

**BOOK 86  
VOLUME 1  
CHAPTER 1**

**GENERAL INFORMATION AND SPECIFICATIONS**

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**CHAPTER 1**  
**GENERAL INFORMATION AND SPECIFICATIONS**

1-1

GENERAL REVENUE VEHICLE INFORMATION

This vehicle was originally built for BART by Rohr Corporation in the early 1970's. In 1996, Adtranz began to rehabilitate these vehicles by incorporating the latest technology and by making general repairs necessitated by normal equipment wear and aging.

Currently, there are four types of revenue vehicles at BART (A, B, C1, and C2). The original A and B cars have been rehabilitated and are now referred to as the A2 car and the B2 car. The A2 car has a consist operator's control cab at one end in which the train control equipment and communications equipment is located. The A2 car is distinctive in appearance because of the white fiberglass tapered nose at the Y-end of the vehicle. The B2 car contains no train control equipment or communications equipment and is squared off at each end. In the proper consist (multiple car) configuration, which utilizes only A2 and B2 cars, there are two A2 cars with the consist operator's cab at each extreme end of the consist, and as many as eight B2 cars between them. Therefore, when considering the individual cars which form one complete consist, the A2 cars are unidirectional, and the B2 cars can be facing in either direction.

The car body is similar to an aircraft design, with roof, sidewalls, and flooring constructed of aluminum beams, struts, and intercostal members. The exterior car body is natural brushed aluminum. The interior overhead and sidewalls are finished phenolic resin fiberglass panels. End wall and door pocket liners are polyester panels. Floors are carpeted and seats are foam rubber padded and fabric covered. The large windows are heavily tinted. The interior temperature is easily maintained because of foam insulation in the sidewalls and roof. This foam insulation also adds to the structural strength of the car's roof. Floor panels are constructed with a balsa core with a steel skin.

An interesting feature is the track gauge (distance from rail to rail) used throughout the BART system. The gauge is 5 feet, 6 inches, compared to the standard 4 feet, 8½ inch rail gauge. This wider gauge provides improved riding comfort and a higher degree of stability at high speeds around banked turns.

In general, BART has been successful in achieving its three major design concepts for the BART A2 and B2 vehicles—reliability, affordability, and fire resistance.

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A2 Car	The original BART A car that has been rehabilitated. The A2 car is a revenue vehicle with a fiberglass operator's control cab at one end. These cars contain automatic train control equipment and communications equipment.
Air Springs	The means by which the car body is suspended on top of the wheel/axle assembly. The air springs are large, rubber, air-filled cylinders. There are eight per car, four at each end. The air springs also keep the vehicle level and at the proper height, regardless of passenger load.
Annunciators	A set of failure indicator lights. When a system failure occurs, annunciators on the operator's console inform the consist operator that a specific system failure has occurred in one of the cars in the consist. There is no provision on the console annunciator panel for determining which car in the consist has failed.
ATO	Automatic train operation. The fail-safe system whereby the consist receives one of seven speed commands transmitted to it by way of the section of running rails immediately in front of the leading car of the consist. Since one of the valid speed codes transmitted to the consist is a 0 mph code, the same system is used to make the consist move at the desired speed, slow down, or stop. ATO is often used as a noun to make reference to the on-board equipment which performs automatic train control functions.
B2 Cars	The original BART B car that has been rehabilitated. B2 cars do not contain automatic train control equipment or communications equipment. In a consist configuration, B2 cars are always positioned between the leading or trailing A2, C1, or C2 cars. B2 cars do not have an operator's cab.
Body Bolster	Steel structural member which serves to anchor the trucks to the car body frame. It has a large center pin that allows the truck to pivot under the car by providing a pivot axis. The underside of the bolster has four Teflon surfaced plates that interface with the truck suspension adapter.
Cab	Where the operator sits in an A2 car. The A2 car cab contains automatic train control equipment, communications equipment, and an operator's console.
Car Battery	A 36 volt, wet cell type battery used to start the auxiliary power supply equipment, and to provide control power and lighting when the APSE is not working due to rail gaps or failure.
Car Control Panel	Located in the X-end of the vehicle. (Refer to definition for X-end.) Contains all car system low voltage circuit breakers, such as the propulsion circuit breaker and the overhead lights circuit breaker. Distributes the car's low voltage from the car battery and battery charger.
Collector Shoes	Cast iron paddles. There are four per car; one close to each corner of the vehicle. These shoes make contact with the 1000 Vdc (third) rail and slide along the top of the third rail as the car moves. They conduct 1000 Vdc to the car's propulsion and auxiliary electric systems.
Consist	The name given for a complete train. A consist can have from three to ten cars, but must always have two control cars (A2 or C cars), one at each end of the consist, with cabs facing away from the consist.

Coupler	The physical latching device that locks the end of one car to the end of another and serves as the electrical connection between cars. Basically, a thick notched pin which enters a receptacle with a spring loaded latch. The latch engages the notch which locks the pin in place.
Crush Load	When a car is carrying the maximum number of passengers it can hold, it is said to be carrying a <i>crush load</i> . Maximum number of passengers per car is 288. Crush load occurs when there is one passenger for every 2 square feet of interior floor space, or when the car is carrying 38,000 pounds above its empty weight.
DDU	Door diagnostic unit. Monitors functions of the door system, including input commands, door leaf response times, door obstructions, and emergency lever operations. The unit is completely passive until a connector containing the door summary trainline loop is disconnected and a special test connector is installed. Shop testing of door functions and timing can be done with this test connector installed.
ECU	Electronic control unit. One ECU is located at each end of a vehicle. Each ECU controls one truck of friction brakes (two disks). Each ECU constantly communicates with the other ECU on the vehicle to monitor general health and compare the validity of inputs.
EHU	Electro hydraulic unit. Supplies pressurized and metered hydraulic fluid for the operation of the friction brake calipers. There is one EHU per truck. It is mounted on the car underframe.
End Door	Manually operated door at each end of a B2 car, and at the X-end (non-cab end) of an A2 car. These doors provide passengers free movement from car-to-car within a consist.
Exterior Trouble Light	There are two amber lights mounted on either side of the car's X-end. These lights illuminate when any of the following conditions exist: <ol style="list-style-type: none"> <li>1. during revenue operation when a door is open or a door fails to close or indicates that it has failed to close;</li> <li>2. when the BRK2 trainline is energized and either (or both) of the friction brake ECUs indicate brakes on, or the parking brake is on for longer than nine seconds; or</li> <li>3. when the FIMS receives an indication from one or both of the friction brake ECUs that there is at least one locked axle.</li> </ol>
FIMS	Fault indicator and monitoring system. A passive vehicle monitor located in the X-end of each vehicle. This system consists of a driver in the propulsion logic and a touchscreen on the CCP. Subsystems monitored by FIMS include propulsion, friction brakes, doors, HVAC, APSE, suspension, and communications.
Hostle	Moving a car or cars in the yard areas for maintenance purposes, or to build up/break down consists. When cars are hostled in the yard, the mode of operation restricts maximum vehicle speed to 10 mph.

Hostling Panel	A small control panel at each end of a B2 car and at the X-end of an A2 car. The hostling panel has a key switch, a P handle to move and stop the car, a horn button, an uncouple button to uncouple cars from each other, and a jog button (reverse movement button). When the key switch is on, direction of car movement is automatically determined and the car is automatically placed in a mode of operation that limits its maximum speed to 10 mph. Because of the direction of trainline signals (electrical signals that go from car to car), the key switch and P handle also configure all cars behind an activated hostling panel to move and drive in the same direction.
Intercom	The consist's communication system, which any passenger can use to initiate a call and talk to the consist operator in the operator's cab. There is an intercom station with a two-way speaker and a call button at each end of the B2 car and at the X-end of the A2 car. The communications signal is transmitted car-to-car to the operator's cab via trainlines.
Interior Trouble Light	A red light is located directly above the car control panel at the X-end of each car. The red trouble light operates in a manner similar to the amber exterior trouble light. The red light indicates that a car fault has been detected by FIMS.
Jog	The term used when a car is backed away a few feet from another car during an uncoupling operation. The operator's console and each hostling panel has a JOG pushbutton that performs this operation.
Mode of Operation	<p>A car or consist can move in three modes of operation. The consist operator can select these modes of operation using the master controller selector switch (MCSS) on the operator's console in the A2 car cab.</p> <ol style="list-style-type: none"> <li>1.     Automatic <p style="margin-left: 40px;">This mode can be used only when there is a complete consist or consist operating in an area of the system where automatic train control signals are available. These areas include transfer tracks, dispatch areas, and all mainline tracks. In this mode of operation, the ATO computer in the head end car receives speed control signals from trackside equipment via the running rails. The consist also receives and transmits identification signals (consist serial number, consist length, consist destination) by way of flat strip antennas on the cover board over the third rail. In automatic, when the consist is stopped in the station, a door open signal sent to the consist enables the doors on the platform side of the station to open. As a consist enters a station, it receives a program stop signal which slows the consist and stops it smoothly, so that the center of the consist is aligned with the center of the station platform, regardless of consist length. The maximum speed of a consist operating in automatic is 80 mph.</p> </li> <li>2.     Road Manual <p style="margin-left: 40px;">This mode can be used only when there is a complete consist. In this mode of operation, the consist operator uses the P handle on the operator's console to move and stop the consist.</p> </li> </ol>

Mode of Operation (continued)	<p>The maximum operating speed in this mode is 25 mph. This limit is automatically enforced by the propulsion logic. In the road manual mode, the consist's doors <i>do not</i> automatically open and close at a station. In this case, the door open signal from the wayside enables the operator to manually operate the consist's doors from the cab.</p> <p>3. Yard Manual</p> <p>This mode of operation can be selected and used at any time on a single car, multiple cars, or a complete consist. This mode can be used in any area of the BART system, even in areas where speed control signals are not available. All functions are handled manually by the consist operator, either from the operator's console or a hostling panel. The maximum speed of 10 mph is enforced by the car's propulsion logic.</p>
Operator's Console	<p>Located in the cab of the A2 car, this console contains system annunciator lights which the operator monitors, and the manual controls used to move the consist and operate the side doors of all cars in the consist. The operator's console also contains a communications control panel, which the operator uses to communicate with passengers on the consist (PA and intercom), or with BART central (radio).</p>
P Handle/ Propulsion Handle	<p>The manually (hand) controlled throttle/brake lever is on the operator's console in the cab of an A2 car. There is also a P handle in the hostling panel at the X-end of an A2 car. On a B2 car, there is a P handle in the hostling panel at each end of the car.</p>
Public Address System (PA)	<p>A consist operator can use the public address system on the operator's console to make announcements to all passengers in all cars.</p>
Side Door	<p>Side doors allow passengers to enter and exit the revenue vehicle from the station platform. There are four side door openings on each vehicle. Each opening has two door leaves.</p>
TCU	<p>Temperature control unit. The main controller for the HVAC system, the TCU receives temperature data from sensors in the return and fresh air ducts, and determines various heating and cooling modes. The TCU also monitors the general health of the HVAC system.</p>
Third Rail	<p>The third rail is the 1000 Vdc power source for the revenue vehicle. This rail is adjacent to the running rails. Pick-up paddles/shoes (two on each side of each car) on the revenue vehicle slide along the third rail and transfer the 1000 Vdc into the car from the wayside power supply. The running rails provide the return path to complete the circuit. The car body itself is tied to ground through the running rails.</p>
Traction Motors	<p>Each vehicle has four 1507C ac drive traction motors. There are two traction motors per truck; one per axle. The motor is a four pole induction motor with form-wound stator coils and a brazed squirrel cage rotor. The motor is self-ventilated and can produce 140 horsepower at 415 Vac and 200 amps.</p> <p>The traction motors perform dual functions, accelerating the car in the propulsion mode and decelerating the car in the electric braking mode.</p>
Train	<p>See Consist.</p>



Trainlines	The wires that route electrical signals from car to car when they are coupled together. The trainlines enable all cars in a consist to be controlled from a single station on the consist. Trainlined signals include propulsion signals, door control, PA, intercom, and others.
Trainline Coupler	The trainline coupler is directly below and attached to the mechanical car coupler. Trainline couplers contain spring loaded button contacts that allow trainline signals to travel from car to car.
Train Telephone	This radio communications transmitter and receiver provides communications between the BART Operations Control Center in Oakland and the consist operator on any consist, anywhere in the system.
Truck	The cast steel frame to which the wheel sets are mounted. The truck supports the car body through the suspension system and has the necessary freedom of motion to allow the car to follow the truck structure. The truck also houses the traction motors and disk brakes, and supports the automatic train control antennas and the third rail collector assembly. There are two trucks per vehicle. The trucks account for approximately one-third of the vehicle weight.
Undercar Equipment	Any physical equipment located and bolted to the underside of the car. For example, the propulsion equipment and auxiliary electrical equipment.
X-end	The standard end of the car, common to both A2 and B2 cars. Refers to the end of the car with the car battery and the car control panel with the FIMS display.
Y-end	The end of the car opposite the standard or X-end. Refers to the end of an A2 car with the operator's cab. The door relay and DDU panels are located on the Y-end of the A2 and B2 cars.

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Table 1-3-1. Vehicle Dimensions

Description	A2 Car	B2 Car
Car total weight	61,500 pounds	60,000 pounds
Car body width	10 feet 6 inches	10 feet 6 inches
Car body length	75 feet	75 feet
Car height, top of rail to top of car, less antennas	10 feet 6 inches	10 feet 6 inches
Ceiling height, center of aisle	6 feet 9 inches	6 feet 9 inches
Floor height, top of rail to top of floor	39 inches	39 inches
Maximum dimension, top of floor to all undercar equipment	33 inches	33 inches
Height of all door openings	6 feet 4 inches	6 feet 4 inches
Width of side door	4 feet 6 inches	4 feet 6 inches
Width of end door	46-3/4 inches	46-3/4 inches
Width of cab door	30 inches	--
Wheel diameter, new	30 inches	30 inches
Wheel diameter, worn condemning	28 inches	28 inches
Truck spacing, center to center of trucks	50 feet	50 feet
Wheel gauge	5 feet 5-1/4 inches	5 feet 5-1/4 inches
Station platform height, from top of rail	39 inches	39 inches
Track gauge, tangent and curved	5 feet 6 inches	5 feet 6 inches
Running clearance, car body to wayside	2 inches	2 inches

Table 1-3-2. Vehicle and Component Weights (In Pounds)

Item	A2 Car	B2 Car
Car Body Total	19430	18450
Carbody Insulation	300	300
Door Panels - End	131	262
Door Panels - Side	488	488
Plymetal Floor	2000	2000
Vehicle Carbody	15400	15400
Fiberglass End Cap	851	---
Windshield	200	---

Table 1-3-2. Vehicle and Component Weights (In Pounds)

Item	A2 Car	B2 Car
Side Windows	60	---
Interior Total	8039	7599
Annunciator Panel	55	55
Car Shell Interior Lining	1300	1300
Door Operator Systems	400	400
Door Relay	30	30
Equipment Lockers	100	100
Floor Covering	1490	1440
Friction Brake Logic	35	35
Graphical Display Equipment	225	225
Interior Wiring	220	100
Lighting	217	217
Propulsion Logic	72	72
Seats	2640	2590
Stanchions, Handrails and Windscreens	1000	1000
Trainline Monitor Logic Box	35	35
Cab Electrical Equipment	220	---
Miscellaneous	---	50
Truck Total (2 trucks)	20140	19916
Axles	2000	2000
Current Collectors	144	144
Friction Brake X Calipers	209	209
Friction Brake Y Calipers	206	206
Friction Ring Assembly (4)	179	179
Journal Bearings	400	400
Traction Gear Units	2128	2128
Traction Motors	3700	3700
Truck Frame Package	7188	7188
Truck Wiring	25	25
Wheels	3200	3200
ATC Equipment	224	---
Undercar Total	11445.4	11445.4

Table 1-3-2. Vehicle and Component Weights (In Pounds)

Item	A2 Car	B2 Car
Accumulator 0.8 Liter (2)	5.5	5.5
Accumulator 3.5 Liter (2)	2.5	25
Air Compressor	400	400
Air Reservoir 5000 cu in (4)	45	45
Air Reservoir 7000 cu in (2)	63	63
Auxiliary On/Off Switch (2)	2	2
Battery Box	740	740
Brake Resistor Long	750	750
Brake Resistor Short	512	512
Coupler Automatic (2)	669.5	669.5
Electrohydraulic Unit (2)	110	110
Electronic Control Unit (2)	30	30
Friction Brake Misc.	82.6	82.6
Friction Brake Pipe and Fittings	25	25
Horn (2)	7	7
Horn Amplifier (2)	2	2
HVAC Center Unit (2)	650	650
HVAC Duct Work	400	400
HVAC End Unit (2)	340	340
HVAC Temperature Control Unit	35	35
Hydraulic Fluid	32	32
Line Reactor (2)	400	400
Line Switch Box	325	325
Park Brake Valve	41	41
Pneumatic Components Misc.	40.5	40.5
Pneumatic Pipes and Fittings	50	50
Pneumatic Suspension Panel X-end	9	9
Pneumatic Suspension Panel Y-end	17	17
Pressure Switch (2)	2	2
Priority Air Reservoir	7.5	7.5
Priority Circuit Components	18	18
Priority Valve	7	7

Table 1-3-2. Vehicle and Component Weights (In Pounds)

Item	A2 Car	B2 Car
Propulsion Inverter	1600	1600
Selector Valve (Brake) (2)	3.9	3.9
Uncoupling Valve X-end	2.0	2.0
Uncoupling Valve Y-end	2	2
Undercar Wiring	300	300

Table 1-3-3. Vehicle Voltage Requirements

Title	Source	Value
Primary	dc contact rail (third rail)	750 Minimum, 1250 Maximum, 1000 Vdc Nominal
Auxiliary	ac bus	120/208, 60 Hz, 3-phase, regulated +/-5%
Low	Vehicle battery	36.5 Vdc Nominal

Table 1-3-4. Friction Brake Subsystem Requirements

Item	Value
System Pressure	2000 psi
Test Pressure	3000 psi
Pressure Relief Valve	2540 psi
Service Brake Pressure	Analog control in range of 0-1450 psi. Pressure limiting valve. Adjustment range 580-1450 psi. Set to 1180 psi.
Hydraulic Fluid Type	Brayco 776RP
Electro-hydraulic Unit Reservoir Capacity	HGA-40ANLH/12 1.58 gallons
Hydraulic Pump Capacity	100 cubic inches per minute at 3450 rpm.
Hydraulic Pump Motor Motor Power Demand	208 Vac, 3-phase, 60 Hz 900 watts
Accumulator (3.5 Liter) Type Volume Precharge Pressure Working Pressure	Diaphragm 0.92 gallon 1200-1250 psi 2000 psi
Accumulator (0.5 Liter) Type Volume Precharge Pressure Working Pressure	Diaphragm 0-13 gallon 650-690 psi. 1750-2000 psi.

Table 1-3-5. Air Suspension Subsystem (Compressor) Requirements

Item	Value
Bore and stroke	4 inch x 2-1/8 inch x 2-3/8 inch
Number of cylinders	2
Motor	5 horsepower
Maximum air delivery	12.5 cubic feet per minute
Maximum pressure	136 psi
Approximate weight	155 pounds (LeRoi compressor only)
Type of cooling	Air
Lubrication	Pressurized
Rotation	Counterclockwise (facing flywheel)
Compressor motor thermal protection	
Thermostat OT1 open	157°C
Thermostat OT1 closed	147°C
Thermostat OT2 open	105°C
Thermostat OT2 closed	95°C

Table 1-3-6. Truck and Component Requirements

Item	Requirements
Truck designation	HPD-3, Rockwell
Truck swivel	Sliding air seal and car body center pin
Suspension	Firestone 205C air bellows
Damping	Hydraulic shock absorbers
Equalization	Self-aligning ball joints
Side Frames	Cast Steel ASTM A27 54-35
Suspension Adapter	Fabricated Steel USS EX_TEN 50
Wheels	30 inch diameter, aluminum centered, steel tire with modified cylindrical thread
Axles	AISI, 5150 steel tube
Journal Bearings	6 x 11 tapered roller bearings
Brakes	Disk type
Motors	Adtranz 1507C, ac drive
Gear Units	Westinghouse Model WR-400-1 with 5.571:1 gear ratio

Table 1-3-6. Truck and Component Requirements

Item	Requirements
Track Gage	5 feet, 6 inches
Truck Wheel Base	7 feet
Truck Width	54 inch journal centers, inboard journals

Table 1-3-7. Vehicle Passenger Loading

Designation	Load Condition	Weight	
		A2	B2
AW-0	Empty car (no passengers)	61500	59000
AW-1	AW-0 + 13,000 pounds	74500	72000
AW-2	AW-0 + 21,000 pounds	82500	80000
AW-3	AW-0 + 37,000 pounds	98500	96000



## ACRONYMS AND ABBREVIATIONS

Table 1-4-1 is a list of acronyms and abbreviations used in the various volumes of Book 86 of the BART Rolling Stock Department Maintenance Procedures. I

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
A	amps
A2	rehabilitated A car
AAR	Association of American Railroads
AC	air conditioning
ac	alternating current
ACCB	air comfort control breaker
ACCR	air compressor control relay
ACDBS	ac dead battery start
ACFM	actual cubic feet per minute
ACJ	air compressor jack
ACM	air compressor motor
ACMB	air compressor motor breaker
ACMS	air compressor motor start
ACP	air pressure control switch
ACPR	AC power relay
ACR	auxiliary control relay
ADA	American Disabilities Act
ADJ	adjust or adjuster
AGC	automatic gain control
Ah	ampere hour
A.I.	analog input
AIMB	auxiliary inverter motor blower
ALR	annunciator light relay
Alum.	aluminum
amps	amperes
AMS	aircraft material specifications
AN	Army-Navy
ANN COM	annunciator common
ANN	annunciator

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ANSI	American National Standard Institute
A.O.	analog output
APBTU	automated power bench test unit
APC	air compressor pressure control
APSE	auxiliary power supply equipment
APSEF	auxiliary line fuse
AR	annunciation relay, annunciator relay
A/R	as required
ASCII	American Standard Code for Information Interchange
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
ATC	automatic train control
ATO	automatic train operation
ATP	automatic train protection
ATS	automatic train supervision
AUTO	automatic
AUX	auxiliary
AUX ANN	auxiliary annunciator
AWG	American wire gage
AWS	American Welding Society
AX	A car, X end
AXR	auxiliaries relay
AY	A car, Y end
B2	rehabilitated B car
BART	Bay Area Rapid Transit
BAT	battery
BC	braking contactor, brake contactor
BCU	brake control unit
BG	battery ground
BIST	built-in self-test
BITE	built-in test equipment
BK	brake

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
BPMB	brake pump motor breaker
BPSV	bypass solenoid valve contactor
BRKR	breaker
BRNG MTG	bearing mounting
BSN	BART stock number
BTU	bench test unit
BX	B car, X end
BY	B car, Y end
C (°C)	degrees Centigrade
C.C.	current collector
CB	circuit breaker
cc	cubic centimeter
CCP	car control panel
CCU	communication control unit
CFMB	condenser fan motor breaker
CFM	condenser fan motor
cfm	cubic feet per minute
CFOL	condenser fan overload
Chk	check
CHM	cab heater motor
CHMB	cab heater motor blower
CMOS	complementary metal-oxide semiconductor
CMS	condenser fan motor starter
CO	cutout switch
COB	convenience outlet breaker
COM	common
comm	communications
comp.	compressor
Conn.	connect
CPU	central processing unit
CS	current sensing
CSHR	current sensor heater return

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
CTRL	control
cu.ft.	cubic feet
cu. in.	cubic inch
DAC	data access card
DB	dynamic brake
dBA	decibels adjusted
dBm	decibels relative to one milliwatt
DBFB	dynamic brake feedback
DBS	dead battery start
DC	door closed
dc	direct current
DCB	door closed brake
DCR	door closed relay
DCRP	door control relay panel
DCS-L	door closed summary left
DCS-R	door closed summary right
DCSR	door close summary relay
DCSR-L	door close summary relay left
DCSR-R	door close summary relay right
DDE	dynamic data exchange
DDU	door diagnostic unit
DE	door emergency
Decel	deceleration
DF	freewheeling diode
DI	door interlock
D.I.	digital in
DIP	dual in-line packages
DIR	direction
DL	door left
DLL	dynamic link library
DNY	diode negative Y-inverter
DO	door open

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
D.O.	digital out
DOB	door open brake
DOSR	door operating summary relay
DPR	dual port RAM
DPY	diode positive Y-inverter
DRCR	door release control relay
DRTR	door release timing relay
DTS	digital test subsystem
DVAM	digital voice announcement module
DVM	digital volt meter
DYN BR	dynamic brake
EBC	evaporator blower contactor
EBM	evaporator blower motor
EBOL	evaporator blower overload
ECOM	electronic communications
ECU	electronic control unit
EH	electro-hydraulic
EHU	electro-hydraulic unit
EHUBX	electro-hydraulic unit breaker, X-end
EHUBY	electro-hydraulic unit breaker, Y-end
EJC	electrical joint compound
elec.	electric
EM	emergency relay
EMB	evaporator fan motor breaker
EMI	electromagnetic interference
EvFMS	evaporator fan motor starter
EMS	emergency relay door open switch
EPC	emergency power contactor
EPROM	electrically programmable read only memory
ESD	electrostatic discharge
ESDC	emergency stop door control
ESNA	Elastic Stop Nut Corporation of America

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ETL	exterior trouble light
EVAL	evaluation
EXT	external
F (°F)	degrees Fahrenheit
FBEU	friction brake electronics unit
FIFO	first in first out
FIMS	fault indication and monitoring system
FITS	fault isolation tool set
FR BR ANN	friction brake annunciator
ft.lbs.	foot-pounds
ft.lb.	foot pound
gal.	gallon
GDB	gate driver board
GDBF	gate driver board faults
GND	ground
gpm	gallons per minute
GR	green
GUI	graphical user interface
HBTU	hydraulic bench test unit
HC	heating contactor
HDLR	headlight relay
HERP	head end relay panel
hex	hexadecimal
HP	high pressure
hp	horsepower
HPS	high pressure switch
hrs	hours
HV	high voltage
HVAC	heating, ventilation, and air conditioning
Hz	hertz
IBTU	integrated bench test unit
IC	integrated circuit

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
ICB	intermediate charge breaker
Id	identification
ID	inside diameter
IEEE	Institute of Electrical and Electronic Engineers
IGBT	insulated gate bipolar transistor
in.lb.	inch-pound
IND	indicator
INT	intercom
I/O	input/output
IR	infrared
iRMK	Intel real-time multitasking kernel
ISA	industry standard architecture
ISO	International Standard Organization
ISR	inverter start relay
ITA	interchangeable test adapter
IV	intermediate voltage
IVPS	intermediate voltage power supply
K	Kelvin
k	kilo
kHz	kiloHertz
km/h	kilometers per hour
KS	key switch
KSI	inside key switch
KSO	outside key switch
KSR	key switch relay
kVA	kilovolt amps
kW	kilowatt
L	liter
lb	pound
LBRC	low battery voltage relay coil
lbs	pounds
LC	inductance-capacitance

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
LCB	logic circuit breaker
LCD	liquid crystal display
LCR	local control relay
LDR	left door open relay
LED	light emitting diode
lg	long
LH	left hand
LL	lower limit
LP	low pressure
LPR	left platform relay
LPT	low pressure transducer
LRU	line replaceable unit
LS	line switch
LSB	line switch box
LSH	low section height
LT	light test
LUC	lay-up contactor
LV	low voltage
LVCB	low voltage circuit breaker
LVPS	low voltage power supply
LW/SS	load weigh and speed sensor
M	motor
man	manual
max.	maximum
MCR	motor control relay
MCSS	master control selector switch
megohms	mega-ohms
MEK	methyl ethyl ketone
mH	milliHertz
MHz	megaHertz
MIC	microphone
min.	minute



Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
mm	millimeter
MMI	man-machine interface
MOV	metal oxide varistor
MPH	miles per hour
mphps	miles per hour per second
MPR	motor power relay
MS	military standard
ms	millisecond
mV	millivolt
N/A	not applicable
NC	normally closed
NO	normally open
NEMA	National Electrical Manufacturer's Association
Nm	Newton meters
nom.	nominal
NPT	national pipe thread
OCC	operations control center
O.D.	output devices
OD	outside diameter
OLR	overload relay
Op.	operational
OSHA	Occupational Safety and Health Administration
OSR	open signal relay
OSR-L	open signal relay left
OSR-R	open signal relay right
PA	public address
PAACA	public address amplifier controller version A
PAACB	public address amplifier controller version B
PB	parking brake
PBMB	propulsion blower motor breaker
PBV	park brake valve
PC	printed circuit

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
PCB	printed circuit board
PERF	performance
PF	power factor
Ph.	phase
P/N	part number
PPG	Pittsburgh Plate & Glass
press.	pressure
PROP ANN	propulsion annunciator
PROP	propulsion
PS	position sensors
psi	pounds per square inch
psig	pounds per square inch gage
PSR	panel sensing relay
PSS	panel sensor switch
PST	Pacific standard time
PTT	push to talk
PTU	portable test unit
PTUIU	portable test unit interface unit
PVB	polyvinyl butyral
PVC	polyvinyl chloride
PWB	printed wiring boards
PWM	pulse width modulated
QD	quick disconnect
QR	quick release
R	resistor
RAM	random access memory
R/C	resistive/capacitive
RCC	refrigeration compressor contactor
RCOL	refrigerant compressor overload
RD	damping resistor
RDR	right door open relay
ref.	reference

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
Reg	regulator
REL	release
req'd	required
RFI	radio frequency interference
RH	right hand
RGC	rail gap contactor
RIU	remote intercom unit
RLS	release
RMS	root mean square
RMSH	reliability, maintainability, safety, and human factors
ROM	read only memory
rpm	revolutions per minute
RPR	right platform relay
RR	run relay
RTD	resistance temperature device
RTOS	real time operating system
s	second
SAE	Society of Automotive Engineers
SCC	serial communication controller
SCS	suspension bag pressure switch
SCV	solenoid control valve
sec	second
SHLD	shield
SIG	signal
SPC	shop power contactor
SPCB	shop power circuit breaker
spec	specification
SPFB	shop power feed breaker
SPK	speaker
S.R.	slave relay
SR	shield relay
SRU	secondary replaceable unit

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
SS	service switch
SSR	solid state relays
SW	switch
Sysadmin	system administration (IBTU login option)
TCU	temperature control unit
TDL	transducer line
TDR	time delay relay
TEV	thermal expansion valve
TH	turret head
TIR	total indicator reading
TL	trainline
TLS	trainline switch
TPINV	three phase inverter
TR	transducer return
Trans	transmission
TT	to talk
TT-PA	to talk-public address
TYP, typ	typical
UART	universal asynchronous receiver/transmitter
uF	microFarad
uH	micorHertz
UL	upper limit
UNC	unified national course
UTIL	utilities
UUT	unit under test
UV	ultraviolet
V	volt
Vac	volts alternating current
Vdc	volts direct current
VOM	volt ohm meter
Vrms	voltage root mean square
VTVM	vacuum tube voltmeter

Table 1-4-1. List of Acronyms and Abbreviations

Acronym/Abbreviation	Definition
WABCO	Westinghouse Air Brake Company
WABD	Westinghouse Air Brake Division
W.C.	water column
YM	yard manual
ZIF	zero insertion force
ZSSR	zero speed slave relay
ZSR	zero switch relay
"	inch (should occur only in drawings)
'	foot (should occur only in drawings)

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