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(Ministry of Railways/ रेल मंत्रालय)

(केवल कार्यालय प्रयोग हेतु)  
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# कोचिंग स्टॉक में लगे पैसेन्जर एमरजेंसी एलार्म सिस्टम का अनुरक्षण MAINTENANCE OF PASSENGER EMERGENCY ALARM SYSTEM OF COACHING STOCK



CAMTECH/M/C/2012-13/PEAD/1.0

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अअमा सं RDS  
रेल अग्रदूत Transforming Railways



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कोचिंग स्टॉक में लगे  
पैसेन्जर एमरजेंसी एलार्म  
सिस्टम का अनुरक्षण

**MAINTENANCE  
OF  
PASSENGER EMERGENCY  
ALARM SYSTEM  
OF  
COACHING STOCK**

# **प्राक्कथन**

## **FOREWORD**

Passenger coaches are fitted with an alarm chain pull arrangement to enable passengers to stop the train by pulling the alarm chain from within the coach in case of any emergency.

The passenger emergency alarm signal device does not need any maintenance during normal service except when it is found damaged or is due for periodic overhauling

The passenger emergency alarm signal device should be completely dismantled and overhauled during every POH or if there is any problem in the equipment.

This hand book is covering complete overhauling procedure and testing in a brief and lucid manner. Wherever required, sketches and colored photographs have been provided for clear understanding .

I am sure that the handbook will be useful to the concerned maintenance staff to ensure trouble free service of the coaches by maintaining the equipment properly.

**CAMTECH, Gwalior**  
**Date: 13.08.2012**

**A.R.TUPE**  
**Executive Director**

## **प्रस्तावना /PREFACE**

In order to minimize PEASD failure cases on Indian Railways, Railway board instructed CAMTECH to prepare a handbook on maintenance of PEASD on coaching stock. Accordingly, this handbook has been prepared giving complete details of maintenance activities. Colored photographs have been provided to clarify the maintenance practices and testing procedure.

The objective of this book is to provide a tool to the staff involved in maintenance during POH to reduce cases of PEASD failure thereby improving safety and throughput of Indian Railways.

This hand book is aimed at assisting concerned staff and does not supersede any existing instructions from Railway Board, R.D.S.O. or IRCA-IV etc. Most of data and information mentioned herein are available in some form the other in various books and manuals or other printed matter. If any changes are made, these will be used in the form of correction slips. For convenience, this book includes a proforma for entering all correction slips serially.

We welcome any suggestion for addition and improvements from our readers.

**CAMTECH, Gwalior**  
**Date: 13.08.2012**

**K.P. Yadav**  
**Director, Mechanical**

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## प्रकाशित संशोधन पत्रियाँ

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CAMTECH/M/C/2012-13/PEASD/1.0/C.S.# XX date ----

## CORRECTION SLIPS ISSUED

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# पैसेन्जर एमरजेंसी एलार्म सिस्टम

## PASSENGER EMERGENCY ALARM SYSTEM

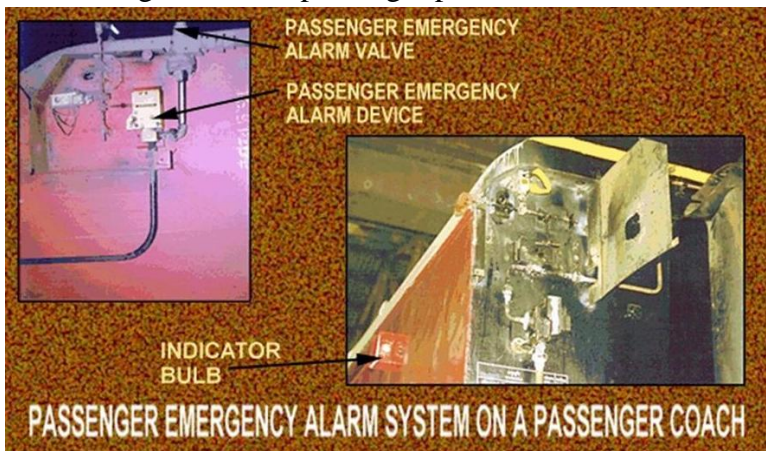
### 1.0 परिचय / INTRODUCTION

Passenger Emergency Alarm system is provided on the coaches for use by travelling passengers in case of emergency. The train is stopped by pulling the chain. Previously two Passenger Emergency Alarm Signal Devices were provided on the coaches which are situated at either side of one end wall of the coach. Now only one PEASD is fitted on the end wall of the coach.

Passenger emergency alarm system consists of two components:

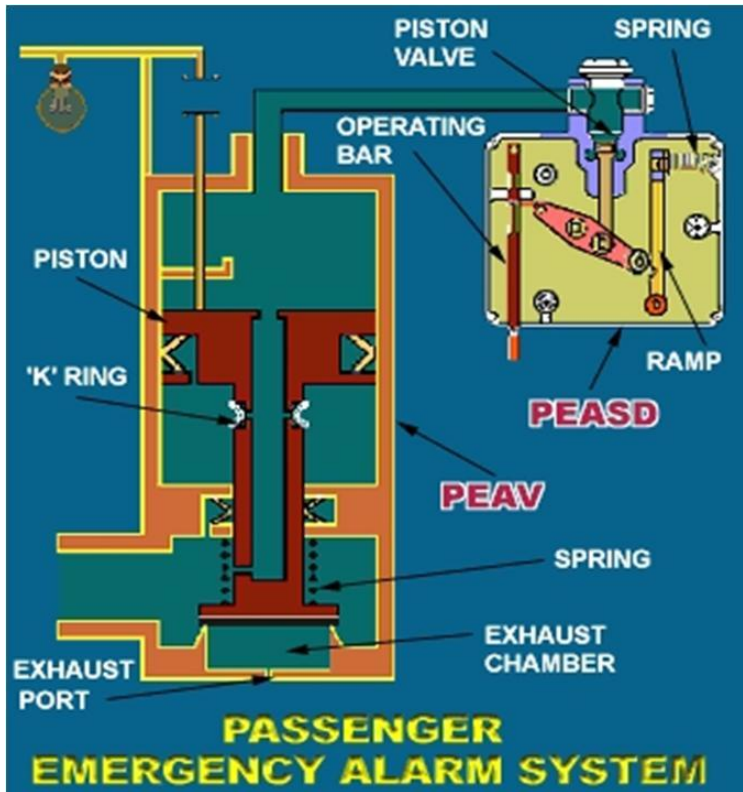
1. Passenger Emergency Alarm Signal Device (PEASD).
2. Passenger Emergency Alarm Valve (PEAV).

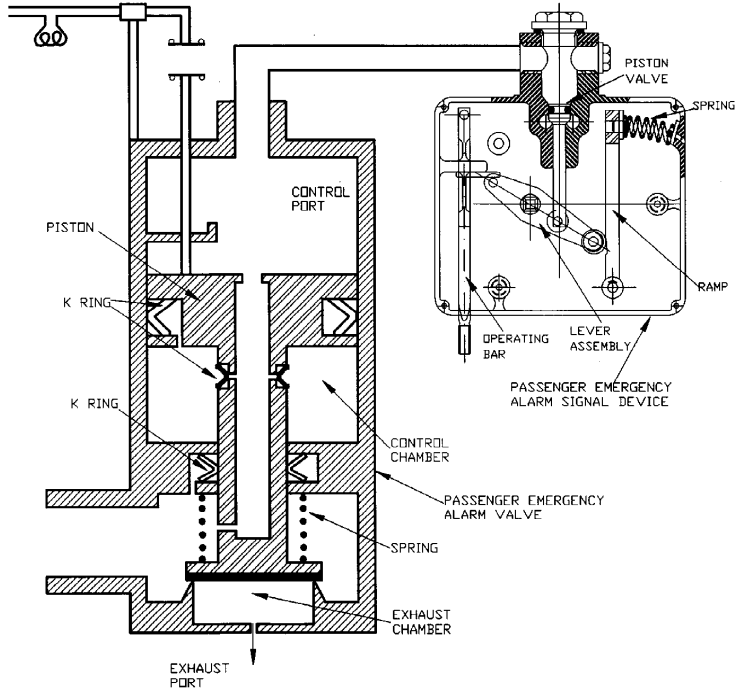
These two components in combination give an indication by reducing BP pressure to the Loco pilot and Guard that some passenger is in need to stop the train. The indication is transmitted from the coach in the form of reduction in BP in BP Gauge when the passenger pulls the chain



## 2.0 पैसेन्जर एमरजेंसी एलार्म सिग्नल डिवाइस / PASSENGER EMERGENCY ALARM SIGNAL DEVICE

Passenger Emergency Alarm Signal Device (PEASD) is a manually operated pilot vent valve. It is operated through mechanical force exerted by pulling the alarm chain provided inside the coaches for emergency use. The passenger emergency alarm signal device does not need any maintenance during normal service except when it is found damaged or is due for periodic overhauling.





**Fig. - Passenger Emergency Alarm Signal Device**

## 2.1 पी ई ए एस डी की ओवर हॉलिंग / Overhauling of PEASD:

The passenger emergency alarm signal device should be completely dismantled and overhauled during every POH or if there is any some specific trouble.

## 2.2 औजार एवं उपकरण / Tools and equipment

The tools and fixtures required for overhauling of passenger emergency alarm signal device are as follows.

- Bench vice
- Working table
- Screw driver

- d) Spanner 30 mm
- e) Allen key for M6 and M8 Screw.
- f) Open ended spanners-size 14 AF.

### 2.3 पी ई ए एस डी की डिसअसेम्बली /Disassembly of PEASD

The passenger emergency alarm signal device after removing from the coach should be disassembled as follows:

- Unscrew 4 Nos. Counter sunk screws and remove the Cover.
- Pull out the sleeve and the lever assembly.
- Pull out the ramp and the spring slowly.
- Take out the operating spindle assembly.
- Unscrew the Stop screw using suitable spanner and take out the washer, piston and 'O' ring.
- Remove 'O' ring from the piston.

### 2.4 पी ई ए एस डी के पार्ट्स की धुलाई / Cleaning of Parts of PEASD

- Clean all the metallic parts using kerosene or equivalent solvent.
- Dry all the components using low-pressure compressed air.
- Ensure smooth scratchless finish of the bore for the displacement of the piston assembly.

## 2.5 पार्ट्स को बदलना / Replacement of Parts

- Inspect all moving parts for abnormal wear, tear, crack and deformation. Replace the parts if found defective.
- Replace the 'O' ring and other rubber parts.
- Replace the spring of ramp in case of cracks, kinks or permanent set.
- Replace damaged threaded screws.

## 2.6 पी ई ए एस डी की एसेम्बली / Assembly of PEASD

- To assemble the passenger emergency alarm signal device (PEASD), follow the instructions for disassembly in the reverse sequence.
- Lubricate the pivot, roller and moving parts and ensure smooth operation of the components.

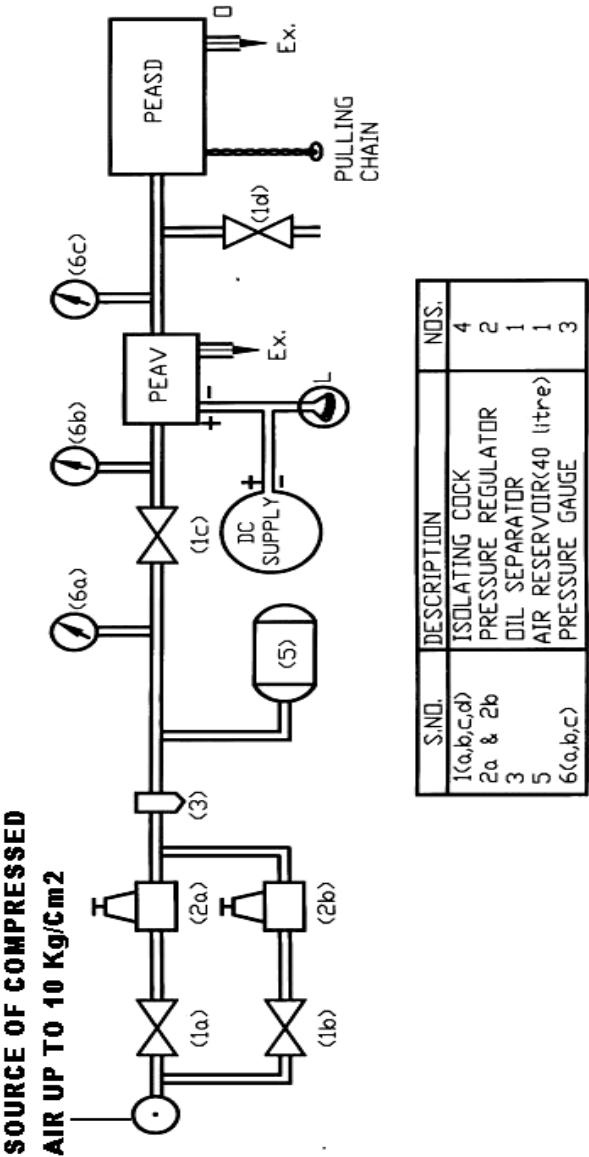


Fig. .- Test Bench Schematic for Testing PEAV and PEASD

## 2.7 पैसेन्जर एमरजेंसी एलार्म सिग्नल यंत्र की टेस्टिंग/ Testing of Passenger Emergency Alarm Signal Device

After overhauling of the passenger emergency alarm signal device, it is checked for leakage at exhaust port and all over body with soap solution. Also checked the mechanical chain pulling for smooth functioning.

### ए) लीकेज टेस्ट

#### A) Leakage Test

- i. Close cock (1b) and open cock (1a), to apply air pressure of **10.0 kg/cm<sup>2</sup>**. See that cock (1d) is closed.
- ii. See that pressure indicated by the gauge (6a) stabilizes at **10.0 kg/cm<sup>2</sup>**.
- iii. Use pressure regulator (2a), if necessary, to adjust the pressure upto **10.0 kg/cm<sup>2</sup>**.
- iv. Open cock (1c) and wait till the pressure indicated by the gauges (6a), (6b) and (6c) stabilizes at **10.0 kg/ cm<sup>2</sup>**. Wait for a few more minutes.
- v. Check for leakage by applying soap solution all over the body of the pull off box or PEASD.
- vi. No leakage is permitted, close cock 1(a) and 1(c), open cock (1d) and discharge the air pressure.

### ब) फंक्शनल टेस्ट

#### B) Functional Test

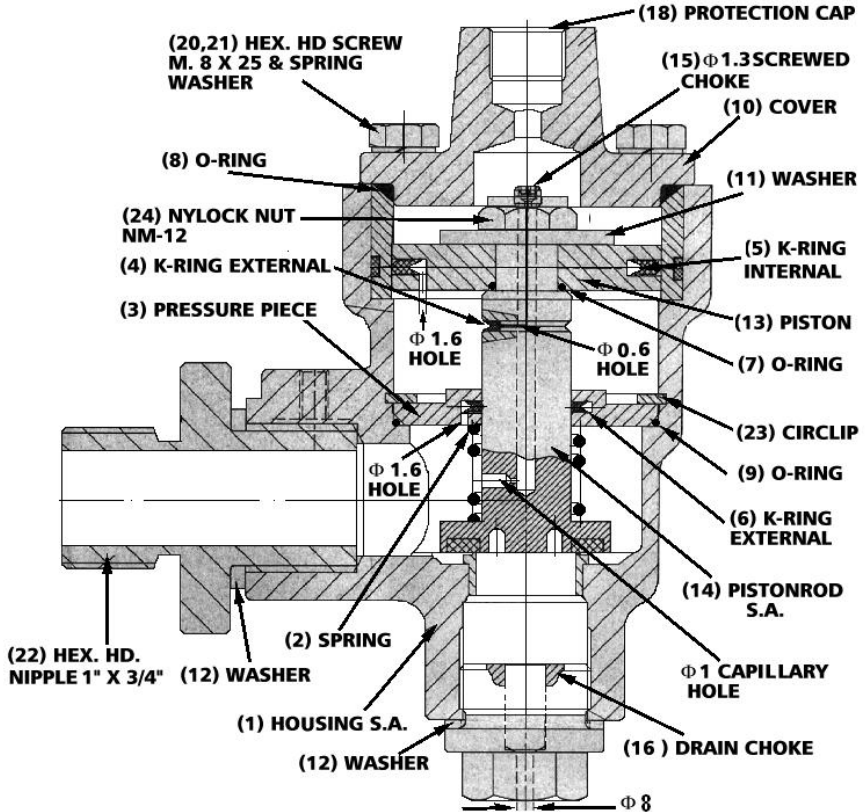
- i. Close Cock (1d) and open cock (1c).
- ii. Open cock (1b) and apply air pressure of **5.0 kg/cm<sup>2</sup>**.
- iii. See that the pressure indicated by the gauge (6a)

stabilizes at **5.0 kg/cm<sup>2</sup>**.

- iv. Use pressure regulator (2b) if necessary to adjust the pressure upto **5.0 kg/cm<sup>2</sup>**.
- v. Pull the operating hook. Air pressure should start exhausting through the pull off box (PEASD) and PEAV.
- vi. Air pressure inside the reservoir must be vented to atmosphere and gauge (6c) should read **0.0 kg/cm<sup>2</sup>**
- vii. As soon as pressure starts exhausting, lever of the pull off box should get locked in applied position.
- viii. It should not be possible to stop the exhaust pressure without getting the lever locked in applied position.
- ix. Reset the pull off box by turning square knob in clockwise position. Repeat step (i) to (v), there should be no leakage.



### 3.0 पैसेन्जर एमरजेंसी एलार्म वाल्व (पी ई ए वी) PASSENGER EMERGENCY ALARM VALVE (PEAV)



**Fig. - Passenger Emergency Alarm Valve (PEAV)**

Passenger coaches are fitted with an alarm chain pull arrangement to enable passengers to stop the train by pulling the alarm chain from within the coach in case of any emergency. Alarm chain is connected to the two Passenger Emergency Alarm Signal Devices which are situated at

either side of end walls of the coach. PEASDs are connected to the Passenger Emergency Alarm Valve (PEAV) through a 10mm control pipe. BP pressure is fed to the PEAV through a 20mm branch pipe. In the event of alarm chain pull air is depleted from the control pipe connecting PEAV and PEASD causing BP pressure to exhaust through the 8 mm choke in the PEAV (RDSO instruction No. MC/APB dated 10.06.2003 along with Railway Board's letter No. 97/M(c)/202/3 dated 28.03.2003). This causes partial application of brakes.

This drop in pressure in the brake pipe line is also observed in the BP gauge air flow indicator fitted in the locomotive for the Loco pilot to stop the train.

### 3.1 पी ई ए वी की ओवरहॉलिंग/Overhauling of PEAV

For effective and reliable functioning, overhauling should be done every POH or if there is any specific trouble.

### 3.2 फिक्चर्स एवं औजारों की सूची

#### List of tools and fixtures

**Table**

<b>S.No</b>	<b>Description</b>
1.	Rotatory PEAV holding fixture clamped on work bench
2.	General tools (A) D/E Spanner (11-13mm), (14-19mm) and (32-36mm) (B) Socket Spanner with driving handle (11,13,19mm) (C) Pipe wrench 250 mm (D) Screw Driver (8 mm blade) (E) Needle pokers (0.5, 0.8,1.0 dia) (F) Blunt tool (for K-ring) (G) Internal (long nose) circlip plier
3.	Kerosene tank
4.	Pin End Tool (suitable length and pin size)

### 3.3 ओवरहॉलिंग की विधि / Procedure for Overhauling of PEAV

Before dismantling PEAV, the outer body should be cleaned to remove dust and dirt by detergent solution followed by drying with air jet.

- Unscrew the Hexagonal Nipple (22) with washer (12) and then clamp the equipment to the holding fixture.
- Keeping the bottom side up unscrew the drain choke (16) with sealing washer (12).
- Turn and lock the PEAV top side up in the fixture and unscrew 4 Nos. Hex Head screw (M8 x 25) and remove cover (10) and 'O' Ring (8).
- Turn the PEAV to horizontal position keeping the top side of the PEAV to your right (or working hand side). Insert the pin-end-tool from the bottom side of PEAV and engage the pins of the tool to the two holes provided on the piston valve end and hold the pin-end-tool.
- With the help of 19 mm socket, unscrew the 12 mm nylock nut (24) at the other end of the piston rod (14). Also remove washer (11).
- Push the piston rod to the upper side of the PEAV by the already engaged pin-end-tool against the compressed spring. By this action, piston (13) along with K-ring (5) will come to the upper end of the PEAV body. Take out the pin-end-tool and remove the piston (13) with K-ring (5). Also take out 'O' Ring (7).
- Turn the PEAV top side up and with the help of a long nose internal circlip plier carefully & take off circlip

(23) from its groove (gently press the pressure piece by a screw driver against the spring force while trying to withdraw the circlip).

- Take out the piston rod (14) along with K-ring (4), pressure piece (3) with K-ring(6) and spring (2). Also take out 'O' ring (9).
- Separate all the parts of the subassemblies.
- Unscrew the screwed choke (15) at the top end of the piston rod carefully with the screw driver.

**Note:** Pressed bush and seat bush need not be taken out from the body.

### 3.4 पी ई ए वी के पार्ट्स की धुलाई /Cleaning of parts of PEAV

- Clean all the metallic parts including housing (1) with a hair brush and kerosene oil and the rubber parts by detergent soap solution.
- Sponge all parts dry by a clean cloth and also remove any residues by dry air jet.
- Clean all the capillary passages on piston (13), pressure piece (3), Piston rod (4), drain choke (16) and the screwed choke (15) with the help of suitable Needle poker and blow air jet through.

### 3.5 निरीक्षण एवं पार्ट्स को बदलना / Inspection and replacement of parts

- Check spring is free of kinks and rust, check free height and spring characteristics.
- Ensure the housing (1) is free of any crack or breakage,

and internal bore surface is smooth. Ensure seat of bush is free of any dent or scratch.

- Threaded portion should be free from any damage and threads should not be damaged or wornout.
- Ensure all capillary holes are clear.
- Outer cylindrical surface of the piston rod should be free of scratches and smooth.
- During scheduled overhauling all rubber and rubber bonded parts should be replaced.
- Ensure the grooves for K-rings on piston, pressure piece and piston rod are clean and are not having any deep denting or scratches.

### 3.6 एसेम्बली /Assembly

- Smear light film of grease on all parts.
- Place properly the K-rings 4,5,6 on piston rod, piston and pressure piece respectively. Screw the screwed choke at the top end of piston rod.
- Hold the PEAV housing (1) on the fixture and proceed further assembly by reversing the sequence adopted for dismantling.
- Screw drain choke (16) and Nipple (22) with washers (12) to the valve.
- After assembling, the PEAV should be tested for the prescribed performance on a suitable test bench. After testing place suitable protection cap on cover, nipple and drain choke openings to protect entry of dirt and dust into PEAV during storage. Nipple threads shall be suitably protected to avoid damage.

### 3.7 पी ई ए वी की जाँच विधि / Test Procedures for PEAV

- Test bench as shown in the schematic in **fig. 2**
- Source of compressed air at **10.0Kg/cm<sup>2</sup>**.
- 110V DC Supply
- Indicating lamp

#### i) विद्युत टेस्ट

#### i) Electrical Test

This test is to be conducted during application test (functional test)

#### ii) लीकेज टेस्ट

#### ii) Leakage Test

- Connect the PEAV to the test bench. When PEAV is being tested, make sure that the passenger emergency signal device fitted on the test bench is already a tested and approved one.
- Fix an operating hook to the signal device operating lever.
- Close cock (1c), (1d) and by opening cock (1a) admit compressed air at a regulated pressure of **10.0 kg/cm<sup>2</sup>** into the system.
- If required, adjust pressure regulator (2a) so that the gauge (6a) reading stabilizes at **10.0 kg/ cm<sup>2</sup>**.
- Open valve (1c) and charge the PEAV. Apply soap solution all over the alarm valve. No leak is permitted from any part of the body.
- Close (1c) and after waiting for a few minutes check

pressure drop in gauge (6b).

- There should not be any drop in pressure in gauge. (6b).
- Close cock (1a) and discharge the PEAV by operating cock (1d).
- Close cock 1(c) and 1(d).

### iii) फंक्शनल टेस्ट

#### (iii) Functional Test

#### ए) चार्जिंग

##### A) Charging

1. Open cock (1b) and charge the reservoir up to **5.0 kg/cm<sup>2</sup>**, using pressure reducer (2b).
2. Open valve (1c) and charge the PEAV up to **5.0 kg/cm<sup>2</sup>**.
3. Wait till gauges (6a) and (6b) and (6c) are stabilized and show the same pressure .
4. These gauges should show a pressure of **5.0 kg/cm<sup>2</sup>** and if the pressure is not equal to **5.0 kg/cm<sup>2</sup>**, adjust the pressure regulator.
5. In this position emergency brake valve is charged.
6. Check leakage from exhaust port 'O' of the PEASD, there should not be any leak.
7. Indicating lamp (L) should be off in this position.

#### ब) एप्लीकेशन

##### B) Application

1. Apply a voltage of 110 V DC to the circuit of the indicating lamp of the PEAV as shown in the figure.

2. Pull the operating hook of the signal device and observe that the air pressure starts venting from both the PEASD and the PEAV from their exhaust ports continuously.
3. The lamp should glow.
4. The gauge (6b) should stabilize at an intermediate reading to balance between the inlet and the exhaust rate of flow of the compressed air.
5. Reset the signal device with the resetting key and note.
6. The venting of air pressure from the exhaust of the signal device should stop. It should also stop from the exhaust of the PEAV and the indication lamp should switch off.
7. The gauge (6b) and (6c) should start building up to **5.0 kg/ cm<sup>2</sup>**.
8. Now again check for leakage all over the alarm valve, especially at the exhaust port. No leakage is permitted.
9. Close cock (1c) and pull the operating hook of the signal device.
10. Wait till gauge (6b) read zero.
11. Disconnect the alarm valve from the test stand and wipe out all soap suds from the device.
12. Close all open ports with suitable closure plugs till further fitment on the coach.



#### 4.0 पैसेन्जर एमरजेंसी एलार्म सिस्टम के ओपन लाइन में रखरखाव के लिए निर्देश

##### **Guidelines for open line for Maintenance of Passenger Emergency Alarm System**

1. Charge the brake pipe with  $5.0 \text{ Kg/cm}^2$  and feed pipe with  $6 \text{ Kg/cm}^2$  pressure.
2. Ensure no leakage in PEAV and PEASD by hearing the hissing sound otherwise remedial action should be taken.
3. Check that wire is not broken. There should not be any joint in the wire.
4. Pull the alarm chain at least in 3 coaches in every trip to ensure the functioning of the system and pulling force of 7.0 to 10.0 Kg by spring balance (This shall also be done during “A” and “B” Schedules)
5. Check the movement of Brake cylinder piston and ensure that brake is applied.
6. Reset the disc of pilot valve with the help of resetting mechanism.
7. Ensure that brake is released.
8. Even after resetting, the hissing sound does not stop, remedial action should be taken.
9. Working of Micro switch of ACP should be locked after by the electrical staff for ensuring proper functioning.
10. Sealing washer of PEASD is replaced, if found defective other wise PEASD is replaced as unit.

## 5.0 पैसेन्जर एमरजेंसी एलार्म सिस्टम के दोष निवारण

### Trouble Shooting of Passenger Emergency Alarm System

S.No.	FAULTS	CAUSES	REMEDY
1.	No hissing sound from Passenger Emergency Alarm valve (PEAV) specially on pulling the pressure rod of PEASD and it does not show any brake pressure reduction effect	K-ring external on piston rod subassembly is defective	Change the “K” ring
		Nylock nut on piston rod subassembly is loose	Tighten the Nylock nuts
		Piston “K” ring external is defective	Change “K” ring
		Piston rod assembly including piston movement’s jammed	Dismantle the assembly and ensure smooth movement
		Drain choke of 8 mm clogged	Clean the drain choke
2.	On resetting PESAD hissing sound from PEAV is not dis appearing	Piston rod assembly is not moving smoothly	Smoothen the movement of the Piston rod assembly
		Cause 1 to 5 for faults no. 1	See remedies 1 to 5 for fault No. 1
3.	Leakage observed from nipple adapter	Nipple threads under size or is worn-out or nipple is loose	Change the nipple adapter. Use Teflon tape on threads to get air tightening of nuts

S.No.	FAULTS	CAUSES	REMEDY
4.	Leakage observed at top cover joints	Four hex. Head studs loose	Tighten the studs fully
		‘O’ ring under the cover flange defective	Change the ‘O’ Ring
5.	Regular hissing sound from PEASD is appearing during charging	Grooved on piston is defective or fitted improperly in its groove	Change the piston rod
		Groove ring on piston is defective or fitted improperly in its groove	Check up for full and smooth movement of piston assembly
		Plug 3/8” and/or locking screw 1/2 “ is loose at their port	Tighten the plug/lock screw
		‘O’ ring at plug and/or locking screw is damaged	Check and replace ‘O’ Ring if found damaged
6.	Pull rod movement is not smooth or jammed	Pushing arm assembly is getting jammed at its fulcrum pivot or its rollers are jammed	Dismantle the device, rectify and re-assemble it again after ensuring smooth movements
		Spring loaded ramp is sticky or spring is out of its proper seal	Ensure proper fitting of spring and make its ramp free for movement

S.No.	FAULTS	CAUSES	REMEDY
		Alignment of moving parts, like pull rod, push arm, piston ramp is not proper	Examine the coordinative fitting and ensure their proper alignment to each other's smooth movement
7.	Even after re-setting, the hissing sound does not stop	Piston groove is defective or groove ring knocked out of its groove	Examine and replace it, if found defective
		Groove ring is defective	Check and change the groove ring if found defective
8.	Pressure not developed in control pipe is adding to Passenger Emergency Alarm Signal Device (PEASD)	Screwed choke of 1.3 mm dia hole or less than that hole is/are clogged	Check the flange joint and if loose, tight it properly
		Holes of diameter 0.6 mm and 0.1 mm on the piston rod sub assembly (SA) clogged	Clean the clogged holes of the piston rod sub assembly (SA)



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# कोचिंग स्टॉक में लगे पैसेन्जर एमरजेंसी एलार्म सिस्टम का अनुरक्षण MAINTENANCE OF PASSENGER EMERGENCY ALARM SYSTEM OF COACHING STOCK



CAMTECH/M/C/2012-13/PEAD/1.0

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अअमा सं RDS  
रेल अग्रदूत Transforming Railways



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**Centre for Advanced Maintenance Technology**  
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कोचिंग स्टॉक में लगे  
पैसेन्जर एमरजेंसी एलार्म  
सिस्टम का अनुरक्षण

**MAINTENANCE  
OF  
PASSENGER EMERGENCY  
ALARM SYSTEM  
OF  
COACHING STOCK**

# **प्राक्कथन**

## **FOREWORD**

Passenger coaches are fitted with an alarm chain pull arrangement to enable passengers to stop the train by pulling the alarm chain from within the coach in case of any emergency.

The passenger emergency alarm signal device does not need any maintenance during normal service except when it is found damaged or is due for periodic overhauling

The passenger emergency alarm signal device should be completely dismantled and overhauled during every POH or if there is any problem in the equipment.

This hand book is covering complete overhauling procedure and testing in a brief and lucid manner. Wherever required, sketches and colored photographs have been provided for clear understanding .

I am sure that the handbook will be useful to the concerned maintenance staff to ensure trouble free service of the coaches by maintaining the equipment properly.

**CAMTECH, Gwalior**  
**Date: 13.08.2012**

**A.R.TUPE**  
**Executive Director**

## **प्रस्तावना /PREFACE**

In order to minimize PEASD failure cases on Indian Railways, Railway board instructed CAMTECH to prepare a handbook on maintenance of PEASD on coaching stock. Accordingly, this handbook has been prepared giving complete details of maintenance activities. Colored photographs have been provided to clarify the maintenance practices and testing procedure.

The objective of this book is to provide a tool to the staff involved in maintenance during POH to reduce cases of PEASD failure thereby improving safety and throughput of Indian Railways.

This hand book is aimed at assisting concerned staff and does not supersede any existing instructions from Railway Board, R.D.S.O. or IRCA-IV etc. Most of data and information mentioned herein are available in some form the other in various books and manuals or other printed matter. If any changes are made, these will be used in the form of correction slips. For convenience, this book includes a proforma for entering all correction slips serially.

We welcome any suggestion for addition and improvements from our readers.

**CAMTECH, Gwalior**  
**Date: 13.08.2012**

**K.P. Yadav**  
**Director, Mechanical**



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## प्रकाशित संशोधन पत्रियाँ

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## CORRECTION SLIPS

The correction slips to be issued in future for this handbook will be numbered as follows:

CAMTECH/M/C/2012-13/PEASD/1.0/C.S.# XX date -----

# Where "XX" is the serial number of the concerned correction slip (starting from 01 onwards).

## CORRECTION SLIPS ISSUED

[illegible]

## हमारा उद्देश्य

अनुरक्षण प्रौद्योगिकी और कार्यप्रणाली को उन्नयन करना तथा उत्पादकता और रेलवे की परिसम्पत्ति एवं जनशक्ति के निष्पादन में सुधार करना जिससे अन्तर्विषयों में विश्वसनीयता, उपयोगिता और दक्षता प्राप्त की जा सके।

यदि आप इस संदर्भ में कोई विचार और विशेष सुझाव देना चाहते हैं तो कृपया हमें इस पते पर लिखें।

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पत्राचार का पता : भारतीय रेल  
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## OUR OBJECTIVE

To upgrade maintenance technologies and methodologies and achieve improvement in productivity and performance of all Railway assets and man power which inter-alia would cover reliability, availability, utilisation and efficiency.

If you have any suggestions and any specific comments, please write to us.

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