

Locomotive Electrical

EMD-GP38 Static Excitation Locomotive Maintenance-Electrical

Course Objective: Learn the description of the electrical transmission and the power control system used on the GP38 locomotive for static control of main generator excitation. Testing, servicing, troubleshooting and maintenance are included.

Who this is for: Electric locomotive maintenance personnel, apprentices or others responsible for the repair of static excitation locomotives.

Item Code	Lesson Description
GP.1	Static excitation
GP.2	Excitation system
GP.3	Transition control system
GP.4	Dynamic braking system
GP.5	Inspection and replacement of contact tips
GP.6	Electrical equipment
GP.7	Reference voltage checks
GP.8	Testing and setting performances control panel PCP-8411758
GP.9	Wheel slip control system testing and setting
GP.10	Transition control system testing and setting
GP.11	Dynamic braking system testing and setting
GP.12	Load test and horsepower standardization
GP.13	General review

Item Code	Required Textbook
BKGP38E	<i>EMD Locomotive Service Manual (GP38 with Static Excitation)</i> This book not available separately

Item Code	Full Course Title	Price
GP1FC	EMD GP38 Static Excitation Loco. Maint.—Elec	\$309.25

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

EMD-SD45 Locomotive Maintenance-Electrical

Course Objective: The student will gain knowledge of “on-the-locomotive” maintenance and become familiar with locomotive components and systems. Also, learn to use the “service data” pages for reference to applicable maintenance instructions, replacement part numbers, component manufacturer’s technical literature, applicable tool and testing apparatus numbers and specific system values for operation or testing

Who this is for: Electrical maintenance personnel, apprentices.

Item Code	Lesson Description
LS.1	Reactor theory, magnetic amplifiers, transducer reactors
LS.2	Electrical transmission, traction alternator commutation
LS.3	Excitation system, sensor, feedback system
LS.4	Power control equipment, rate control panel
LS.5	Diesel locomotive, electrical equipment, transition control
LS.6	IDAC wheel slip control system
LS.7	Switchgear, contact tips, inspection and replacement
LS.8	Electrical equipment, generators, electrical cabinets
LS.9	Power control system, testing and setting, troubleshooting
LS.10	Control pane, relays, switchgear
LS.11	Wheel slip control, testing and setting
LS.12	Transition control, testing and setting
LS.13	Dynamic brake testing, setting
LS.14	Load testing

Item Code	Required Textbook
BKSD45E	<i>SD45 Locomotive Service Manual</i>

Item Code	Full Course Title (Includes Textbook)	Price
LS1FC	EMD SD45 Locomotive Maintenance—Electrical	\$344.75

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

EMD SD50 Locomotive Maintenance-Electrical

Course Objective: Gain a general familiarity with EMD locomotive systems and equipment and study the electrical and mechanical maintenance that can be performed on the locomotive. Use the service data pages provided as references along with the metric conversion table as needed.

Who this is for: Maintenance personnel, foremen or others responsible for the maintenance of the EMD SD50 Locomotive.

Item Code	Lesson Description
SD.50	Engine starting, fuel oil system
SD.51	Lubricating oil system, cooling system
SD.52	Central air system, compressed air system
SD.53	Electrical equipment
SD.54	Electrical equipment
SD.55	Electrical control equipment, Super series wheel creep control system
SD.56	Motor E/N generator module EN, current maximizer module CM, generator feedback module FG
SD.57	Motor feedback module FM, wheel slip correction system, starting wheel slip module SQ, sanding module 8A
SD.58	Load control system section 8C introduction, load control module LC, motor temperature simulator module MS
SD.59	Sensor module SE and SCR assembly, barometric compensation module BC, generator transition control module TR
SD.60A	Excitation limit module EL, dynamic brake system, dynamic brake regulator module DR
SD.61A	Dynamic brake protection module DP, dynamic brake extended range module DE, load test and horsepower standardization, high potential test for locomotives in service

Item Code	Required Textbook
BKSD50BK	<i>SD50 Locomotive Service Manual</i>

NOTE: Students must contact EMD for the textbook

Item Code	Full Course Title	Price
SD50FC	EMD SD50 Locomotive Maintenance—Mechanical	\$264.00

SD60M Locomotive Service

Course Objective: Gain an overview of EMD locomotive systems and equipment as well as specific electrical and mechanical procedures which can be performed on board the locomotive. Also, get an introduction to the computer control system and representative circuitry. Use service data references and metric conversion tables as needed.

Who this is for: “Qualified” service personnel.

Item Code	Lesson Description
SD.60M	Forward and general locomotive information, engine starting
SD.61M	Fuel oil system
SD.62M	Lubricating oil system
SD.63M	Cooling system
SD.64M	Central air system
SD.65M	Compressed air system
SD.66M	Electrical equipment
SD.67M	Electrical equipment
SD.68M	Electrical equipment
SD.69M	Electrical control system
SD.70M	Electrical control system
SD.71M	Load test and horsepower calculating, high potential test for locomotive service, metric conversion, logic system troubleshooting

Item Code	Required Textbook
BKSD60BK	<i>SD60M Locomotive Service Manual</i>
NOTE: Students must contact EMD for the textbook	

Item Code	Full Course Title	Price
SD60MFC	SD60M Locomotive Service Manual	\$264.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson pricing.

Locomotive Electrical

GE Dash 8 Locomotives-Mechanical and Electrical

Course Objective: The student will study the principles of maintenance on General Electric 1987 Series-8 Locomotives and learn about any special tools required to properly maintain GE locomotives. Be aware of warnings, cautions, or hazards and additional clarifications when performing maintenance.

Who this is for: Maintenance personnel, foremen, inspectors or anyone responsible for the maintenance of GE DASH 8 Locomotives.

Item Code	Lesson Description
DS.1	Introduction
DS.2	Diagnostic display panel (Level 1)
DS.3	Diagnostic display panel (Level 2)
DS.4	Engine support systems
DS.5	Locomotive electrical systems operation and locomotive engine overspeed system
DS.6	Nose, operator, dynamic braking, engine and radiator cab equipment
DS.7	Locomotive alternator blower, removal and installation, locomotive equipment blower 1, air compressor removal and installation
DS.8	Victaulic couplings, radiator removal and installation of locomotive radiator fan
DS.9	26L air brake system, air supply system and air compressors

Course continued on facing page

Locomotive Electrical

GE Dash 8 Locomotives Mechanical and Electrical continued

Item Code	Lesson Description
DS.10	Trucks
DS.11	Traction motors, running maintenance, traction motor installation and removal
DS.12	5GMG186 and 5GMG187 alternators, load and insulation testing
DS.13	Control and power devices
DS.14	Description of electrical equipment, power cable termination and connection
DS.15	Diesel engine checks and adjustments
DS.16	Diesel engine replacements

Item Code	Required Textbook
BKDS BK	<i>GE Dash 8 Locomotive Service Manual</i>
NOTE: Students must contact GE for the textbook	

Item Code	Full Course Title	Price
DS1FC	GE Dash 8 Locomotives—Mechanical and Electrical	\$352.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

GP50 Locomotive—Mechanical and Electrical Maintenance

Objective: Provide, from a servicing standpoint, a general familiarity with EMD locomotive systems and equipment, instructions for electrical and mechanical maintenance that can be performed on the locomotive. Use service data pages as reference and metric conversion table.

Who this is for: Mechanical maintenance personnel, foremen or others responsible for servicing and maintaining the GP50 Locomotive.

Item Code	Lesson Description
G.1	General information, engine starting
G.2	Fuel oil system, lubrication oil system
G.3	Cooling system
G.4	Central air system
G.5	Compressed air system
G.6	Compressed air system
G.7	Electrical equipment: AR15 generator, voltage suppression, D14 alternator, traction motors, fans, pumps
G.8	Electrical equipment: locomotive control stand, assembly, dynamic brake throttle and reverser handles, air gauges, panel lights
G.9	Electrical equipment: engine panel lights, gauges and what they mean, switches, circuit breaker panel

Course continued on facing page

Locomotive Electrical

GP50 Locomotive—Mechanical and Electrical Maintenance continued

Item Code	Lesson Description
G.10	Electrical equipment: generator field, fuse test equipment and switch panel, electrical devices located in the main electrical cabinet
G.11	Electrical devices ETS to TLTD located in the main electrical cabinet
G.12	Electrical cabinet TSR to WL, pneumatic devices, hose systems, ground relay protection system, main generator and dynamic braking grid grounds, wheel creep control system
G.13	Radar Module RA, Motor E/N generator module, current maximizer module
G.14	Electrical control system, wheel slip system
G.15	Wheel overspeed module, load control module, dynamic brake system module and dynamic brake protection module
G.16	Load test and horsepower standardization, high potential test for locomotives in service

Item Code	Required Textbook
BKGP50	<i>GP50 Locomotive Service Manual</i>
NOTE: Students must contact EMD for the textbook	

Item Code	Full Course Title (Includes Textbook)	Price
G1FC	GP50 Loco. Mechanical and Electrical Maintenance	\$352.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson pricing.

Locomotive Electrical

EMD SD40-2 Locomotive Electrical Equipment

Course Objective: The student will gain knowledge of “on-the-locomotive” maintenance and to provide under separate cover material for general familiarization with locomotive components and systems. Also, learn the service data pages for reference to applicable maintenance instructions and technical manuals, applicable tool and testing apparatus numbers, specific system values for operation or testing. Metric and US Standard units of measurement are shown.

Who this is for: Electrical maintenance personnel and apprentices.

Item Code	Lesson Description
SD.16	Locomotive maintenance, electric-rotating equipment, locomotive control stand, electrical cabinets
SD.17	Electrical equipment
SD.18	Generators and voltage regulator, auxiliary generator, AR10 main generator
SD.19	D14 alternator, voltage regulator module, VR
SD.20	Excitation and power control system, excitation limit backup protection system, load regulator
SD.21	Generator excitation regulating system, load regulator assembly performance control module, PF17 and PF18 (special order)
SD.22	Rate control module RC11; sensor bypass module SB11; silicon controlled rectifier assembly SCR; sensor module SE; voltage reference regulator and throttle
SD.23	Transition module
SD.24	Wheel slip system; sanding module SA10; wheel slip module WS10; wheel slip bridge circuit; wheel slip transconductor WST

Course continued on facing page

Locomotive Electrical

EMD SD40-2 Locomotive Electrical Equipment continued

Item Code	Lesson Description
SD.25	Dynamic braking system, excitation and control, extended range dynamic brake module DE (special order), dynamic brake protection module DP, dynamic brake regulator module DR, indicating lights and devices
SD.26	Load test and horsepower standardization, high potential test for locomotives in service
SD.27	Troubleshooting
SD.28	General electrical qualifications and troubleshooting guide
SD.29A	Troubleshooting outlines (Part I)
SD.30A	Troubleshooting outlines (Part II)

Item Code	Required Textbook
BKSD EL	<i>SD40-2 Locomotive Service Manual</i>
NOTE: Students must contact EMD for the textbook	

Item Code	Full Course Title	Price
SD16FC	EMD SD40-2 Locomotive Electronic Equipment	\$330.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson pricing.

Locomotive Electrical

EMD GP38-2 Locomotive Electrical Equipment

Course Objective: The student will gain knowledge of “on-the-locomotive” maintenance and general familiarization with locomotive components and systems. Also, use the service data pages at the back of some of the sections for reference to applicable maintenance instructions and technical manuals, applicable tool and testing apparatus numbers and specific system values for operation or testing. Metric and U.S. Standard measurements are shown.

Who this is for: Electrical maintenance personnel, apprentices and shop personnel responsible for “on-the-locomotive” maintenance.

Item Code	Lesson Description
GP.51	Electric rotating equipment, control stand
GP.52	Electrical cabinets, control stand
GP.53	Auxiliary generator, AR10 main generator, D14 alternator
GP.54	Voltage regulator, excitation limit backup protection system
GP.55	Generator voltage regulator module, silicon-controlled regulating system, load regulator assembly, performance control module
GP.56	Rate control module, sensor bypass module, silicon-controlled rectifier assembly, sensor module, voltage reference regulator, and throttle response module
GP.57	Wheel slip system
GP.58	Dynamic braking system

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Locomotive Electrical

EMD GP38-2 Locomotive Electrical Equipment continued

Item Code	Lesson Description
GP.59	Dynamic braking grid protection system, dynamic brake protection module, dynamic brake regulator module
GP.60	Indicating lights and devices
GP.61	Control circuits and devices
GP.62	Contact tips
GP.63	Load test and horsepower standardization, high potential tests
GP.64	Troubleshooting, introduction
GP.65	Troubleshooting guide
GP.66	General troubleshooting (Outline I)
GP.67	General troubleshooting (Outline II)

Item Code	Required Textbook
BKGP38L	<i>GP38-2 Locomotive Service Manual</i>
	NOTE: Students must contact EMD for the textbook

Item Code	Full Course Title	Price
GP51FC	EMD GP38-2 Locomotive Electrical Equipment	\$374.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson pricing.

Locomotive Electrical

Voltage Regulators

Course Objective: Describe the EMD static voltage regulator, explain the theory of operation of its circuits and components, and to describe a basic operational check. This is explained in three sections: elementary electron and semiconductor theory, and briefly explains capacitor and inductor behavior, explains the operation of the voltage regulator circuits and provides information relating to normal service maintenance.

Who this is for: Electrical maintenance personnel and apprentices.

Item Code	Lesson Description
VR.1	Static voltage regulator (Part I)
VR.2	Static voltage regulator (Part II)

Item Code	Required Textbook	Price
BKVR BK	<i>Locomotive Control handbook</i>	
	This book not available separately	
Item Code	Full Course Title (Includes Textbook)	Price
VR1FC	Voltage Regulators	\$51.95

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Electrical Maintenance Work

Course Objective: Upon completing this course the student will be familiar with the electrical instruments which are in general use (voltmeter, ammeter, millimeter and Megger) and care of the instruments. The student will also learn some practical uses of voltmeters and how to test and take care of diesel locomotive batteries, adjust and maintain the voltage regulators to ensure proper charging current.

Who this is for: Apprentices, maintenance personnel and others requiring basic instruction for electrical maintenance work.

Item Code	Lesson Description
EM.1	Instruments
EM.2	Use of voltmeters
EM.3	Voltage regulation, gravity readings, flushing

*A separate booklet is required for each lesson.

Item Code	Full Course Title (Includes Textbook)	Price
EM1FC	Electrical Maintenance Work	\$87.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

Electronics on the Rails

Course Objective: A detailed study of electronic components used in train control systems. The course begins with a very basic explanation of electronic components and progresses toward combining components with the intent of making them easily understood, describe how they are used, their reliability, efficiency, and ease of maintenance. Detailed drawings and explanations help students to “see” how these components work.

Who this is for: Electricians, apprentices and other electrical workers interested in the many applications of electrical components.

Item Code	Lesson Description
CE.7	Components, semiconductors, diodes, transistors, rectifiers
CE.8	Transistors, controlled rectifiers, special diodes
CE.9	Saturable transformers, reactors
CE.10	Control system, regulations, controlled rectifier applications, pulse amplification
CE.11	Application of controlled rectifier, controlled rectifiers for traction systems, train-control systems
CE.12	Train-control systems, controls for positioned stop, summary

Item Code	Required Textbook
BKER	<i>Electronics on the Rails</i>

Item Code	Full Course Title (Includes Textbook)	Price
CE7FC	Electronics on the Rails	\$146.95

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical Troubleshooting for SD40-2

Course Objective: The student should be able to accurately read a schematic wiring diagram for a diesel-electric locomotive so he/she is able to competently troubleshoot.

Who this is for: Journeymen, apprentices, electricians and others who are familiar with the principles of magnetism, elementary electricity and be acquainted with basic electrical symbols.

Prerequisite: Knowledge in the following areas of study or listed courses from The Railway Educational Bureau, or comparable experience with the SD40-2 Locomotive:

Item Code	Lesson Description
SD402.A	SD40-2 schematic lesson
SD402.B	SD40-2 schematic lesson
SD402.C	SD40-2 schematic lesson
SD402.D	SD40-2 schematic lesson
SD402.E	SD40-2 schematic lesson
SD402.F	SD40-2 schematic lesson
SD402.G	SD40-2 schematic lesson

Item Code	Required Textbook
BKSD402S	<i>SD40-2 Locomotive Electrical Troubleshooting</i>

Item Code	Full Course Title (Includes Textbook)	Price
SD402FC	Locomotive Electrical Troubleshooting for SD40-2	\$275.00

Enrolled students may take individual lessons.

Locomotive Electrical

General Electric-Electrical and Air Equipment-Model U25

Course Objective: Enable the maintenance worker to become acquainted with the locomotive in general and specifically with those details which relate to performing “running maintenance”. “Running maintenance” consists of such work as terminal servicing, interchanging small components, or any other minor repairs and adjustments, which will restore the locomotive to service within an eight-hour period.

Who this is for: Electrical maintenance workers apprentices and others responsible for the maintenance of diesel-electric locomotives.

Item Code	Lesson Description
GE.31	Electrical equipment
GE.32	Relays
GE.33	Contactors
GE.34	Reverser and braking switch, magnet valves, interlocks
GE.35	Alternator, static panels
GE.36	Automatic transition equipment panel, reverse current panel, static voltage regulator
GE.37	Rotating equipment, commutator maintenance
GE.38	Traction generator, exciter generator, auxiliary generator
GE.39	Circuit operation, semiconductors, transistors, diodes
GE.40	Excitation, transition
GE.41	Dynamic braking
GE.42	Engine shutdown
GE.43	Insulation testing, troubleshooting

Item Code	Required Textbook
BK3813B	<i>GE Model U25 Diesel-Electric Locomotive</i> This book is not available separately

Item Code	Full Course Title (Includes Textbook)	Price
GE31FC	GE Electrical and Air Equipment—Model U25	\$299.00

EMD Maintenance Instructions

Course Objective: Through this study, complete with pictures, diagrams and explanations of proper testing and repair, be able to disassemble, assemble, clean, repair and/or maintain the EMD Generator Types D32, D22, and D12. Also, learn procedures for removing a traction motor from a locomotive and various inspections which should be made in such instances, as well as general or “running” maintenance recommended for traction motors.

Who this is for: Electrical maintenance personnel and apprentices.

Item Code	Lesson Description
MM.33	Main generator types D32, D22, D12
MM.39	General maintenance D37, D47, D57, D67, D75, and D77 traction motors

*A separate booklet is required for each lesson.

Item Code	Full Course Title (Includes Textbook)	Price
MM33FC	EMD Maintenance Instructions	\$58.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

Circuit Diagrams

Course Objective: The student should be able to read a diesel locomotive schematic and understand the symbols. Also learn the use of contactors and relays, and how a simple holding circuit works in a locomotive. Common practices for representations and arrangements of certain symbols and their application in diesel locomotive circuit diagrams are described.

Who this is for: Diesel locomotive electricians and apprentices.

Item Code	Lesson Description
CD.1	Diesel locomotive schematic circuit diagrams
CD.2	Contactors, relays, holding circuits

*A separate booklet is required for each lesson.

Item Code	Full Course Title (Includes Textbook)	Price
CD1FC	Circuit Diagrams	\$58.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Guide to Locomotive Electrical Maintenance for SD and GP Type Locomotives

Course Objective: Aids or assists an employee in performing electrical inspections. The book breaks down the major areas of concern to include tips on what to look for to spot potential problems. It follows the bottom-to-top inspection procedure. Safety is always the first concern.

Who this is for: Personnel responsible for routine electrical maintenance on SD and GP locomotives.

Item Code	Lesson Description
GLEM.1A	Insulation dielectric test, traction motors and main generator
GLEM.2A	Main generator, auxiliary generator, inertial filter motor
GLEM.3A	Governor, load regulator, fan contactors, temperature switches, AC cooling fan motors, shutter control, compressor magnet valve, traction motor blower motor, ground lights and lights
GLEM.4A	Sarco drain valve and heaters, sander magnet valves, axle generators, axle generators (PTC) receptacles (snowplow), (MU) (battery charging), emergency fuel cut-off, small motors, dynamic braking, batteries and contact tips
GLEM.5A	Contact tips, running work, running work (IPS), and load test
GLEM.6A	GE locomotive AC 4400 CW, recorder and vigilance testing, speedometer verification, and TSM Locotemp test procedures
GLEM.7A	Microprocessor excitation, locomotive hp settings, horsepower calculation and calculator, qualification checks
GLEM.8A	Component arrangement, terminal boards and zones, governor solenoids, diagnosis of ground relay, and appendices

Item Code	Required Textbook
BKGLEM	<i>Guide to Locomotive Electrical Maintenance</i>

Item Code	Full Course Title (Includes Textbook)	Price
GLEM1AFC	Guide to Locomotive Electrical Maintenance	\$215.25

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

General Electric Locomotive Running Maintenance and Troubleshooting for Series 7 Road Locomotives-Electrical

Course Objective: The student will be able to perform “running maintenance” on General Electric Series-7 Locomotives built since January, 1977. Become familiar with major locomotive equipment and systems of the standard Series-7 locomotive and frequently installed optional equipment. “Running maintenance” is defined as maintenance done on board the locomotive and which can ordinarily be done in eight hours or less time.

Who this is for: Maintenance personnel responsible for the servicing and maintenance of GE Series-7 Road Locomotives.

Item Code	Lesson Description
JE.1A	Data, qualification, and troubleshooting
JE.2A	Systems, cabs, and underframes
JE.3A	Air brake equipment, trucks, traction motors, and traction alternator area
JE.4A	Traction alternator area
JE.5A	Load testing
JE.6A	Power device compartment
JE.7A	Control device compartment
JE.8A	General purpose, general maintenance – electrical

Item Code	Required Textbook
BKSERIES7	<i>Locomotive Service Manual Running Maintenance and Troubleshooting for Series-7 Road Locomotives</i>

Item Code	Full Course Title (Includes Textbook)	Price
JE1AFC	GE Loco. Maintenance, Troubleshooting for Series-7	\$216.50

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

EMD-GP38-2 Locomotive Troubleshooting Electrical

Course Objective: The student will learn an insight into the physical schematics. Examine a locomotive print, its notations and abbreviations, then explore in depth the major locomotive circuits and systems. First current flow is followed through the circuits for students to see the electrical interactions which are taking place for each circuit; secondly, the simplified circuits will be referred back to the physical schematic, traced and explained. Then, the print ties all the systems together into one locomotive system giving the student a good working knowledge essential to the electrical locomotive troubleshooter.

Who this is for: Experienced locomotive personnel or electrical locomotive maintenance personnel, apprentices.

Item Code	Lesson Description
GP.20	Physical schematic, explanation
GP.21	Starting and fuel pump circuit
GP.22	Generator field circuit
GP.23	Excitation system (Part I)
GP.24	Excitation system (Part II)
GP.25	Wheel slip system (Part I)
GP.26	Wheel slip system (Part II)
GP.27	Dynamic brake system
GP.28	Basic locomotive voltage supply circuits
GP.29	Motor connection circuit

Item Code	Required Textbook
BKETS	<i>GP38-2 Electrical Troubleshooting Manual</i>
	This book not available separately

Item Code	Full Course Title (Includes Textbook)	Price
GP20FC	EMD GP38-2 Locomotive Troubleshooting Electrical	\$249.25

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

Tracing Physical Schematic Wiring Diagrams on Diesel Electric Locomotives

Course Objective: Describe the physical schematic wiring diagram along with its associated diagrams and wiring running list book, and to provide a guide to aid in the use and understanding of the diagrams and list.

Who this is for: Anyone needing practical experience in locomotive schematic wiring diagrams.

Item Code	Lesson Description
WD.1A	Tracing physical schematic wiring diagrams
WD.2A	Tracing physical schematic wiring diagrams on diesel-electric locomotives

Item Code	Required Textbook
BKWD BK	<i>Tracing Physical Schematic Wiring Diagrams on Diesel Electric Locomotives</i>

Item Code	Full Course Title (Includes Textbook)	Price
WD1AFC	Tracing Physical Schematic Wiring Diagrams	\$55.95

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Diesel Locomotive Maintenance

Course Objective: This course will enable the student to become acquainted with the locomotive in general and specifically with those details which relate to performing running maintenance. Running maintenance consists of such work as terminal servicing, minor repair and adjustments, interchanging small components, or any other work functions which will restore the locomotive to service within an eight-hour period.

Who this is for: Maintenance personnel, foreman or others responsible for performing running maintenance for electrical and air equipment on diesel-electric locomotives.

Item Code	Lesson Description
GE.1	Locomotive description and equipment
GE.2	Control equipment: Part I, relays
GE.3	Control equipment: Part II, contactors
GE.4	Control equipment: Part III, magnet valves, interlocks
GE.5	Control equipment: Part III, alternator, static panels
GE.6	Control equipment: Part V, static voltage regulator, panels, control switches
GE.7	Rotating equipment: Part I, general, commutator maintenance
GE.8	Rotating equipment: Part II, traction alternator and generator traction motor

Item Code	Required Textbook
BK3868	<i>Electrical and Air Equipment Service Manual</i>

Item Code	Full Course Title (Includes Textbook)	Price
GE1FC	Diesel Locomotive Maintenance	\$189.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson and textbook pricing.

Locomotive Electrical

SD70 MAC Locomotive Electrical

Course Objective: To train locomotive personnel in the repair and troubleshooting of the SD70 MAC locomotive. Giving a complete review of the locomotive components and electrical systems.

Who this is for: Electrical maintenance personnel responsible for the servicing and maintenance of SD70 MAC locomotives.

Item Code	Lesson Description
MAC70E.1	General information
MAC70E.2	Engine starting and stopping
MAC70E.3	Fuel system, lubricating oil system, cooling system
MAC70E.4	Forced air system, compressed air systems
MAC70E.5	Compressed air systems
MAC70E.6	HTCR radial truck
MAC70E.7	Electrical equipment
MAC70E.8	Electrical equipment
MAC70E.9	Electrical control system and control computers
MAC70E.10	Control computers
MAC70E.11	Power operation
MAC70E.12	Inverter operation
MAC70E.13	TTC components
MAC70E.14	Traction computer
MAC70E.15	Operational control modes and load control

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Locomotive Electrical

SD70 MAC Locomotive Electrical continued

Item Code	Lesson Description
MAC70E.16	Adhesion control
MAC70E.17	Functionally Integrated Rail Electronics (FIRE)
MAC70E.18	Functionally Integrated Rail Electronics (FIRE)
MAC70E.19	Locomotive data screens (FIRE and ICE)
MAC70E.20	Locomotive data screens (FIRE and ICE)
MAC70E.21	Load test and horsepower evaluation
MAC70E.22	High potential testing and welding procedures, troubleshooting, heating, ventilation, and air conditioning systems

Item Code	Required Textbook
BKSD70MAC	<i>SD70 MAC Locomotive Service Manual</i>
NOTE: Students must contact EMD for the textbook	

Item Code	Full Course Title	Price
MAC70E1FC	SD70 MAC Locomotive Electrical	\$484.00

Enrolled students may take individual lessons.
Please contact student services for individual lesson pricing.