



SEPTA Engineering Change Notice

ECN # 4019

Summary Description of Change: Blending valve

Affected Fleet(s):				Effectivity:		Documents Affected:		
B IV		N5	<input checked="" type="checkbox"/>	SL IV		Change: All Cars		Drawing(s)
LRV DE		PCC II		SL V		Change Car #'s:		Specification(s)
LRV SE		ACS-64		P-P				IPC <input type="checkbox"/> RMM <input type="checkbox"/> HRM
M4					<input checked="" type="checkbox"/>	Evaluate/Test Only Car Nos.:		Operator's Manual
Wk Car/Loco:						145		Schematics
Facility/Equipment:						Documentation only:		Other
Other:								<input checked="" type="checkbox"/> None

Description of change: The DB Resistor Panel, bypass H5 Relayair valve and blending valve are removed from the car and replaced with the new microprocessor-based Knorr blending valve.

Reason for change: The O.E.M. blending valve is obsolete. Knorr has notified SEPTA that the parts are no longer available.

System Safety Class: 2

VMIS Job Code:

Priority: High Med Low Doc Only

Attachments:

Special Instructions: The MU will operate in service for a minimum of 6 months. If a failure in the blending valve circuit (electrical or pneumatic) occurs, Engineering must be notified.

New Stock Request: YES NO

Distribute to: RRD Distribution

Originator: [Redacted]

Date approved: 01/23/2008

Engineering Manager: [Redacted]

Date approved: 01/23/2008

REVISIONS	REV. NO.:	REVISION ORIGINATOR:	ENGINEERING MANAGER APPROVAL:	DATE APPROVED:
	Rev. 1			
	Rev. 2			
	Rev. 3			
	Rev. 4			
	Rev. 5			

Change Details:

The Knorr blending valve system consists of an ECU (Electronic Control Unit), a PBM (Pneumatic Brake Module), a BVOR (Blending Valve Out Relay) a BVOL (Blending Valve Out Light), a H5 supply plate and an OEM Blending Valve Pass Through Plate.

The ECU is a microprocessor-based device which reads the 0–69 Vdc signal from the GE (OEM-not changed) transducer and applies the appropriate pneumatic tractive effort. This device is physically located in the Cam Control group where the Dynamic Brake Resistor panel used to live. The power supplied to the ECU comes from the Traction Control Circuit Breaker.

The PBM is located between the J1 Relay Valve and the manifold. It contains 2 Magnet Valves (Apply Magnet Valve-AMV and Release Magnet Valve-RMV), 2 transducers (16 pipe-16PT and Feedback-FPT) and 2 Piston Valves (Knorr name for a piloted double check valve).

The H5 supply plate replaces the emergency bypass H5 (25 lb). Air brake tubing runs from this plate to the PBM. This Brake Pipe air provides the pilot for the Knorr Piston Valves.

The BVOR is an electrical relay controlled by the ECU. When the ECU is powered and fault free, the relay will be energized. If the ECU is in a fault condition or lacks power, the BVOR will be de-energized.

The BVOL is a fault light driven by the BVOR. The light is located on the side of the Cam Control Group Box. The BVOL will be lit when there is an ECU fault. An ECU fault will also light the DBOL.

There is a work order installed in the system that requests that Engineering be notified whenever MU 145 has a dynamic brake fault.

Knorr Electronic Blending Valve Installation ECN # 4019-1

Tools Required:

Stud welder, Hand tools, VEEM pin crimping tool kit, Label printer with heat shrinking labels, 1" hole saw and drill, 7/8" step drill bit or 1/2" hole punch.

Materials Required:

13 ft. of Sealtite® conduit (C/L 33-00131-R02)
1 1/2" steel straight connector (C/L 59-0775-A)
13 ft EMI sleeve
325 ft. of #16awg Exane wire (57-2327-R04)
15 Ring terminals #14/16awg w/#6 hole (59- 5055-R01)
1 Red LED light assembly (59-2971-R01)
Ty-Wraps
Knorr Blending Valve kit
90° Cannon Plug body
5ea. 1/4" x 20 nuts, flat washers, & lock washers
1 J-1 Gasket
1 H-5 Gasket
2 ea. Heat shrinkable butt splices

Assemble the wire harness:

1. Assemble the cannon plug using the 90° body not the straight body in the kit. Set this aside, it will not be used.
2. Cut ten 30ft. lengths of #16awg Exane wire.
3. Using the VEEM pin crimper, pin out the plug as follows:

PBM Connector	TB1
A	11
B	10
C	11
D	12
E	8
F	7
H	9
I	5
J	4
K	6

4. Label the wires as follows: **PBM-A to TB1-11**, etc...

In the CAM GROUP:

1. Turn off the Traction Control Breaker and tape it over.
2. Disconnect and remove the Blending Valve Resistor Panel and wood spacers left on the studs.

Knorr Electronic Blending Valve Installation ECN # 4019-1

3. Drill a 7/8" hole (or 1/2" knockout) through the rear of the lower left end of the group box (near where the wiring for the DEB comes in) for the new wire harness.
4. Drill a 1" hole in the top right side of the group box for the fault LED. Be careful not to drill into the side of the adjacent box. Install the fault LED.
5. Remove the ESRA from the mounting plate by disconnecting the two connectors on the side of the unit, loosening the 4 mounting bolts, and sliding the unit sideways until the bolts fit thru the holes. Store the unit in a safe place. It will not be needed until the installation is finished.
6. Fit the mounting plate onto the studs for the old BVRP. Add a 1/4" x 20 stud for the hole above the lower right mount for the ESRA to stabilize the unit. Use the mounting plate as a template to mark the box for the new stud. Once the stud is added, mount the plate. Tighten the hardware until the plate starts to deflect. Do not over tighten as it will bend the plate.
7. Locate the **26AA** and **26AB** wires from the old BVRP. Connect **26AA** to the car wire side of the fuse at the bottom of TB1 on the mounting plate. Connect **26AB** to TB1-16. Move the mounting plate wire from TB1-18 up to TB1-16. All other wires from the old BVRP are not used. Tape them up and tie them back.
8. There is presently a jumper wire between TB1-23 and TB1-3 on the mounting plate. Remove the wire from TB1-3 and place it on TB1-16 with the **26AB** wire.
9. Install the new wire harness thru the hole made in the back of the group box. Route the harness over the DEB to the Main Airbrake Manifold on the other side of the car near the service portion and Pull box 10.
10. Connect the harness wires to the mounting plate using the pin chart above.
11. On the left side of the Cam Group there are spare wires. Two of them will need to be used to get to Electrical Locker #1. They are typically blue/white and black/red. Once located they will need to be extended to reach the mounting plate using blue heat shrinking butt splices and 16 awg Exane wire. Label one **38+** and the other **38GA**.
12. Connect **38+** to BVOR # 11 on the mounting plate and TB260C in Electrical Locker #1.
13. Connect **38GA** to BVOR # 13 on the mounting plate and TB260E in Electrical Locker #1.
14. Install a new wire (16 awg Exane) from TB1-1 on the mounting plate to TB2-B/C on the right wall of the Cam Group Box. Label this wire **38VDC+**.
15. Install a new wire (16 awg Exane) from TB1-2 on the mounting plate to TB2-D/E on the right wall of the Cam Group Box. Label this wire **38VDC-**.
16. Install a new wire (16 awg Exane) from BVOR #10 on the mounting plate, to + terminal on the Fault LED. Label this wire **LED+**.
17. Install a new wire (16 awg Exane) from TB2-D/E to the – terminal on the Fault LED. Label this wire **LED-**.
18. Install a new wire (16 awg Exane) from BVOR # 8 on the mounting plate to TB2-B/C. Label this wire **38VDC+**.
19. The wiring is now complete. Mount the ESRA back to the mounting plate and connect the cables.

Knorr Electronic Blending Valve Installation ECN # 4019-1

At the Main Airbrake Manifold:

1. Unplug and remove the old Blending Valve. Tape up and tie back the old cable. It will be replaced by the new harness.
2. Remove the mount for the old Blending Valve from the manifold. Install the large pass thru plate (part # 808655) included in the kit, in its place re-using the gasket.
3. Remove the H-5 Valve. Install the small passage plate (part # 810124) included in the kit, in its place with a new H-5 gasket. Install one of the two elbows (part # 810130) included in the kit, into the front of the plate.
4. Remove the J-1 Valve. Install a new J-1 Gasket.
5. Install the second elbow into the side of the new PBM, then install the new PBM in place of the J-1.

Note: Existing air lines may interfere at this point and may need to be re-routed in order to continue. Please notify your supervisor.

6. Measure and cut to length a piece of the included air brake tubing. Install it between the PBM and the H-5 Passage Plate.
7. Re-install the J-1 Valve on top of the new PBM.
8. Connect the new wire harness to the PBM.
9. Secure all electrical lines.
10. Return all removed equipment to your supervisor.

The installation is now complete. The car must now be tested for leaks and function before it is released into service. The work order Modification # 638 must also be complete and closed out.

MATERIAL WITHDRAW DOCUMENT - SL4 Electronic Blending Valve Installation							TICKET NO.																					
STORE ROOM ISSUED FROM: Wayne Junction					JOB NO :			MONTH	DAY	YEAR																		
					WORK ORDER:																							
DELIVERY INFORMATION (Please Print)																												
NAME: Keith Bean				CHARGE NUMBER																								
				COMPANY			LEDGER ACCOUNT		MANAGEMENT CENTER		COST CENTER		PROJECT CODE															
				3	1	0	0	5	3	2	5	2	2	1	8	3	0	6	9	9	0	0						
TELEPHONE/EXT.		DEPARTMENT / SECTION					DELIVERY ADDRESS																					
X6814		RRDM																										

CLASS #	LOT #	ISSUED QUANTITY	UNIT	DEM IND	PHY INV	B/O MTH	DESCRIPTION OF MATERIAL	QUANTITY ORDERED	UNIT
59	01743-R02					Pmp Rm	Plastic Conduit	13	FT
59	01744-R06					Pmp Rm	Straight Connector	1	EA
57	02327-R04					D-27	#16awg Exane wire	325	FT
59	05055-R01					A-5	Ring Terminal	15	EA
59	02971-R01					D-39	LED Light Assem.	1	EA
40	07102-R05					H-14	1/4 x 20 nut	5	EA
40	09997-S09					H-13	1/4 flat washer	5	EA
68	11550-L					H-13	1/4 lock washer	5	EA
50	03160-R03					L-9	J-1 Valve Gasket	1	EA
50	02902-B06					A-24	H-5 Valve Gasket ring	3	EA
50	03156-R28					A-3	H-5 Valve Gasket ring	2	EA
59	05101-C					Loc #3	Ty-Wraps	20	EA
59	05101-D					Loc #3	Ty-Wraps	20	EA
59	05050-R09					A-13	Blue heatshrink butt splices	2	EA

ENTER BY:	FILLED BY:	SHIPPED VIA:
APPROVED BY:	EXT.	RECEIVED BY: ACCT NO.
PRINT NAME	PRINT NAME:	