



~~12~~

MMA - 2000

MO-3 TBST

Locomotive Release from Shop Form

To be completed on every engine released from the Shop

I have reviewed the work packet for locomotive 2000 on this date 3-16-12 and take no exception to applicable laws, rules and or MMA standards, policies and standards.

# Service Operations

## THROTTLE 8 OUTBOUND LOAD TESTS

UNIT \_\_\_\_\_

DATE \_\_\_\_\_

Eng RPM (900)	EMD	_____	Lube Oil Pres	_____
Eng RPM (1050)	GE	_____	Water Temp	170
Horsepower		2096	Overspeed Setting	_____
Volts (5.3)	B-23	4.9	RACK SETTING	_____
Volts (7)	C-30	_____		
Volts (720)	B-39	_____		

### THROTTLE #1 STALL TEST

OP Mode	(PWR)	F	
AMPS	(300)	300	
MGA	(1220)	_____	NOT APPLICABLE TO B-23 AND C-30
Charging Rate	(70v)	73.8	

### TL 24T

Throttle 1	(1V)	_____
Throttle 2		_____
Throttle 3		_____
Throttle 4		_____
Throttle 5		_____
Throttle 6		_____
Throttle 7		_____
Throttle 8	(72V)	_____



# B-23, B-39, C-30, GP-7 M12 MAINTENANCE

## *In-Bound Or Running Electrical*

WORKED BY:

### ELECTRICAL

SWITCH ENGINES DO NOT GET LOAD BOXED ON THE INBOUND, THEY ONLY GET LOAD BOXED ON THE OUTBOUND INSPECTION

COMPLETE BATTERY MAINTENANCE

DOWNLOAD & TEST EVENT RECORDER SYSTEM,

VERIFY COOLING FAN OPERATION

CHECK INERTAL BLOWER OPERATION

PERFORM ALL LOCOMOTIVE SELF TEST FUNCTIONS

B. CHECK FOR AC GROUNDS IN COOLING FAN CIRCUIT WITH TEST LIGHT (30 watt bulb)

CHECK OPERATION OF GROUND RELAY

CHECK FOR LOW VOLTAGE GROUNDS (7 watt bulb)

WHILE IN THROTTLE 3 LOAD TEST, CHECK FOR AC GROUNDS

CHECK OPERATION OF:

A. HEATING/AIR CONDITIONING UNIT

## *In-Bound Or Running Mechanical*

WORKED

CHECK FOR PROPER LUBRICATION AND CAM ROLLER ROTATION

VISUALLY INSPECT AIR COMPRESSOR FOR WATER, AIR OR OIL LEAKS

PERFORM MANUAL AIR BRAKE TEST AND PENALTY BRAKE TESTS

PERFORM AIR BRAKE SELF TEST

CHECK FOR WATER LEAKS

CHECK FOR OIL LEAKS

CHECK FOR FUEL LEAKS

CHECK FOR EXHAUST LEAKS

CHECK FOR VERIFY CLEAR STACK



**B-23, B-39, C-30, GP-7 M12 MAINTENANCE**

CHECK THE FOLLOWING EQUIPMENT AND THEIR RELATED GUARDS AND LENSES FOR PROPER OPERATION:			
INSPECT BOTH STARTER SERIAL NUMBERS. IF ANY STARTER IS WITHIN 3 MONTHS OF BEING 3 YEARS OLD, PLEASE CHANGE THE STARTER. TOP STARTER SN _____ BOTTOM STARTER SN _____ DID EITHER STARTER GET REPLACED? YES NO			
APPLY A THIN COAT OF THE SAE NO. 10 OIL TO THE FOLLOWING STARTER COMPONENTS			
A. ARMATURE SHAFT SPLINES			
B. CLUTCH ASSEMBLY SPIRAL SPLINES AND MATING GEAR SPLINES			
FRONT AND REAR HEADLIGHTS, DITCH LIGHTS, CAB LIGHTS, GAUGE LIGHTS, NUMBER PLATES, PLATFORM LIGHTS, ENGINE ROOM LIGHTS, INDICATOR LIGHTS			J-Hart
CHECK CONTROLLER FOR PROPER OPERATION OF REVERSER AND THROTTLE HANDLE LOCKING DEVICES			J-Hart
CHECK EMERGENCY FUEL SHUT-OFF FROM ALL LOCATIONS			J-Hart
<b>TRACTION MOTORS AND UNDERFRAME</b>			
INSPECT AXLE GENERATOR AND ENSURE ALL COVER BOLTS ARE IN PLACE AND TIGHT			J-Hart
CLEAN AND CHECK THE TRACTION MOTOR LEADS, CLAMPS, VERIFY NO LEADS ARE RUBBING ON THE FRAME			J-Hart
CHANGE ANY TRACTION MOTOR BRUSH WITH LESS THAN 50% LIFE LEFT	20422161(D87) 20426671(D78)	16 12	J-Hart
INSPECT TRACTION MOTOR COVERS AND ENSURE BOLTS ARE IN PLACE AND TIGHT			J-Hart
ENSURE TRACTION GROUND WIRES ARE IN PLACE AND PROPERLY SECURED			J-Hart
CLEAN FACE PLATE ON RADAR TRANSCIVER			
CHECK M.U. RECEPTACLE AND LIDS. MAKE NECESSARY REPAIRS			J-Hart
MAKE SURE M.U. CABLES DO NOT FOUL COUPLERS			

**B-23, B-39, C-30, GP-7 M12 MAINTENANCE**



*In-House Or Dead Mechanical*

Part #

Q  
T  
Y

WORKED BY

**SECTION 1 (ANNUAL ITEMS)**

WITH ENGINE WARM, COMPRESSION TEST THE ENGINE AND RECORD READINGS:

CYL#1 _____	CYL#9 _____
CYL#2 _____	CYL#10 _____
CYL#3 _____	CYL#11 _____
CYL#4 _____	CYL#12 _____
CYL#5 _____	CYL#13 _____
CYL#6 _____	CYL#14 _____
CYL#7 _____	CYL#15 _____
CYL#8 _____	CYL#16 _____

WITH ENGINE WARM, PRESSURE TEST COOLING SYSTEM AT 20 PSI AND INSPECT THE ENTIRE COOLING SYSTEM FOR LEAKS

PERFORM CRANKCASE INSPECTION WHILE BARRING THE ENGINE OVER, PAY CAREFUL ATTENTION FOR BROKEN RINGS AND/OR "JUMPING" RODS INDICATING THRUST WASHER WEAR  
INSPECT PISTON COOLING TUBES (EMD ONLY)

TAKE THRUST WASHER SNAP RING READINGS. FILL OUT THRUST WASHER SHEET. (USE JSP-001 FOR GUIDANCE)

INSPECT WATER MANIFOLD SADDLE STRAPS BETWEEN 4&5 AND 12&13 PA'S FOR PROPER SECUREMENT (EMD ONLY)

INSPECT AIR BOX; CLEAN AS NECESSARY

INSPECT TOP DECK COVERS, SEALS AND LATCHES. REPLACE AS NECESSARY

INSPECT TURBOCHARGER EXHAUST SCREEN AND EXPANSION JOINT. IF ANY DEBRIS IS FOUND IN THE TRAP, INVESTIGATE FOR A DROPPED VALVE AND REMOVE TURBO SCREEN AND INSPECT THE TURBO FOR DAMAGES BLADES.

INSPECT ALL EXHAUST MANIFOLDS, EXPANSION JOINTS AND HEAT SHIELDS FOR DEFECTS AND SECUREMENT.

REMOVE AND CLEAN EDUCTOR TUBE AND STACK OUTLET AND REPLACE GASKETS

REMOVE AND CLEAN ENGINE OIL SEPARATOR. REPLACE GASKET (EMD ONLY)

VERIFY SOAKBACK PUMP OPERATION AT #16 OIL PAN COVER (EMD ONLY)

PULL MICHIANA TANK AND SUCTION BOX DRAIN (IF CRANKCASE AND AIRBOX PASS INSPECTION) (EMD ONLY)

INSPECT AFTERCOOLER DUCTS FOR LOOSE/MISSING BOLTS (60 FT LBS)

REPLACE FLEXIBLE COUPLING SEALS IN COOLING AND LUBE OIL SYSTEM

LUBRICATE RADIATOR SHUTTER LINKAGES AND CYLINDERS

REPLACE THE BELL VALVE

INSPECT AIR COMPRESSOR SHAFT COUPLINGS (FOR THOSE UNITS WITH SHAFT DRIVEN AIR COMPRESSORS)

CLEAN AIR COMPRESSOR UNLOADER VALVES AND REPLACE UNLOADER VALVE "O" RINGS

Inspect rocker arms, rocker arm bushings and cam followers

**SECTION 2**

CHANGE / INSPECT / CLEAN:

CHANGE HVAC FILTERS IF APPLICABLE

INTAKE FILTER(ONLY AFTER HVAC IS WASHED)

REPLACE "BAGGIE" AIR FILTERS AND VISUALLY INSPECT TURBO IMPELLER AND EXAMINE CHAMBER FOR DEBRIS AND CRACKS

PRIMARY, SECONDARY FUEL FILTERS & O RING SEALS

FUEL STRAINERS & O RING SEALS

FUEL BY-PASS GAUGE (INSPECT ONLY)

CHANGE SOAKBACK FILTER AND RENEW O RING SEALS

CHANGE TURBO FILTER AND RENEW O RING SEALS

REMOVE PRIMARY LUBE OIL FILTER BYPASS VALVE AND CLEAN

CHANGE ENGINE LUBE OIL FILTERS

RENEW MICHIANA O RING SEAL AND CLEAN MICHIANA FILTER HOUSING

CLEAN LUBE OIL STRAINERS AND STRAINER BOX, REFRESH OIL

20402961 1

20434861 1

VARIES

20423521 1

REFERENCE ATTACHED  
FILTER KIT LIST

20409081  
20410471(sw) 1

*changed 3mths ago*

*R. Briley*

3MO.

B-23, B-39, C-30, GP-7 M12 MAINTENANCE

SECTION 3			
COMPLETE FRA INSPECTION			
INSPECT ALL TRAINLINE BRAKE VALVES			DB
COMPLETE WHEEL REPORT SHEET			DB
CHECK FOR BROKEN COIL SPRINGS & LATERAL PADS			
INSPECT VERTICAL AND YAW DAMPERS FOR LEAKS AND SIGNS OF BUSHING DETERIORATION.			
CHECK AND LUBRICATE COUPLER CARRIER			DB
INSPECT AND REPLACE BRAKE SHOES AS NECESSARY (40012998)			DB changed shoes
CHECK BRAKE CYLINDER TRAVEL			DB
MAKE PIT INSPECTION OF LOCOMOTIVE UNDERCARRIAGE			
INSPECT WICK BOLT SECUREMENT AND REPAIR IF NECESSARY			DB
CHECK SUSPENSION BEARING OIL LEVEL			DB
CHECK JOURNAL BOX OIL LEVEL			DB
CHECK OIL FILLED GEAR CASES AND FILL			DB
CHECK GEAR CASES AND INSPECT BULL GEAR (ADD 3lbs. OF GEARCASE GREASE			DB
SUSPENSION BEARING BOXES			DB
TRACTION MOTOR AIR DUCTS			DB
NOSEPADS, BINDERS, PEDESTAL JAWS AND LINERS, ROLLER BEARING BOXES AND BOLTS			DB
BRAKE CYLINDERS			DB
INITIAL BY APPROPRIATE TYPE (SWITCHER: 6 in ROAD: 8 in			DB
ELLIPTIC SPRINGS, HANGERS AND SAFETY STRAPS, BOLSTER WEAR PLATES, BOLSTER			DB
SUPPORT PADS AND TIE PADS			DB
INSPECT ALL BRAKE HANGERS, HEADS, GUIDES AND STRAPS INSURING BRAKE SHOES ARE IN			DB good
LINE WITH WHEELS			
INSPECT SIDE BEARINGS AND REPAIR AS NEEDED			
CHECK KNUCKLE CLEARANCE AND KNUCKLE THROWER, MAKE REPAIRS AS NEEDED AND APPLY			DB
SPARE KNUCKLES (E AND F TYPE)			DB
INSPECT, TEST, LUBRICATE HAND BRAKE, NOTE SERVICE DATE ON BLUE CARD			DB
SECTION 4			
IN ACCORDANCE WITH FRA 229.23. VERIFY AIR GAUGES (+/- 3PSI) CALIBRATE AT +/- 1PSI,			
REQUIRES 130 PSI MR			
CHECK ALL FLUID LEVELS, ENGINE OIL, COOLING WATER, AIR COMPRESSOR OIL			DB
DRAIN RETENTION TANK			
TOILET MAINTENANCE:			N.H.
INSPECT/REPAIR AS NEEDED TOILET DRAIN VALVE & FLOOR SEALS			OK
INSPECT CAB SEATS. REPAIR AND LUBRICATE AS REQUIRED			
INSPECT AND REPAIR AS REQUIRED:			DB
CAB / CARBODY/DOORS/HINGES/WINDOWS/LATCH SEALS/WEATHER STRIPPING AND			
SEALS/MIRRORS. ALSO LUBRICATE AS NEEDED			
A. CLEAN THE CAB, WINDOWS, AND EQUIPMENT			
COMPLETE WINTERIZATION SHEET (AUGUST - APRIL)			
WASH LOCOMOTIVE ENGINE/ENGINE ROOM/AND AIR COMPRESSOR ROOM			
WASH THE LOCOMOTIVE			
TOTAL TASK TIME		minutes	
		hours	



B-23, B-39, C-30, GP-7 M12 MAINTENANCE

LOCOMOTIVE INSPECTION REPORT AIR99		SIGNATURE
	RECORDED DATE	(STENCIL DATE)
26 INDEPENDENT BRAKE VALVE		
26 C AUTOMATIC BRAKE VALVE		
HB5D RELAY AIR VALVE (NOTE IF		
26 F CONTROL VALVE		
A-1 CHARGING VALVE		
P-2-A PENALTY BRAKE APPLICATION		
F-1 SELECTOR VALVE (NOTE IF NOT		
MU2A VALVE		
J-1 RELAY AIR VALVE		
J-1.6-16 RELAY AIR VALVE		
QUICK RELEASE PORTION		
#8 VENT ENGINEER'S SIDE (NOTE IF		
#8 VENT FIREMAN'S SIDE (NOTE IF		
MAIN RESERVOIR POP VALVE Check		
CHANGE ALL MAIN RESERVOIR AND DIRT COLLECTOR ELEMENTS		

The equipment above is to be changed out every 24 months. If the date dictates it needs changed, please change it.



<b>LOCOMOTIVE</b> <i>2000</i>	<b>DATE</b> <i>3-16-12</i>
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	Start Readings				Has Shims			END READING				Has Shims		OLD GAUGE
	Flange Height	Flange Thickness	Rim Thickness	Witness Grove	YES	NO		Flange Height	Flange Thickness	Rim Thickness	Witness Grove	YES	NO	
L#1	0-21	0-0	24				L#1							<b>FLANGE THICKNESS MEASUREMENT</b> 0-on 0-1-17/64" 1-on 0-1-15/64" 2-on 0-1-7/32" 3-on 0-1-5/32" 4-on 0-1-7/64" 5-on 0-1-3/8" 6-on 0-1-1/32" 7-on 0-63/64" 8-on 0-15/16"
L#2	0-19	0-0	30				L#2							
L#3	0-20	0-0	32				L#3							
L#4	0-20	0-0	24				L#4							
L#5							L#5							
L#6							L#6							
<b>OLD GAUGE</b>														
R#1	0-21	0-0	24				R#1							<b>FLANGE THICKNESS MEASUREMENT</b> 0-on 0-1-17/64" 0-on 1-1-1/16" 0-on 2-1-1/8" 0-on 3-1-3/16" 0-on 4-1-1/4" 0-on 5-1-5/16" 0-on 6-1-3/8" 2-on 6-1-13/32" 4-on 6-1-7/16" 6-on 6-1-31/64"
R#2	0-20	0-0	30				R#2							
R#3	0-20	0-0	32				R#3							
R#4	0-20	0-0	24				R#4							
R#5							R#5							
R#6							R#6							

WEAR LIMITS FOR ROAD & SWITCH LOCOMOTIVES - MINIMUM DAILY REQUIREMENTS

FRA 1 1/2" MMA 1 7/16" Flange Height  
 FRA 7/8" MMA 15/16" Flange Thickness  
 FRA 1" MMA 1 1/16" Rim Thickness  
 FRA 5/16" MMA 1/4" Tread Wear

FLANGE HEIGHT MEASUREMENT

WEAR LIMITS - ROAD & SWITCH LOCOS - MIN. 92 DAY REQ

WEAR LIMITS - PASSENGER LOCOS - MIN 92 DAY REQ

FLANGE HEIGHT	Flange THICKNESS	Rim THICKNESS	Tread WEAR	Flange HEIGHT	Flange THICKNESS	Rim THICKNESS	Tread WEAR
FRA 1 1/2"	FRA 7/8"	FRA 1"	FRA 5/16"	FRA 1 1/2"	FRA 7/8"	FRA 1"	FRA 5/16"
MMA 1 7/16"	MMA 1 1/32"	MMA 1 1/8"	MMA 1/4"	MMA 1 7/16"	MMA 1"	MMA 1 1/2"	MMA 1/4"

**CONVERSION CHART FOR WHEEL DIAMETER**

8= 37"	15= 37 7/8"	22= 38 1/4"	29= 39 5/8"	36= 40 1/2"
9= 37 1/8"	16= 38"	23= 38 7/8"	30= 39 1/4"	37= 40 5/8"
10= 37 1/4"	17= 38 1/8"	24= 39"	31= 39 7/8"	38= 40 3/4"
11= 37 3/8"	18= 38 1/4"	25= 39 1/8"	32= 40"	39= 40 7/8"
12= 37 1/2"	19= 38 3/8"	26= 39 1/4"	33= 40 1/8"	40= 41"
13= 37 5/8"	20= 38 1/2"	27= 39 3/8"	34= 40 1/4"	41= 41 1/8"
14= 37 3/4"	21= 38 5/8"	28= 39 1/2"	35= 40 3/8"	42= 41 1/4"

FLANGE THICKNESS MEASUREMENT

**LOCOMOTIVE RAIL CLEARANCE**

COUPLER HEIGHT		PILOT HEIGHT		FRONT		HEIGHT OF HORIZONTAL END HANDHOLD OR UNCOUPLING LEVER IF USED AS HORIZONTAL HANDHOLD		LOCO RAIL CLEARANCE	
FRA	MAX 34 1/2" MIN 31 1/2"	FRA	MAX 6" MIN 3"	FRONT	6	FRA MIN 30"		FRA MIN 2 1/2"	
MMA	MAX 34 1/2" MIN 32 1/2"	MMA	MAX 6" MIN 3 1/2"	REAR	6	MMA MIN 30"		MMA MIN 3"	

WHEEL DIAMETER MEASUREMENTS ARE TAKEN FROM THE TOP OF THE WITNESS GROOVE 40" DIAMETER WHEELS WITNESS GROOVE = 36"

42" DIAMETER WHEEL WITNESS GROOVE = 38"

WHEEL MATCHING STANDARDS FOR 6 AXLE LOCOMOTIVES (FRA & MMA STANDARDS ARE THE SAME)

3/4" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS IN THE SAME TRUCK WITHOUT SHIMS.  
 1 1/4" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS IN THE SAME TRUCK WITH SHIMS APPLIED.  
 1 1/2" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS ON DIFFERENT TRUCKS.

NOTE: WHEN FIGURING THE DIFFERENCE IN WHEEL DIAMETER, TO DETERMINE IF SHIMS ARE REQUIRED, YOU MUST USE THE AVERAGE WHEEL DIAMETER FIGURES

**REMEMBER THIS RULE**

0 TO 5 DIAMETER DIFFERENCE NO SHIMS REQUIRED 6 TO 10 DIAMETER DIFFERENCE ADD APPROPRIATE SHIMS TO BOTH BOXES ON BOTH SIDES OVER 10 IN DIAMETER DIFFERENCE REQUIRES WHEEL CHANGE OR TRUED NOTE: ON EMD LOCOMOTIVES USE ONLY ONE 1/2" SHIM EMD PART NUMBER 8455981 SHELLED TREAD AND FLAT SPOTS MUST BE TRUED OR CHANGED WHEN FOUND ON PERIODIC OR UNSCHEDULED MAINTENANCE. KCS CONDEMNING LIMITS FOR SHELLED TREAD ON A SERVICE TRACK: \* ONE SHELLED SPOT 1" OR GREATER IN LENGTH \* ONE SHELLED SPOT WITH A DEPTH OF 1/4" OR MORE.

EMPLOYEES SIGNATURE

*D. Black*

SUPERVISORS SIGNATURE

# B-23, B-39, C-30, GP-7 MO6 INSPECTION



## Out Bound Loadtest Electrical/Mechanical

WORKED BY:

### ELECTRICAL

- VERIFY THE OPERATION OF THE GROUND RELAY
- CHECK FOR LOW VOLTAGE GROUNDS (7 watt bulb)
- WHILE IN THROTTLE 3 LOAD TEST, CHECK FOR AC GROUNDS
- CHECK OPERATION OF:
  - A. HEATING
- COMPLETE THE IN-BOUND LOAD TEST SHEETS
- GROUND RELAY-(TEST THREE TIMES TO VERY LOCK-OUT)(DYNAMIC & POWER)
- CHECK THE FOLLOWING FOR PROPER OPERATION:
  - A. CREW ALERT
  - B. RADIO AND ANTENNA
  - C. AXLE ALT. SPEEDO
  - D. MU ENGINE SHUTDOWN
  - E. FUEL CUT-OFF
  - F. TEST WARNING DEVICES

J. Martin

### MECHANICAL

- CLEAN AND SERVICE TOILET AND RESTROOM
- DRAIN RETENTION TANK
- PROPER LUBRICATION? FUEL LEAKS? CAM ROLLER ROTATION? ETC.
- INSPECT FUEL SYSTEM HOSES AND PIPES FOR LEAKS
- INSPECT COOLING SYSTEM:
  - A. CHECK HOSES AND PIPES FOR LEAKS
- CHECK OPERATION OF ENGINE PROTECTION DEVICES:
  - A. CRANKCASE PRESSURE
- VISUALLY INSPECT AIR COMPRESSOR FOR WATER, AIR OR OIL LEAKS
- PERFORM MANUAL AIR BRAKE TEST
- Verify Flow Gauge NOTE: 120-130-140 main  
 130 main reservoir is 64 + or - 3,  
 reservoir is 60 + 0
- PERFORM PENALTY BRAKE TEST
- CHECK FOR CORRECT AIR PRESSURE SETTINGS:
  - A. MAIN RESERVOIR (130 - 140 PSI)
  - B. BRAKE PIPE (90 PSI)
  - C. EQUALIZING RESERVOIR (90 PSI)
  - D. BRAKE CYLINDER (72 - 74 PSI)
  - E. COMPRESSOR CONTROL (130 - 140 PSI +/-5 PSI)
- CHECK FLUID LEVELS BEFORE LOADING:
  - A. ENGINE OIL
  - B. COOLING WATER
  - C. AIR COMPRESSOR OIL
- TEST OPERATION OF THE FOLLOWING DEVICES:
  - A. BELL
  - B. SANDERS (FORWARD, REVERSE, EMERGENCY)
  - C. RADIATOR SHUTTERS

DB  
DB  
DB  
DB

DB  
DB  
DB

DB

# JSP-010 (BATTERY MAINTENANCE AND QUALIFICATION)

## JOB SPECIFIC PROCESS

Locomotive Type: ALL MODELS

Valid for Road Numbers: (All Models)

Overview: This job process sheet will assist with the maintenance and qualification of batteries.

### SPECIAL TOOLS OR EQUIPMENT:

### SEQUENCE OF JOB STEPS

Please print your name,  
NO signatures

1. Ensure the locomotive is shutdown, discharged, all of the circuit breakers are open and the battery knife switch is open.

J. Martin

### Battery Qualification/Maintenance

2. **NOTE: If batteries are dead, connect the charger until the charge rate falls below 10 amps to determine state of charge. Readings under 20 V are suspect for units with just 2 batteries.**

3. Insert hose stem into battery cell and squeeze bulb.

4. Release pressure until enough acid solution is drawn into the tube allowing the float to float freely. Be sure float does not touch rubber stopper at the top of the tube.

5. The float reading at the water line is the uncorrected charge level of the battery.

6. Read and record the specific gravity of all 16 pilot cells. "record readings below": acceptable range is 1.225 – 1.300 ( if out of this range notify tech support)

**Note 1:** the sheet below is set up for 2 or 8 batteries as some units have 8 batteries.

**Note 2:** accurate readings cannot be obtained if water has recently been added to cells. Differences of 50 points or more between readings in battery cells may indicate pending battery failure.

7. Based on the above specific gravity readings, do any batteries need replaced? Remember, if the unit came in with already dead batteries, an attempt to charge the batteries must be made before taking the specific gravity readings. YES

8. Return acid to cell from which it was drawn.

9. Be sure all vent plugs are replaced and tight.

10. With Unit shut down measure the voltage reading across each battery at the terminals, record readings on the chart below.

11. Make a general check of the battery as to proper blocking, clean and tight connections at all points, and any unusual appearance or condition. If any unusual appearance or conditions exist, like corrosion, clean with scotch-brite buffer or wire br

12. Apply approved protective coating to connections after terminals are cleaned and dried

13. Add water as required (Add water to bottom of filler neck).

### Battery Cranking Voltage Test

14. Close battery knife switch, and circuit breakers.

15. Open the injector toggle switch, on EUI units to prevent unit from starting.

**NOTE: Battery cranking voltage readings do not need to be taken on Air Start Locomotives.**

16. On MUI engines, pull the Governor button and hold back the Lay-shaft while cranking the engine over to prevent unit from starting.

18. Based on the cranking voltages, is any battery suspect of needing replaced? YES NO

2 Battery Units	Specific Gravity				Water Added			Battery Replaced-Reason
	Cell 1	Cell 2	Cell 3	Cell 4	Yes	No	Yes	
Battery 1								o
Section A					✓			
Section B	1	2	5		✓			
Section C					✓			
Section D					✓			

2 Battery Units	Specific Gravity				Water Added			Battery Replaced-Reason
	Cell 1	Cell 2	Cell 3	Cell 4	Yes	No	Yes	
Battery 2								o
Section A	1	2	5		✓			
Section B					✓			
Section C					✓			
Section D					✓			

8 Battery Units	Specific Gravity				Water Added			Battery Replaced-Reason
	Cell 1	Cell 2	Cell 3	Cell 4	Yes	No	Yes	
Battery 1								
Battery 2								
Battery 3								
Battery 4								
Battery 5								
Battery 6								
Battery 7								
Battery 8								

**BATTERY CRANKING VOLTAGE CHART**

	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
Battery Voltage	32.7	32.7						
	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
Battery Voltage								
	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
Cranking Battery Voltage								
Battery Voltage								
	Battery 1	Battery 2	Battery 3	Battery 4	Battery 5	Battery 6	Battery 7	Battery 8
Cranking Battery Voltage								

REVISED: 8/18/2010



**MMA RAILWAY  
MECHANICAL DEPARTMENT  
MODIFICATIONS**

UNIT \_\_\_\_\_

DATE \_\_\_\_\_

ELECTRICIAN / MACHINIST

SIGNATURES

1. DYNAMIC BRAKE HOLDING FEATURE

\_\_\_\_\_

2. CHECK BATTERY CONNECTIONS AND RECOAT LUGS

\_\_\_\_\_

3. SINGLE MAN BRAKE TEST

\_\_\_\_\_



# Service Operations

UNIT \_\_\_\_\_

DATE \_\_\_\_\_

## THROTTLE 8 INBOUND LOAD TESTS

Eng RPM (900)	EMD	_____	Lube Oil Pres	_____
Eng RPM (1050)	GE	_____	Water Temp	_____
Horsepower		_____	Overspeed Setting	_____
Volts (5.3)	B-23	_____	RACK SETTING	_____
Volts (7)	C-30	_____		
Volts (720)	B-39	_____		

## THROTTLE #1 STALL TEST

OP Mode	(PWR)	_____	
AMPS	(300)	_____	
MGA	(1220)	_____	NOT APPLICABLE TO B-23 AND C-30
Charging Rate	(70v)	_____	

## TL 24T

Throttle 1	(1V)	_____
Throttle 2		_____
Throttle 3		_____
Throttle 4		_____
Throttle 5		_____
Throttle 6		_____
Throttle 7		_____
Throttle 8	(72V)	_____



# Description of Work Performed

Locomotive ID \_\_\_\_\_

Time Started \_\_\_\_\_

Time Finished \_\_\_\_\_





Unit: \_\_\_\_\_

Date: \_\_\_\_\_

### DEFECTS FOUND DURING INSPECTION

DEFECT <u>Fl. Sand Nozzle Missing</u>	INSPECTED BY: <u>DP</u>
REPAIR <u>replaced</u>	CORRECTED BY: <u>DP</u>

DEFECT _____	INSPECTED BY: _____
REPAIR _____	CORRECTED BY: _____

DEFECT _____	INSPECTED BY: _____
REPAIR _____	CORRECTED BY: _____

DEFECT _____	INSPECTED BY: _____
REPAIR _____	CORRECTED BY: _____

DEFECT _____	INSPECTED BY: _____
REPAIR _____	CORRECTED BY: _____

Unit: \_\_\_\_\_

Date: \_\_\_\_\_

### DEFECTS FOUND DURING INSPECTION

DEFECT _____ _____ _____	INSPECTED BY: _____ _____
REPAIR _____ _____ _____	CORRECTED BY: _____ _____

DEFECT _____ _____ _____	INSPECTED BY: _____ _____
REPAIR _____ _____ _____	CORRECTED BY: _____ _____

DEFECT _____ _____ _____	INSPECTED BY: _____ _____
REPAIR _____ _____ _____	CORRECTED BY: _____ _____

DEFECT _____ _____ _____	INSPECTED BY: _____ _____
REPAIR _____ _____ _____	CORRECTED BY: _____ _____

DEFECT _____ _____ _____	INSPECTED BY: _____ _____
REPAIR _____ _____ _____	CORRECTED BY: _____ _____

Manual Air Brake Inspection

Date:

Model Year: \_\_\_\_\_  
VIN: \_\_\_\_\_

Signature: \_\_\_\_\_

1. Inspect and repair all piping and valves for leaks. \_\_\_\_\_
2. Test all air gauges with gauge tester and set as required. \_\_\_\_\_
3. With full brake pipe pressure, make a 20lb. reduction, move the cutoff valve to "OUT" position and move the lead - dead valve to "DEAD" position. Brakes must remain applied for 5 minutes. \_\_\_\_\_
4. Cover each trainline hose coupling with hand and test for leakage through valve, then apply blank dummy couplings to the trainline hoses on each end of the unit and open trainline valves. Make a 20lb. reduction with the Automatic, move the cutoff valve to "OUT" position and check for brake pipe leakage. Leakage shall not exceed 5 lb. per minute. \_\_\_\_\_
5. Reduce main reservoir pressure to 85 lbs. by draining #2 main reservoir. (\*) Check cab gauge for leakage from main reservoirs and piping for 3 minutes. Leakage must not exceed an average of 3 lb. per minute during the test. \_\_\_\_\_
6. Drain #1 main reservoir (\*) completely and test check valve between reservoirs. Pressure should remain on the main reservoir gauge in the cab as #1 main reservoir is drained. \_\_\_\_\_
7. Check all M/V valve handles to ensure the locking device work properly. Lubricate or replace as necessary. \_\_\_\_\_
8. Check for air through handbrake assembly. \_\_\_\_\_
9. Check for air through the handbrake assembly. \_\_\_\_\_

9 Test and CALABRETT Air Flow Meter

26 L EQUIPMENT, (UNITS 20-24, 309-303, 40-4305 and 81-98)

Date

unit no.

1. Change Automatic Brake Valve Portion.
2. Change Independent Brake Valve.
3. Change A-1 Changing Outlet Pilot Valve.
4. Change Control Valve Portion.
5. Service Portion.
6. Quick Release Portion.
7. Change P-2-A Application Valve.
8. Change Overspeed Magnet Valve (Below 816-1).
9. Change Compressor Unloader Magnet Valve.
10. Change Out Compressor Intake Air Filters.
11. Remove and Wash Inertial Air Separators.
12. Change J-Relay Air Valve.
13. Clean Six Z-Way Checks.
14. Change Air Compressor Intake Air Filters.
15. Change Oil in Air Compressor.
16. Change #8 Vent Valve.

Comments:

LOCOMOTIVE											DATE			
Start Readings					Has Shims		END READING					Has Shims		OLD GAUGE
	Flange Height	Flange Thickness	Rim Thickness	Witness Groove	YES	NO		Flange Height	Flange Thickness	Rim Thickness	Witness Groove	YES	NO	
L#1	0-21	0-00	24				L#1							<b>FLANGE THICKNESS MEASUREMENT</b> 0-on 0-1-17/64" 1-on 0-1-15/64" 2-on 0-1-7/32" 3-on 0-1-5/32" 4-on 0-1-7/64" 5-on 0-1-3/64" 6-on 0-1-1/32" 7-on 0-63/64" 8-on 0-15/16"
L#2	0-19	0-0	30				L#2							
L#3	0-20	0-0	32				L#3							
L#4	0-20	0-0	24				L#4							
L#5							L#5							
L#6							L#6							
														<b>OLD GAUGE</b>
														<b>FLANGE HEIGHT MEASUREMENT</b> 0-on 0-1" 0-on 1-1-1/16" 0-on 2-1-1/8" 0-on 3-1-3/16" 0-on 4-1-1/4" 0-on 5-1-5/16" 0-on 6-1-3/8" <b>2-on 6-1-13/32"</b> 4-on 6-1-7/16" 6-on 6-1-31/64"
R#1	0-20	0-0	24				R#1							<b>NEW GAUGE</b> 0-on 17-1-1/16" 0-on 18-1-1/8" 0-on 19-1-3/16" 0-on 20-1-1/4" 0-on 21-1-5/16" 0-on 22-1-3/8" <b>2-on 22-1-13/32"</b> 4-on 22-1-7/16" 6-on 22-1-15/32" 8-on 22-1-1/2"
R#2							R#2							
R#3	0-20	0-0	30				R#3							
R#4	0-20	0-0	22				R#4							
R#5	0-20	0-0	24				R#5							
R#6							R#6							

WEAR LIMITS FOR ROAD & SWITCH LOCOMOTIVES - MINIMUM DAILY REQUIREMENTS

FRA 1 1/2" MMA 1 7/16" Flange Height  
 FRA 7/8" MMA 15/16" Flange Thickness  
 FRA 1" MMA 1 1/16" Rim Thickness  
 FRA 5/16" MMA 1/4" Tread Wear

FLANGE HEIGHT MEASUREMENT

WEAR LIMITS - ROAD & SWITCH LOCOS - MIN. 92 DAY REQ

WEAR LIMITS - PASSENGER LOCOS - MIN 92 DAY REQ

FLANGE Height	Flange THICKNESS	Rim THICKNESS	Tread WEAR	Flange HEIGHT	Flange THICKNESS	Rim THICKNESS	Tread WEAR
FRA 1 1/2"	FRA 7/8"	FRA 1"	FRA 5/16"	FRA 1 1/2"	FRA 7/8"	FRA 1"	FRA 5/16"
MMA 1 7/16"	MMA 1 1/32"	MMA 1 1/8"	MMA 1/4"	MMA 1 7/16"	MMA 1"	MMA 1 1/2"	MMA 1/2"

CONVERSION CHART FOR WHEEL DIAMETER

8= 37"	15= 37 7/8"	22= 38 3/4"	29= 39 5/8"	36= 40 1/2"
9= 37 1/8"	16= 38"	23= 38 7/8"	30= 39 3/4"	37= 40 5/8"
10= 37 1/4"	17= 38 1/8"	24= 39"	31= 39 7/8"	38= 40 3/4"
11= 37 3/8"	18= 38 1/2"	25= 39 1/8"	32= 40"	39= 40 7/8"
12= 37 1/2"	19= 38 3/8"	26= 39 1/4"	33= 40 1/8"	40= 41"
13= 37 5/8"	20= 38 1/2"	27= 39 3/8"	34= 40 1/4"	41= 41 1/8"
14= 37 3/4"	21= 38 5/8"	28= 39 1/2"	35= 40 3/8"	42= 41 1/4"

FLANGE THICKNESS MEASUREMENT

LOCOMOTIVE RAIL CLEARANCE

COUPLER HEIGHT	FRONT	PILOT HEIGHT	FRONT	HEIGHT OF HORIZONTAL END HANDHOLD OR UNCOUPLING LEVER IF USED AS HORIZONTAL HANDHOLD	LOCO RAIL CLEARANCE
FRA	MAX 34 1/2" MIN 31 1/2"	MAX 6" MIN 3"	6	FRA MIN 30" MMA MIN 30" FRA MAX 50" MMA MAX 50"	FRA MIN 2 1/2" MMA MIN 3"
MMA	MAX 34 1/2" MIN 32 1/2"	MAX 6" MIN 3 1/2"	4		

WHEEL DIAMETER MEASUREMENTS ARE TAKEN FROM THE TOP OF THE WITNESS GROOVE. 40" DIAMETER WHEELS WITNESS GROOVE = 36"

42" DIAMETER WHEEL WITNESS GROOVE = 38"

WHEEL MATCHING STANDARDS FOR 6 AXLE LOCOMOTIVES (FRA & MMA STANDARDS ARE THE SAME)

3/4" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS IN THE SAME TRUCK WITHOUT SHIMS.  
 1 1/4" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS IN THE SAME TRUCK WITH SHIMS APPLIED.  
 1 1/2" IS THE MAXIMUM VARIATION ALLOWED, IN WHEEL DIAMETER, BETWEEN ANY 2 WHEELS ON DIFFERENT TRUCKS.

NOTE: WHEN FIGURING THE DIFFERENCE IN WHEEL DIAMETER, TO DETERMINE IF SHIMS ARE REQUIRED, YOU MUST USE THE AVERAGE WHEEL DIAMETER FIGURES

REMEMBER THIS RULE

0 TO 5 DIAMETER DIFFERENCE NO SHIMS REQUIRED 6 TO 10 DIAMETER DIFFERENCE ADD APPROPRIATE SHIMS TO BOTH BOXES ON BOTH SIDES OVER 10 IN DIAMETER DIFFERENCE REQUIRES WHEEL CHANGE OR TRUED NOTE: ON EMD LOCOMOTIVES USE ONLY ONE 1/2" SHIM EMD PART NUMBER 8455981 SHELLED TREAD AND FLAT SPOTS MUST BE TRUED OR CHANGED WHEN FOUND ON PERIODIC OR UNSCHEDULED MAINTENANCE. KCS CONDEMNING LIMITS FOR SHELLED TREAD ON A SERVICE TRACK

• ONE SHELLED SPOT 1" OR GREATER IN LENGTH • ONE SHELLED SPOT WITH A DEPTH OF 1/2" OR MORE

EMPLOYEES SIGNATURE

SUPERVISORS SIGNATURE



Quantum Desktop Playback

Manufacturer is QEI    Version # S45E  
Serial Number is 0204090087  
Customer is MMR

Data was removed on        - 10:12:47 on 03/16/12  
Last Downloaded on        - 10:11:00 on 09/17/11  
Battery was installed on    - 09/08/04  
Locomotive Number is      - 2000

Downloaded by    -        jh  
Location         -        derby  
Train            -        234  
Wheel Size Entry -    39  
Wheel Size used by program:  
Circumference = 122.5    Diameter = 39.0  
No memo present.

Wheel size used for printout is 122.52

QDP Version V



Quantum Desktop Playback  
Data Scan Report

Report Date: 03-16-2012  
Locomotive 2000

Data Removed on 03-16-12

SPEED (MPH)	OK
TRACTION MOTOR CURRENT	OK
BRAKE PIPE PRESSURE	OK
INDEPENDENT BRAKE	OK
END-OF-TRAIN PSI	Never above 20.
EP BRAKE REQUESTED	Never ON/ACTIVE
THROTTLE	Dynamic Brake never reported. Stop never reported. Low Idle never reported.
REVERSE	Never ON/ACTIVE
EIE	OK
PCS	OK
HORN	OK
EOT MOVING	Never ON/ACTIVE
EOT MSG. JUST RX	Never ON/ACTIVE
EOT LIGHT	Never ON/ACTIVE
EP OPERATING MODE	Never ON/ACTIVE
EP PENALTY BRAKE	Never ON/ACTIVE
EP ENGINEER EMERGENCY	Never ON/ACTIVE