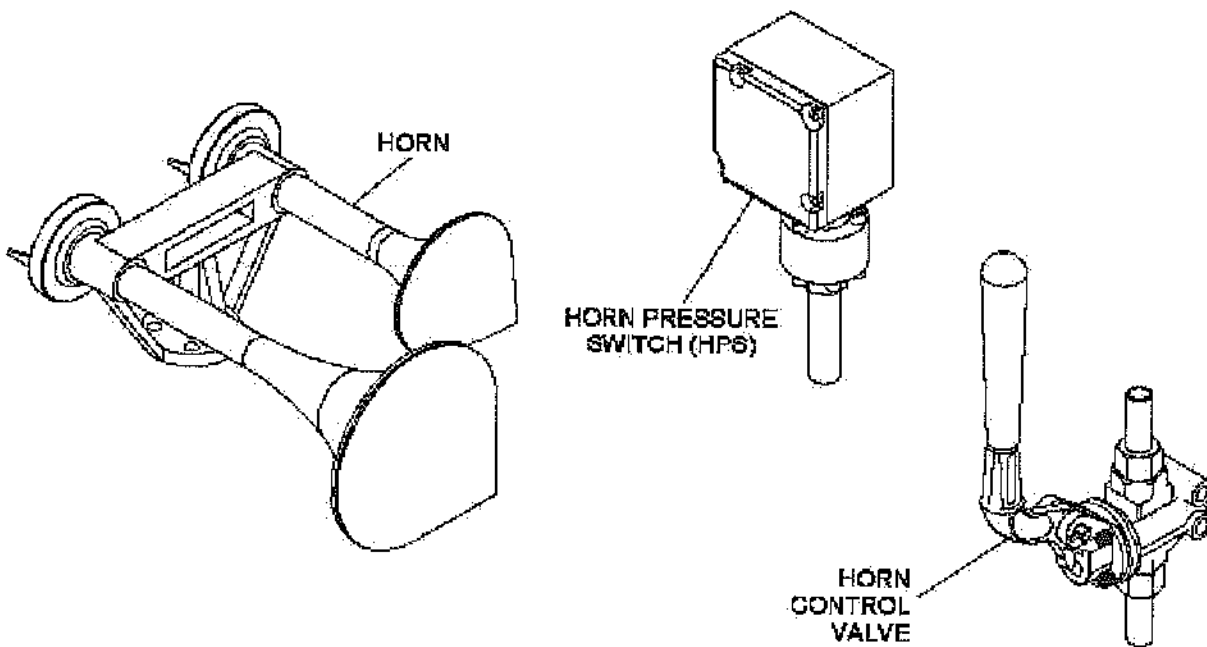


AIR HORN (03 30 10 01)

A pneumatic horn is present on each car. A manually operated HCV(03 30 10 01 01) controls operation of the horn. The horn supply line contains a HPS (03 30 10 24 01) that sends a signal to the event recorder and the Automatic Train Control (ATC). The horn supply 1/2-inch vented isolating cock (03 20 60 01 07) isolates the horn for maintenance and troubleshooting, and the horn supply LA2100-T1 air filter keeps the line and mechanism free of debris. (See Fig. 1-3-37)

Figure 1-3-37 Horn, Horn Pressure Switch (HPS), and Horn Control Valve (HCV)

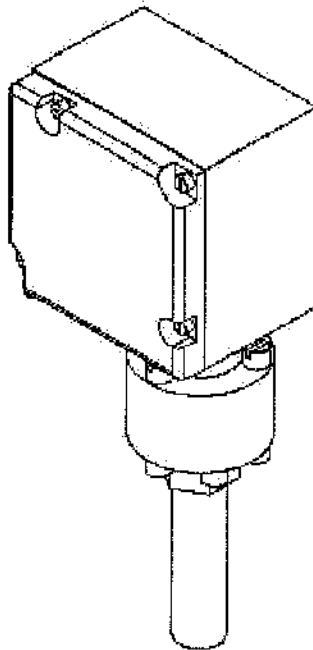


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HORN PRESSURE SWITCH (03 30 10 24 01)

The Horn Pressure Switch (HPS) detects pressure in the horn circuit. The HPS sends a signal to the event recorder indicating that the horn is activated. (See Fig. 1-3-39)

Figure 1-3-39 Horn Pressure Switch (HPS)



KNO6034

51-31-0410-01 A CAR POU INTERCONNECTION TOP TIER**1 "F"-EndPOU Components****1.1 Analog Converter and Analog Converter Control Unit**

In response to a Brake Effort Command (BEC) signal from the Propulsion System (PCUF or PCUB), the Analog Converter Control Unit (ACCU) [A2] operates in a closed loop manner and adjusts the control volume pressure within the Analog Converter (AC) [A1] as necessary. Note that the PCUF and PCUB command signals from the propulsion systems are wired in parallel. This is the only control signal the ACCU uses to attain the correct Control Volume pressure level. The only feedback signal used by the ACCU to attain the correct control volume pressure level is the Control Volume Pressure Transducer (PTCV) [A1] which is part of the AC.

Control signals from the PCUF or PCUB are in the range of 4 to 20 mA. The current level determines the brake level requested. If the Current Level is less than or equal to 4mA, then a full service brake is requested, with control volume pressure of 80 psi. If the current level is between 4mA and 16mA, then a variable brake effort is requested. If the current level is greater than or equal to 16mA, then a brake release is requested. With a control volume pressure of 0 psi.

A brake level "In-shot" of 5 psi (approximately 15.25 mA) is used to overcome the return spring force of the brake caliper units and initiate movement of the caliper braking elements.

The minimum brake function is realized at a nominal BEC current of 13 milliamps, resulting in an approximate brake pressure of 20 psi.

A BEC signal requesting 5 psi is sufficient to initially prepare the friction brake system for subsequent friction braking applications.

Input power for the ACCU components (BATT PWR IN) (50 to 90 Vdc, nominal current less than 1.1 amps) is supplied by battery power from the Low Voltage Distribution Network (LVDN).

1.2 Emergency Magnet Valve

The Emergency Magnet Valve (EMV) [B2] is normally energized. The EMV locally vents the brake pipe, initiating an emergency brake application by causing the large exhaust port on the rate sensitive vent valve to open. There is one EMV on the A Car, located on the "F"-End A Car POU assembly. This component is part of the Emergency Brake Trainline. EMV input operating specifications are as follows: Input voltage is 50-90 Vdc, magnet valve maximum drawing power is 20 watts, coil resistance is 531 ohms $\pm 10\%$ at 20 C, coil inductance is approximately 6 henries at 20 C, coil drop-out voltage is approximately 10.8 Vdc, coil minimum holding voltage is approximately 40 Vdc, and coil minimum pull-in voltage is approximately 50 Vdc.

A diode is installed in the mating connector to provide transient suppression.

1.3 Brakes Released Pressure Switch

The Brakes Released Pressure Switch (BRPS) [B2] contains one Single Pole Double Throw (SPDT) switch. The BRPS detects low air pressure in the brake cylinder, and annunciates brake release. This pressure switch contact opens on increasing pressure at approximately 13 psi and closes on decreasing pressure at approximately 10 psi. There is one BRPS per POU on the A Car. This signal interfaces in a serial manner as part of the Emergency Brake Local Loop circuit. BRPS operating specifications are as follows: Common Voltage is +72 Vdc, only NO contact is used, minimum current is 20 mA, maximum current is 150 mA.

1.4 Dump Valve

The Dump Valve (DV) [B2] is used to control wheel slide on a per truck basis. The DV comprises two magnet valves (VM1 and VM2) [B2], which are used together to control wheelslide. DV operating specifications are as follows: Input voltage is 50-90 Vdc, maximum electrical power is 30 watts, coil resistance is 207 to 249 ohms at 20 C, coil inductance is approximately 115 millihenries at 20 C, three conductors total for valve apply and release functions. The two solenoid coils have a common return.

DV operating states are as follows: When VM1 and VM2 are both de-energized, the DV allows brakes apply and release, without wheelslide control; brakes are reapplied by wheelslide control. When VM1 is de-energized and VM2 is energized, brake cylinder pressure is maintained with negligible leakage from POU to brake cylinder. When VM1 is energized and VM2 is deenergized, the DV enables POU and brake cylinder to vent to atmosphere at same time. When VM1 and VM2 are both energized, the brakes are released by wheelslide control, and the DV holds off POU pressure, with negligible leakage to atmosphere.

A diode is installed in each signal input line to provide transient suppression.

1.5 Brake Cylinder Cutout Cock

The Brake Cylinder Cutout Cock (BCCO) [C2] contains one SPDT electrical switch. There is one BCCO per POU on the A Car.

When BCCO is closed, the "cutout" function is annunciated. Using the NC switch contact provides this annunciation. BCCO switch operating specifications are as follows: Common voltage is 24 Vdc, minimum current is 20 mA, and maximum current is 100 mA.

The interfacing cable from Propulsion is actually a three conductor cable, providing a common voltage (24 Vdc) to the BCCO and Service Brake Cutout Cock (SBCO) [C2] components and connecting to the output signal from each component.

1.6 Service Brake Cutout Cock

The Service Brake Cutout Cock (SBCO) [C2] contains one SPDT electrical switch

The Service Brake Cutout Cock (SBCO) [C2] contains one SPDT electrical switch. There is one SBCO per POU on the A Car.

When the valve is closed, the "cutout" function is annunciated. Using the NC switch contact provides this annunciation. BCCO switch operating specifications are as follows: Common voltage is 24 Vdc, minimum current is 20 mA, and maximum current is 100 mA.

The interfacing cable from Propulsion is actually a three conductor cable, providing a common voltage (24 Vdc) to the BCCO and SBCO components and connecting to the output signal from each component.

1.7 Brake Cylinder Transducer

The Brake Cylinder Transducers (BCT1 and BCT2) [C2] measure the pressure acting upon the "F"-Endbrake cylinders. This signal is used to detect Brake Cylinder Pressure and annunciate Service Brake applied. BCT1 interfaces with the PCUF and PCUB equipment on the A Car. BCT2 interfaces with the Event Recorder (ER) on the A Car. BCT1 and BCT2 are used for monitoring and diagnostics. BCT1 and BCT2 operating specifications are as follows: Supply voltage is 7 to 35 Vdc range, maximum current draw is 25 mA, and output current 4-20 mA (4 mA is approximately 0 psi, 20 mA is approximately 200 psi)

Sensing elements in the PCUF and PCUB equipment is approximately 250 ohms each, providing for a total loop resistance with a nominal value of 500 ohms.

1.8 Load Weigh Transducer 1

The Load Weigh Transducer 1 (LWT1) [D2] measures the passenger loading on the right side suspension airbag. There is one LWT1 per POU on the A Car. LWT1 operating specifications are as follows: Supply voltage range is 7 to 35 Vdc, maximum current draw is 25 mA, and output range is 4-20 mA (4 mA is approximately 0 psi, 20 mA is approximately 200 psi)

This component interfaces at the system level with the PCUF or PCUB in the A Car. The sensing element in the PCUF equipment is approximately 550 ohms, providing for a total loop resistance with a nominal value of 550 ohms.

1.9 Load Weigh Transducer 2

The Load Weigh Transducer 2 (LWT2) [D2] measures the passenger loading on the left side suspension airbag. There is one LWT2 per POU on the A Car. Supply voltage range is 7 to 35 Vdc, maximum current draw is 25 mA, and output range is 4-20 mA (4 mA is approximately 0 psi, 20 mA is approximately 200 psi).

This component interfaces at the system level with the PCUF or PCUB in the A Car. The sensing element in the PCUF equipment is approximately 550 ohms, providing for a total loop resistance with a nominal value of 550 ohms.

1.10 Brake Pipe Transducer

The Brake Pipe Transducer (BPT) [D2] measures the pressure of the brake pipe. There is one BPT in the A Car, located on the "F"-End POU. The A Car sensor signal interfaces with the Event Recorder (ER). BPT operating specifications are as follows: Supply voltage range is 7 to 35 Vdc, maximum current draw is 25 mA, and output range is 4-20 mA (4 mA is approximately 0 psi, 20 mA is approximately 200 psi).

The sensing element in the PCUF equipment is approximately 550 ohms, providing for a total loop resistance with a nominal value of 550 ohms.

2 Horn Pressure Switch

The Horn Pressure Switch (HPS) [B1] contains one Double Pole Double Throw (DPDT) electrical switch. The HPS annunciates air pressure in the horn supply pipe. This pressure switch contact closes on increasing pressure at approximately 7 psi and opens on decreasing pressure at approximately 4 psi. There is one HPS in the A Car. HPS operating specifications are as follows: Common voltage is 24 Vdc, only NO contact is used, minimum current is 20 mA, maximum contact current is 150 mA.

3 Park Brake Applied Pressure Switch

The Park Brake Applied Pressure Switch (PBAPS) [C1] contains one SPDT electrical switch. This switch detects low air pressure in the park brake pipe, thus annunciating application of the park brake. This switch contact opens on increasing pressure at approximately 45 psi and closes on decreasing pressure at approximately 37 psi. This signal interfaces in a serial manner as part of the Friction Parking Brake Interlock T/L circuit. PBAPS operating specifications are as follows: Common voltage is 72 Vdc, only NO contact is used, minimum current is 20 mA, and maximum current is 150 mA.

4 Park Brake Control Cock

The Park Brake Control Cock (PBCC) [C1] contains one SPDT electrical switch. There is one PBCC on the A Car. When the control cock is closed, the "cutout" function is annunciated. Using the NC switch contact provides this annunciation. PBCC switch operating specifications are as follows: Common voltage is 24 Vdc, only NC contact is used, minimum current is 20 mA, and maximum current is 100 mA.

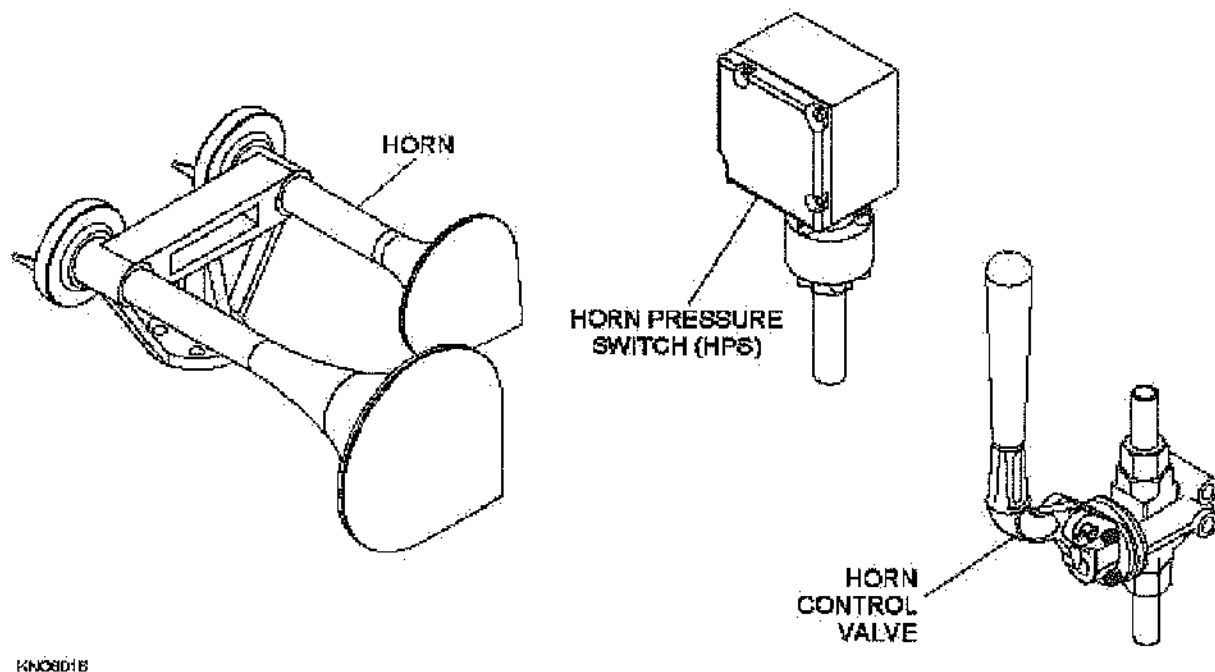
5 Emergency Magnet Valve Cutout Cock

The Emergency Magnet Valve Cutout Cock (EMVCO) [D1] contains one SPDT electrical switch. There is one EMVCO on the A Car. When the valve is closed, the "cutout" function is annunciated. Using the NC switch contact provides this annunciation. EMVCO switch operating specifications are as follows: Common voltage is 24 Vdc, only NC contact is used, minimum current is 20 mA, and maximum current is 100 mA.

AIR HORN (03 30 10 01)

A pneumatic horn is present on each car. A manually operated HCV(03 30 10 01 01) controls operation of the horn. The horn supply line contains a HPS (03 30 10 24 01) that sends a signal to the event recorder and the Automatic Train Control (ATC). The horn supply 1/2-inch vented isolating cock (03 20 60 01 07) isolates the horn for maintenance and troubleshooting, and the horn supply LA2100-T1 air filter keeps the line and mechanism free of debris. (See Fig. 1-3-37)

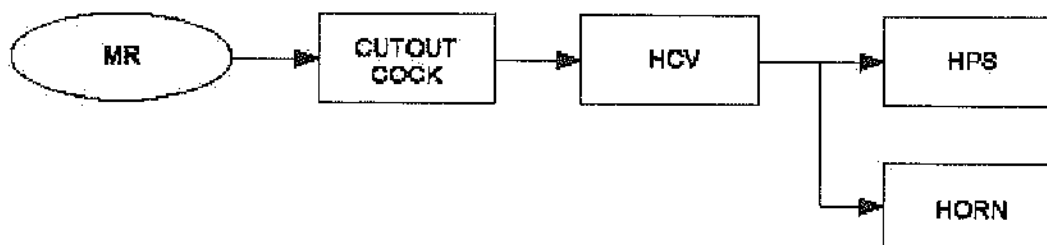
Figure 1-3-37 Horn, Horn Pressure Switch (HPS), and Horn Control Valve (HCV)



HORN ACTIVATION

Modulated horn control is accomplished by manually activating the fully modulated HCV (03 30 10 01 01). This valve provides a metered flow of air from the MR pipe to the horn (03 30 10 01). The HPS (03 30 10 24 01) is a double switch pressure switch that provides notification that the horn is sounded to the ATC system and event recorder. The horn supply 1/2-inch vented isolating cock (03 20 60 01 07) provides the ability to isolate the horn circuit from the MR pipe in the event of a failure or for maintenance. (See Fig. 1-3-64)

Figure 1-3-64 Horn Activation Block Diagram



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