED TRIP LINK	CONDITION			
3	OVERSPEED GOVERNOR				
4	BARRING OVER SWITCH	COVER ON			
5	FUEL PUMP	OPERATION			

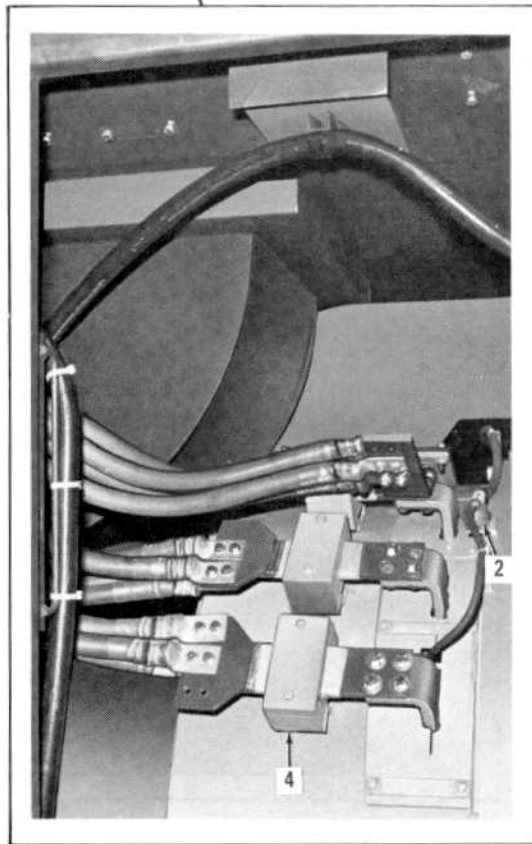
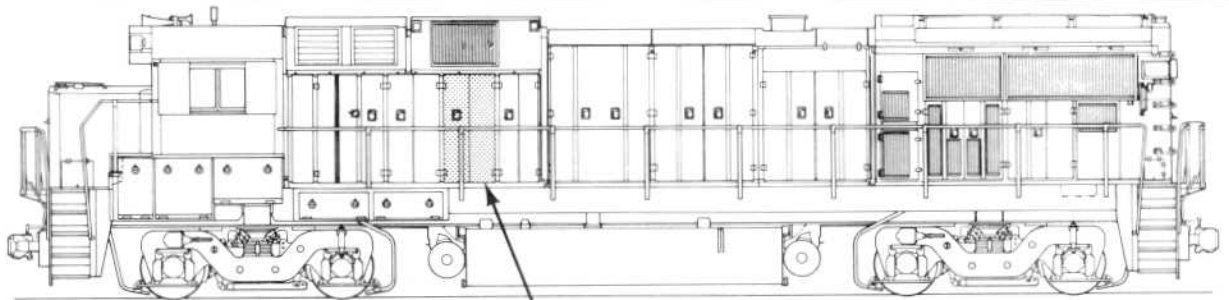
FIG. 49. ENGINE CAB.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	MAIN ALTERNATOR		6	GOVERNOR DRIVE GEARCASE	
2	ENGINE GOVERNOR	LEAKS	7	BARRING OVER SWITCH CONNECTOR	TIGHT
3	GOVERNOR OIL LEVEL	LEVEL	8	ENGINE TACHOMETER CONNECTOR	TIGHT
4	GOVERNOR DRAIN COCK	CLOSED	9	ENGINE OVERSPEED PRESSURE SWITCH	
5	LAY SHAFT LEVER				

FIG. 50. GOVERNOR.

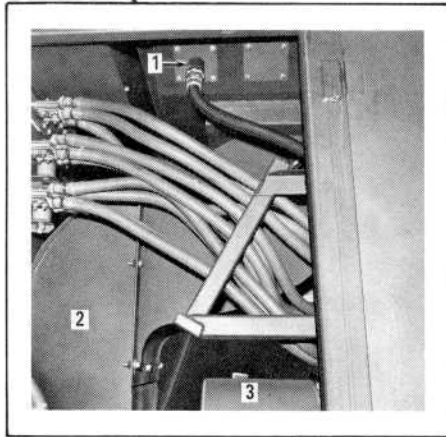
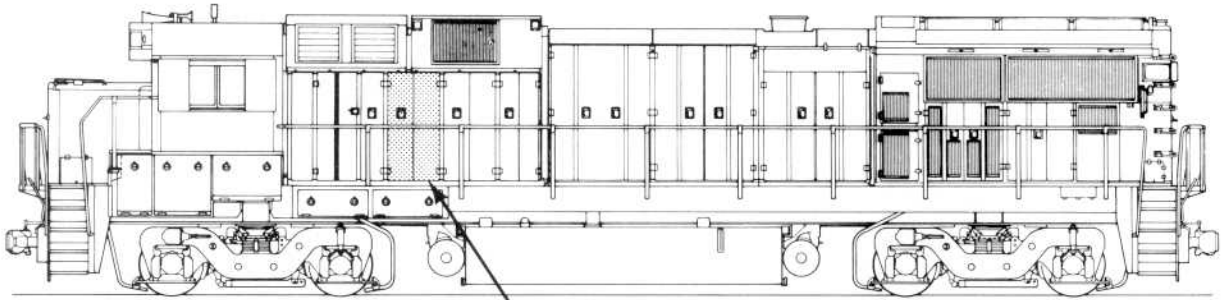
FIG. 51, E-31568



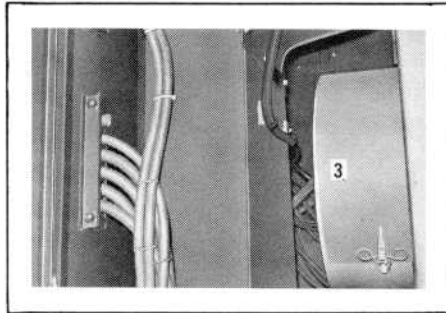
NOTE:
GUARD DOOR
REMOVED.

REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	BRAKING GRID BLOWER MOTOR SPEED SIGNAL CONNECTION	TIGHT			
2	MAIN ALTERNATOR NEUTRAL CONNECTION				
3	MAIN ALTERNATOR				
4	MAIN ALTERNATOR OUTPUT CONNECTIONS				

FIG. 51. MAIN ALTERNATOR.

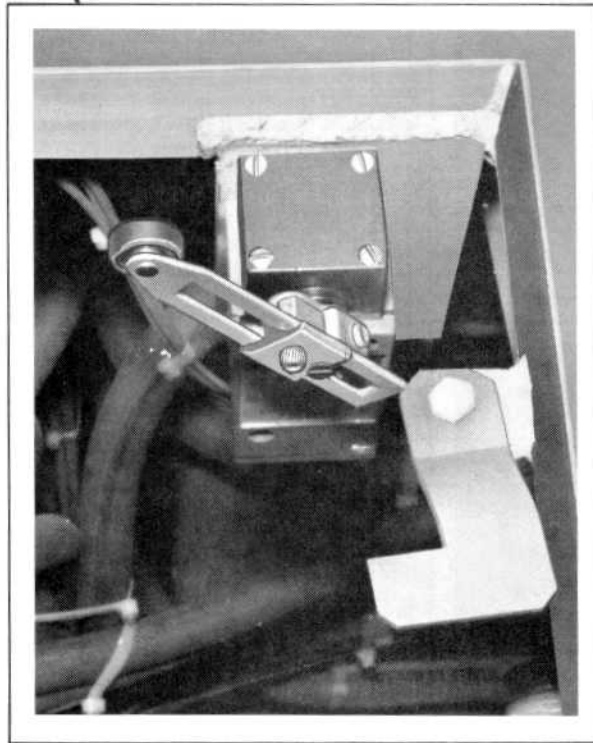
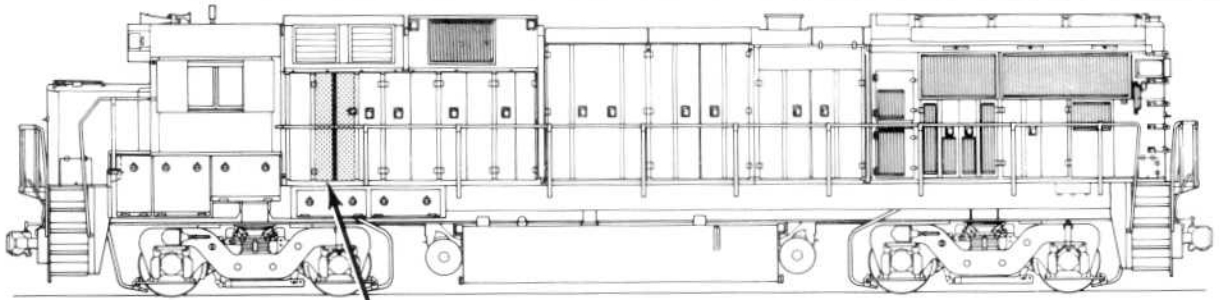


NOTE:
INNER DOOR
REMOVED.



REF.	DESCRIPTION	CHECK	REF.	DESCRIPTION	CHECK
1	BRAKING GRID BLOWER MOTOR SPEED SIGNAL CONNECTION	TIGHT			
2	AIR DUCT				
3	MAIN ALTERNATOR				

FIG. 52. EQUIPMENT BLOWER.



DOOR INTERLOCK SWITCH (DIS). WHEN DOOR TO CC2/3 IS OPENED, DIS WILL TRIP CAUSING ALL POWER ON LOCOMOTIVE TO GO TO ZERO. THIS IS A SAFETY PRECAUTION TO PREVENT INJURY IF YOU ENTER THIS COMPARTMENT UNDER POWER.

FIG. 53. CONTROL COMPARTMENT NO. 2 AND 3.

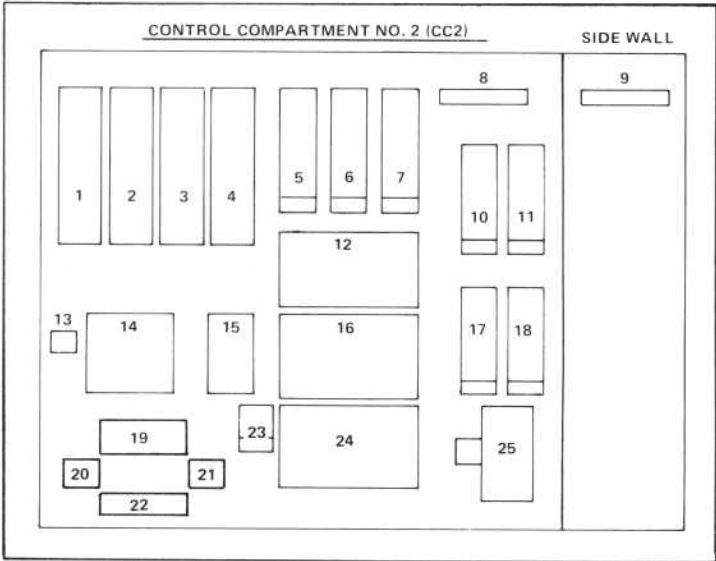
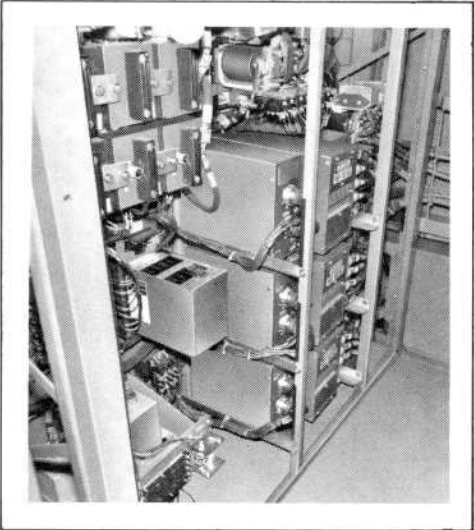
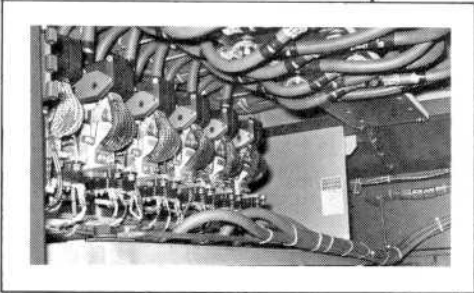
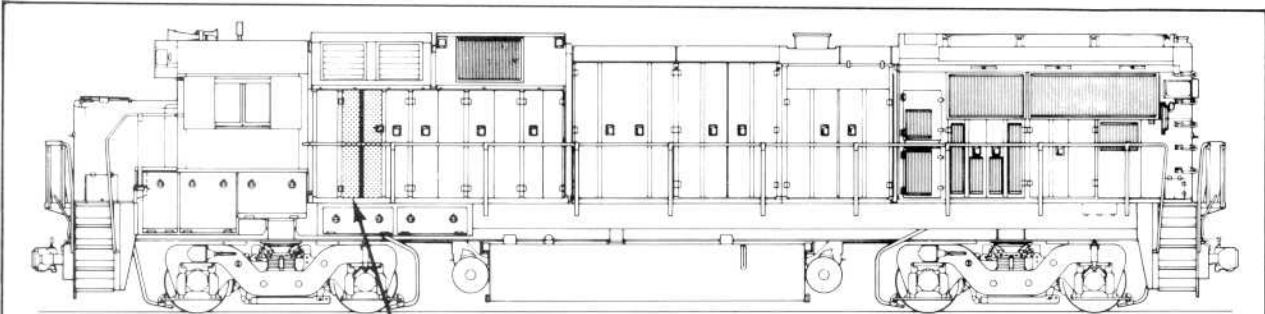


FIG. 54, E-31570

FIG. 54. CONTROL COMPARTMENT NO. 2 (LEFT SIDE).

REF.	DESCRIPTION
1	(CPT4) DIESEL ENGINE CRANKING THYRISTOR
2	(CPT3) DIESEL ENGINE CRANKING THYRISTOR
3	(CPT2) DIESEL ENGINE CRANKING THYRISTOR
4	(CPT1) DIESEL ENGINE CRANKING THYRISTOR
5	(XFC) AUXILIARY ALTERNATOR FIELD CONTACTOR
6	(BFC1) TRACTION ALTERNATOR CRANK FIELD EXCITATING CONTACTOR
7	(BFC2) TRACTION ALTERNATOR CRANK FIELD EXCITATING CONTACTOR
8	(TB2B) TERMINAL BOARD
9	(TB2A) TERMINAL BOARD
10	(GSC) ENGINE CRANK CONTACTOR
11	(GS+) ENGINE CRANK CONTACTOR
12	(BRP) BATTERY REGULATOR
13	(T1) VOLTS/HERTZ FEEDBACK TRANSFORMER
14	(HVM) ENGINE CRANK HIGH VOLTAGE INTERFACE UNIT
15	(ECM) ENGINE CRANK CONTROLLER
16	(BFR) AUXILIARY ALTERNATOR FIELD REGULATOR
17	(AFC) ALTERNATOR FIELD CONTACTOR
18	(GSS) ENGINE CRANK SEQUENCE CONTACTOR
19	(CCC) ENGINE CRANK COMMUTATING CAPACITOR
20	(ACM) ALTERNATOR FIELD CLIPPER
21	(TAT) TRACTION ALTERNATOR FIELD SUPPRESSION
22	(R2) AUXILIARY ALTERNATOR FIELD FLASHING RESISTOR
23	(FPR) FUEL PUMP RELAY
24	(AFR) TRACTION ALTERNATOR FIELD REGULATOR
25	(ABC) ALTERNATOR BLOWER CONTACTOR

FIG. 54. CONTROL COMPARTMENT NO. 2 (LEFT SIDE).

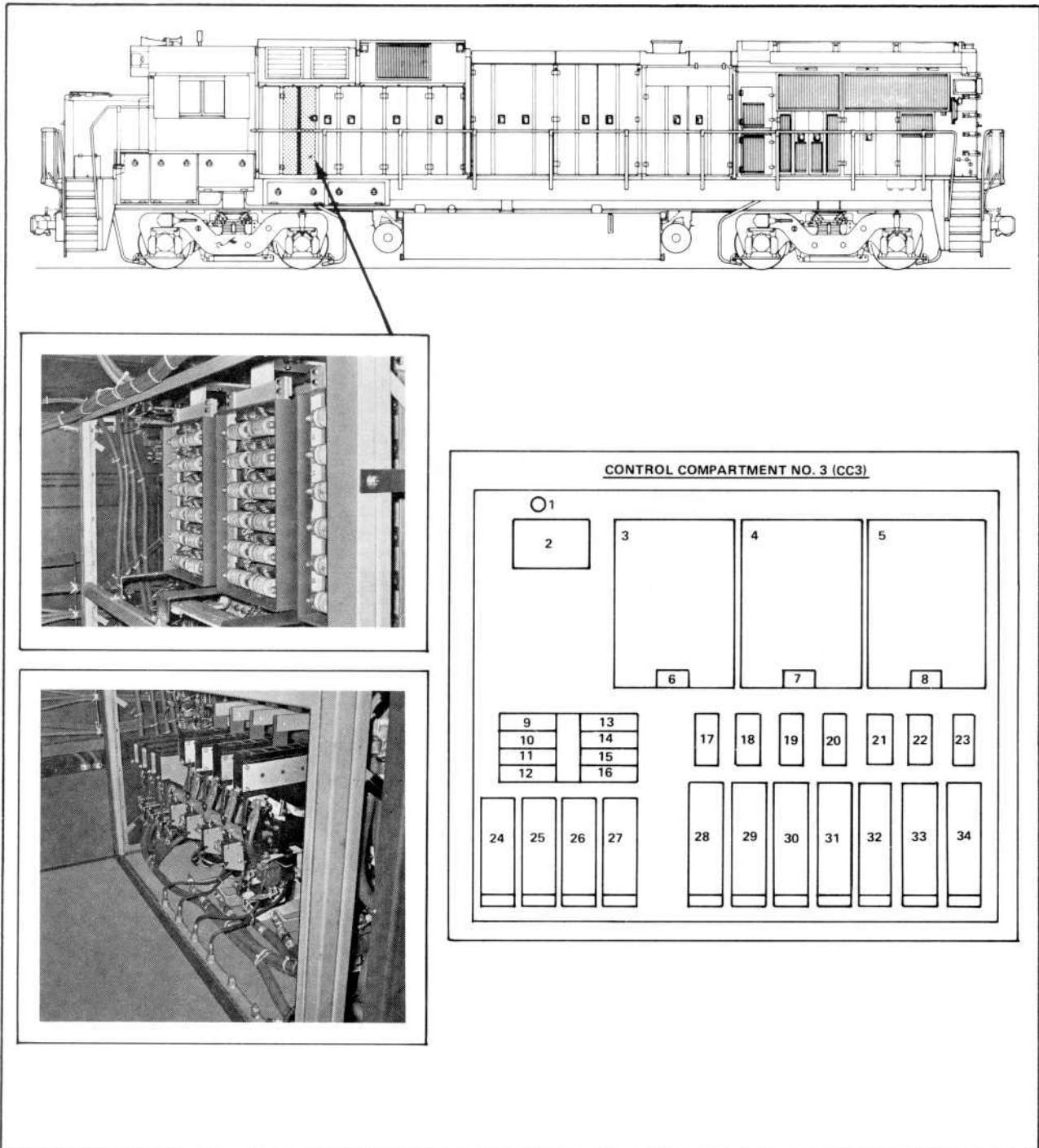


FIG. 55, E-31571

FIG. 55. CONTROL COMPARTMENT NO. 3 (RIGHT SIDE).

REF.	DESCRIPTION
1	(AT) AMBIENT TEMPERATURE SENSOR
2	(SP1) TRACTION ALTERNATOR SUPPRESSION UNIT
3	(RM1) PROPULSION RECTIFIER UNIT
4	(RM2) PROPULSION RECTIFIER UNIT
5	(RM3) PROPULSION RECTIFIER UNIT
6	(OTS1) OVERTEMPERATURE SWITCH
7	(OTS2) OVERTEMPERATURE SWITCH
8	(OST3) OVERTEMPERATURE SWITCH
9	(SCM1) NO. 1 MOTOR CURRENT SIGNAL CONDITIONER
10	(SCM2) NO. 2 MOTOR CURRENT SIGNAL CONDITIONER
11	(SCM3) NO. 3 MOTOR CURRENT SIGNAL CONDITIONER
12	(SCM4) NO. 4 MOTOR CURRENT SIGNAL CONDITIONER
13	(SCM5) NO. 5 MOTOR CURRENT SIGNAL CONDITIONER
14	(SCM6) NO. 6 MOTOR CURRENT SIGNAL CONDITIONER
15	(SCM7) DYNAMIC BRAKE MOTOR FIELD CURRENT SIGNAL REGULATOR
16	(SCM8) PROPULSION VOLTAGE SIGNAL CONDITIONER
17	(CS1) CURRENT SHUNT NO. 1 MOTOR
18	(CS2) CURRENT SHUNT NO. 2 MOTOR
19	(CS3) CURRENT SHUNT NO. 3 MOTOR
20	(CS4) CURRENT SHUNT NO. 4 MOTOR
21	(CS5) CURRENT SHUNT NO. 5 MOTOR
22	(CS6) CURRENT SHUNT NO. 6 MOTOR
23	(CS7) CURRENT SHUNT FIELD (BRAKING)
24	(LBS4) LOAD BOX SWITCH NO. 4
25	(LBS3) LOAD BOX SWITCH NO. 3
26	(LBS2) LOAD BOX SWITCH NO. 2
27	(LBS1) LOAD BOX SWITCH NO. 1
28	(P1) MOTOR CONTACTOR
29	(P2) MOTOR CONTACTOR
30	(P3) MOTOR CONTACTOR
31	(P4) MOTOR CONTACTOR
32	(P5) MOTOR CONTACTOR
33	(P6) MOTOR CONTACTOR
34	(B1) BRAKING CONTACTOR

FIG. 55. CONTROL COMPARTMENT NO. 3 (RIGHT SIDE).

OPERATION

INTRODUCTION

All of the operating devices, manual and visual, normally used by the engineer during locomotive operation are located near the operator's position on the control console or on the engine control panel.

MASTER CONTROLLER

The Master Controller is used by the operator to control the locomotive during operation. It is equipped with a Throttle handle, Dynamic Braking handle and Reverse handle. Various toggle switches, circuit breakers, indicating lights and instruments are mounted adjacent to the controller housing and are also used for operating functions.

Reverse Handle

The Reverse handle, the bottom of the three handles, determines the direction of locomotive travel. It has positions REVERSE, OFF and FORWARD. The handle is removable only when the Throttle handle is in IDLE position and Braking handle is in OFF.

Throttle Handle

The Throttle handle is above the Reverse handle. It has a SHUTDOWN, IDLE and eight major positions or notches for power.

The SHUTDOWN position is located to the right of IDLE and is used in an emergency to shut down all power on a multiple-unit consist from the operator's position of the controlling unit. Pull out axially on Throttle handle to put into SHUTDOWN. This action shuts down diesel engine.

To increase motoring power, the handle is moved toward the operator.

Braking Handle (Dynamic Braking)

The Braking handle is above the Throttle handle and has OFF and SET-UP positions and a BRAKING sector.

In the OFF position, nearest the operator, dynamic braking is shut off. The SET-UP position establishes dynamic braking circuits. Movement beyond this position into the BRAKING sector (away from the operator) increases braking effort.

Interlocking Between Handles

Interlocking between the handles of the Master Controller is provided as follows:

1. The Reverse handle must be inserted before the Throttle handle can be moved out of IDLE position for power or emergency shutdown.
2. The Reverse handle can be moved into FORWARD or REVERSE only when the Throttle handle is in IDLE position and the Braking handle is in OFF position.
3. The Reverse handle cannot be moved out of FORWARD or REVERSE position when either the Throttle handle is advanced beyond IDLE or the Braking handle is advanced beyond OFF.
4. The Braking handle must be in OFF position before the Throttle handle can be moved out of IDLE position, except for emergency shutdown.
5. The Throttle handle must be in IDLE and the Reverse handle in FORWARD or REVERSE before the Braking handle can be moved.
6. The Reverse handle can be removed when the Braking handle is in OFF and the Throttle handle is in IDLE.

Operation

To manipulate the controller handles during locomotive operation, proceed as follows:

Lead or Single-Unit Operation

Operating handle set-up (Reverse handle removed):

1. Braking (top) handle in OFF.
2. Throttle (middle) handle in IDLE.

CAUTION: *Finding the Braking handle away from OFF or the Throttle handle away from IDLE with the Reverse handle removed indicates that interlocking between handles requires repair or adjustment. Do not attempt to operate.*

3. Insert the Reverse (bottom) handle.
4. Set the Reverse handle for desired direction.

Operating in Power Mode

1. Braking handle remains in OFF.
2. Move the Throttle handle to the desired notch.

Operation in Dynamic Brake Mode

1. Throttle handle returned to IDLE.
2. Move the Braking handle to SET-UP; pause, then advance as desired.

Operation as Trail Unit

1. Braking handle in OFF.
2. Throttle handle in IDLE.
3. Reverse handle centered and removed.

For Emergency Multiple-Unit Shutdown

In the controlling unit, pull out axially on the Throttle handle, and move it beyond IDLE to SHUTDOWN.

NOTE: *In a trail unit, the Reverse handle must be inserted to release the Throttle handle before it can be moved to SHUTDOWN.*

DEVICES ON CONTROL CONSOLE

Air Brake Equipment

The schedule 26-L equipment, arranged for single station multiple unit operation. The principal parts are:

26-C Brake Valve

This valve consists of two separate pieces: the Automatic brake valve and the Independent brake valve. The Automatic valve is designed for regulating brake-pipe pressure to control both locomotive and train brakes. The Independent valve also controls the release of the locomotive brakes (due to an Automatic brake application) without releasing the train brakes.

Automatic Brake Valve Handle

The Automatic Brake Valve handle has six positions:

1. **RELEASE (RUNNING)** position – This position charges the equipment and releases the locomotive and train brakes after an Automatic application. This is accomplished by controlling air flow to the brake pipe as set by handle position of regulating valve (on back of brake stand). The **RELEASE** position is at the extreme left of the quadrant and is the normal position when the automatic brake is not in use.
2. **MINIMUM REDUCTION** position – This position is located to the right of the **RELEASE** position where the brake valve handle reaches the first raised portion of the quadrant. With the brake valve handle moved to this position, the Minimum Service application is obtained, which results in a four to six pound brake pipe reduction.
3. **SERVICE** positions – This sector for brake valve handle movement is to the right of the **MINIMUM REDUCTION** position. Moving the handle from the left to right in this sector increases the degree of brake application. At the extreme right of the sector, a Full Service brake application is obtained.

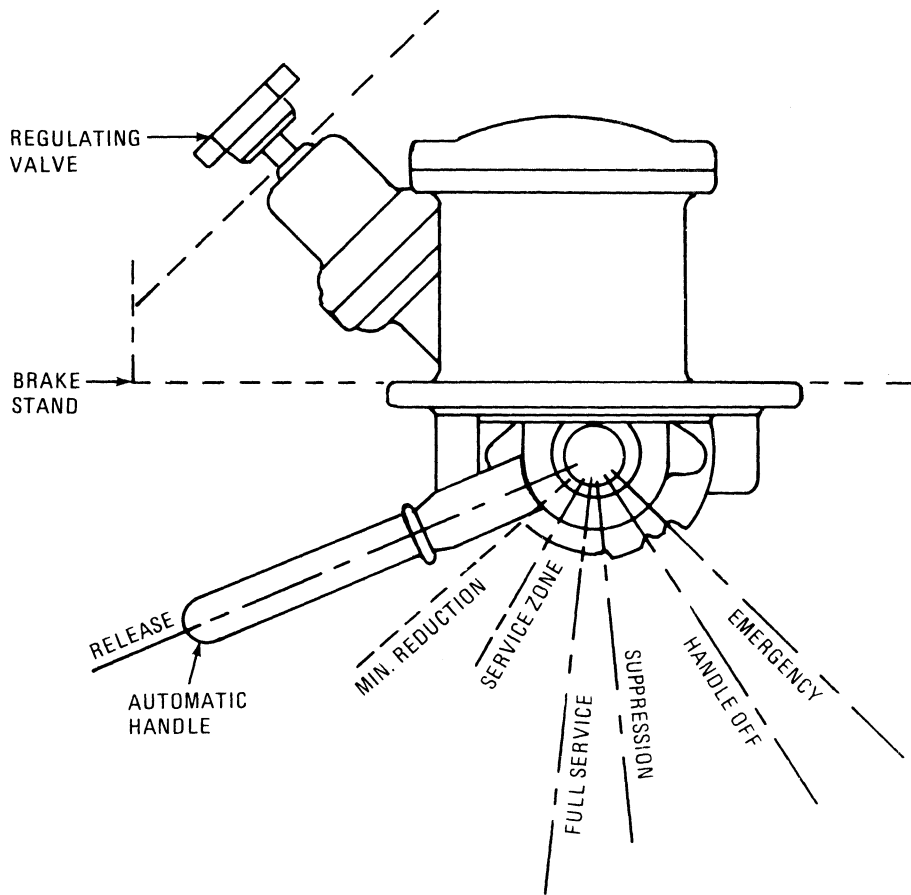


FIG. 56. AUTOMATIC BRAKE VALVE POSITIONS.

4. **SUPPRESSION** position – This position is located with the handle against the second raised position of the quadrant, to the right of the **RELEASE** position. This position provides a Full Service brake application and will suppress a cab signal or speed recorder overspeed as well as the vigilance deadman feature.
5. **HANDLE OFF** position – This position is located by the quadrant notch to the right of the **SUPPRESSION** position. The handle is normally removable in this position. It should be placed in this position and removed on trailing units of a multiple-unit consist or on locomotives being towed “dead-in-train.”
6. **EMERGENCY** position – This position is located to the extreme right of the brake valve quadrant. It is used to make a brake valve initiated Emergency brake application.

When an Emergency application has been experienced, the Automatic brake valve handle must be moved to the **EMERGENCY** position and left in this position until the equalizing reservoir gage hand indicates zero (“0”) pressure and the Sand light is out. The Automatic brake valve handle may then be moved to the **RELEASE** position to recharge the brake pipe and release the brakes.

Independent Brake Valve Handle

This handle applies and releases the brakes on the locomotive consist or releases the brakes on the locomotive units alone, after an Automatic or Emergency application.

The Independent brake valve has two positions: **RELEASE** and **FULL APPLICATION**, with an application zone between. The brake valve is of the self-lapping type which automatically maintains brake cylinder pressure when it reaches a value corresponding to the handle position. An Independent brake application can be released only by movement of the handle toward the **RELEASE** position. An automatic Service or Emergency application can be released on the locomotive consist by depressing the Independent brake valve handle in the **RELEASE** position.

Brake Valve Cut-Out Cock

This cock, also known as the “double-heading cock” is located on the front of the Automatic brake valve. Push in the handle and turn to position for type of service. The **OUT** position is used when the locomotive is operating as a trailing unit.

MU Cut-Out Cock

This valve is located on the brake stand. It enables a locomotive equipped with 26-L brakes to operate in multiple with locomotives having similar or other types of brake equipment. Turn to the proper position.

Air Regulating Valve (Feed Valve)

The air regulating valve, located on the control stand, Fig. 1, automatically maintains a predetermined air pressure in the train brake pipe. A clockwise movement of the adjusting handle increases the pressure setting. A counterclockwise movement decreases the pressure setting. Adjust to conform with railroad rules.

Horn Valve

By pulling toward you on the handle the air horn will sound.

Lead Axle Sand Switch

Sand will be applied to the Front axle only.

Sand Switch

Sand will be applied to the leading axle of each truck no matter which direction you are going.

Bell Valve

The locomotive bell will sound when valve is pulled toward you. Push in to shut off.

Air Gages

The following duplex air gages are located on the gage panel on the control console:

1. Main Reservoir/Equalizing Reservoir - Red hand indicates main reservoir pressure; white hand indicates equalizing reservoir pressure.
2. Brake Cylinder/Brake Pipe - Red hand indicates locomotive brake cylinder pressure; white hand indicates brake pipe pressure.
3. Air Flow Indicator - White hand indicates amount of flow. Red hand is set by the operator. When the flow is greater than what the operator set, a red light on the bottom of the indicator will come on.

Load Ammeter

This meter reads the highest current going to the traction motors. Motoring is shown to the right of 12 o'clock and has two bands. The green band is the continuous rating of the motors and the red band is in the short time rating. When in the short time rating, observe the time limit on the meter. Dynamic Braking is shown to the left of 12 o'clock and has two bands. The yellow band is the continuous rating of the motors and the red band is overload. If the meter goes into the red band, reduce the Braking Handle position.

Indicating Lights

Six indicating lights are on the console. They are from left to right and top to bottom –

Wheelslip - Indicates that the wheels on some locomotive in the consist is slipping. This is a trainlined indication.

PCS Open - Indicates that the air brakes have gone into Emergency position and all power should be removed from the locomotives.

Dynamic Brake Warning - This indicates that a locomotive in the consist is experiencing excessive dynamic braking current. Reduce the braking handle position until this light goes out. This light is an option and may not appear on your locomotive.

Blank -

Sand - This indicates that either the lead axle and switch or the sand switch is on. During a wheelslip, sanding will automatically turn on, then off.

Blank -

Switches

Gage light switch - Turns on all the lights on the operators console. The gage light dimmer knob is around the front of the console, near the front window.

Step light switch - Turns on all four corner step lights.

Generator-Field Circuit Breaker

The Generator-Field circuit breaker is ON whenever the locomotive is powered AND operating as a lead unit. The breaker also may be used to keep the main generator de-energized when it is necessary to run the engine at speeds higher than idle.

Engine Run Breaker

The Engine Run breaker controls engine speed. It must be ON to control engine speed of the lead locomotive and all locomotives of a consist. On trail locomotives, the breaker is in the OFF position.

Control Breaker

The Control breaker must be ON to start the engine and provide power to other circuits including the auxiliaries. In MU operation, this breaker must be ON on the lead locomotive only.

Dynamic Braking Control Breaker

The Dynamic Braking Control breaker is used to control the dynamic braking of the locomotive. In MU operation, this breaker must be ON on the lead locomotive only to control the dynamic braking of all units in the consist.

Headlight Switches

Front Headlight

Rear Headlight

Call Button

This button rings the call bell in all units in the consist.

The following is normal correlation between the Throttle handle or Braking handle and engine speed (rpm).

<u>Throttle Handle</u>	<u>Engine Notch</u>	<u>Engine RPM</u>		
Idle	*			
1	1	445-453	When in dynamic braking, the engine speed depends upon the braking grid current:	
2	2	521-549		
3	4	704-712		
4	5	758-788	0-449 traction motor amps	Engine at IDLE
5	6	876-884	450-574 traction motor amps	Engine at Notch 5
6	6	876-884	575-720 traction motor amps	Engine at Notch 8
7	7	962-980		
8	8	1049-1057	Regular	450
			Low	385
			Low-Low	270

Cut-Out Cocks

This is a listing of the cut-out cocks or valves on the locomotive and their location.

CUT-OUT COCKS	FIG. NO.
Actuating Pipe (end connection)	7, 16, 18, 24
Application Pipe (end connection)	7, 16, 18, 24
Brake Pipe (end connection)	7, 18
Brake Pipe (air rack)	26
Control Reservoir Drain	20
Dead Engine	26
Fuel Filter Drain	40
Horn & Bell	26
Lube Oil Drains	14
Main Reservoir (end connection)	7, 16, 18, 24
Main Reservoir	22
Overspeed (OSV)	26
Sand & Wipers	26
Safety Control (SCMV)	26
Truck Cut-Out	19, 23
Water Drain	42
Water Sight Glass Shut-Off	42

ENGINE CONTROL PANEL

The Engine Control (EC) panel is located on the rear wall of the operator's cab, Fig. 31. Mounted on this panel are various circuit breakers, switches, display panel and other operating devices used during locomotive operation. A description of each of these devices will follow.

Circuit Breakers on EC Panel

The top row of circuit breakers on the EC panel are used for optional equipment or equipment that can be turned off when the unit is operating as a trail unit. From left to right are the circuit breakers and their functions. If your locomotive does not have one of these circuit breakers it is not equipped with that option.

1. Pace Setter
2. Window Heater
3. Overspeed
4. Locotrol
5. Cab Signal
6. Alertness Equipment
7. Warning Light
8. Oscillating Light
9. Radio
10. Water Cooler
11. Front Headlight
12. Rear Headlight

Engine Stop Push Button

This button is used to shut down the diesel engine on that unit only.

The second row of circuit breakers on the EC panel is used for both standard and optional equipment, all of which must be left on whether the unit is operating as a lead or trail unit. From left to right are the circuit breakers and their function. If your locomotive does not have one of these circuit breakers it is not equipped with that option.

1. Auto Water Drain*
2. Toilet Tank Heater*
3. (Blank)
4. (Blank)
5. Running Lights
6. Compressor Clutch**
7. Fuel Pump
8. Local Control
9. Battery Charge and Computer

*Optional

**Some locomotives do not have clutch.

Diagnostic Display Panel (DID)

The Diagnostic Display Panel (DID) performs several different functions on the locomotive. The first function of the panel is to tell the operating crews about the status of the locomotive. This function is divided into two forms.

- (A) a fault has occurred on the unit and the crew should take some action or
- (B) an information status message that will tell the crew why the unit is not at full power.

The second function of the panel is to

- (A) inform the maintenance personnel what condition has occurred on the unit and
- (B) test and correct those conditions. Access to this function requires a password entry.

On the top of the DID panel is a two line message board. The top line is used to list the fault number, then the status or fault type messages. The bottom line is used to display from one to five response words. These words are the input that the computer needs to know what it should do next. These word inputs are used in conjunction with the F1 thru F5 keys located directly below each word. By pressing the corresponding F (function) key that word will be entered into the computer. The response words and their position on the display will vary with each new message.

Shift Key

The function of the Shift Key is to allow you to insert the smaller letter or symbol that is on each key. By pressing the Shift Key first the next key you press will be entered as the smaller letter or symbol on that key. The Shift Key is only good for one input at a time. To enter a second small letter or symbol you must press the Shift Key again then the letter or symbol.

Example: If you wish to input the letters A and B you would press this sequence, SHIFT KEY; #1 KEY; SHIFT KEY; #2 KEY.

Bright/Dim Key

To dim the display simply press the Bright/Dim key and hold. The longer you press on the Bright/Dim key the dimmer the display will get until it is almost out. To increase the brightness of the display first press the Shift key then the Bright/Dim key. The longer you press on the Bright/Dim key the brighter the display will get:

Hint: When you are increasing the brightness and you stop, the next time you touch the Bright/Dim key the display will go dimmer unless you first touch the shift key.

Number/Letter Key

To enter the number keys 1 thru 0 just press. To enter the letters A thru F plus the symbols (.), (+), (-), and (*) first press the Shift key then press the desired letter.

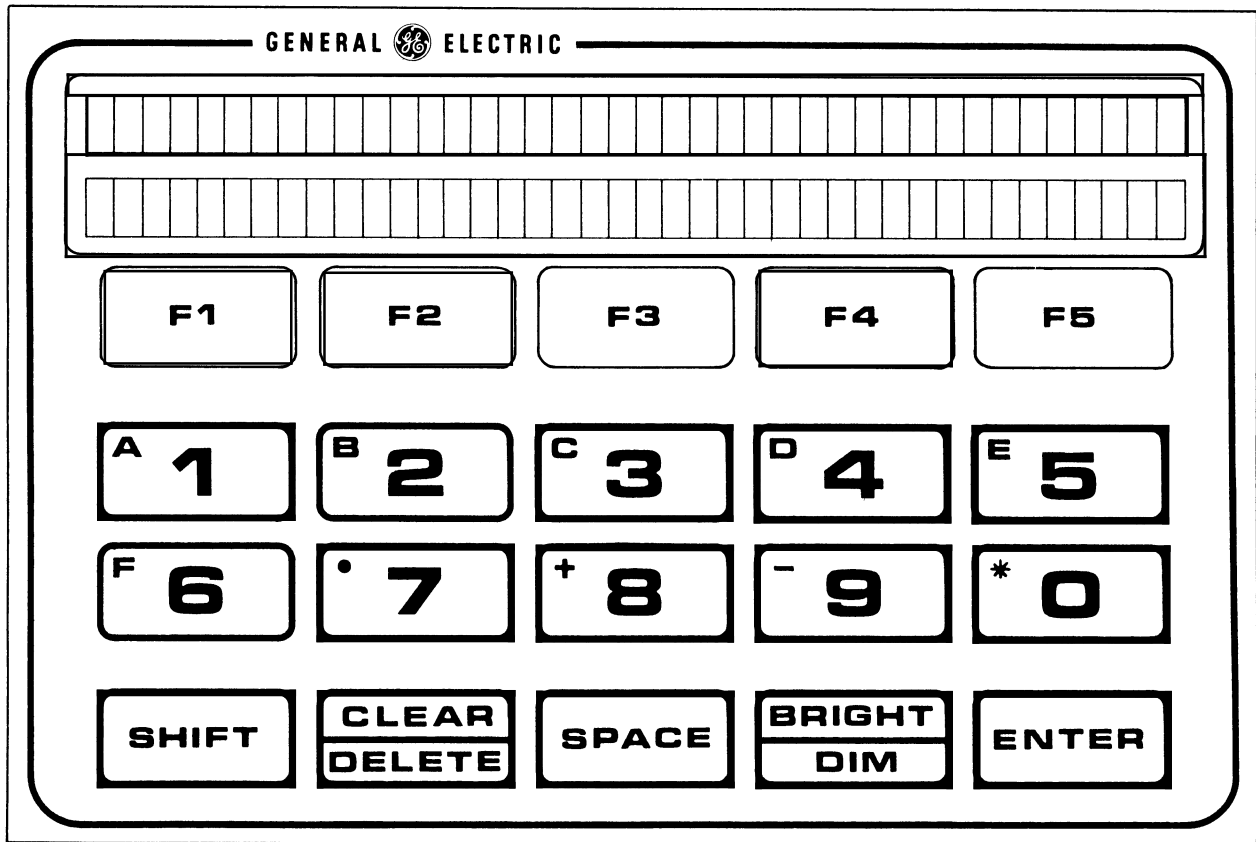


FIG. 57, E-31307

FIG. 57. DIAGNOSTIC DISPLAY PANEL (DID).

Clear/Delete Key

To enter the Delete command, just press the key. To enter the Clear key, first press the Shift key then press the Clear/Delete key. The Delete key will omit what is on the display from the computer and take you back to the beginning of the sequence you were in. The Clear key will clear the display back one step on the sequence you were in.

Space Key

To enter just press.

Enter Key

To enter just press.

Multi Fault Display

The readout on the DID display panel is only capable of displaying one fault or status message at one time. The fault or message with the highest level of priority will be displayed and the lower level faults/messages will be stored. When the highest level fault/message is cleared, the next highest level fault/message will be displayed and so on down the priority list until all faults/messages are reset or cleared.

Example: A load limit message is on the display and a ground relay picks up. The load limit message will be stored and the ground relay message will be displayed.

This is a list of the faults that can be displayed and the response the crew should take. These messages are not listed in order or priority.

Fault Won't Load: Dirty Engine Air Filters
Response Press the reset key.

Fault Won't Load: Hot Diodes
Response Press the reset key.

Fault Shutdown: Engine Overspeed
Response Press the reset key.

This is a list of other messages that can be displayed and the response the crew should take.

Message Alarm from other unit
Response No Crew action required, Display will go to Ready status when the trainline is de-energized.

Message Can't Battery Jog: BKT in wrong position
Response Try throwing reverser handle. Check if there is air pressure. Call for maintenance.

Message Display Ready
Response It is normal on a start up for this message to be displayed for a few seconds. If this message stays on longer, it indicates that the CAB controller is not functioning. Call for maintenance.

Message Fault Message Stored
Response Report to maintenance, continue to operate.

Message In Self Load
Response Check to see if the Self Load switch in the electrical locker in the operators cab is in the NORMAL position.

Message Isolated
Response Place EC Switch in RUN position.

Message Response	Load Limited: Dirty Engine Air Filt No crew action required.
Message Response	Load Limited: Hot Engine No crew action required.
Message Response	Load Limited: Low Water Pressure No crew action required.
Message Response	Load Limited: Low Oil Pressure No crew action required.
Message Response	Load Limited: Power Circuit Ground No crew action required.
Message Response	Load Limited: Electrical Control Problem No crew action required.
Message Response	Load Limited: Hot Traction Motors No crew action required.
Message Response	Load Limited: PLS in Notch 7 Check position of Notch 7 switch. That switch should only be used on Lead Unit and when throttle handle in Notch 8 results in excessive wheelslip.
Message Response	Load Limited: Cold Engine No crew action required.
Message Response	No Battery Charge Isolate unit.
Message Response	No Dyn Brake: Auto Motor Cutout No crew action required. This is normal if a motor is automatically cutout by the controls.
Message Response	No Dyn Brake: Man. Motor Cutout No crew action required. This is normal if a motor is cutout.
Message Response	No Dyn Brake: Electrical Control Problem Isolate Unit from Dynamic Braking.
Message Response	Providing Standby Power Call maintenance.

Message	Rad Fan Problem: May Reduce Load
Response	No crew action required.
Message	Ready
Response	No crew action required. After 30 minutes of no activity the display will go blank. If you wish to turn on the display, simply touch any key.
Message	Shutdown: Low Water Pressure
Response	Check water level. If full and temperature is below 45°F, follow railroad rules on draining unit.
Message	Shutdown: Low Oil Pressure
Response	Check oil level. Isolate unit and prepare to drain water if necessary.
Message	Shutdown: Crankcase Over-Pressure
Response	Isolate unit and prepare to drain water if necessary.
Message	Wait
Response	Wait.
Message	Won't Crank: Electrical Control Problem
Response	Call maintenance.
Message	Won't Load: Waiting for Aux. Alternator
Response	Isolate, call maintenance.
Message	Won't Load: Hot Engine
Response	Isolate.
Message	Won't Load: Power Circuit Ground
Response	Isolate.
Message	Won't Load: Power Circuit Problem
Response	Isolate.
Message	Won't Load: Electrical Control Problem
Response	Isolate.
Message	Won't Load: Check BFCO and DIS
Response	Check switch BFCO inside electrical locker in operators cab. Check that the door to the high voltage compartment behind the operators cab is closed.
Message	Won't Load: Battery Charge Problem
Response	Check Battery Charge/Computer circuit breaker on EC panel. If on, then isolate unit.

Message Routine Maintenance needed for DID.
Response Continue to operate unit. Call maintenance or GE representative to collect repair data.

Engine Control Switch

The Engine Control (EC) switch has a four position switch, START, ISOLATE, RUN AND JOG. The Engine Start switch is effective only when the EC switch is in the START position. The JOG position is an option and may not appear on your unit.

When the engine is running and the EC switch is in START position, engine speed is held at idle and power cannot be applied to the locomotive. The power plant is said to be “off the line.”

When the engine is running and the EC switch is in the ISOLATE position, the engine speed is held at idle and power cannot be applied to the locomotive. The alarm bell will sound if a fault occurs that will shut the engine down.

When the engine is idling and the locomotive is to be operated, the EC switch must be moved to the RUN position.

When the engine is shut down and the locomotive is to be moved using battery propulsion, the EC switch must be moved to the JOG position.

MU Headlight Set-Up Switch

The MU Headlight Set-Up switch has five positions. Positioning of this switch is determined by location of the locomotive unit in the consist and whether the front of the locomotive unit is leading or trailing. Switch positions are as follows:

1. SINGLE OR MIDDLE UNIT: Place switch in this position on any locomotive unit operated singly or on all units except the leading or trailing unit when the locomotive consist is made up of more than one unit.
2. SHORT HOOD LEAD – LEADING UNIT: Place switch in this position when the leading unit is operated with the short hood forward.
3. LONG HOOD LEAD – LEADING UNIT: Place switch in this position when the leading unit is operated with the long hood forward.
4. SHORT HOOD TRAIL – TRAILING UNIT: Place switch in this position when the final trailing locomotive unit is connected so its short hood trails.
5. LONG HOOD TRAIL – TRAILING UNIT: Place switch in this position when the final trailing locomotive unit is connected so its long hood trails.

Switches on EC Panel;

The following light switches are located on the EC panel:

1. Crosswalk
2. Control Compartment
3. Front Number
4. Rear Number
5. Front Class
6. Rear Class

The following Cut out switches are located on the EC panel:

1. Motor No. 1
2. Motor No. 2
3. Motor No. 3
4. Motor No. 4
5. Motor No. 5
6. Motor No. 6
7. Speed Sensor
8. Locked Axle

NOTE: *The Speed Sensor cutout switch only cuts out the sensor on any traction motor that is cutout. Two motor speed sensors must be operating before the unit is allowed to load.*

Battery Charge Receptacle

The battery charge receptacle is located on the EC panel.

Circuit Breakers

The following power circuit breakers are located on the bottom of the EC panel.

1. Engineers strip heater
2. Helpers strip heater
3. Engineers main cab heater
4. Helpers main cab heater
5. Air conditioner.*

*Optional

OPERATING HINTS ON THE SERIES-8

YOU SHOULD KNOW:

- That when you start up a cold diesel engine that the equipment blowers and radiator fans will go to full speed. The reason is to add some load to warm up the diesel engine faster.
- That until the cooling water temperature gets above 90°F the diesel engine will only be allowed to go to NOTCH 1 RPM and power even if the Throttle Handle is calling for a higher notch.
- That until the cooling water temperature gets above 140°F the diesel engine will only be allowed to go to NOTCH 3 RPM and power even if the Throttle Handle is calling for a higher notch.
- That the equipment blowers do not follow diesel engine RPM but vary speed according to cooling requirements.
- That the radiator fans vary in speed according to cooling water temperature.
- That after you start up the diesel engine the battery charger will not start to operate for a period of 60 seconds.
- That when you turn on the Battery Charge/Computer circuit breaker the electronics checks itself.
- That the Display panel will turn itself off after it says “READY” for a 30 minute period.
- That the temperature of the traction motors is calculated by the built in computer using inputs of traction motor current, air temperature, time, etc.
- That if the traction motors are too hot the computer will automatically cut back on traction motor current.
- That these units will not respond to the manual trainlined sanding signal if the locomotive speed is over 7 MPH. Lead axle sand will function as before.
- That the engine will not load if the door going into the electrical locker on the left side of the locomotive is open.
- That the Loadmeter will come up during self test, self loadbox or shop loadbox testing. There is no current in the traction motor armatures during these tests.
- That there is no transistion.
- That in Low Low IDLE if the battery charging voltage drops too low, the diesel engine speed will come up to a higher IDLE while the battery charging demand is on.

- That power will automatically be reduced on each unit separately if a leakage ground exists in the power circuit. The ground relay will not trip, but power will be reduced until the ground dries up or goes away. If the ground gets worse, the relay will trip. After three trips in a 30 minute period the relay will no longer reset itself, but should be reset by shop electrician after clearing the ground fault.
- That power will be reduced if cooling water temperature starts to get too hot, and power will return to normal when water temperature is normal.
- That the Diesel Engine will go to IDLE and unload if the water temperature exceeds the top end limit.
- That for 16 cylinder Diesel Engines (B39-8 and C39-8 models) the speed will automatically be reduced from NOTCH 8 speed to NOTCH 7 speed at certain train speed. This is to save fuel. Diesel engine speed will return to NOTCH 8 when necessary.
- That Diesel Engine RPM will vary in Dynamic Braking according to Braking Handle position (IDLE thru 8).
- That after the Prime/Start switch is turned to Start there will be about 2 to 4 seconds delay until the Diesel Engine starts to rotate.
- That a 30 second bell means a unit is off the line and the diesel engine is still running. A continuous bell means that a unit is off the line and the diesel engine is shut down.
- That the Exciter and the Auxiliary Generator are now combined in the Auxiliary Alternator which is built into the Main Alternator frame.
- That the Main Alternator is used as a starting motor, running from the battery.
- That each Rectifier Over Temperature Switch has its own separate input to the Computer.
- That by manual request the radiator fans can be set to run full speed backwards for 1 minute with the Reverser Handle centered. This is to blow debris off the inlet screen.
- That the Display Panel on the EC panel will provide messages of locomotive condition.

STARTING THE DIESEL ENGINE

NOTE: *If the engine has been shut down for a considerable period of time, the cylinder should be cleared of fuel or water accumulation before starting the engine.*

Proceed as follows:

- a. Apply the engine barring-over device, and back off the compression relief plugs on the left side of each cylinder.
- b. Rotate the engine at least two complete revolutions by use of the engine barring-over device.

- c. Remove the barring-over device from the engine, and tighten all compression relief plugs before cranking.

NOTE: *Cover for barring-over feature must be securely mounted, otherwise engine cannot be cranked. See Fig. 50.*

1. Check that the emergency stop feature is nullified (Throttle handle in IDLE).
2. Close the Battery switch located behind the door under the EC panel.
3. Turn on all the circuit breakers in the bottom row of the EC panel.
4. Turn on whichever circuit breakers on the top row are needed.
5. Check the Diagnostic Display for any fault messages. It should read READY.
6. Place the EC switch into the START position.
7. Go to the start station located at the engine and put the start switch to the PRIME position and hold until you see fuel in the sight glass.
8. Turn the switch to the START position and hold until the engine starts.

NOTE: *If proper engine lube-oil pressure does not build up within approximately 40 seconds, the governor will shut off fuel and prevent the engine from running.*

STOPPING THE DIESEL ENGINE:

NOTE: *Allow the engine sufficient time at IDLE to cool down.*

1. Place the EC switch in the START position.
2. Push the Engine Stop button on the EC panel or at the Start Station.
3. Open all Circuit Breakers.
4. Open the Battery Switch.
5. Secure the locomotive.

MOTORING

1. Close the Generator-Field circuit breaker on the control console.

CAUTION: *To prevent equipment damage when changing from power to dynamic braking or from dynamic braking to power, pause 10 seconds with Throttle handle at IDLE and Dynamic Braking handle in OFF.*

2. Move the Reverse handle to the desired direction of movement.
3. Advance the Throttle handle.
4. The Throttle handle has notches (IDLE up to Notch 8), with each successive notch representing an increase in power, or locomotive tractive effort.

DYNAMIC BRAKING

1. Make sure throttle handle is in IDLE.
2. Advance braking handle as desired.

REVERSING LOCOMOTIVE

1. Bring the locomotive to a full stop.
2. Move the Reverse handle to the opposite direction.
3. Release the brakes.
4. Advance the Throttle handle.

OPERATING AS A LEAD UNIT:

1. Test the Air brakes in accordance with railroad rules.
2. Close the Generator Field, Dynamic Braking control and Engine Run circuit breakers on the operator's console.
3. Place the MU headlight switch in the proper position.
4. Move the Reverse handle to the desired direction.
5. Operate the locomotive in accordance with railroad operating procedure.

OPERATING AS A TRAIL UNIT:

Air Equipment Set-Up

1. Make a Full Service application with the Automatic Brake valve handle.

2. Move the brake valve cut-out (double-heading) cock to the OUT position.
3. Move the Automatic Brake valve handle to the OFF position, and remove the handle.
4. Place the Independent handle in the RELEASE position.
5. Move the MU Cut-Out cock to the out position.

Electrical Set-Up

1. Move the Reverse handle to OFF, and remove the handle.
2. Open the Generator Field, Dynamic Brake Control and Engine Run circuit breakers on the operator's console. Leave all the circuit breakers in the closed position on the bottom row of the EC panel.
3. Place the MU headlight setup switch in the proper position.

HAULING DEAD IN TRAIN

1. Place the Independent Brake valve handle in the RELEASE position and the Automatic Brake valve handle in the OFF position.
2. Depress the brake-valve cut-out cock handle and move to the OUT position.
3. Place the MU cut-out cock (double-ported cut-out cock) handle in the IN or OPEN position.

CAUTION: *To avoid wheel flat spots, drain the main reservoir down to 40 psi below the brake pipe pressure used on the train to which the locomotive will be coupled.*

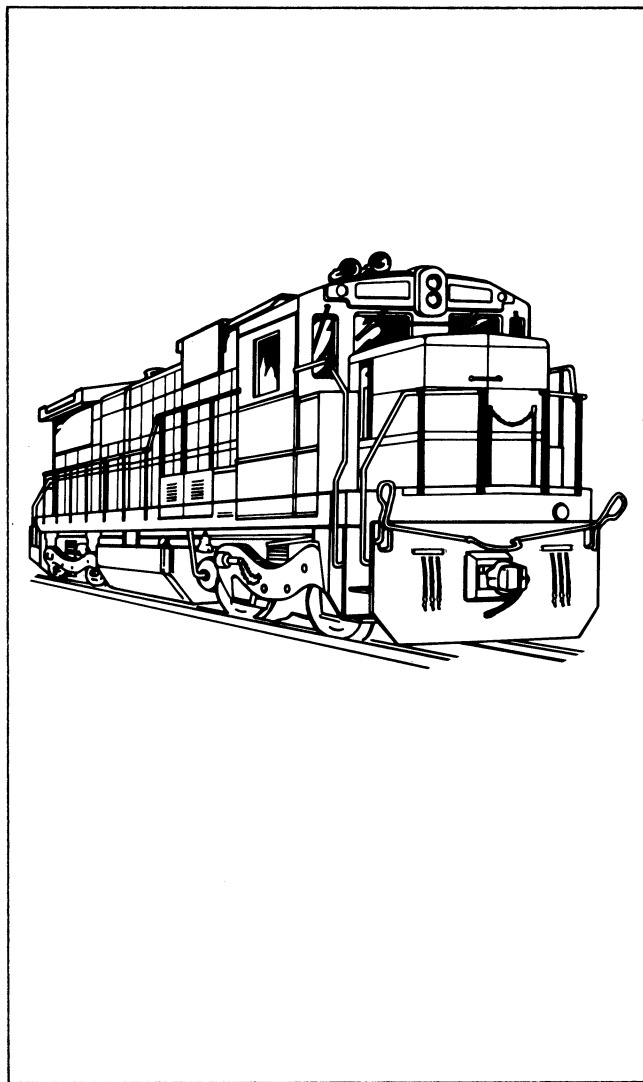
4. Open the dead-engine cock. See Fig. 26.



SERIES-8 HANDBOOK

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