

M93137

M93137 AK Class Car Operating Manual - Code Supp.docx

DOCUMENT CONTROL

This document will need to be reviewed every five years or earlier if required. If changes arise from the review, this document will be reissued. If no changes arise from the review, the current version of this document will remain in force.

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1. AMENDMENT RECORD

Issue Number	Section	Changes Made
4	All	Amended to conform to re-branding guidelines. Instructions added for Caterpillar DE Series Generator Sets with Cat 7.1 engines. Added AKS (AK Support Vehicle), AKV new fire suppression and general updates.
5	5.5, 5.6, 5.12	Updated instructions for use of Buckeye couplers
6	12.10	Added AKF6112 grey water selection cocks
7	5.7, 11, 18.3, 18.4	Addition of Train Status Panel information and adjustments to airbag monitoring instructions and airbag deflation response, incl. speed limits, to match Shield Section 2.
8	57., 17.1 and 17.2	Added AK Amsted coupler and uncoupling lever operation section 5.7. Updated TMS train safe notes section 17.1. Added TMS Self checking upgrade section 17.2.

This document includes technical instructions relating to the design of equipment used on AK train sets. To ensure safety, these instructions must be applied in conjunction with the requirements of the Operators Safety System.

2. INTRODUCTION TO THE AK TRAIN

2.1 IMPORTANT SAFETY INFORMATION – BRAKE SETUP

IMPORTANT

AK train brakes are 'graduated release' and are not compatible with 'direct release' brake systems. See Section 4.1 for details. Dragged brakes are likely to occur if this rule is not followed.

When AK cars and vans are operated as a two-pipe system, the main reservoir and brake pipe air hoses must be connected to provide air for the brake system and door.

These carriages may be operated in passenger service for recovery purposes with only the brake pipe connected; however, the operation of services may be sluggish, due to the restricted supply of air. Air bag inflation will have to be monitored. Graduated release will operate with either two pipes or single-pipe set-up. For single-pipe set up, see Sections 5.1 [Graduated release](#) and [2-Pipe brake system](#).

AAR27 pin jumper: This electrical jumper is fitted between carriages/vans and the locomotive to trainline the Tranzlog Alarm. It must be fitted to the locomotive.

2.2 THE AK TRAIN

The AK train has been designed as a long-distance passenger consist for use on tourist-oriented routes. There are seven classes of vehicle that share the 'AK' prefix. None of these may run coupled to other rolling stock using direct-release brakes, except in exceptional circumstances as specified in this document.

The AK train will normally be run as a stand-alone consist. Therefore, this operating manual for all 'AK' prefixed vehicles has been consolidated in a single document.

2.3 AK TRAIN SET RUNNING RIGHTS

Refer to Rail Operating Code Rolling Stock Restrictions: Passenger Restrictions for information on:

- AK class car and van running rights
- AK class cars in freight trains
- AKL and AKV cars on freight trains
- AK class cars on a special AK passenger train
- Passenger trains comprising a mix of AK AKC and AKS cars
- Maximum passenger loadings
- Maximum luggage loading for AKS



2.4 KEY TERMS AND ABBREVIATIONS FOR THE AK TRAIN

Term	Definition
AK car	Passenger car with seating for 63 passengers and a toilet
AKC car	Catering car that contains the Train Manager's office, servery, lounge area with ordinary seating for 8 and temporary standing occupation for food consumption. Also includes space for 2 passengers in wheelchairs, a disabled toilet, 2 wheelchair hoists and workspace for up to 4 crew members
AKS (AK support Vehicle)	A support vehicle containing luggage, crew rest, food storage and waste storage areas.
AKL van	A van to carry luggage only, with space for emergency egress via the rear or the front of the consist. This is a 'no-ride' vehicle
AKV van	A van containing a generator set providing electricity to the entire consist and an open-side viewing area for passengers
Note: The term 'AK car' may refer to any of the above car or van types. The term 'AK consist' may refer to any combination of the above car or van types.	
AAR	Association of American Railroads (standardised format for jumper cable)
AC	Alternating current
Car	AK or AKC
CB	Circuit breaker
CCTV	Closed circuit television
DC	Direct current
DVR	Digital video recorder (for CCTV)
HVAC	Heating, ventilation and air conditioning system
kPa	Kilopascals (pressure)
LED	Light emitting diode
MDL	Midland Line (Rolleston to Greymouth Freight (Elmer Lane))
MNL	Main North Line (Addington to Picton)
MSL	Main South Line (Lyttelton to Invercargill)
NIMT	North Island Main Trunk Line (Wellington to Auckland)
NAL	North Auckland Line
No Ride Vehicle	No staff or passengers may ride on this vehicle while the train to which it is attached is moving
PA	Public Address
PIDS	Passenger Information Display System
PIS	Passenger information system: a combination of PIDS, PA and car ID systems
PLC	Programmable Logic Controller
RCD	Residual Current Device (fault detection/isolator)
Saloon	The internal or seating compartment of a car
TM	Train Manager
TMS	Train management system
Tranzlog	Train event recorder
VAC	Alternating current volts
Van	AKV, AKL
VFD	Variable frequency drive (fan)

2.5 GENERAL DESCRIPTION

Descriptions of the [AK](#), [AKC](#), [AKS](#), [AKL](#) and [AKV](#) are published on [Sharepoint](#).

3. PREPARING THE TRAIN FOR SERVICE

The following procedure is to be followed when preparing an AK train for service:

1. Ensure shore supply (land line) is turned off and disconnected from the AKV Van at End 2.

NOTE: Shore supply is only available on current AK train routes at Waltham (KiwiRail Passenger Depot, Christchurch); KiwiRail Passenger Depot, Wellington; Stop Block end of Platform 9 Wellington Station; KiwiRail Mechanical Depot, Westfield (Auckland).

2. Ensure that couplers, MR and BP air hoses, TMS trainline cable and 400/230VAC trainline electrical jumper cables are all correctly coupled and fitted.
3. Check that cocks on isolation cock panel on B-side of AK/AKC cars are all in the "In Service" position (vertical).
4. Check that the cocks on the AKS support vehicle are in the in-service positions on both the A and B sides of the car. The park brake by bogie, brake cylinder, air bag and triple isolation cocks should be perpendicular to the pipe. Door and park brake by carriage isolation cocks should be in line with the air pipe i.e. horizontal along the car.
5. Ensure that the 400/230VAC jumper socket lid at the opposite end of the consist from the locomotive is firmly latched closed if the rear vehicle is an AK/AKC or AKS car. End 2 of AKV, End 1 of AKL vans, End 1 of the AKS, (End 2 also on AKS, but not used) have sockets for AAR jumper cables only. The lids of these should be closed unless attached to a loco.
6. Unlock AKV End 2 gates and door with S key and enter.
7. At AKV electrical control cabinet in passenger viewing area:
 - a) Open main electrical cabinet door with CF 315 Key.
 - b) Open inner cabinet (switchboard) door with 100 Key. All key switches are operated by KN 200 key.
 - c) Turn Main Switch from SHORE to GENERATOR.
 - d) Ensure Trainline Isolator is ON. This allows transmission of 230VAC power from the AKV to the rest of the train.
 - e) Turn Generator ON/OFF to ON.
 - f) Turn lower key switch to START.

NOTE: There may be a pause before the engine starts while the controller undertakes diagnosis. If the engine does not start, or to start it from the generator set control panel, follow the instructions in [8.1 Generator start up](#).

- g) In the "230VAC Distribution Board" cupboard ensure the 230VAC Main Isolator is turned ON.
- h) In the "24VDC Distribution Board" cupboard ensure the 24VDC isolator is turned ON.
- i) In the 24VDC Distribution Board cupboard ensure the Tranzlog switch (CB DC4) is turned ON.



NOTE: On "Northern Explorer", "Coastal Pacific" and "TranzAlpine" trains, the end of train AKV Tranzlog must be active. This is shown as the green light illuminated at the top of the AKV Switchboard bulkhead. On occasions when TranzAlpine services run with two AKV vans, the Tranzlog in the second AKV (which will be marshalled in the centre of the consist) will automatically turn off and display an Orange light, however if the Tranzlog green light on the middle AKV switchboard bulkhead is not off, it must be turned OFF using CB DC4 in that AKV. This is to eliminate the possibility of variable data and performance from two Tranzlogs on the same consist.

- j) At PA & lights control panel ensure PA Switch is OFF.
 - k) Turn LIGHT switch to ON.
 - l) Check that lights on viewing deck are working.
 - m) Turn TAIL LIGHT switch to END 2 if AKV is rear vehicle of consist. If AKV is not rear vehicle, turn switch to OFF.
 - n) Check that tail lights are on if at rear end.
 - o) At emergency brake control panel turn OVER RIDE SELECTOR Switch to TRAIN MANAGER.
 - p) The TM OVER RIDE switch is spring loaded to return to OFF position. Ensure this switch is in OFF position as this function is trainlined.
 - q) Check TMS display screen is working.
 - r) Check battery display screen (24VDC) is working. If showing no charge check CB DC 12 on 240VAC distribution board is ON. Not available on the AKS.
 - s) Lock inner cabinet doors with 100 Key.
 - t) Close and lock main electrical cabinet door with CF 315 Key.
8. Check that MR and BP air hoses at End 2 of AKV (if rear of train) are clipped to bungy straps to keep them clear of rails and ballast.
 9. Check status of hinged plate at base of concertina. If the end of any AK consist vehicle is to be coupled to another AK vehicle, the plate should be secured in vertical position flush with concertina plate using 18mm socket wrench.
 10. Check that spring locked gates at End 2 of AKV are in position - closed if AKV is end vehicle of train, open if AKV is in middle of a TranzAlpine consist.
 11. Close AKV End 2 gates and lock red emergency release boxes with S key.
 12. Lock door at generator set end of AKV (End 2) with S key then lock red emergency release box with S key.
 13. Check that fire extinguisher beside the above door is in place.
 14. Check that emergency egress ladder is in place.
 15. Check bi-fold doors on AK/AKC coupled to the AKV are locked open with top and bottom mortice bolts. Lock red emergency release boxes with S key.
 16. Check that concertina curtains are in place and clipped to hooks.
 17. Proceed through the train and in each individual car at the electrical control cabinet—Side B, End 2 vestibule in AK, Side B, End 2 saloon in AKS; Side B, End 2 opposite TMs office door in AKC:

- a) Open cabinet doors using 100 key. All key switches are operated with KN 200 key.
 - b) In the "230VAC Distribution Board" cupboard, ensure the 230VAC Main Isolator is turned ON.
 - c) In the "24VDC Distribution Board" cupboard, ensure the 24VDC isolator is turned ON.
18. In "Controls and Indication" cupboard:
- a) On air conditioning panel, turn ON/OFF/REDUCED POWER Switch to ON.
 - b) Turn TEMPERATURE Switch to Heat/Cool setting as appropriate (Red/Blue).
 - c) Turn TUNNEL MODE Switch to NORMAL. This is correct setting for GPS activation of Tunnel Mode.
 - d) Turn SUPPLY FAN MODE Switch to NORMAL.
 - e) The STATION MODE Switch is spring loaded to return to the AUTO position (for GPS activation of Condenser Fans).
 - f) On PA/PIDS Panel ensure PA Switch is OFF.
 - g) Turn PIDS Switch to ON.
 - h) On PA AUDIO SELECT panel select Channel 5 to allow PIDS to operate through at seat jack points.
 - i) On TAIL LIGHTS Panel turn switch to OFF (unless this AK/AKC car is the rear vehicle of the consist, in which case, select END 1 or END 2 as appropriate and check they are working).
 - j) Turn DOORS TRAINLINE Switch to CLOSE. (This switch is for Door Splitting).
 - k) On Lighting Panel turn OFF/ON Switch to ON.
 - l) Turn AISLE-WINDOW/AISLE MAX/AISLE MIN/WINDOW/ OFF Switch to desired setting.
 - m) Check that saloon lights are working
 - n) On Emergency Brake Panel turn OVER RIDE SELECTOR Switch to TRAIN MANAGER.
 - o) The TM OVER RIDE Switch is spring loaded to return to the OFF position. Ensure this switch is in OFF position as this function is trainlined.
 - p) On car ID Controller Panel check car letter on external door display panel for that car. (Each car to be set per daily Docking List. Reset using keypad if necessary).
 - q) Check Battery Display Screen (24VDC) is working. If showing no charge check CB B12 on "230VAC Distribution Board" is ON.
 - r) Check TMS Display Screen is working and showing No Faults.
 - s) Check Air Conditioning Display Screen is working. Check Active Alarms screen for faults.
 - t) Check Air Conditioning Emergency Switch is OFF.
 - u) Lock cabinet doors with 100 key.
19. In the AKC TM's Office, check Microphone is in place and is transmitting through PA throughout the train.
20. Check that train cell phones are in cradles and operating-one in TM's Office and one in Servery.
21. Check that axe for emergency egress is in place in TM's Office.
22. Check first aid kit in place.



23. In the cupboard in the centre of the AKC check that the following are in place: trauma kit, blankets, light sticks, gas masks and canisters (TranzAlpine only), tool box.

24. At each external door:

- a) Unlock deadlock on interior of external door if it is locked.

NOTE: External deadlocks are located as follows:

- i) AK cars: on Door B2 only.
- ii) AKC cars: on Door B2 only.
- iii) Exterior of AKS intercar doors
- iv) External deadlocks are operated with S key.
- b) If it is known that any Emergency Door handles have been used, push in external door Reset Button located in the hole above each door. (Thin instrument such as pen required).
- c) On door control panel set ON LINE/ISOLATE Switch to ON LINE, unless door needs to be isolated for a particular reason, in which case switch to ISOLATE.
- d) Check that TRAIN CLOSED Light is illuminated.

NOTE: This will only occur when the train is fully charged with air.

- e) Check Bi-fold doors locked open with top and bottom mortice bolts between AK/AKC cars. Lock red Emergency Release boxes with S key.
- f) Check concertina curtain between cars is in place and clipped to hooks.

25. In each car check that the following emergency equipment is in place:

- a) Window hammers on bulkheads End 1 and End 2 inside saloon.
- b) Emergency egress ladder in End 1 vestibule if car is rear vehicle of train.
- c) Two fire extinguishers- one behind single seat in saloon at End 2, and one behind double seats in saloon at End 1, A Side of AK cars. In AKC cars, two fire extinguishers- one between wheelchair seats and saloon door, one in behind server counter.
- d) One axe for emergency egress behind double seats in saloon at End 1, A side of AK cars.

26. In each car:

- a) Check toilet flush and water flow by pressing Toilet flush button and operating hand basin tap.
- b) Reset toilet circuit breaker (CB DC6) on the "24VDC Distribution Board" if not flushing.
- c) If no water flow, check water raising cock is ON. This is under car on B-side. Should be in vertical position.
- d) ON "TRANZALPINE" CONSISTS WHERE THERE IS A SECOND AKV VAN THE SAME PROCESS SHOULD BE FOLLOWED AS FOR THE FIRST AKV ABOVE, EXCEPT:
- e) Ensure that the Tranzlog in the AKV in the middle of the consist is turned OFF by checking that the switchboard bulkhead is Orange light is on. If this has not automatically happened, the Tranzlog is turned off using CB DC4 -this is to eliminate the possibility of variable data and performance from two Tranzlogs on the same consist.
- f) The door beside the diesel generator at End 2 of the AKV in the middle of the consist may be clipped open to allow access to cars on both sides of the AKV for passengers and crew.



- g) The spring locked gates at End 2 should be locked in the open position to allow access to cars beyond End 2 of the AKV.
 - h) Check that bi-fold doors on AK/AKC cars coupled to both ends of the AKV in the middle of the consist are locked open with top and bottom mortice bolts. Lock the red emergency release boxes with S key.
 - i) Concertina curtains should be in place between this AKV and the cars either side of it.
27. AT AKS electrical control cabinet:
- a) Ensure the 230VAC Isolator on the "230VAC Distribution Board" is turned ON.
 - b) Ensure the 24VDC Isolator on the "24VDC Distribution Board" is turned ON.
 - c) On lights panel turn Switch to ON.
 - d) Check that lights are working
 - e) Turn TAIL LIGHTS Switch to END 1 if AKS is rear vehicle of consist. If not rear vehicle, turn to OFF.
 - f) Check that tail lights are working if turned on at rear end.
28. Check fire extinguisher is in place behind door at End 1 and next to electrical cabinet End 2.
29. Check emergency egress ladder is in place.
30. Check concertina curtains are in place at AK car/ AKS connection
31. Check that the AKS end 2 crew rest area intercar door is unlocked and remains unlocked during the journey.
32. Check that the adjacent AK intercar bi-fold doors are locked.
33. Check that the end 1 door is locked. It has thumb turn egress from inside the AKS only.
34. AT AKL electrical control cabinet:
- g) Ensure the 230VAC Isolator on the "230VAC Distribution Board" is turned ON.
 - h) Ensure the 24VDC Isolator on the "24VDC Distribution Board" is turned ON.
 - i) Check Battery Display screen (24VDC) is working. If showing no charge check CB.... in 230VAC Distribution Board Cupboard is turned ON.
 - j) On lights panel turn LUGGAGE Switch to ON.
 - k) Check that van lights are working
 - l) Turn TAIL LIGHTS Switch to END 1 if AKL is rear vehicle of consist. If not rear vehicle, turn to OFF.
 - m) Check that tail lights are working if turned on at rear end.
35. Check fire extinguisher is in place behind door at End 2.
36. Check emergency egress ladder is in place.
37. Check concertina curtains are in place at AK car/ AKL van connection.
38. Bi-fold doors at end of AK/AKC car coupled to AKL van to be closed and locked with top and bottom mortise locks. Lock at centre- red handle should be horizontal and lock bolt horizontal and visible between doors. Lock the red emergency release box with S key.



39. Check door operation on both sides of train. Check CB DC3 (labelled TMS and Doors) in the 24VDC distribution board cupboard is ON.
- a) Starting at one end of train at door control panel in an AK, (Note that you cannot control the AK/AKC doors from an AKS, but you can RELEASE and CLOSE AKS doors from an AK/AKC), insert door key (Rockwell 3825) and select CONTROL. Then press RELEASE button. Repeat this at the door control panel on the opposite side of the vestibule. The door released alarm should sound and the door lock bolts retract.
 - b) The TRAIN CLOSED Light will extinguish and the THIS DOOR OPEN Lights illuminate. Turn key back to RUN and withdraw key.
 - c) Open doors by pushing illuminated OPEN button.
 - d) Return through the train and sequentially open doors on both sides by pressing the door OPEN button on either the internal or external panels. Check that all doors open satisfactorily and that both steps beneath each door have extended.
 - e) At the opposite end of the train to which the process started, in an AK, not AKS, and in a vestibule where an Electrical Control Panel is located (for TMS lights), at door control panels on both sides of the train insert key and select CONTROL.
 - f) Press CLOSE button. Check the door close alarm sounds. Check all doors except the local door (the panel being operated) have closed and both steps at all doors (no steps on AKS), including the local door, have retracted. All door lock bolts should be extended and door and step alarms should cease sounding. If an alarm is still sounding, check the door and steps concerned for the fault.
 - g) The TRAIN CLOSED light should illuminate. The THIS DOOR OPEN lights (both on the door control panels and on the exterior of the doors) should extinguish except at the local door. Check that TMS alarm lights on the nearby electrical control panel are extinguished.
 - h) Press LOCAL CLOSE button. The TRAIN CLOSED light should stay illuminated and the TMS lights extinguished. The THIS DOOR OPEN light will extinguish. The door lock bolts should be extended and no alarms sounding.
 - i) Turn the key switch to GONG position and check that gong operates.
 - j) Turn the key switch to Run and remove. Check TRAIN CLOSED light remains illuminated.
 - k) Bi-fold doors at end of AK/AKC car coupled to AKS support vehicle are to be closed and locked with top and bottom mortise locks. Lock at centre- red handle should be horizontal and lock bolt horizontal and visible between doors. Lock the red emergency release box with S key.



Figure 1: AKV switchboard



Figure 2: AKV control panel

4. Start up procedures

Carry out Terminal Brake Test and all other safety checks as required by "Rail Operating Code, Section 5.3- Train Marshalling, Build and Inspection Procedures" before moving the AK train.

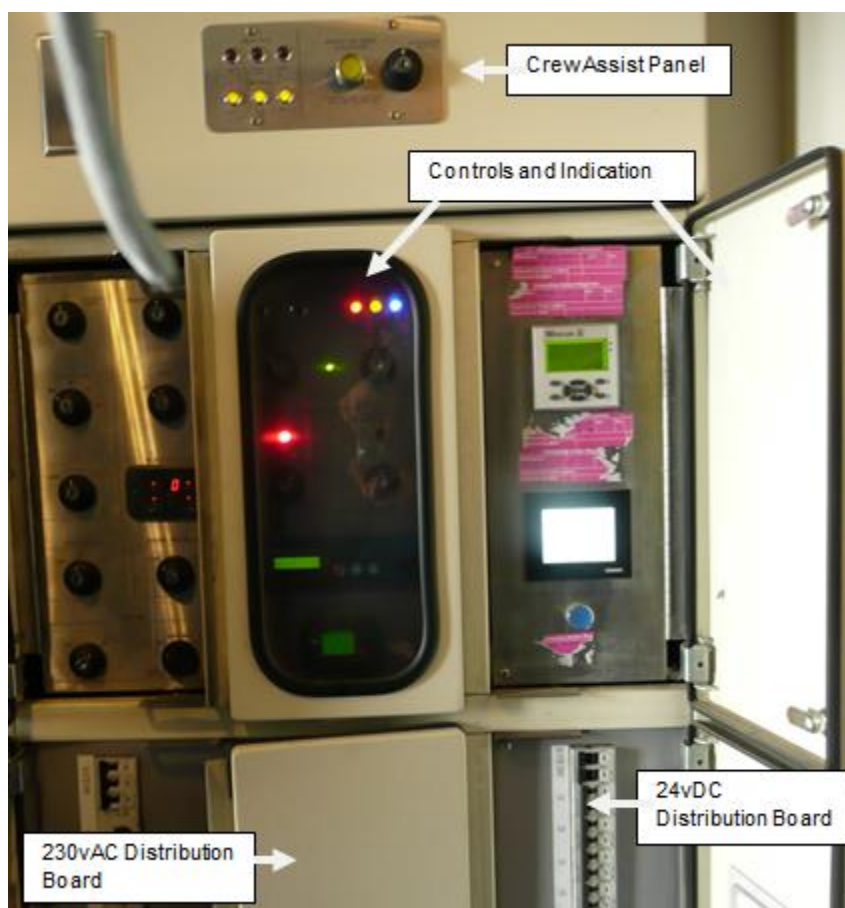


Figure 3: AKI/AKC electrical control cabinet



Figure 4: AKS electrical control cabinet

5. OPERATION

5.1 GRADUATED RELEASE

All AK cars, support vehicles and vans are fitted with WG1 triple valves. These have a graduated release capability which means that brakes can be applied and released gradually in steps.

The locomotives assigned to haul the AK train sets will have the 26L brake cut off valve set up for 3 positions: "Out", "Freight" and "Passenger". The "Passenger" position must be used on these locomotives when hauling the AK train sets.

1. In locomotive cab:
 - a) Set up as normal for lead operation
 - b) Set 26L cut off valve to "Passenger"

If these locomotives are assigned to haul freight or passenger trains fitted for "one pipe" operation, the "Freight" position must be selected on the locomotive brake cut off valve.

NOTE that this option is not to be used for normal passenger operation

NOTE: If the Locomotive Engineer is not certified for graduated release operation, the 26L brake cut off valve must be set to "Freight" and one pipe direct release braking operated with both BP and MR connected. The MR will maintain the Airbag inflation.

Refer to also to Rail Operating Code for more information:

- Section 5.1 Operating Instructions for Yard Shunting and Allied Personnel.
- Section 5.3 Train Marshalling, Build and Inspection Procedures (ROC supplement).

5.2 AK TRAIN HANDLING INSTRUCTIONS

The following key points must be noted when handling AK train sets:

1. Brake pipe pressure must be reduced to zero kPa when changing ends with the same locomotive, or when changing locomotives. This is done to allow the control reservoirs on each of the cars to be correctly charged. If this is not done the brakes on the cars may not fully release when the brake pipe is fully charged from the other end. This should also be done to prevent the possibility of the train being overcharged particularly when the No. 4 brake valve is in use on shunt locomotives.

To reduce brake pipe pressure:

- a) Couple locomotive to train and connect MR/BP hoses with air cocks open.
 - b) When Brake Pipe gauge registers airflow, place brake valve handle in "Off" position and reduce air pressure to zero kPa.
 - c) At zero kPa place brake valve handle in "Release" position and charge brake pipe to 550kPa before performing brake test.
2. The locomotive may weigh up to half the total weight of an AK train that has the minimum permitted number of carriages coupled. The independent release on the locomotive should not be used to bleed off any automatic brake application on the locomotive to avoid skids on the cars and vans or overheating of the wheels on trains with few cars coupled.
3. The locomotive, car and van brakes are capable of being applied, then partially released to any point between full service and release before being reapplied. The air supply that feeds the brake



cylinders is constantly topped up out of the Main Reservoir pipe. This ensures brake cylinder air is always available.

4. If a brake application is made and then the brake handle is moved part way back towards release, the brake cylinder pressure will reduce according to the new handle position.
5. Graduated release brakes are used on both the locomotives and cars, support vehicles and vans. There is, therefore, air pressure in the brake cylinders after a brake pipe reduction until the brake pipe is fully recharged again. If the locomotive automatic brake application is left applied as recommended, the locomotive brake cylinder pressure will replicate the brake cylinder pressure on the cars and vans.

5.3 PARKING THE AK TRAIN CONSIST UNATTENDED

Sufficient AK Park brakes must be applied if the train consist or any individual carriage is to be parked and left unattended.

AK cars fitted with P-11 bogies and AKS support vehicles fitted with P11 and S-Ride bogies may be parked with the LE's service brake, as they will automatically revert to the park brake in the event of air loss.

Alternatively, the park brakes may be applied via the park brake applied button in the train managers office or they may be parked by using the park brake isolation cock BY CAR, which must be returned to "In Service" position before moving. Please note that the TMS will not pick up that the park brakes are applied if the isolation cock "by bogie" is used to apply the park brakes.

AKL / AKV vans are fitted with X28020 bogies and have standard vertical wheel operated handbrakes at End 1 A1 platform corner.

5.4 TERMINAL BRAKE TEST

The terminal brake test for AK train consists is similar to the test used for other train consists, and involves the following steps:

1. Make a 100kPa brake pipe reduction.
2. Set the brake valve cut out valve to "Cut Out" and monitor the brake pipe pressure for 1 minute. Maximum allowable brake pipe leakage is 35kPa in 1 minute.
3. Return the brake valve cut out valve to the "Passenger" position on completion of the terminal brake test.

5.5 COUPLING AN AK TRAIN CONSIST TO A LOCOMOTIVE WITHOUT AN AUTO COUPLER

The AK cars, AKS support vehicles and AKV/AKL vans use "Buckeye" auto couplers and should preferably be coupled to a locomotive that is equipped with auto couplers.

In the event that a train consist is to be coupled to rolling stock without auto couplers, a modified transition head is located on the headstock of the end AKV van, AKS support vehicle or AKL van (alternatively this may be an AK car if the consist is running with AK car coupled to the locomotive).

The transition head or "bull hook" is painted gold and has been designed specifically to accept the knuckle of the Buckeye coupler, ensuring a positive coupling. The transition head is to be placed back on the hook on the headstock of the AK set after use. It is not to be used on anything other than AK cars,

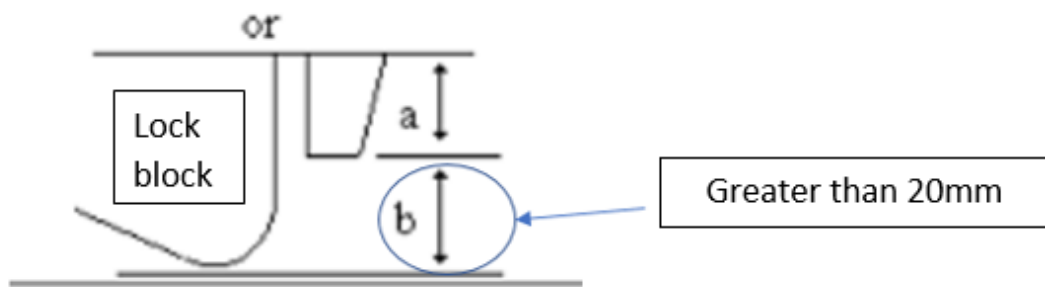


AKS support vehicles or AKV / AKL vans. Gold transition heads are compatible with Buckeye couplers on the S, SR, SE and SW passenger car sets.

NOTE: Standard blue transition heads are NOT to be used with the Buckeye coupler as the profile of the Buckeye knuckle differs from the profile on an Alliance coupler.

To couple cars to the locomotive using a gold transition head:

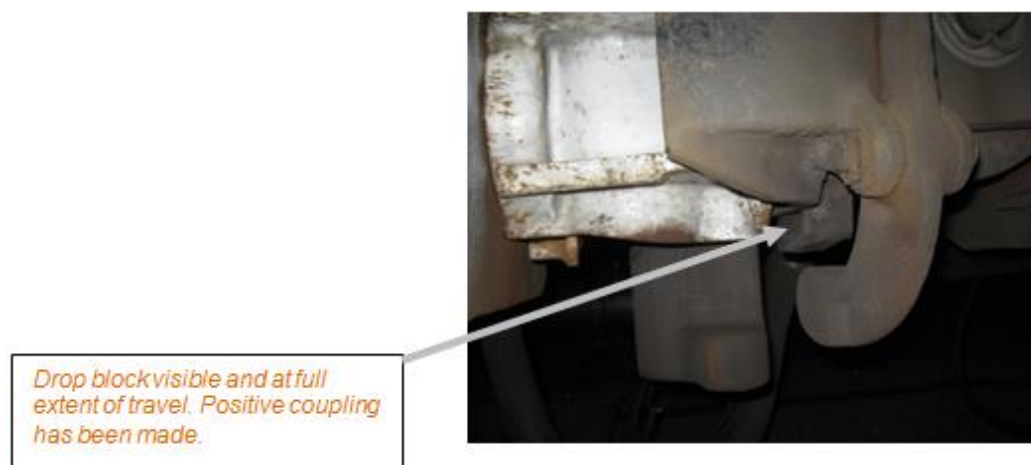
1. Fit the gold transition head to locomotive coupler.
2. Open the Buckeye coupler of AK carriage, support vehicle or van.
3. Align the buffers and then stand clear of the danger zone between vehicles.
4. Guide the locomotive engineer to couple the vehicles at walking speed.
5. Carry out a visual inspection to confirm drop block has fallen to full extent of travel. At least 20mm must protrude below the lowest part of the coupler as shown in the diagram below.

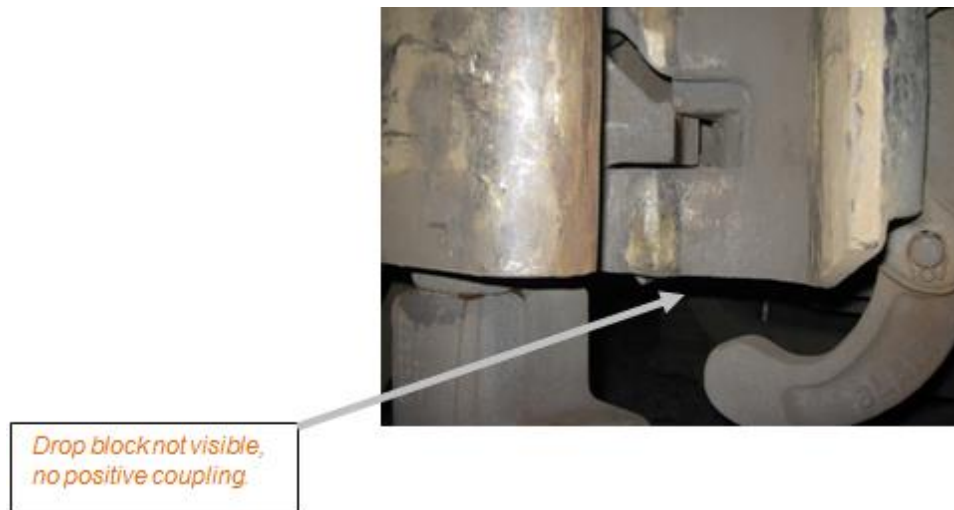


6. Instruct the locomotive engineer to perform an "out short" manoeuvre to test that a positive coupling has been made.
7. The "out short" must be carried out as a separate movement after coupling to a consist. It must involve pulling the loco out against the consist in Notch 1.

See below for reference photographs of drop block as seen from each side. These are usually painted white for visibility.

A Side





B Side



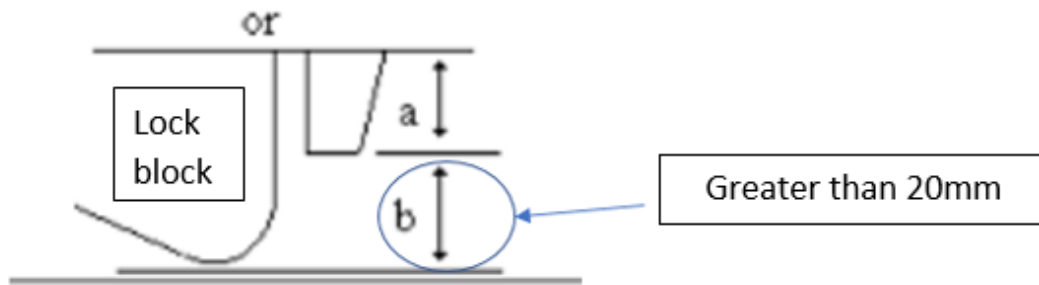
5.6 COUPLING AN AK TRAIN CONSIST TO A LOCOMOTIVE WITH AN AUTO COUPLER

To couple an AK carriage or van to a locomotive that is equipped with an auto coupler (Alliance coupler):

1. Open Alliance coupler on locomotive.
2. **Close the Buckeye** coupler knuckle on AK carriage / support vehicle / van.
3. Carry out a visual inspection to confirm that the drop block on the carriage coupler has fallen to full extent of travel by checking both the opening and the lower block.



4. As seen from the side, at least 20mm of the lock block tail must protrude below the lowest part of the coupler, as shown in the diagram below:



Refer to photographs in Section 5.5 above for examples of correct and incorrect lock block positions as viewed from A and B sides.

5. Align buffers and then stand clear of the danger zone between vehicles.
6. Guide the locomotive engineer to couple at walking speed.
7. Carry out a visual inspection to confirm that the drop block on locomotive coupler has fallen to full extent of travel.
8. Instruct the locomotive engineer to perform an "out short" manoeuvre to test that a positive coupling has been made. The "out short" must be carried out as a separate movement after coupling to a consist. It must involve pulling the loco out against the consist in Notch 1.

5.7 AK FLEET WITH AMSTED COUPLERS AND RELEASE LEVERS

1. The AK fleet is to have new Amsted couplers installed to improved vehicle anti-climb performance drawgear noise and reduce maintenance costs.

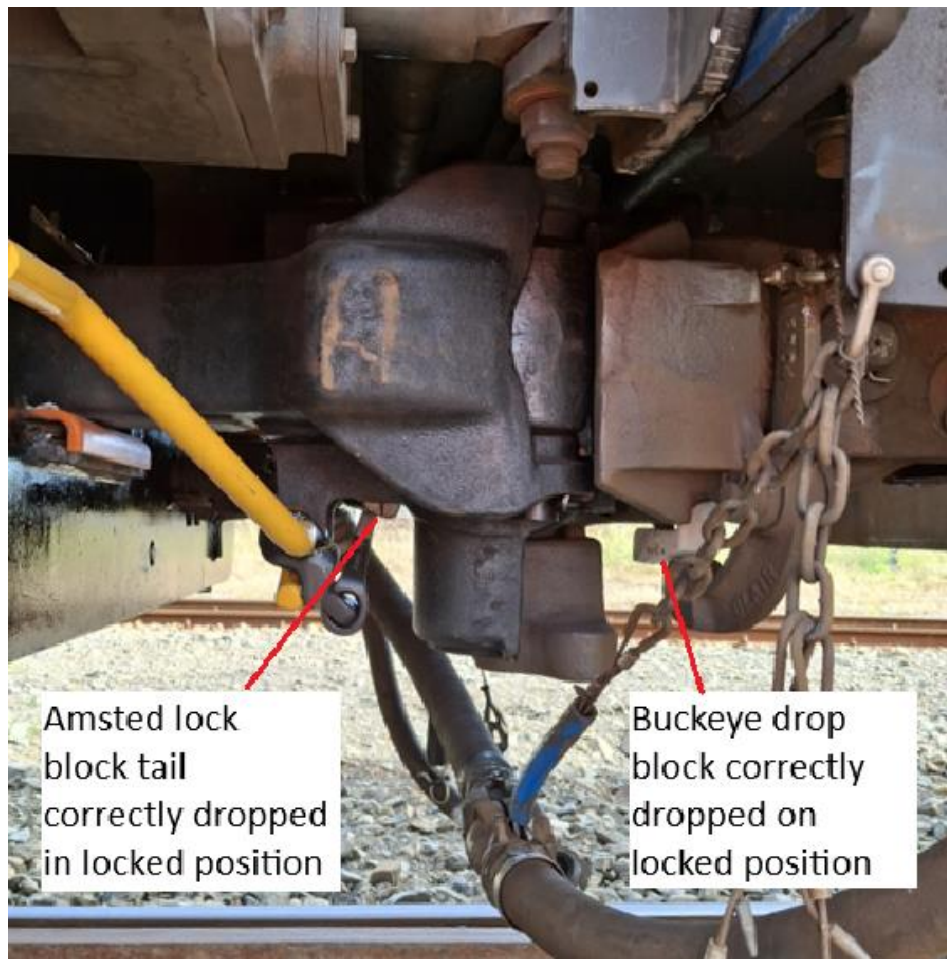
The key difference that operational and maintenance staff will see is that these couplers require the use of uncoupling lever for bottom lift uncoupling, and the key difference with the uncoupling levers is that they are located diagonally opposite to the existing buckeye coupler release pull cable.

2. Coupling procedure – The existing AK coupling procedures must be adhered to as in section 5.12 above. The out-short (section 5.12.8) must always be carried out as a separate movement after coupling to a consist irrespective of which type of drawgear is on each carriage.
3. Lock block drop confirmation to confirm positive coupling visually differs a little from the Buckeye.

Refer to photo below to see the difference between the two types.

The bottom of the lock block tail does not protrude as far on the Amsted coupler but is visible below the knuckle when in the fully locked position.

Carriages with Amsted couplers can be placed anywhere on an AK consist, there are no compatibility issues between the two coupler types.



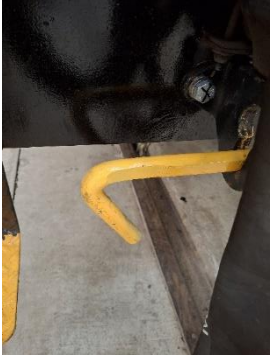
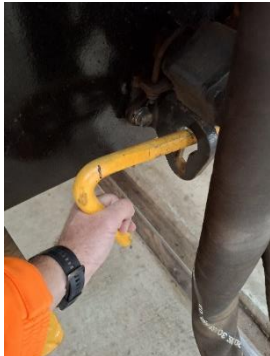
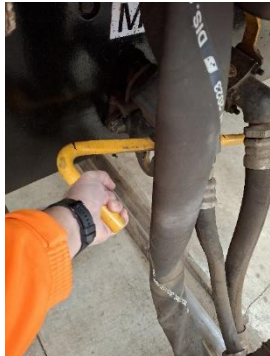
4. Operating the uncoupling levers - The uncoupling levers are basic lift and turn in operation. The cars need to be eased up prior to uncoupling, as any tension between the cars will make uncoupling impossible.
5. Uncoupling for end 1

End 1

		
Uncoupling lever shown in service position – lever down in guide slot	Ready for uncoupling – lift lever straight up out of guide slot to allow the lever to rotate	To uncouple – rotate lever. If cars are eased up, there is very little effort to uncouple

6. Uncoupling for end 2

End 2

		
Uncoupling lever shown in service position – lever down in guide slot	Ready for uncoupling – lift lever straight up out of guide slot to allow the lever to rotate	To uncouple – rotate lever. If cars are eased up, there is very little effort to uncouple

The key item for uncoupling end 2 is that the 400VAC jumper may get in the way if stowed prior to uncoupling. Access to the uncoupling lever is easier if the jumper is unstowed and laid on the ground as shown above.

5.8 MOVING AN AK CAR / VAN ON ANOTHER FREIGHT OR PASSENGER SERVICE

The AK cars, support vehicles and vans are not to be conveyed on any ordinary freight or passenger train service unless the movement is covered by an Engineering-initiated "Special Bulletin".

The following rules apply whenever AK cars, support vehicles and vans are conveyed in this way:

- When an AK / AKP / AKC car or AKS support vehicle is conveyed on the above occasions, a suitably qualified RSAS engineer or operational person able to monitor air bag suspension systems must accompany the train. The qualified staff member must travel aboard the vehicle to monitor the TMS in accordance with Sections 5, 10, 11 and 18 and be in radio communication with the LE. If a qualified person is not available, the train is not to run. AK vans do not need to be accompanied if conveyed independently.
 - Maximum speed 80km/h.
 - If at any time the airbag warning alarm sounds the qualified person advises of an airbag fault / failure, the Locomotive Engineer must slow the train to 25 km/h and find a safe place to stop so that the fault can be inspected.
 - Should the fault clear or be cleared, the train can resume normal 80km/h speed after a visual inspection to confirm the airbags are inflated.
 - **If there is an obvious air leak from the air bags, Isolate the airbags at the affected end only.** The train can only run at a speed of under 25 km/h to a location to cut out the problem vehicle.
 - The AK cars, support vehicles/ vans must run towards the rear of the train with:
 - A minimum of two loaded braked vehicles behind them. Direct release AG vans can run brakes cut in on freight services and will count as loaded vehicles for the purpose of this instruction.
 - A minimum trailing tonnage of 60 tonnes is required for consists of up to 6 un-braked cars / vans. Minimum trailing tonnage to be increased for longer consists and / or in areas with grades over 1:70.
- A maximum trailing tonnage of 600 tonnes.



- All AK class carriage and van park brakes to be cut out when conveyed on a train with direct release brakes. Both bogies must be cut out, but the triple valve must be cut in to ensure the supply reservoirs continue to be charged from the brake pipe. This is essential to maintain airbag pressure.

5.9 AK TRAIN ASSISTED FROM THE REAR BY A LOCOMOTIVE-HAULED TRAIN

The following rules apply for breakdown situations in which an assisting locomotive or locomotive-hauled train is pushing from the rear:

- If the consist-to-locomotive brake set-up compressor is operative (lead loco online):
- As per Rail Operating Code instructions for "assisting loco BP coupled only". This means Main Reservoir air is still supplied to all AK cars, support vehicles and vans; but the Main Reservoir Pipe **may** also be coupled if necessary.
- If the consist-to-locomotive brake set-up compressor is inoperative (lead loco off line):
- As per Rail Operating Code instructions for "dead loco BP coupled only" EXCEPT that the Main Reservoir Pipe **must** also be coupled.



Figure 5: BP and MR brake cocks and pipes.

5.10 AK TRAIN ASSISTED BY A LOCOMOTIVE ON THE FRONT OF THE TRAIN

In this breakdown situation, the assisting and assisted locomotives are coupled together. The towing procedure is:

1. Couple all brake hoses between the locomotives (brake pipe (BP), main reservoir (MR) and BC equalising pipe (EP). Leave the brake pipe and main reservoir pipes connected throughout the AK train and locos.

2. On the assisting locomotive put the brake valve into the "Passenger" position with MR hoses connected to allow graduated release if this is available. Alternatively, the "Freight" position may be used. When using the "Freight" position, be aware that the brakes on the train may take longer to release (i.e. only releasing once the brake pipe is fully charged) and the graduated release feature will not be available. [Please read this in conjunction with section 5.2. for correct setup.](#) failure to do so will result in dragged brakes.

NOTE: EMU/DMUs and Silver Fern railcars are NOT permitted to assist AK car trains.

5.11 AK TRAIN ASSISTED BY OTHER VEHICLES

An AK train may only be assisted from the rear by a locomotive hauled train or by a locomotive attached to either the rear or to the front of an AK train.

An AK train may NOT be assisted by any other self-propelled vehicles such as EMUs or DMUs.

5.12 SHUNTING

When shunting an AK train:

- Doors must be closed
- TRAIN CLOSED light must be illuminated
- All the "THIS DOOR OPEN LIGHT" are extinguished

Shunting staff must not ride on the outside of AK vehicles. The space between the cars will close during curve negotiation. They must ride inside cars, inside the AKS support vehicle, inside the gates of AKV and AKL vans. Windows are provided in the carriage inter-car doors for shunting purposes.

If it is necessary to exit the train for shunting purposes, exit via the side gates on the vans or manually operate the "Emergency Door Opening" handle to open a door AK cars and exit. Close the gate or door from the outside after exiting. NOTE: Steps will not extend when a door has been opened using the Emergency Door Opening" handle. Refer to [Door operation](#) later in this document for more information.

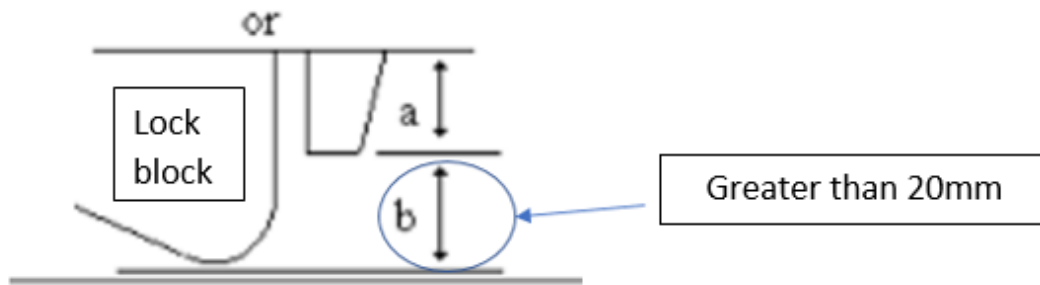
5.13 COUPLING AND UNCOUPLING AK CARS AND VANS

The following procedure is to be used by Operations and Maintenance staff when coupling AK carriages or vans together:

1. Open Buckeye coupler on stationary AK carriage/ AKS support vehicle / van.
2. Close Buckeye coupler on moving AK carriage/ AKS support vehicle / van.
3. Carry out visual inspection to confirm drop block on coupler of moving carriage has fallen to full extent of travel, by checking both the opening and the lower block.



4. As seen from the side, at least 20mm must protrude below the lowest part of the coupler as shown in the diagram below:



See photographs in section 5.5 above for examples of correct and incorrect positions as viewed from A and B sides.

5. Align buffers and then stand clear of the danger zone between vehicles.
6. Guide Locomotive Engineer to couple at walking speed.
7. Carry out visual inspection to confirm drop block on coupler of stationary carriage has fallen to full extent of travel. Refer to step 4 above for lock block position
8. Instruct the Locomotive Engineer to perform an "out short" manoeuvre to test that a positive coupling has been made. The "out short" must be carried out as a separate movement after coupling to a consist. It must involve pulling the loco out against the consist in Notch 1.
9. Carry out a [Re-marshalling door check](#) as prescribed in Section 6.19 [Re-marshalling door checks](#) of this Code Supplement.
10. Ensure that the inter-connecting doors that need to be locked are locked as prescribed in Section 5.14 [Inter-connecting doors](#).

Refer to Rail Operating Code for more information:

- Section 5.1 Operating Instructions for Yard Shunting and Allied Personnel.
- Section 5.3 Train Marshalling, Build and Inspection Procedures (ROC supplement).

Within this manual refer also to:

- Section 6.19 [Re-marshalling door checks](#).
- Section 9.2 [400/230VAC trainline jumper cable](#) and 9.3 [24VDC trainline jumper cable](#).

5.14 INTER-CONNECTING DOORS

Passengers are permitted through interconnecting doorways between AK carriages. However, care must be taken when moving between cars while the train is going through turnouts etc, as the 2 concertinas can move sideways in relation to one another, restricting the available passage way.

To prevent unauthorised passenger movements elsewhere in an AK consist:

- The end door at each end of the consist MUST be locked.
- Where the end vehicle is an AK carriage, the bi-fold doors at the train's trailing end or the end coupled to a locomotive must be closed and locked.

- If the end vehicle is an AKV van, the door beside the Generator Compartment leading to the end platform of the van must be locked.
- If the end vehicle is an AKL van coupled to an AK carriage, the bi-fold doors at the end of the AK carriage coupled to the AKL van must be closed and locked.
- If the end vehicle is an AKS support vehicle coupled to an AK carriage, the bi-fold doors at the end of the AK carriage coupled to the AKS support vehicle must be closed and locked. The AKS adjacent END 2 door must **NOT** be locked while in service.
- The end door in the AKS support vehicle whether coupled to an AKL van or not, must be locked via the thumb turn.
- If the end vehicle is an AKL van coupled to an AKV van, the door beside the generator compartment leading to the end platform of the AKV must be locked.

NOTE: All **locked** doors are compliant with Passenger Emergency Egress rules as they are fitted with a form of emergency release.

6. DOOR OPERATION

6.1 DOOR OPERATION SAFETY

The following rules apply:

1. Only one Train Manager is to control the doors at a station.
2. The Train Manager **MUST NOT** insert the door key into the door control panel or operate the doors in any way until the train has completely stopped.
3. When the train has stopped, the Train Manager may then insert the door key into one of the control panels located next to each AK/AKC corner door on the side adjacent to the platform.
4. Note, to release doors on the AKS only for unloading or loading luggage, the doors in the AKS can be locally released, but must be closed from an AK to achieve a train closed light.
5. Keys must not be left unattended in door control panel key switches. If they are, this leaves the panel susceptible to use by unauthorised persons and will leave the door out of the TMS loop if the key is in the control position.
6. Right Away is only to be given after **ALL** doors including the local door are completely closed, all steps are retracted, all **THIS DOOR OPEN** lights are extinguished, the **TRAIN CLOSED** light is illuminated and TMS lights extinguished.
7. If the **TRAIN CLOSED** light extinguishes while the train is in motion, the Locomotive Engineer must be instructed to stop the train. Insecure doors and steps must be isolated electrically or pneumatically and, if necessary, physically secured.
8. The Train Manager must advise passengers on the PA system that, before disembarking, they should check that the steps have fully extended beneath the doors.

6.2 AK/AKC KEY SELECTOR SWITCHES

Two key-operated switches are provided at each door control panel:

- Door isolation key switch
- Door operation key switch.

The door isolation key selector switch at the top right of the door control panel has two positions:

Position	Function
On Line	Enables the door to be selected for opening if required
Isolate	Removes the door from the trainline opening circuit

The door operation key selector switch at the bottom right of the door control panel has three positions:

Position	Function
Run	Renders control panel buttons inoperable
Gong	Confirms that the local door is closed. TRAIN CLOSED light illuminated. Indicates Right Away (i.e. doors are safe for train to proceed) with a chime.
Control	Enables release and closure of doors on side of train on which panel is located.

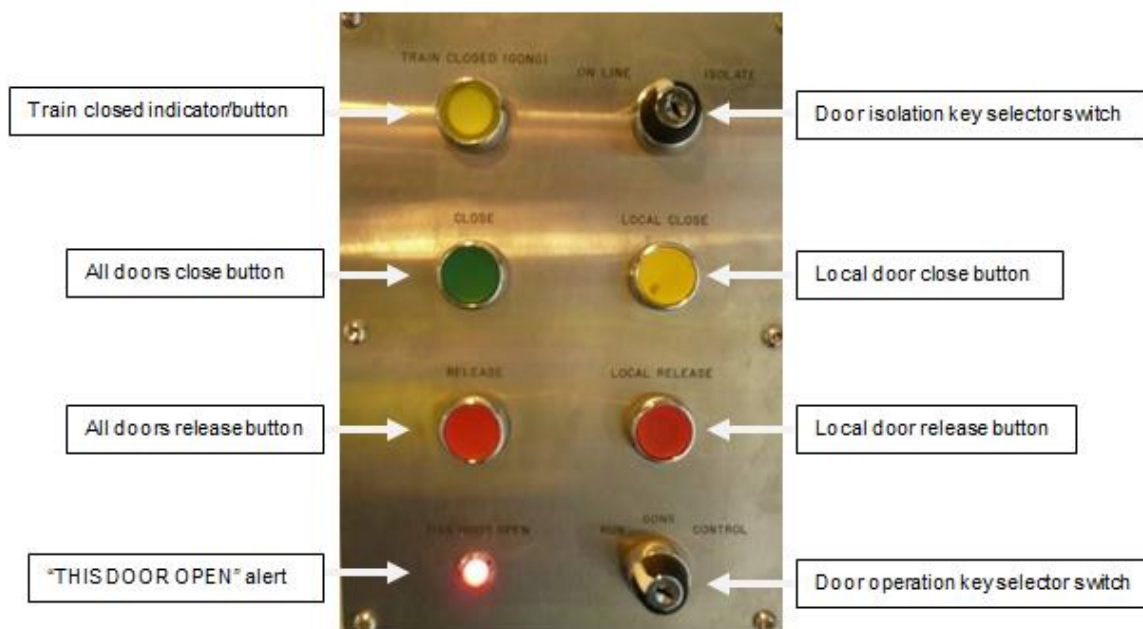


Figure 6: Crew operated door control panel.

6.3 AKS KEY SELECTOR SWITCHES

Two key-operated switches are provided at each door control panel:

- Door Lockout key switch
- Door operation key switch.

The door lockout key selector switch at the top right of the door control panel has two positions:

Position	Function
Normal	Enables the door to be selected for opening if required
Fault	Removes the door from the trainline opening circuit

The door operation key selector switch at the bottom left of the door control panel has two positions:

Position	Function
Out	Renders control panel buttons inoperable unless released from this panel and key removed.
Position 1	Enables release and closure of doors on the side of this car of which the panel is located. (Note: position 2 is not used)

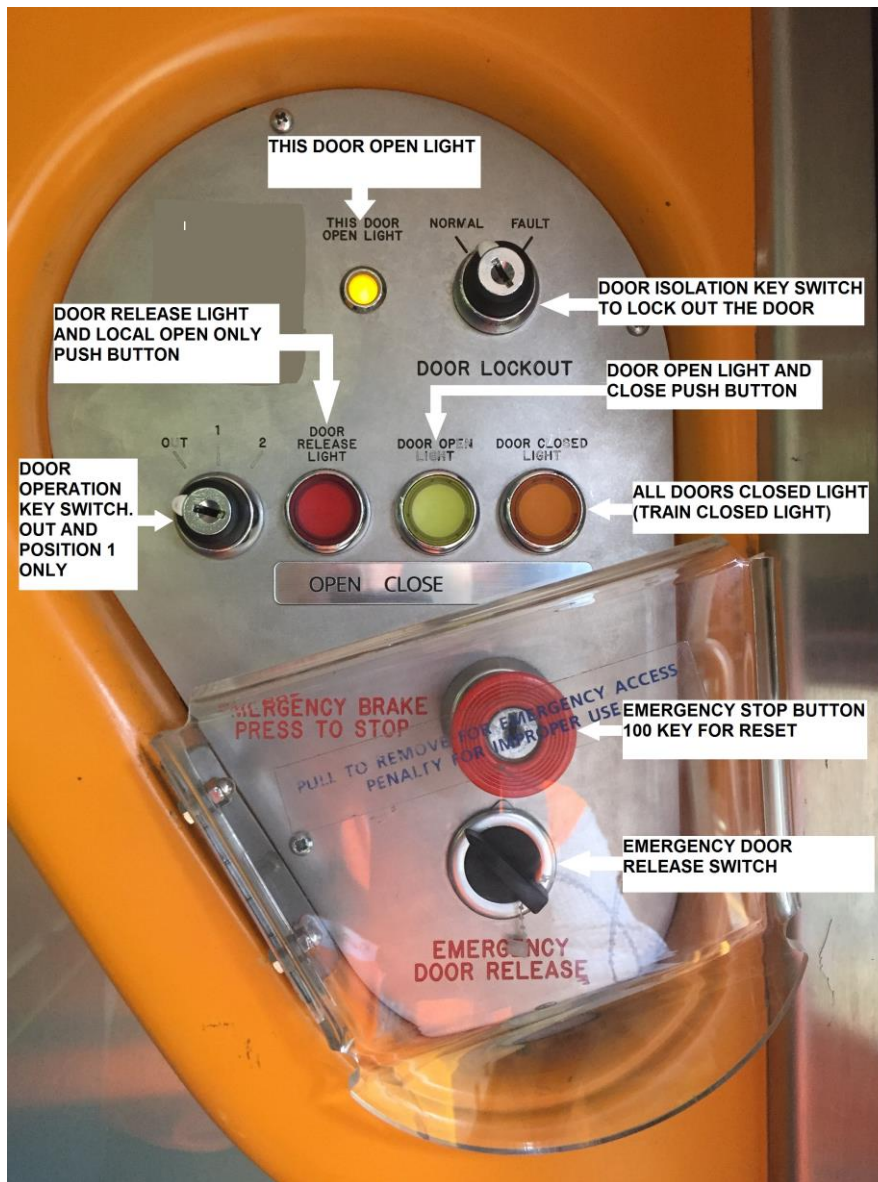


Figure 7: AKS crew operated door control panel.

6.4 DOOR RELEASE

1. For AK, AKC and AKS, make sure that all deadbolts are unlocked.
2. Only the Train Manager can release the doors for operation. Inserting the door key (Rockwell 3825) into Door Operation Key Selector Switch and select CONTROL on any door control panel on the desired side of the train. Then press the RELEASE button to retract the locking bolts each door on that side of the train only.

3. **NOTE: The AKS doors can be released from the AK cars but the AK doors cannot be released from the AKS.**

An alarm will sound to indicate a door release has occurred, the TRAIN CLOSED light will extinguish and the THIS DOOR OPEN light will illuminate. An alarm will sound indicating a commanded door release. The interior and exterior door OPEN buttons on that side of the train will illuminate.

4. The key can then be turned back to RUN, removed, and the doors will remain released.

6.5 OPENING DOORS ON A SIDE

Once the Train Manager has released the door locking bolts, the door OPEN buttons illuminate and staff and passengers may open the door by pressing the OPEN button – internal or external – at any given door on that side of the train.

When the door opens, two steps will also extend beneath each AK/AKC door. If a platform edge or obstruction prevents either step from fully extending, they will automatically retract and stay retracted. The bottom step has the ability to hinge upwards. If it extends slightly above a platform and the car drops with the additional weight of people boarding, the step may catch on the platform. "Bump Stops" (obstacle detection) have been fitted to help prevent this issue from occurring.

If the step extends then retracts, or does not reach the end of its stroke, the OPEN button should be pressed for a few seconds.

PASSENGERS SHOULD BE ADVISED ON THE PA SYSTEM THAT BEFORE DISEMBARKING THEY SHOULD CHECK THAT THE STEPS HAVE FULLY EXTENDED BENEATH THE DOORS.

NOTE: The wheelchair hoist door in the AKC car can only be opened or closed by the Train Manager at that door station, but the AKS luggage hoist door can be release remotely. The AKC wheelchair hoist door is, in part, manually operated but is interlocked with the door control trainline. Refer to Section 19 [Wheelchair systems](#) for operational instructions.

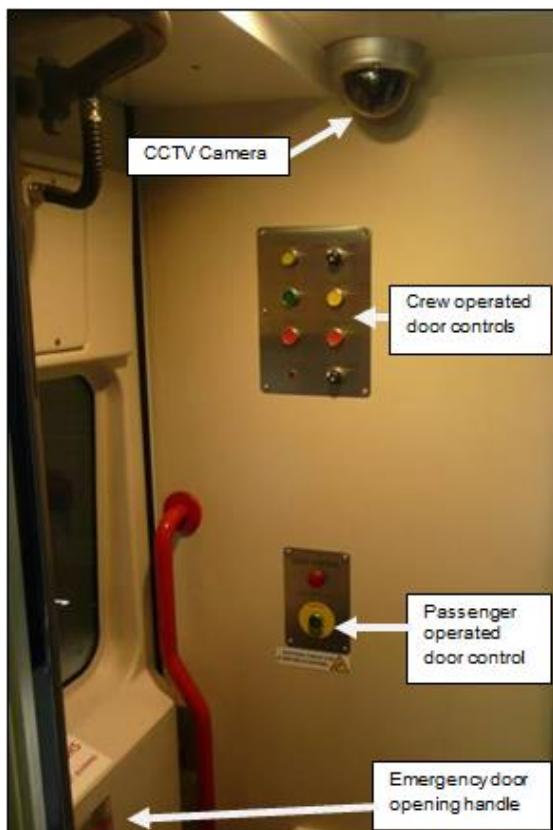


Figure 8: Internal view of plug door and controls.



Figure 9: External view of plug door and controls.

6.6 OPENING A LOCAL DOOR - AK/AKC

1. At the door to be opened, insert the door key into the Door Operation Key Selector Switch and select CONTROL.
2. Press the LOCAL RELEASE button.



The locking bolts on that door only will retract, the TRAIN CLOSED light will extinguish and the THIS DOOR OPEN light will illuminate.

An alarm will sound to indicate a commanded door release.

The interior and exterior door OPEN buttons on that door only will illuminate.

3. Turn the key back to RUN and remove it, leaving the door released and the THIS DOOR OPEN light illuminated.
4. Open the door by pressing the internal or external door OPEN push button.

The door will open and both steps beneath the door will extend when this is done.

NOTE: If a local door has been opened and it is then desired to do a full release of a side, the local door should be closed to get it back "on line" before the full release is done. This will overcome any command confusion within the TMS PLC.

6.7 OPENING A LOCAL DOOR - AKS

1. At the door to be opened, insert the door key into the Door Operation Key Selector Switch and select Position 1, (position 2 is not used).
2. Press the red door release button to release both doors on that side of the car.

The TRAIN CLOSED light will extinguish and the THIS DOOR OPEN light will NOT illuminate until the door is opened.

NO alarm will sound to indicate a commanded door release in AKS however, it will sound in the AK cars.

The interior door OPEN button for both doors will illuminate.

3. Turn the key back to OUT and remove it, leaving the door released.
4. Open the door by pressing the red door OPEN push button.
5. Both the interior and exterior "this door open" light will illuminate.

6.8 CLOSING LOCAL DOOR -AK/AKC

At the open door, insert the door key into the bottom right door operation key selector switch and select CONTROL. Press the LOCAL CLOSE button. The door close alarm will sound, the two steps will retract, the door will close and the locking bolts extend. The THIS DOOR OPEN light will extinguish and the TRAIN CLOSED light will illuminate. TMS lights should be extinguished. No alarms should be sounding.

Turn the key to GONG and push the illuminated TRAIN CLOSED button to sound the chime in each vestibule ceiling, indicating that the doors are safe for the train to proceed. Turn the key back to RUN and remove. If the local door has not closed correctly a Right Away gong will not be possible.

6.9 CLOSING LOCAL DOOR - AKS

At the open door, no key required, press the yellow CLOSE button. The door close alarm will sound, the door will close. The THIS DOOR OPEN light will extinguish, the release light will stay illuminated, so no train closed light will be illuminated.

To get a TRAIN CLOSED light, a door closed operation must be made from any AK car.



6.10 CLOSING DOORS ON A SIDE

At an AK/AKC door control panel in a vestibule where TMS lights are located (End 2 vestibules) and on the same side as the open doors, insert the door key into the bottom right key switch and select CONTROL. Then press the CLOSE button. The door close alarm will sound and all doors except the local door (at the door control panel being operated) will close. All steps, *including* those at the local door will retract.

Check that all door and step alarms have ceased. The TRAIN CLOSED light should be illuminated and TMS lights extinguished. If an alarm is still sounding, check the door and steps concerned for the fault. The fault could also be that the luggage hoist is still extended in the AKS not allowing the door to close.

All THIS DOOR OPEN lights on the exteriors and interiors of doors should be extinguished, except at the local door.

Then press the LOCAL CLOSE button to close the local door. The TRAIN CLOSED light should stay illuminated and the TMS lights extinguished. The THIS DOOR OPEN light will extinguish. The door locking bolts should be extended and no alarms sounding.

Turn the key to GONG and press the illuminated TRAIN CLOSED light to sound the chime in each vestibule ceiling, indicating that the doors are safe for the train to proceed. Turn the key back to RUN and remove. If the local door has not closed correctly a Right Away gong will not be possible.

6.11 DOOR SPLIT (DOORS TRAINLINE) SWITCH FOR SHORT PLATFORMS

The electrical control cabinets in AK/AKC cars have a key switch labelled DOORS TRAINLINE to control doors at short platforms. When the train consist is too long for a platform the Train Manager can use this key switch before arriving at the platform. This prevents doors on cars that are off the platform from being unlocked.

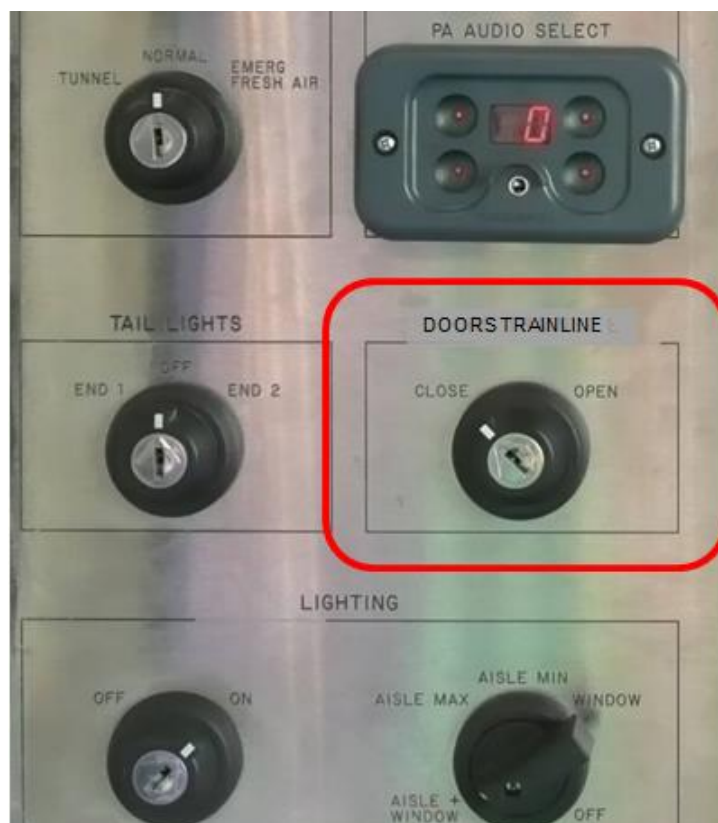


Figure 10: Doors trainline key selector switch.

NOTE: CLOSE and OPEN positions on this switch refer to the trainlined Release circuit running the length of the train, not the closed or open state of the door. CLOSE = Circuit continuous (normal situation); OPEN = circuit broken.

The "split of the train operates from the exact location of the DOORS TRAINLINE switch used. With key switched to OPEN, a decision can be made which end of the train is to have doors released. If a door control panel to the right of the opened key switch is activated, all doors to the right of the key switch will be released, and those doors to the left of the key switch will not. Alternatively, if a door control panel to the left of the opened key switch is activated all doors to the left of the key switch will be released, and those doors to the right of the switch will not.

Doors on either side of the train can be "split" and released depending on whether the A or B side door control panel is used. It is also possible to do additional splits further down the train, allowing multiple sections to be operated independently.

NOTE: once a "split" has been done, doors are released following the usual process outlined in sections above.

A PA announcement should be made informing passengers where to disembark.

Turn the switch or switches back to CLOSE after the doors have been closed. Door split capability will remain active until the switch or switches are returned to the CLOSE position.

6.12 OBSTACLE DETECTION

The doors have an obstacle detection system that operates in both open and close directions, but close cycle only on the AKS.

The extendable steps have an obstacle detection system that operates in the extend direction only.

If the door or steps detect an abnormal resistance during operation they will automatically change direction. For the AKS, open close cycle will be repeated several times until obstacle is clear.

For the AK/AKC, extreme wind may be sufficient to trigger the obstacle detection system, preventing the door or steps from opening or closing. The system may be overridden by holding down the OPEN or CLOSE buttons as required. If the Train Manager holds the CLOSE button down to ensure a door closure, he/she must first visually check to ensure there are no real obstructions.

6.13 EMERGENCY DOOR RELEASE - AK/AKC

A manual "Emergency Door Opening" handle is provided on the interior and exterior of the following doors: AK cars A1, A2, B1 B2; AKC cars A2, B2. These allow the safety systems to be overridden and the door to be opened in an emergency, without the Train Manager's presence.

When the emergency handle is used it interrupts the TRAIN CLOSED circuit. This is detected by the TMS PLC. The TRAIN CLOSED light will extinguish, an alarm will sound continuously at that door and an audible warning will be sounded briefly throughout the train to indicate the change of status. The Train Manager must stop the train and identify the cause of the change of status as soon as practically possible.

To operate the "Emergency Door Opening" handle, make sure the deadbolt lock is unlocked. If entering a locked car from the outside, use the one door of each car fitted with an S Key lock to release the deadbolt lock. On AK and AKC cars this is door A2. Once this lock is released, lift the clear polycarbonate flap marked "Emergency Door Opening" and turn the handle anti-clockwise (it should be turned clockwise if operated from inside the car). Air is dumped from both the lock-bolt mechanism and



the door opener and the locking bolts are manually retracted. On reaching the end of the rotation of the handle the door can be manually pulled or pushed open.

NOTE: Steps will not extend when a door has been opened using the "Emergency Door Opening" handle. The crew can be guided to the open door via the Train Management System (refer to 17 [Train management system \(TMS\)](#)).

To manually close an open door, lift the clear polycarbonate flap covering the "Emergency Door Opening" handle and turn the handle clockwise (from the inside) or anti-clockwise (from the outside). Air is dumped from both the lock-bolt mechanism and the door opener, and the locking bolts are manually retracted. On reaching the end of the rotation of the handle the door can then be pulled or pushed closed. Once closed, on releasing the door handle, the locking bolts should slowly extend into the lock bolt blocks, locking the door closed.

The door handle must be held fully rotated when opening and closing the door so the locking bolts are kept retracted so they clear the door frame. If the door has been manually opened using the "emergency Door Opening" handle, thus dumping the air from that door's operating system, then the air must be reset via the recessed reset valve located in the horizontal plate above the door. A pen or similar instrument should be used to press the button through the 10mm hole. The door will operate automatically again until this reset button is pressed.

IF THE RESET IS PRESSED WITH THE DOOR OPEN AND THE LOCKING BOLTS EXTENDED, THE DOOR WILL SWING CLOSED VIOLENTLY CAUSING THE BOLTS TO HIT THE EDGE OF THE DOOR FRAME ON BOTH SIDES AND DAMAGING (BENDING) THE LOCKBOLT MECHANISM WITHIN THE INTERIOR OF THE DOOR. FULLY CLOSE THE DOOR MANUALLY WITH LOCKING BOLTS RETRACTED BEFORE PRESSING RESET.

6.14 EMERGENCY DOOR RELEASE - AKS

A manual "Emergency Release Switch " is provided on the interior of all the interior door control panels. The 10 o'clock position is normal operation and the 2 o'clock position is emergency release. This position exhausts the air from the door piston allowing the door to be manually opened.

These switches allow the safety systems to be overridden and the door to be opened in an emergency, without the Train Manager's presence.

NOTE: No alarms will sound unless the door is opened.

NOTE: If an AKS door has had to have the emergency release switch activated due to a fault and the switch is to be left in the 2 o'clock position (no air), the manual dead bolt must be placed in the locked position to stop the doors from opening while the car is in service.

The following doors, A2 and B2, have an exterior isolation cock mounted to the underframe with normal position handle pointing along the car body. If any of these two isolation cocks are isolated, they allow all the doors on the car to be manually opened. These are predominantly used for accessing the cars from the outside in a depot environment.



Figure 11: AKS Manual Door Lock bolt.

6.15 INTERNAL / EXTERNAL THIS DOOR OPEN LIGHT

To assist with the detection of faulty doors and steps an external light has been provided on the top of each external door. The internal light is on the bottom left of the door control panel. If a door is not fully closed or steps not fully retracted, the external and internal THIS DOOR OPEN lights will remain illuminated. TMS lights will also indicate a door open. The TRAIN CLOSED light will remain extinguished until the fault is rectified.

RIGHT AWAY MUST NOT BE GIVEN WITH ANY STEPS EXTENDED AS MOVEMENT OF THE TRAIN WILL RESULT IN EXTENSIVE DAMAGE TO THE STEPS, STEP FRAMES AND THE HEADSTOCKS OF THE CARS.

6.16 EXTERNAL DOOR ISOLATION - AK/AKC

Should a door fail in service, insert door key into the upper right door isolation key switch on the door control panel adjacent to the defective door and select ISOLATE. The DOOR OUT OF ORDER lights above the door OPEN lights on both the interior and exterior will illuminate and the door will be rendered inoperative. When in the ISOLATE position, the door and step closed sensors are not monitored so if there is a fault in these sensors it is still possible to receive a TRAIN CLOSED light. The TMS PLC registers ISOLATE as an acceptable status within the trainline.

Problems may occur, for example, with a door alarm sounding continually, a door frame being physically damaged, a door locking bolt being damaged or not connecting with the sensor within the lockbolt blocks, or steps not extending or not retracting beneath the door. In all these cases, the Train Manager may choose to isolate the door.

Prior to isolating, ensure that the door is fully closed with locking bolts extended and that the steps beneath the door are fully retracted. These steps must be cable tied closed.

If the "Emergency Door Opening" handle is used to open this isolated door the break in the trainline will still be detected by the TMS PLC, the TRAIN CLOSED light will extinguish, an alarm will sound continuously at that door and an audible warning will sound briefly throughout the train indicating the change of status.

To stop the door being opened with the "Emergency Door Opening" handle, the deadbolt lock **must** be locked. If the door is brought back on line, or the "Emergency Door Opening" handle made available while the door is still isolated, the deadbolt lock must be released.

Instances of isolated doors must be recorded in the Loco 54D Repair Book and on a Train Incident Report.

6.17 EXTERNAL DOOR ISOLATION - AKS

Should an AKS door fail in service, insert door key into the upper right DOOR LOCKOUT key switch on the door control panel adjacent to the defective door and select FAULT. When in the FAULT position, the door sensors are not monitored so if there is a fault in these sensors it is still possible to receive a TRAIN CLOSED light.

The switch may be used if the door will not shut, it will not open, it sticks, or the door repeatedly opens and closes.

In all these cases, the Train Manager may choose to isolate the door.

Prior to isolating, ensure that the door is fully closed with manual lock bolt in the locked position.

Instances of isolated doors must be recorded in the Loco 54D Repair Book and on a Train Incident Report.

6.18 STEP ISOLATION

If a pair of steps fail in service through not retracting, through pneumatic failure causing them not to extend, or leaving them unrestrained within their frame, or through physical damage, they should be isolated in the following manner.

Unscrew with a round key the square panel at the base of the vestibule wall adjacent to the door concerned. Inside the cavity is a red isolation cock handle which should be moved from the vertical to the horizontal position. This will cut the supply of air to the steps rendering them inoperable. Both top and bottom steps must then be cable-tied to their respective frames to eliminate the possibility of outward movement of the unrestrained steps from within the frames. Two holes have been drilled through the top steps to enable cable-ties to be inserted through these then through holes in the frame beneath, tying the step to the frame. Similar holes exist in the top and bottom of the lower step frames to tie these steps back.

Cable ties are stored in the train manager's office.

On adjacent door control panel change the top right key switch from ON LINE to ISOLATE. The DOOR OUT OF ORDER lights above the door OPEN button will illuminate. The deadbolt lock on the door concerned must be locked.

Instances of isolated steps must be recorded in the Loco 54D Repair Book and on a Train Incident Report.



6.19 RE-MARSHALLING DOOR CHECKS

Whenever AK train consists are re-marshalled (cars added or removed), the following check must be performed to ensure all external doors in the consist are operating safely and correctly:

1. Ensure that couplers, air hoses, TMS trainline cable, 400/230VAC trainline jumper cables are all fitted correctly
2. Ensure that the 400VAC jumper socket lid at the opposite end of consist from the locomotive is firmly latched closed if the rear vehicle is an AK, AKC or AKS car. End 2 of AKV and End 1 of AKL vans or AKS support vehicles have sockets for AAR jumper cables only.
3. Set consist up and perform a full door check.
4. The locomotive should restore full air pressure.
5. Starting at one end of the train, AK or AKC cars only, at door control panel, insert door key (Rockwell 3825) and select CONTROL.
6. Press RELEASE button. The door released alarm should sound and the door locking bolts retract on the side of the train of the door control panel used. The TRAIN CLOSED light will extinguish and the THIS DOOR OPEN lights illuminate. Note: for the AKS, the THIS DOOR OPEN light only illuminates once the door has started to open.
7. Turn the key back to RUN and withdraw key.
8. Repeat this at the door control panel on the opposite side of the vestibule.
9. Open doors by pressing illuminated door OPEN buttons.
10. Move through the train and sequentially open all doors on both sides of the train by pressing the door OPEN button on either the internal or external panels. Check that all doors open satisfactorily and that both steps beneath each door have extended.
11. At the opposite end of the train to which the process started, and in an AK/AKC vestibule where an electrical control panel is located (for TMS lights), at door control panels on both sides of the train, insert key and select CONTROL. Note; you cannot close the AK train from an AKS door control panel.
12. Press CLOSE button. Check the door close alarm sounds. Check all doors except the local door (the panel being operated) have closed and both steps at all doors, including the local door, have retracted. All door locking bolts should be extended and door and step alarms should cease sounding. If an alarm is still sounding, check the door and steps concerned for the fault.
13. The TRAIN CLOSED light should illuminate after both sides of the train have been closed. The THIS DOOR OPEN lights (both on the door control panels and on the exterior of the doors) should extinguish except at the local door. Check that the TMS alarm lights on the nearby electrical control panel are extinguished.
14. Press LOCAL CLOSE button. The TRAIN CLOSED light should stay illuminated and the TMS lights extinguished. The THIS DOOR OPEN light will extinguish. The door locking bolts should be extended and no alarms sounding.
15. Turn the key switch to GONG position and check that gong operates.
16. Turn switch to RUN and remove key. Check TRAIN CLOSED light remains illuminated.

NOTE: that both sides of the train need to be closed before TRAIN CLOSED is achieved and alarms cease.



17. Once both sides have been checked, return key to door control panel and select CONTROL. Press LOCAL OPEN. Check that local door opens and both steps extend. The TRAIN CLOSED light should remain illuminated. Press LOCAL CLOSE and check door closes, door locking bolts extend and both steps retract. Turn the key back to RUN and remove key. The TRAIN CLOSED light should remain illuminated.
18. Operate an "Emergency Door Release" handle to open an exterior door. Ensure that the TRAIN CLOSED light extinguishes as the door is opened. Check that alarm sounds. Close the door by turning the emergency handle to keep the bolts retracted. Pull the door closed then release the handle to let the locking bolts extend into the lockbolt blocks. Reset the air by pressing the recessed reset valve in the hole above the door with a pen.

6.20 INTERIOR SALOON DOORS

The automatic interior saloon doors (between the saloon and the vestibule) are opened by passing through a light beam which is beamed and reflected across walkways either side of the doors. After a person has passed through the sensor range, the door will automatically close in 3 seconds.

The doors may also be opened or closed using the pneumatic OPEN/CLOSE pushbutton on the bulkhead wall beside the door.

In the event of the 24VDC power failing or air pressure dropping below 300kPa the saloon doors will open and stay open until power or air pressure is restored. This is to allow for emergency egress.

In order to keep these doors open when air pressure is above 300kPa, duct tape should be placed across the light sensor so an obstacle is registered. The door will then default to the open position. Remove the duct tape after the problem has been solved and the door will close.

NOTE: if the circuit breaker DC3 on the 24VDC distribution board in the car concerned is turned off to open the saloon doors, it will disable the four exterior doors and the TMS, therefore the duct tape method is preferred.

6.21 DOOR FAULT PROCEDURES – AK/AKC CARS

The procedures below are provided as guidelines to aid fault rectification and allow a train to complete its journey if this is possible. However, under ALL circumstances the Operators Safety System takes precedence over these procedures in order to ensure passenger safety.

Symptom	Cause	Remedy
Door will not respond to controls and "Out of Order" light extinguished	1. Emergency door handle has been used or deadlock has not been released	Locate the 10mm hole in the panel immediately above the door. Push a pen or similar object through this hole to operate The Door Reset pushbutton and then operate the door as normal. Check that deadlock has been released.
	2. Low Air Pressure	Attach locomotive – increase air pressure to 550kPa.
"Door Closed" light does not illuminate after the "Door Closed" button is pressed.	1. Circuit incomplete	Use the Train Management System to find the cause, which may be one of the following: open door or steps door key selector switch in wrong position activated smoke detector activated emergency brake 400/230VAC plug lid at end of train not properly closed 400/230VAC jumper between cars – generator must be shut down before handling 24VDC jumper between cars a carriage's circuit breakers are "OFF" wiring/component failure
	2. Door blocked by obstacle	Cycle the doors again. If problem does not clear itself, look for the obstacle. If wind causing the door to detect an obstruction, hold down the "Close" button until the door is completely closed. Visually ensure no person obstructs the doorway while closing the door in this way.
	3. Defective door bolt, reed switch or door bolt not fully engaged	Find the defective door using the TMS Panel and the "This Door Open" lights on the control panels. Then: 1. Push a pen through the small hole in the panel above the defective door to press the door reset push button. This is done to ensure an emergency door release has not occurred. 2. Cycle the doors again, at the defective door. 3. If the door light still does not illuminate, check the doorsteps are fully retracted and the door is closed. If necessary use the emergency door handle to close that door. Cable tie the step closed, lock then isolate the door.
One "Train Closed" light not illuminated. All other doors illuminated with "All Doors Closed".	Blown bulb in the location that is not lit	Ensure other "Train Closed" lights are on and no faults are listed on the Train Management PLC Display. Record fault in 54D book and continue as normal.
Compressed air blowing in the vestibule roof area with possible erratic door operation	Leaking pneumatic components	Lock and isolate the defective door using the upper-right key switch on the main door control panel at the defective door location.

6.22 DOOR FAULT PROCEDURES – AKS SUPPORT VEHICLE

The procedures below are provided as guidelines to aid fault rectification and allow a train to complete its journey if this is possible. However, under ALL circumstances the Operators Safety System takes precedence over these procedures to ensure staff and passenger safety.

Symptom	Cause	Remedy
If the "Doors Closed" lights do not come on after the exterior doors have been commanded to close:	Check the indicator lights on the local door control	If neither the "Doors Closed" nor "Door Open" lights are on at the local door control panel, look at the door control panel for the doors on the other side. If the "Doors Closed" light for this door control panel is on, and the "Door Open" light is off, then all the doors have closed properly.
	If the indicator lights are working OK	Open and close the doors again on the side that the doors were opened by pressing the OPEN push button at each door station, then the ALL CLOSE push button in an AK car.
	If "Doors Closed" lights are still not on	Check each saloon door to determine whether a door has its "This Door Open" light on. This could be because: - The air supply to a door has been turned off - A door has become dislodged or jammed - The door is opening and closing If the door is opening and closing repeatedly, the obstacle detection system thinks there is an obstruction in the door: - Check that there is nothing jamming the door - If the door is still opening and closing repeatedly, turn the Door Lockout switch to the FAULT position, let the door close, then turn the Door Lockout switch back to the NORMAL position and remove the key.
	If a door continues to give trouble	If a problem cannot be rectified or a problem keeps recurring, write a note in the 54M book about the fault. Lock the door out using the Door Lockout key switch and manually lock the door using the manual lock bolt.
	If a door cannot be closed at all	If a door has come off its track or, for some other reason, it cannot be manually closed and the door is stuck partly or fully open: Turning the "Door Lockout Switch" to "Fault" overrides the door indication circuit at this door. This should result in "Door Closed" lights being obtainable. This is a staff only car, but staff should not ride in the car if with this type of fault. The AKS must be taken out of service as soon as it is practicable for repair
	If "Door Closed" lights cannot be obtained	Turning the "Door Lockout Switch" to "Fault" overrides the door indication circuit at this door. This should result in "Door Closed" lights being on.
	If no Door Release or Door Close signal is being received by the AKS	This problem is most likely caused by a loose jumper cable. Check the security of the jumper cables between the cars. If at a terminal station, check that an external emergency release cock has not been closed. Check that the emergency door release switch has not been operated at a door control panel. For the release signal only, check that the switchboard Door On/Off switch has not in the Off position. Record specific details of the fault in the 54M book to assist maintenance staff in determining the reason for the problem.
	Leaking pneumatic components not letting door or doors close.	Turn the "Door Lockout Switch" to "Fault" and then manually close the door and secure with the lock bolt. This will keep the door from vibrating open in service.

NOTE: The train-set 54D repair book will be located in the Train Manager's office of the AKC car.



7. TRAIN STABLING (SHUT DOWN)

The following procedure is to be used when leaving an AK train at a KiwiRail passenger depot, e.g., Waltham, Wellington, Westfield.

1. Proceed through the train and in each car (and van where necessary):
 - a) Turn Off Air Conditioning (HVAC). This is important as the 63 amp shore supply may be unable to power all the HVAC units.
 - b) Turn OFF saloon lights. (May be left on if cleaners are working).
 - c) While shore supply is connected, the 24V batteries are being charged; therefore, it is not necessary to turn off the 24VDC system.
 - d) Saloon doors will default to OPEN position when air pressure drops below 300kpa or the 24VDC system is switched off. This is to allow for easy egress in emergency situations if air or power is lost.
 - e) Turn PIDS off. This has a 15-minute wind down time. This must be allowed to take place while the generator is still running; otherwise damage may be done to PIDS programming.
2. On AKL, turn Tail Lights OFF if they are on.
3. If the AKS is attached to the consist, to maintain the goods in the fridge and freezers, if the generator is not running the consist must be attached to the shore supply.
 - a) On AKS, turn the HVAC off along with the lights unless the cleaners are working.
 - b) Leave the 230VAC mains on so that the fridges and freezers remain on.
 - c) Leave the 24VDC breaker on so that the batteries are charged.
 - d) If in the yard, apply the manual lock bolts on the exterior doors and lock both end doors to secure the goods in the car.
4. On AKV (both AKVs if there are two on a TranzAlpine consist):
 - a) Open Main Electrical cabinet Door with CF315 Key.
 - b) Turn Tail Lights OFF if they are on.
 - c) The Trainline Isolator may be left in the ON position as generator "deep sea controller" will control shut down.
 - d) Turn Generator START switch to vertical position (OFF) with KN 200 key.
 - e) Turn Generator ON/OFF switch to OFF.
 - f) Allow generator controller to regulate shut down until motor stops—can take a few minutes.
 - g) Turn Main Switch from GENERATOR to OFF.
 - h) Connect the shore supply (Land Line) to the AKV van external connection at End 2.
 - i) Switch the external power supply ON.
 - j) Turn Main Switch from OFF to SHORE.
 - k) Close the main electrical cabinet door.



5. Close all external doors using normal CLOSE and LOCAL CLOSE procedures. Close bi-fold doors at both ends of consist for weatherproofing. Exit can be made via gates on AKV. When train is enclosed within a secured compound under CCTV surveillance, it is not necessary to deadbolt doors from inside. Damage from vandals will be minimised by not dead-bolting.
6. Follow Rail Operating Code procedures for securing train with handbrakes and park brakes. If locomotive is detached, this is covered in ROC Section 4.2 Clause 2.1. Specific instructions for park brakes on AK Trains are in Section 10 of this Supplement.

The following procedure is to be used when leaving an AK train in any location which is not a KiwiRail passenger depot.

NOTE: This is dependent on the situation as turning the generator will affect the perishable goods in the AKC, AKS and AKL fridges and freezers.

1. Check all external doors are closed using a door control panel. Use normal CLOSE and LOCAL CLOSE procedures.
2. Deadbolt all exterior doors of AK/AKC/AKS cars using the lock and lock bolts on the interior of these doors.
3. Proceed through the train and in each car at switchboard:
 - a) Turn OFF Air Conditioning (HVAC).
 - b) Turn OFF saloon lights. This allows a lesser load on the generator when it is next started from cold.
 - c) Turn PIDS off. This has a 15 minute wind down time and must be allowed to take place while the generator is still running otherwise damage may be done to PIDS programming. Then: Turn OFF the 24VDC Isolator in the "24VDC Distribution Board" Cupboard. This is important otherwise batteries will drain while not charged by generator or shore supply. The 24VDC must be turned off AFTER the PIDS because power is supplied to it via an AC/DC inverter.
4. At AKS and or AKL electrical control cabinet:
 - a) Turn OFF the Lights.
 - b) Turn Tail Lights OFF if they are on.
 - c) Turn OFF the 24VDC Isolator in the "24VDC Distribution Board" Cupboard.
 - d) For AKS and AKL, insert the Tower Bolts on the four exterior side doors and lock the end doors, and if equipped, the red Emergency Release boxes using S Key, leaving via the End 2 door.
 - e) Close and lock the intercar doors on the car coupled to the AKL, and if equipped, lock the red Emergency Release box with S Key.
 - f) Return through the train and on the AKV (both if there are two in the consist), close the gates and lock the red Emergency Release boxes using S Key.
 - g) Lock the bi-fold doors on the car coupled to the AKV at the end of the train using top and bottom mortice locks and the horizontal lock at the centre.
 - h) At AKV electrical control cabinet in passenger viewing area:
 - i) Turn OFF the Lights.
 - j) Turn Tail Lights OFF if they are on.



- k) The Trainline Isolator may be left in the ON position as generator "deep sea controller" will control shut down.
 - l) Turn Generator START switch to vertical position (OFF) with KN 200 key.
 - m) Turn Generator ON/OFF switch to OFF.
 - n) Allow generator controller to regulate shut down until motor stops—can take a few minutes.
 - o) Turn OFF the 24VDC Isolator in the "24VDC Distribution Board" Cupboard.
 - p) Lock all switchboard Cupboards with 100 Key and the main electrical cabinet door with CF 315 Key.
5. At Generator Compartment, open farthest right door to gain access to Generator Control Panel.
- a) Turn the Ignition Key from ON to OFF.
 - b) Close and lock all Generator Compartment Doors using CF 315 Key.
6. Leave via the AKV End 2 door and lock door and red Emergency Release boxes on End 2 gates with S Key.
7. Follow Rail Operating Code procedures for securing trains with handbrakes and park brakes. If locomotive is detached, this is covered in ROC Section 4.2 Clause 2.1. Specific instructions for Park brakes on AK Trains are in Section 10 of this Supplement.

8. DIESEL ALTERNATOR SET (GENERATOR)

The 200kVA diesel alternator set, located in the AKV van, supplies 400/230VAC power for all electrically operated services in the train. The power is also used to charge the 24VDC battery back-up system in the consist vehicles. The recommendation is that one AKV power no more than 6 cars + AKS and 2 vans, one of the vans being the AKV with the generator. This will minimise the possibility of overloading the 400VAC electrical supply system.

AKV vans feed 400/230VAC power in only one direction, towards the END 1 direction of all vehicles. The jumper cable socket is located on the B-side at End 1 only. End 2 of the AKV van is not fitted with a 400/230VAC jumper cable socket.

8.1 GENERATOR START UP

The generator can be started from either the switchboard in the AKV viewing area or from the control panel on the generator itself. In either case, the circuit breaker on the generator control panel and the trainline isolator on the AKV switchboard must BOTH be in the ON position for power to be fed to the rest of the train.

The name Trainline Isolator is used as it is labelled as such on the switchboard.



Figure 12: AKV switchboard.

8.1.1 Start Up Procedure for AKV 41

AKV 41 is fitted with Deep Sea Electronics control panels; the set up and start up procedures for this vehicle follows. For AKV 13, AKV 26, AKV 39, AKV 54 and AKV 67, see [quick guide](#) later in this document.

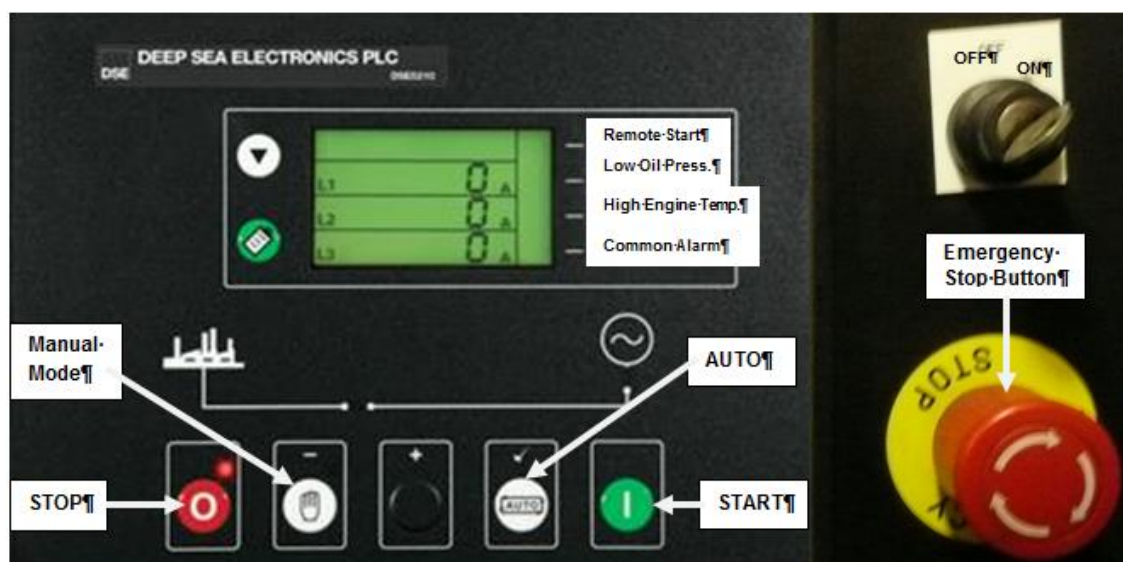


Figure 13: Generator control panel.

The standard setup procedure for AKV 41 is as follows: On the Generator Control Panel:

1. The ignition key will be switched on.

2. The circuit breaker will be in the ON position.
3. The white AUTO button will be activated (a small red light will illuminate at the top of the button).

Unless a reset is required, these settings are not altered, even after shutdown. The above settings enable a "remote" start of the generator to be undertaken from the electrical control cabinet facing the outside viewing area. The diesel generator incorporates a "deep sea controller" which undertakes a self-diagnosis and energising of the VFD intake fan, once the motor is switched on. This allows the diesel generator to run for a few minutes with no load to allow it to warm up and prevent power surges and spikes.

4. Open the main electrical control cabinet door with CF 315 key.
5. Check that the Main Switch is turned to GENERATOR. It may have been in the OFF or SHORE position.
6. The Trainline Isolator may be left in the ON position.
7. Open inner cabinet door with the 100 key.
8. With the KN 200 key turn Generator ON/OFF switch to ON.
9. With the same key, turn lower key switch to START.

There may be a pause before the motor starts while the "deep sea controller" undertakes diagnosis. After the motor starts, the red, orange and blue phase lights will illuminate. Power will subsequently be fed through the train provided the Trainline Isolator is ON. The whole process may take a few minutes to complete.

NOTE: If the motor does not start, check in the Generator Compartment that Ignition Switch is ON, that faults are clear and that white AUTO button is activated.

10. Close main Electrical Cabinet door and lock.
11. If the diesel generator needs to be started from the Generator Control Panel:
 - a) The farthest right of the three Generator Compartment doors should be opened using CF 315 key.
 - b) Check if faults showing on screen. Attempt to clear by turning ignition switch OFF and pushing red STOP button.
 - c) Check also that Generator Emergency Stop button has been reset.
12. Turn ignition switch ON.
13. Push white MANUAL button (a small red light will illuminate at the top of the button).
14. Push green START button.
15. The CB can remain in the ON position as the "deep sea controller" will undertake diagnosis.
16. Close Generator Compartment door and lock.

8.1.2 Start Up Procedure for AKV 13, AKV26, AKV39, AKV 54 and AKV67

AKV 13, AKV 26, AKV 39, AKV 54 and AKV67 are fitted with Caterpillar DE Series Generator Sets with Cat C7.1 engines. The engine can be started by pressing the green RUN key at the C7.1 control panel. For this to happen the remote keys must be in the "ON" and "START" positions.

Normally though, the C7.1 will be in AUTO mode after the yellow AUTO key has been pressed. This allows the engine to be started remotely at the electrical control cabinet facing the outside viewing area.

1. Open the main electrical control cabinet door with CF 315 key.
2. Check that the Main Switch is turned to GENERATOR. It may have been in the OFF or SHORE position.
3. The Trainline Isolator may be left in the ON position.
4. Check that the VSFD (variable speed fan drive) switch is set to AUTO.
5. Open inner cabinet door with the 100 key.
6. With the KN 200 key turn Generator ON/OFF switch to ON.
7. With the same key, turn lower key switch to START.

The engine management control panel checks the system before cranking the engine, and deactivates the starter motor once the engine is running. It will also stop the starter motor if the engine fails to start in a set time. If the engine fails to start after 30 seconds of starter motor cranking, wait 2 minutes before trying again to allow the starter motor to cool.

After the motor starts, the red, orange and blue phase lights will illuminate. Power will subsequently be fed through the train provided the Trainline Isolator is ON. The whole process may take a few minutes to complete.

NOTE: If the motor does not start, check in the Generator Compartment that the yellow AUTO key is ON.

1. Close main Electrical Cabinet door and lock.
2. If the diesel generator needs to be started from the Generator Control Panel:
 - a) Make sure that the remote key switches are in the ON and START positions
 - b) Open the farthest right of the three Generator Compartment doors using CF 315 key.
 - c) If either the ALARM ACKNOWLEDGMENT or EVENT RESET key is lit, follow the steps in the Quick Start Guide below.
3. Push green RUN key.
4. Close Generator Compartment door and lock.

EMCP 4.1/4.2

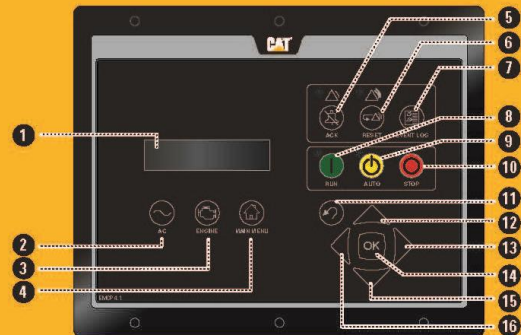
Quick Start Guide

5



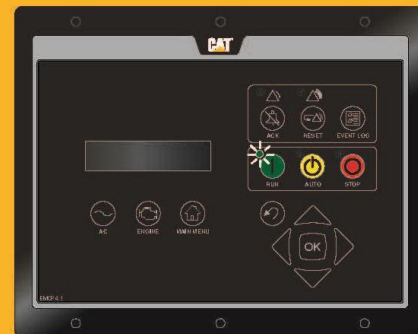
Return to RUN / STOP / AUTO as required

OVERVIEW



- | | |
|---|----------------------|
| 1. Display Screen | 9. Auto Key |
| 2. AC Overview Key | 10. Stop Key |
| 3. Engine Overview Key | 11. Escape Key |
| 4. Main Menu/Home Key | 12. Scroll Up Key |
| 5. Alarm Acknowledge/Silence Key with Yellow Warning Lamp | 13. Scroll Right Key |
| 6. Event Reset Key with Red Shutdown Lamp | 14. OK Key |
| 7. Event Log Key | 15. Scroll Down Key |
| 8. Run Key | 16. Scroll Left Key |

To START



Press RUN Key

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To STOP



Press STOP Key
STOP

2 Fault / Alarm Reset



Press STOP Key
STOP

AUTO Mode



Press AUTO Key
AUTO

3 Fault / Alarm Reset



Press RESET key
RESET

1 Fault / Alarm Reset Process



If either of these indication lamps are flashing or solid there is a warning or shutdown

4 Fault / Alarm Reset All. The display will show:



Press OK Key to clear all Warnings and / or Shutdowns (or)

Press ESCAPE Key to cancel

8.2 GENERATOR SHUTDOWN

To shut down the diesel generator using the 'remote' position:

1. Open the main electrical control cabinet door with CF 315 key.
2. Leave Trainline Isolator in ON position.
3. Open inner cabinet with 100 key.
4. Turn Generator START key switch to vertical position (OFF) with KN 200 key.
5. Turn Generator ON/OFF switch to OFF.

The engine will not shut down immediately following operation of the key switches as it has a 3 minute shutdown timer to cover the cooldown period for the turbocharger. The diesel generator controller will again undertake diagnosis of motor and VFD fan functions. Following this, phase lights will extinguish and power feed to the train consist will cease.

The generator engine will then shut down. When using remote shutdown it is not necessary to operate the Generator Control Panel.

If it becomes necessary to use the Generator Control Panel to shut the generator down:

Deep Sea	Cat 7.1
Push the red STOP button on the Generator Control Panel at the lower left. NOTE: THIS IS NOT THE GENERATOR EMERGENCY STOP BUTTON TO THE RIGHT OF THE CONTROL PANEL. Turn OFF the Ignition Key Close the generator compartment doors (and lock them if not at a KiwiRail Maintenance Depot).	Push the red STOP button on the Generator Control Panel. Also make sure that the remote ON and Start switches are OFF.

8.3 GENERATOR EMERGENCY SHUT DOWN

8.3.1 Emergency shut down

The Generator may be shut down in an emergency situation by pressing any of the following: Emergency Stop buttons on the AKV van. These are located:

- Emergency Stop button on the No. 2 end vestibule
- Emergency Stop button (Deep Sea) or Stop button (Cat 7.1) on the Generator Control Panel (inside Generator Compartment)
- Emergency Stop button on Generator Compartment wall (End 1 of walkway beside Generator Compartment).

8.3.2 Resetting generator emergency stop and generator faults/alarm

If the Generator Emergency Stop button is pressed, it creates an alarm condition which prevents the generator from being re-started until it is reset.

All Generator Emergency Stop buttons are reset by turning the red knob clockwise, then pulling it outwards.



If an alarm or fault has occurred, the menu display on the Generator Control Panel screen should be checked to see if the fault requires cancelling before restarting the generator. The screen will display faults such as:

- Low Oil pressure
- High Engine Temperature
- Common Alarm

To cancel faults and to reset:

Deep Sea	Cat 7.1
In the electrical control cabinet, turn the lower switch from Start to the vertical position (to allow the faults to be cleared). At the Generator Control Panel, push the red STOP button at the lower left (not the Emergency Stop). It may then be necessary to turn the ignition switch OFF then ON again. It is not normally necessary to operate the CB on the Generator Control Panel as the "deep sea controller" will regulate Start Up and Shut Down to overcome surges and spikes.	In the electrical control cabinet, turn the lower switch from Start to the vertical position (to allow the faults to be cleared). Follow the instructions in the Cat 7.1 Quick Start Guide.

8.4 DIESEL GENERATOR SET FIRE EXTINGUISHER SYSTEM

Fire Pro fire suppression systems are fitted to all the AKV gensets. Each system consists of a FirePro 2000 aerosol generator. One aerosol generator and a linear heat detection wire are located in the generator compartment. A control module located above the electrical switchboard enclosure continually monitors the state of the linear heat detection wire.

In the event of a fire, the control module immediately shuts down the engine and forced ventilation system, the red alarm is illuminated and the alarm buzzer sounds. Ten seconds after the engine shut-down is initiated, the aerosol generator will discharge. This floods the generator compartment with a fire suppression aerosol.



CRITICAL SAFETY ITEMS

If the fire suppression system has activated,

- **Do Not open the generator compartment until advised it is safe.**
- **Do Not attempt to start the generator.**

8.4.1 Specification

- Australian Standard 5062 Fire protection for mobile equipment.
- Battery backup
- Automatic fault monitoring
- Automatic shutdown of engine and ventilation fan when fire is detected.



8.4.2 Layout

This shows the locations of the control panel and manual activation points

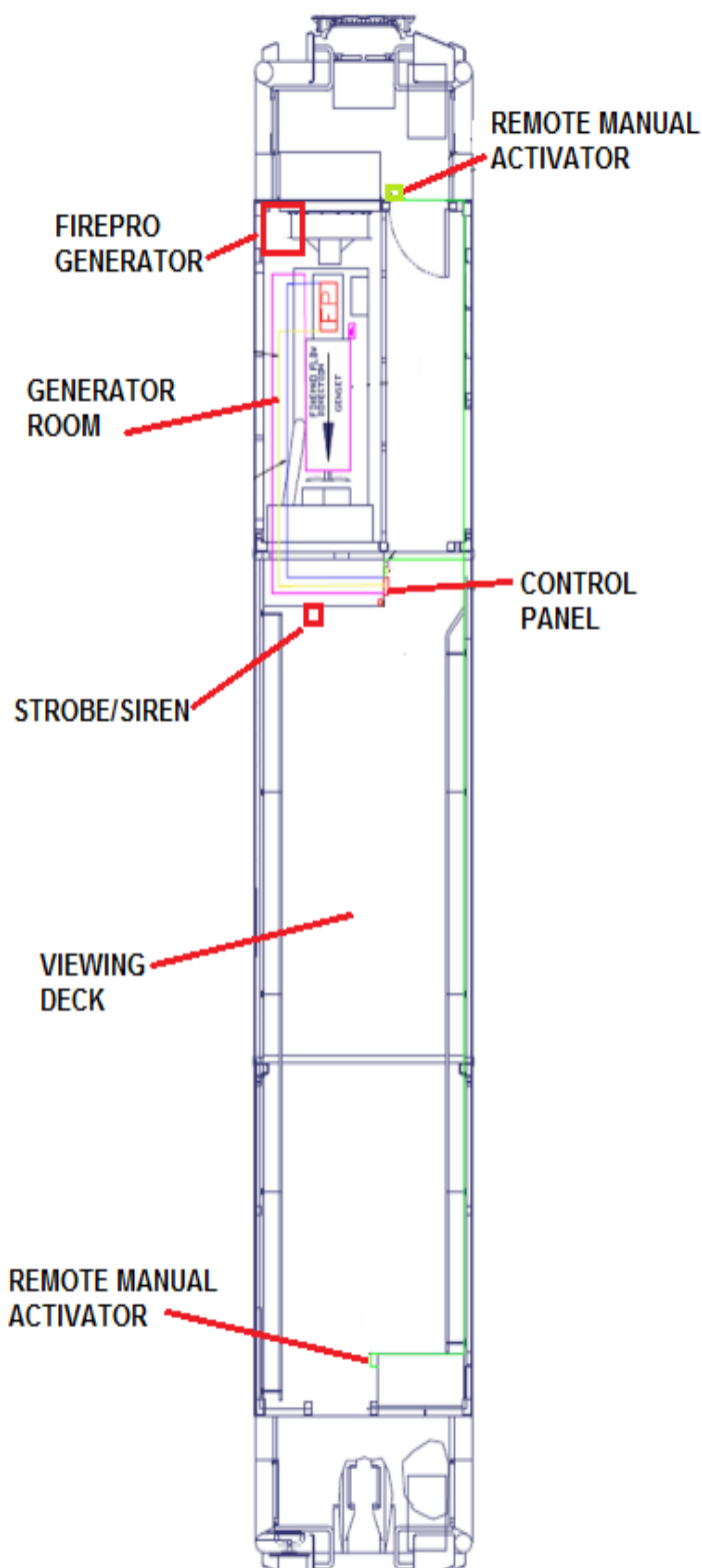


Figure 14: AKV Fire Suppression Control Point Locations.

8.4.3 Fire Suppression Control Panel

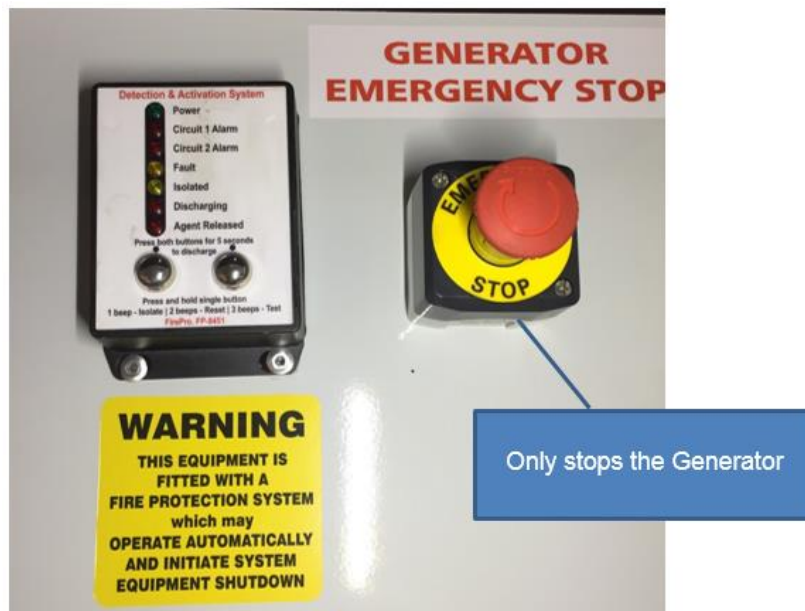


Figure 15: Generator control panel.

Located on the outside of the generator room next to emergency stop.

Indicates system status.

Can be used to manually activate the fire suppression system, which will also stop the generator

8.4.4 Manual Remote Activation Push Button

Located at the end of each van.

Manually activates the fire suppression system and shuts down the engine.



Figure 16: Manual Activation Push Button

8.4.5 Strobe light and Siren

Indicates the system has activated, and that the fire suppressing agent has been released into the engine bay.



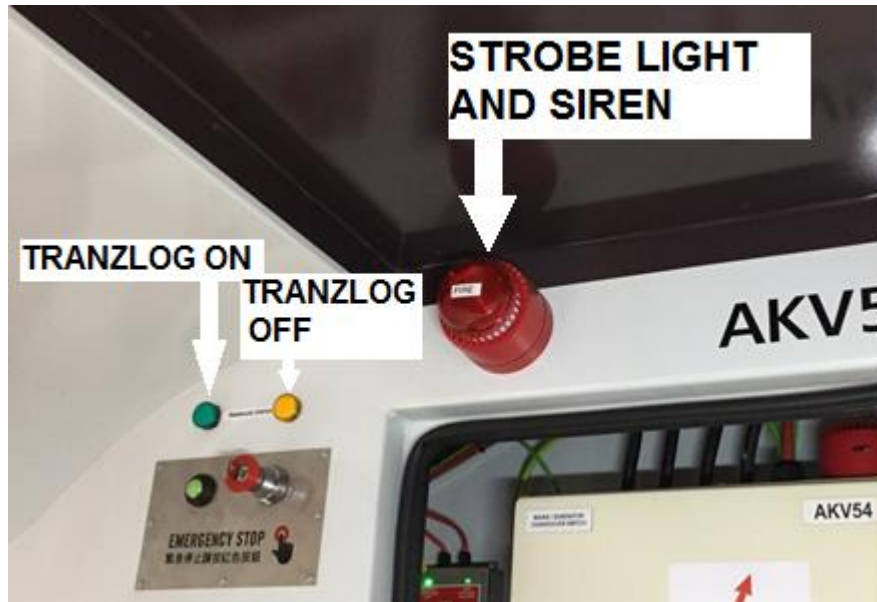


Figure 17: Strobe/Siren Location.

8.4.6 OPERATION

8.4.6.1 DAILY CHECKS

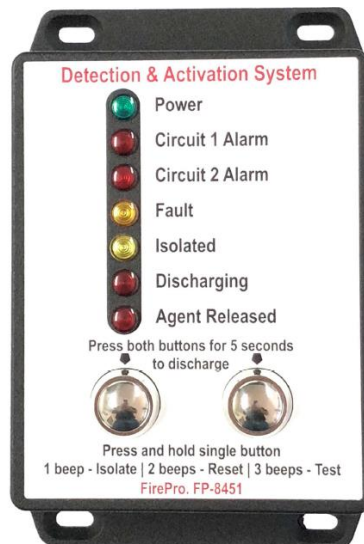


Figure 18: Control Panel.

1. On the control panel, power light must be ON, all other lights OFF.
2. In the viewing area, Red strobe light NOT flashing.
3. On the manual activation pushbuttons, plastic tamper seals are intact.

8.4.6.2 MANUAL ACTIVATION

To activate the fire suppression manually;

- On the control panel; press both buttons together for 5 seconds.
- On the Manual Fire Switches located at each end of the van, remove the pin and press the button for 5 seconds.

8.4.6.3 AFTER ACTIVATION

- **Do Not open the generator compartment until advised it is safe.**
- **Do Not attempt to start the generator.**

Siren and strobe light will indicate an alarm condition.

Control panel will indicate an alarm, and that the agent has been released.

After it has activated, the system cannot be reset using the buttons.

8.4.6.4 SYSTEM RESET

On the control panel, press and hold ONE button until the double beeps are heard.

8.4.7 Switchboard Fire Suppression

There is also a STAT-X 100T aerosol generator located in the switch board cabinet of AKV13, 26, 39 and 41. This is a separate, 'standalone' unit that is triggered by fire in the cabinet. It is not connected to the alarm module so there will be no indication if it is triggered.

If fire damage to the cabinet is noticed, this means the unit has discharged and the cabinet doors are not to be opened for at least 20 minutes. A portable fire extinguisher must be on hand when the cabinet is opened.

 WARNING
Do not enter the generator compartment or switch board cabinet until all the aerosol has dispersed with the doors open.

8.4.8 Electrical switch board cabinet

The Fire Suppression Isolation switch and the standalone STAT-X 100T aerosol generator are located in the switchboard cabinet.



Figure 19: STAT X 100T aerosol generator.

8.5 MAIN SWITCH

A shore supply (landline) / Generator Supply changeover switch is provided on the AKV switchboard — see photo in Section 2.

In the GENERATOR position, it allows power from the generator to be supplied to the AKV and all connected cars and vans connected via the End 1 of the AKV through the 400/230VAC trainline jumper cable.

In the SHORE SUPPLY position, it allows a land-based connection to be plugged into the shore supply socket on the B-side, at End 2 of the AKV. This provides limited power to run lights and cleaning equipment — 63 amps only.

NOTE: No more than 3 HVAC units per AKV may be operated on shore supply or damage may occur.

Ensure the appropriate shore supply switch in the depot is turned off before connecting or disconnecting the cable at the AKV. The Main Switch on the AKV should be turned to OFF. When the cable is disconnected, the dummy cover on the shore supply socket on the AKV should be screwed into position to protect the pins.

8.6 DIESEL GENERATOR SET FUELLING

Three fuel tanks are located under the AKV vans. Two are mounted on the B-side and one on the A Side. In total, these can hold 700 litres of fuel, which is sufficient for two days normal operation. The fuel tanks operate in parallel, and the fuel level drops at an equal rate within each tank.

A fuel gauge is not fitted, but AKV54 and AKV67 have a sight glass. The fuel tanks can be filled directly using a traditional fuel nozzle. DIESEL FUEL ONLY MUST BE USED.

8.7 400/230VAC CIRCUIT BREAKER PROTECTION

The purpose of the circuit breakers is to protect trainline cable plugs and sockets and allow power feed from the generator to the rest of the train.

There are two circuit breakers on each AKV van. One is located on the switchboard in the viewing area and is labelled "Trainline Isolator". The other is on the Generator Control Panel on the generator itself.

BOTH circuit breakers must be in the ON position for power to be fed to the train. Both can be left in the ON position as the diesel generator's controller will control initial power feed to prevent surges and spikes over run in and run down periods. Damage to the generator is minimised by having no load through these periods.

The "Trainline Isolator" will turn off power to all vehicles except the AKV if it trips. In the event of a trip, reset it and record the event in the Loco 54D book.

8.8 VFD (VARIABLE FREQUENCY DRIVE) FAN CONTROL

- This is located above the Tranzlog to the left of the main AKV switchboard.
- A key switch has three positions: AUTO/ OFF/ MANUAL. It is normally set to AUTO position and this should not be changed during normal operation of the fan. For the vans with the new CAT 7.1 Generator sets, if the Run light does not come on, the switch may have to be turned to MANUAL to get the fan started, once started, return switch to AUTO.t.
- There are three lights: VFD Run/ VFD Fault/ Motor Fault.
- Maintenance staff should be consulted if a failure of the fan occurs.



8.9 GENERATOR SET COMPARTMENT LIGHTING

8.9.1 Generator Room Lights

- AKV13, AKV26, AKV39 and AKV41 have 230VAC fluorescent lighting in their generator compartments.
- AVK54 and AKV67 have 24VDC LED lights. These also stay on if the mains power is out.

8.9.2 Radiator cap and oil dip stick

The radiator cap is located at the left end of the generator compartment. The farthest left of the three generator compartment doors needs to be opened to gain access to the radiator.

The oil dip stick is located at the base of the diesel generator. The centre of the three generator compartment doors needs to be opened to gain access to dip stick and oil refill.

9. ELECTRICAL SYSTEM

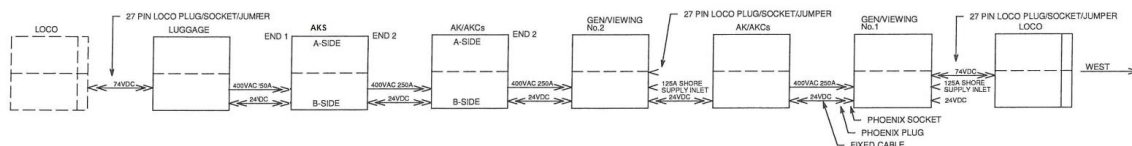
9.1 JUMPER CABLE ARRANGEMENT

Each vehicle on an AK Train vehicle has its own electrical control cabinet from which it is possible to control all electrical functions. In AK/AKC cars, they are located in the End 2 vestibules, on AKS End 2 B2 corner of the saloon, AKV vans at End 2 of the outdoor viewing area, and in AKL vans on the cross wall facing End 2.

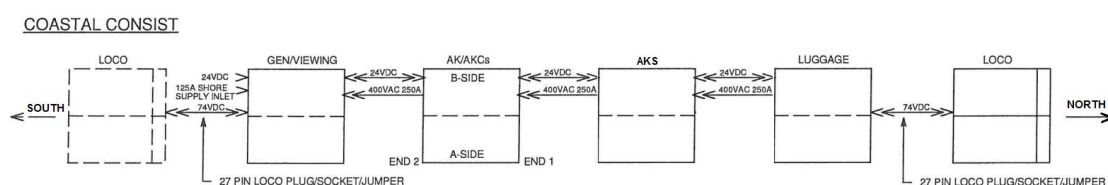
Power is supplied from the diesel generator via trainlined 400/230VAC jumper cables between vehicles. The power is fed from End 2 of each vehicle towards End 1. AKV vans do not have a jumper cable socket at End 2, therefore when a TranzAlpine train includes two AKVs within its consist, one will be at the end of the train, feeding power from the diesel generator towards the AKV's End 1 and then via jumper cable through the attached AK/AKC cars to End 1 of the AK coupled to a second AKV in the centre of the consist.

The jumper cable socket lid at End 1 of that adjacent AK or AKS must be clamped shut for safety. The second AKV diesel generator will then feed power through its End 1 to the remaining AK/AKC/AKS cars and the AKL van, all in the direction End 2 to End 1. While End 1 of the AKL van is not fitted with a jumper cable socket, a sensor will indicate End of Train to the TMS PLC.

NOTE: if there is only one power van and the end car is a carriage and not a van as per a charter setup, the 400/250amp socket lid in the closed position signals end of train to the TMS.



Inter-car wiring arrangement: TranzAlpine arrangement



Inter-car wiring arrangement: Coastal Pacific and Northern Explorer arrangement

9.2 400/230VAC TRAINLINE JUMPER CABLE

Three phases of AC power are transmitted through these cables. If all three phases are functioning, three lights – Red, Orange and Blue – will be illuminated through the glass panel on each vehicle's switchboard. If one or more are extinguished, the phase will have "dropped out" and some electrical function will be lost. If this occurs, all circuit breakers should be checked to identify the problem.

When handling the trainline 400/230VAC jumper cables between vehicles in a KiwiRail Passenger Depot, ensure the shore supply is not connected. The Main Switch in the AKV electrical control cabinet must be in the OFF position.

In a situation where an AK Train is in service in an area other than a KiwiRail Passenger Depot, and vehicles require to be coupled or uncoupled, the following options exist when handling the trainline 400/230VAC jumper cable:

NOTE: WHEN A TRANZALPINE CONSIST INCLUDES TWO AKV VANS IT WILL BE NECESSARY TO IDENTIFY CLEARLY WHICH AKV DIESEL GENERATOR IS POWERING THE VEHICLES WHICH REQUIRE COUPLING AND UNCOUPLING.

1. The Generator can be shut down, so cutting the power feed completely.
2. The Generator may be left running but the Generator Circuit Breaker on the Generator Control Panel turned OFF, so cutting power feed to all vehicles powered from that AKV including the AKV itself.
3. The Generator may be left running but the Main Switch in the AKV electrical control cabinet turned to the OFF position, so cutting power feed to all vehicles powered from that AKV including the AKV itself.
4. The Generator may be left running but the Trainline Isolator in the electrical control cabinet of the AKV turned to the OFF position, so cutting power feed to all vehicles powered from that AKV EXCEPT the AKV itself.

Once the power feed is cut to the jumper cables by the relevant means, they may be detached by lifting the jumper cable socket lid clip (on the B-side at End 1 of the vehicle being uncoupled) and pulling the cable down from the socket.

An audible alarm will be sounded by the TMS (powered via the 24VDC backup) indicating a break in the trainline circuit. An END OF TRAIN alarm will be indicated on the TMS screen in the vehicles being disconnected.

The jumper cable should then be turned and placed upward into the bracket on the End 2 headstock of the other vehicle.

9.3 24VDC TRAINLINE JUMPER CABLE

The 24VDC jumper cables that are fitted between all vehicles on an AK train transmit the trainlined low-voltage circuits that operate the equipment items listed in 9.5 below. These cables, being low voltage, can be detached without shutting down the AKV diesel generator and without turning off the Trainline Isolator and the Generator Circuit Breaker.

They should be disconnected at each end by pushing their securing clip upwards above the cap, then pulling the cable gently downwards. DO NOT KNOCK OR DAMAGE ANY OF THE PINS EITHER ON THE CABLE OR ON THE SOCKET ON THE AK VEHICLE.



When the cable is disconnected, an audible alarm will be sounded by the TMS indicating a break in the trainline circuit. An END OF TRAIN alarm will be indicated on the TMS screen in the vehicles being disconnected.

The cables must then be placed in a secure place inside the train ready for future deployment. 24VDC JUMPER CABLES MUST NOT BE LEFT ON THE GROUND OR IN AN INSECURE OR DIRTY PLACE.

NOTE: The AKS has a non-removable 24VDC control jumper at End 2. This jumper has its own dummy storage housing attached to the End 2 end wall just below the B side tail light and must be used when the jumper is not attached to an adjacent vehicle.

9.4 CIRCUIT BREAKERS

Circuit breaker (CB) switches protecting circuits operating within each car and van are located in the 230VAC DISTRIBUTION BOARD and 24VDC DISTRIBUTION BOARD cupboards in the electrical control cabinets of each vehicle. These are opened using the 100 Key.

Within each is a notated list identifying which CB operates the train's circuits and equipment. Some equipment is powered through the 230VAC circuits only. These items will cease to operate when the diesel generator is shut down. They can be identified using the lists within the electrical control cabinets within each vehicle.

AK cars all operate identically. AKC/AKS cars have some equipment the AKs do not have. All AKC server equipment and AKS fridge/freezers will cease to operate when the diesel generator is shut down. If a particular item of equipment fails, check the relevant CB on the 230VAC distribution board of the AKC/AKS. AKV and AKL vans also have individual 230VAC and 24VDC distribution boards but these have fewer circuits than those found in the cars.

9.5 24VDC BATTERY SUPPLY AND BACK-UP POWER SYSTEM

Underneath every AK train car, support vehicle and van is a box containing 24VDC batteries. A battery charger is located at the base of every electrical control cabinet, accessible by maintenance staff only using 144 Key. The batteries are charging whenever the AKV diesel generator is operating or the shore supply is connected. These operate as a back-up power source when the generator fails. Some equipment operates via the 24VDC circuits as a matter of course (listed below).

It is most important that power is not drawn from these batteries when the AK Train is SHUT DOWN in a location other than a KiwiRail passenger depot—See Section 3 of this code. To disable the 24VDC power supply within each vehicle, the 24VDC DISTRIBUTION BOARD door on the electrical control cabinet should be opened using 100 Key.

The CB labelled 24VDC ISOLATOR is turned off by flicking it to the right. This CB is to be used to turn the battery supply "off" rather than using the fuses located in the battery box under the car or van. These CBs must be turned off in every car and van when the train is "shut down." This is NOT a trainlined feature.

In the event of power failure through the loss of power supply from AKV diesel generator, the 230VAC circuits will cease to operate. However, the following items of equipment will continue to operate by drawing on the 24VDC batteries:

Emergency lights in AKV/ AKL vans.

Vestibule Emergency Lights in AK/AKC cars.

Toilet emergency lights in AK/AKC cars.

Saloon emergency lights in AK/AKC/AKS cars.



Tail lights on all vehicles.

Car ID displays.

PIDS headsets (Trainlined)

PA in cars and AKV vans (Trainlined)

CCTV cameras and DVRs in cars and AKV vans (Trainlined)

CCTV monitor in AKC cars (Trainlined)

TMS PLC in all vehicles (Trainlined)

Exterior doors in AK/AKC/AKS cars

Saloon doors in AK/AKC cars

Emergency brake override in cars and AKV vans (Trainlined)

Help call buttons in cars and AKV vans (Trainlined)

Smoke detectors in AK/AKC/AKS cars

Toilet flush in AK/AKC cars

HVAC circulating fans

24VDC voltage monitors in all vehicles

Tranzlog in AKV vans

Wheelchair hoist in AKC cars—see note below

Luggage hoist in AKS cars – see note below.

For the AK, AKC, AKS and AKV, once the diesel generator shuts down, the 24VDC batteries will no longer be charging, therefore the draw on them will gradually reduce the voltage available. The charge still available from each vehicle's batteries can be monitored from the voltage monitors on the electrical control cabinets of each vehicle—cars and vans. They normally read 27.3V available when batteries are fully charged.

For the AK and AKC, the batteries have a nominal capacity of 4 hours running time. This covers 2.5 hours with all the above equipment operating, including one HVAC circulating fan. The TMS PLC has a timer to limit the supply fan run time to 2.5 hours in a one day (by date) period. After 2.5 hours, the system is designed to run all the other services for a further 1.5 hours. Discretion may be used in deciding which services may be shut down (CBs turned off) to conserve the batteries' charge.

It is possible to use the wheelchair hoist in the AKC and the luggage hoist in the AKS cars using the 24VDC system, although this will make a huge draw on the batteries. The hoists can be operated manually using the pump handle, and this option should be taken whenever practicable.

9.6 AK SALOON, SUPPORT VEHICLE AND VAN LIGHTING

In AK/AKC/AKS cars, the ON/OFF key switch to operate saloon vestibule/toilet lighting is located on the LIGHTING Panel on the switchboard of the electrical control cabinet of each car and van. This switch operates BOTH the emergency lights (24VDC) and the non-maintained saloon lighting (230VAC). The 230VAC fluorescent lights will operate only when the diesel generator is running or the train is connected to a shore supply.

There are five settings for the saloon lights in AK cars operated by a toggle switch on the LIGHTING panel of the switchboard, providing varying intensities from the two strips of fluorescent tubes running the length of the coat/luggage racks:

- Aisle and Window
- Aisle Maximum
- Aisle Minimum



- Window
- Off

AKC cars have two settings only, from one strip of fluorescent tubes above pelmets in the Lounge area.

AKS cars have one setting only, "ON" for side fluorescent and centre aisle emergency lights.

AKV and AKL vans have one strip only along the centre of the vans. All non-maintained lights are RCD protected.



Figure 20: Lighting panel - AK switchboard.



Figure 21: Lighting panel - AKS switchboard.

9.7 EMERGENCY LIGHTING

The switch to turn the emergency lights on is adjacent to the saloon lighting ON/OFF key switch on the LIGHTING panel located on the switchboard of the electrical control cabinet of each car and van. The 24VDC batteries running these lights are continuously charged while the diesel generator is running or if the cars are on shore supply.

NOTE: THIS SWITCH MUST BE TURNED "ON" AT ALL TIMES IN CASE THE 230VAC SYSTEM FAILS.

In the saloon and vestibules and on the vans there are a number of LEDs powered via a 24VDC-230VAC Inverter. These are the maintained emergency lights which operate continuously. The Toilet Emergency Light is located within the same fitting as the non-maintained toilet light.

9.8 TAIL LIGHTS

Every vehicle in the AK consist has four fitted tail lights; two are located at each end of each vehicle. These are operated manually by a key switch on the TAIL LIGHT Panel on the switchboard of the electrical control cabinet of all cars and vans.

The tail lights are operated from the switchboard of the vehicle on which they are being used. This is NOT a trainlined feature.

There are also reversing (white) lights fitted to the End 1 of the AKS and AKL. These are used when reversing, and are activated in the AKS/AKL.

9.9 230VAC POWER POINTS

A 230VAC power point is provided for each passenger seat in most AK/AKC cars, for each wheelchair station in AKC Cars, the crew rest area in the AKS and at various places around the AKS and AKL cars to suit the locations of various appliances.

A power point is provided for interior cleaning purposes in each vehicle. These are located at the base of each vehicle's electrical control cabinet.

NOTE: Some of the AK cars have been converted to USB only supply at the seats.

9.10 MAIN SUPPLY SWITCH

A Shore Supply (landline) / Generator Supply changeover switch is provided on the AKV Switchboard. In the GENERATOR position, it allows power from the generator to be supplied to the AKV and all connected cars and vans connected via the End 1 of the AKV through the 400/230VAC trainline jumper cable. In the SHORE position, it allows a land-based connection to be plugged into the shore supply socket on the B Side, at End 2 of the AKV. This provides limited power to run lights and cleaning equipment — 63 amps only.

NOTE: No more than 3 HVAC units per AKV may be operated on shore supply or damage may occur.

Ensure the appropriate shore supply switch in the depot is turned off before connecting or disconnecting the cable at the AKV. The main switch on the AKV should be turned to OFF. When the cable is disconnected, the dummy cover on the shore supply socket on the AKV should be screwed into position to protect the pins.

9.11 OTHER SWITCHBOARD ITEMS

A description of the following can be found in dedicated sections of this document:

- 12 [Air conditioning system](#)
- 13.1 [PA \(public address system\)](#)
- 13.2 [Passenger information display system \(PIDS\)](#)
- 6.11 [Door split \(doors trainline\) switch for short platforms](#)
- 16 [Emergency brake operation and override](#)
- 13.3 [Car ID – LED displays](#)
- 17 [Train management system \(TMS\)](#)
- 18 [Help Points](#)

NOTE: For train start up, the normal operating settings for key switches on the switchboards are in Section 4 [Start-up procedures](#).

10. BRAKE SYSTEM

10.1 TWO PIPE BRAKE SET UP

When AK cars, support vehicles and vans are in passenger service, the main reservoir and brake pipe air hoses **MUST** be connected through the entire train.

The main reservoir air supply provides air to operate:

- Brake cylinders
- Air bag springs (secondary suspension)
- Doors, extendable steps & all other on-board pneumatics

10.2 SINGLE PIPE BRAKE SET UP

In the rare event it is not possible to operate the AK carriages and AKS support vehicle as a 2 pipe train, e.g. for recovery purposes or moving cars on freight services, the BP will automatically feed air into the MR however, operation of services may be sluggish, due to the restricted supply of air. Air bag inflation will have to be monitored. Graduated release will operate with either two pipes or single pipe set-up.5.8

Refer to Section **Error! Reference source not found.** **Error! Reference source not found.** and Sections 5.8, 5.9 and 5.10 of this document, and to the Rail Operating Code: Rolling Stock Restrictions: Passenger Restrictions Clause 11.2 for more information on towing AK cars while using a single pipe brake system.

10.3 CUTTING OUT BRAKES ON THE AK TRAIN CONSIST ONLY

When brake faults occur on AK cars, AKS support vehicles and vans, both brake cylinders on each bogie must be isolated. The entire car's and van's brakes can be isolated in the case of a triple valve fault.

If the triple valve isolating cock (on the triple valve) is isolated, the main reservoir drain prevention cock must also be isolated to prevent constant draining of the main reservoir.

The AK train consist may run with either:

- the brakes on one AK car, AKS support vehicle or van only cut out (except when this car / van is at the rear of the consist), or
- the brakes of up to two bogies cut out on one or two cars or vans (in any position, except the last position, if both bogies are on the same car or van), or
- only one bogie of the two locomotives cut out (applies only if train is double-headed).

10.4 PARK BRAKE

AK and AKC cars fitted with P-11 bogies have one spring-applied park brake unit per axle. AKS cars fitted with S-Ride bogies have axles 2 and 3 fitted with 2 spring applied park brakes per axle. These cars are NOT fitted with conventional handbrakes. The park brakes are applied by springs when the park brake release cylinder is drained of air.

10.4.1 Checking whether park brakes are applied:

A green/red eyeball ('Rotowink') indicator shows the presence of pressurised air in the park brake chamber. Green indicates that the park brake is released and red indicates that the park brake is applied.

NOTE: The indicator will turn red only when the isolation cock labelled "Park Brake By Carriage" is applied and only when ALL the air is exhausted from the park brake units. It will NOT turn red when either or both isolation cocks labelled "Park Brake Isolation cock End 1 or 2" are applied. This is the same for AK/AKC and AKS except, that for the AKS, the "park Brake Isolation cock by car is under the B2 door and the Park brake isolation cocks by bogie are on the A-side under each door.



Figure 22: Park brake Rotowink indicator viewed through closed cabinet.



Figure 23: Park brake Rotowink indicator, Air Services Box (open).

10.4.2 Park brake application and release for spring applied park brakes

There are two main methods for applying the park brakes on the AK consist, **excluding** vans.

1. Push the park brake apply push button in the Train Managers (TM) office. This electrically controls the park brake isolation valve **APPLYING THE PARK BRAKES IN THE ENTIRE CONSIST EXCEPT AKV/AKL VANS**, by releasing the air off the system allowing the spring to apply brake force on the wheels. The Park Brake applied light will be illuminated on the TM

control panel and on the AKS switchboard and the Rotowinks will be red on the Air Services Box

2. To release, push the park brake release push button on the TM park brake control panel.
3. Or from the ground, a CARS park brake may be applied by turning to the park brake isolation cock on the air "isolation cock panel" on the B side of an AK, AKC and for the AKS, on the B side by turning the isolation cock so that the handle is perpendicular to the pipework. For both the AK/AKC and AKS, this exhausts the air from the park brake chambers on that cars park brakes, allowing the internal spring to apply the park brake.

NOTE: THIS ONLY APPLIES THE PARK BRAKE PER CAR BASIS, NOT THE ENTIRE CONSIST.

4. The park brake must be released by returning the park brake isolating cock to "In Service" position. This action re-admits air to the park brake chamber, and re-compresses the spring.

10.4.3 Emergency release of park brake

In the event that there is insufficient air pressure to release the park brake, the park brake may be released using the bogie-mounted pull cables for the P11's or the brake cylinder mounted levers for the S-rides.

For the P11 bogies there is one cable per axle, on each B side corner of the bogie frame. Each cable only releases the park brake on its adjacent axle; i.e. both cables need to be pulled to release the park brakes for the bogie.

For the S-Ride, there is one lever per Park Brake Cylinder on the number 2 and 3 axles, both A and B sides, both sides must be released.



WARNING

When the park brake is released, the car may roll away. There is no way to reapply the park brake, or service brake, except by a supply of air and a service brake application.



WARNING

If the park brake is manually released, and if the park brake isolation cocks are in the "Isolate" position, then the park brakes will reset on the next application of the service brakes. This would not be known to the LE, and dragged brakes will result. For this reason, if a bogie's park brakes are manually released, and the carriage is to be moved by loco, the brake cylinder isolation cocks must also be turned to "Isolate", to prevent the unintended application of the carriage park brakes.



Figure 24: P11 Bogie location of park brake mechanical release handle.

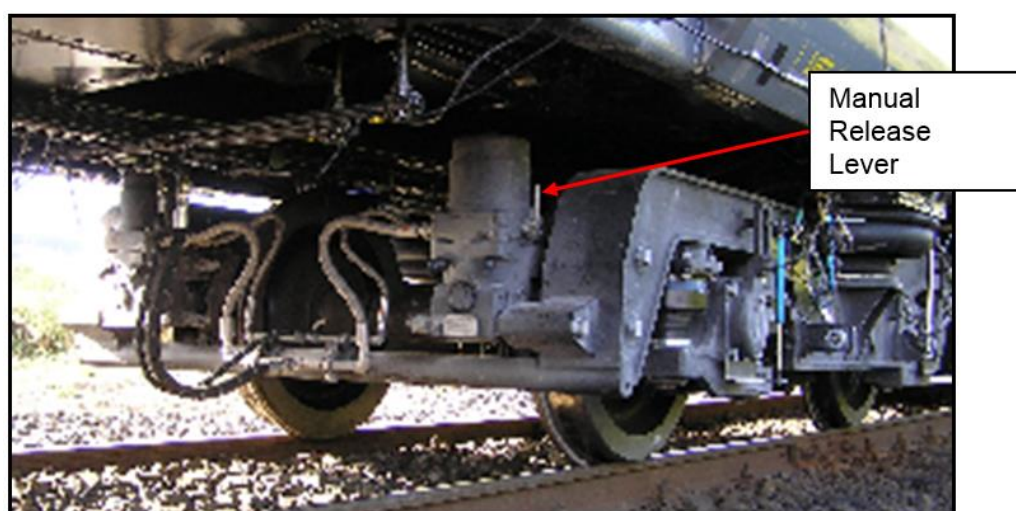


Figure 25: AKS S-Ride Bogie location of park brake mechanical release levers.

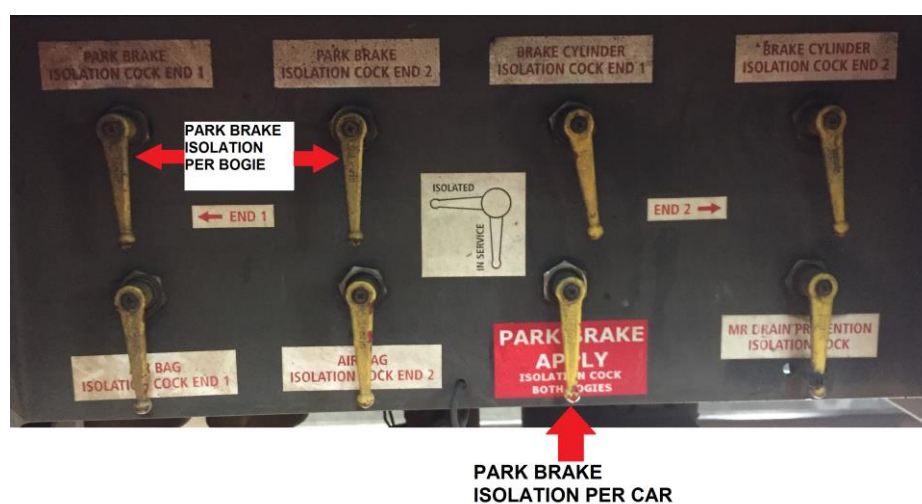


Figure 26: AK/AKC Air isolation cock panel.



Figure 27: AKS Park Brake air isolation cock by car.

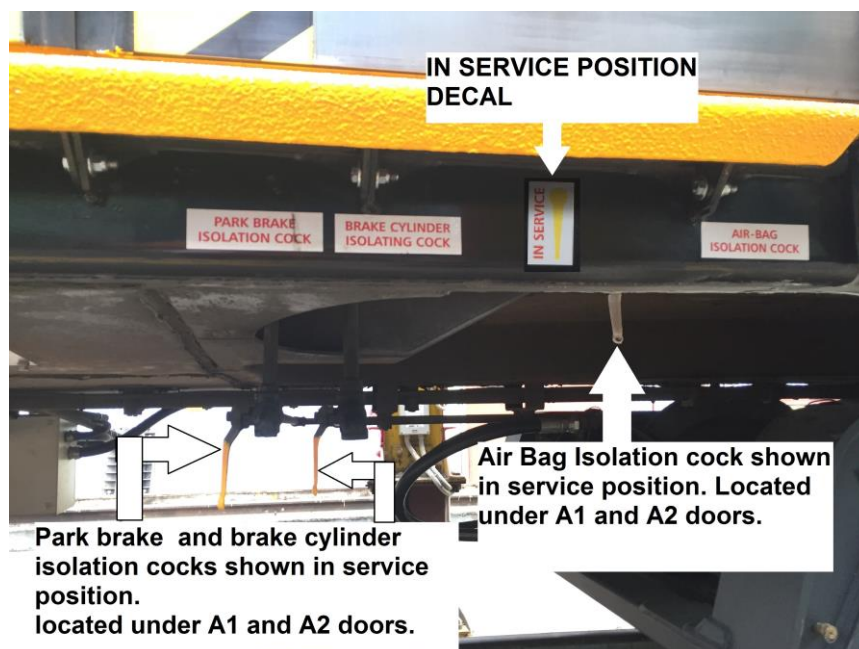


Figure 28: AKS Park Brake air isolation cock per bogie.

AKV and AKL van handbrakes are activated by a conventional vertical wheel located at the No1 end. Vans are fitted with X28020 bogies.

11. AIRBAG SYSTEMS

Vertical springs supply the primary suspension on each bogie. Airbags supply the secondary suspension. The air is supplied from the Main Reservoir to the top of each airbag, which is connected to an auxiliary air tank on each side of the bogie for the P11 and each side frame for the S-Ride.



There is a half-round datum on each side of the bogie and a datum plate above it on the carriage, at the level of the transom. With correct air pressure on level track, the vertical distances between these data should be 275–285mm. A deflated airbag may cause this measurement to be as low as 245mm.

If a pair of airbags deflate:

If an airbag on one side of the car deflates, the airbag directly opposite will also deflate in order to prevent the carriage from leaning. If this occurs, Airbag Deflation will be indicated in Tranzlog and TMS, and the TMS audible alarm will sound. The Airbag Deflated indicator light on the Train Status Panels (AKC and AKS) will also illuminate.

In the first instance, the Train Manager should press the airbag deflated reset button on the Train Status Panel to determine the validity of the alarm. If the light extinguishes immediately, this indicates a possible false alarm. This should be monitored and reported via email if this occurs again on the same service. If the light stays illuminated despite reset, this is a genuine airbag deflation alert. If the LE has not already begun to reduce speed, the Train Manager must advise the LE of the alarm and ask the LE to confirm they are reducing speed to 25km/h and preparing to stop in the next safe location.

If there is an obvious air leak from the airbags, Isolate the airbags at the affected end only. The train can only run at a speed of 25 km/h to a location to cut out the problem vehicle or to the nearest safe location for passengers to disembark.

Refer to Shield 2.8.3 – Reduced Speed Continuous Monitoring for further details on operating Carriage Services with deflated airbags or damaged / missing jumper.

Notes on the Train Alert Panel airbag reset push-button:

1. The airbag deflated light is on a timer and will automatically extinguish 5 minutes after correct airbag pressure has been restored (if not reset prior).
2. The airbag deflated lights in the AKC and AKS both illuminate in the event of low airbag pressure anywhere on the consist. However, the push-button reset operates independently, ie reset in the AKC will not automatically reset in the AKS and vice-versa.

To locate the carriage at fault, the Train Manager must use the TMS fault direction arrows to find the vehicle/s displaying the Airbag Deflated fault on the TMS screen.

11.1 PROCEDURE FOR ISOLATING BRAKES ON A BOGIE FOR AK / AKC AND AKS CARRIAGES

1. Drain and isolate the park brake cylinder using park brake isolation cock.
2. Manually release brake blocks using the P11 bogie-mounted pull cable or S-Ride brake cylinder mounted release.
3. Drain and isolate brake cylinder using brake cylinder isolation cock.

This procedure can be repeated for each bogie as required.

The triple valve isolation cock should not be used to isolate carriage brakes except in case of a major air leak.

The remainder of this section lists each item, its location and its function.

11.2 MAIN RESERVOIR NO.1 AND MAIN RESERVOIR NO.2 DRAIN COCKS

- For the AK/AKC, these are located on the side of the auxiliary air service box on the A side of the car.
- For AKS, these are located one each on opposite sides of the in line with the air reservoirs.
- The #1 main reservoir provides air to the brakes; the #2 reservoir provides air to the doors and the air bags.

11.3 TRIPLE VALVE ISOLATION AND MAIN RESERVOIR (DRAIN PREVENTION) ISOLATION COCK

These two cocks are used to isolate the entire braking system on a car in the event of a major air leak. If the triple valve isolation cock is isolated, the main reservoir (drain prevention) isolation cock must also be isolated to prevent constant draining of the main reservoir.

The triple valve isolation cock is located next to the triple valve on the 'B' side of the car.

For the AK/AKC the main reservoir (drain prevention) isolation cock is located on the bottom row of the isolation cock panel on the 'B' side of the car.

For the AKS the main reservoir (drain prevention) isolation cock is located under the B2 door.

For the AKV / AKL the main reservoir (drain prevention) isolation cock is located on the underframe near the triple.



Figure 29: AKV MR drain prevention cock

NOTE: The main reservoir drain prevention cock provides the air supply to the brake cylinders. For normal operation, this cock must be left in the “IN” service position and should be cable tied in this position.

11.4 RELEASE PULL WIRE

The release pull wire will NOT release the brakes if the brake pipe is charged, but will release the brakes completely on the carriage if the car's brake pipe pressure is below 100kPa (park brake applied). The release pull wire does not affect the park brake.

11.5 AIRBAG ISOLATION COCK

For the AK/AKC, these are located on the ‘B’ side of the car, on the bottom row of the isolation cock panel. There is one isolating cock for each bogie at End 1 and End 2. Only use the air bag isolation cock to cut the air supply to a bogie's air bags if there is a major leak to the air bag supply or an airbag has burst.

For the AKS, these are located on the ‘A’ side of the car, under the A1 and A2 doors as shown in fig 28. There is one isolating cock for each bogie at End 1 and End 2. Only use the air bag isolation cock to cut the air supply to a bogie's air bags if there is a major leak to the air bag supply or an airbag has burst.

11.6 BRAKE CYLINDER ISOLATION COCK

For the AK/AKC, there are two brake cylinder isolation cocks provided on the ‘B’ side of the car, on the top row of the isolation cock panel for End 1 and End 2 bogies. Each brake cylinder isolation cock isolates the brake cylinder on an axle. These cocks are vented, so that any air trapped in the brake cylinders is exhausted when the cock is turned to the isolate position.

For the AKS with **P11 bogies**, there are **TWO** brake cylinder isolation cocks provided on the ‘A’ side of the car, one for the End 1 bogie and one for the End 2 bogie and as for the AK cars, each brake cylinder isolation cock isolates the brake cylinders on a bogie. These cocks are vented, so that any air trapped in the brake cylinders is exhausted when the cock is turned to the isolate position.

For the AKS with **S-Ride bogies**, there are **FOUR** brake cylinder isolation cocks provided on the ‘A’ side of the car, one either end of each bogie for each axle.

11.7 PARK BRAKE ISOLATION COCK – BY BOGIE

For the AK/AKC, each bogie has its own park brake isolation cock, located on the ‘B’ side of the car, on the top row of the isolation cock panel for End 1 and End 2 bogies. Isolating this cock exhausts the air from the park brakes on its bogie and applies the park brakes on this bogie only. These isolated park brakes cannot be released from the Train Managers office and the Park brake applied light will also not be illuminated.

The bogie park brake will release if the isolation cock(s) are returned to the ‘Service’ position and there is air available.

For the AKS, each bogie has its own park brake isolation cock, located on the ‘A’ side of the car under the A1 and A2 doors as shown in Fig 28, one for the End 1 bogie and one for the End 2 bogie. Isolating one of these exhausts the air from the park brakes on its bogie and applies the park brakes on this bogie only.

NOTE: These isolated per bogie park brakes cannot be released remotely and the Park Brake applied light will not be illuminated.

The bogie park brake will release if the isolation cock(s) are returned to the 'Service' position and there is air available.

11.8 PARK BRAKE ISOLATION COCK – BY CAR

For the AK/AKC, the park brake isolation cock for the entire car is located on the bottom row of the isolation cock panel on the 'B' side. Isolating this cock exhausts the air from all the park brakes on the car and applies all the park brakes on this car.

NOTE: Activation of this Park Brake Isolation cock by car will show on the TMS as a fault.

The car park brake will release if the isolation cock is returned to the 'Service' position and there is air available.

For the AKS, the park brake isolation cock for the entire car is located on the B side under the B2 door as shown in Fig 28. Isolating this cock exhausts the air from all the park brakes on the car and applies all the park brakes on this car.

NOTE: Activation of this Park Brake Isolation cock by car will show on the TMS as a fault.

The car park brake will release if the isolation cock is returned to the 'Service' position and there is air available.

Note: That the "by car" park brake can be applied and release from the Train Managers office for the entire consist **excluding** the AKV/AKL vans.

NOTE: IF PARK BRAKE IS BEING APPLIED FROM GROUND LEVEL, THE "PARK BRAKE APPLIED BY CAR" IS THE PREFERRED METHOD.

11.9 EXTERNAL DOOR STEP ISOLATION COCKS

For the AK/AKC, two isolation air cocks are mounted behind a panel in the vestibule end wall and should the footsteps need to be isolated the steps Must be cable tied in the closed position. Holes are drilled in the step frame to allow cable tie threading.



Figure 30: Location of access panel for door and step isolation cocks.



Figure 31: Door and step isolation cocks

11.10 ISOLATION AND CUTOUT COCKS



Figure 32: AK/AKC B-Side isolation cocks.



Figure 33: AK/AKC Main reservoir #1 and #2 Drain Cocks.

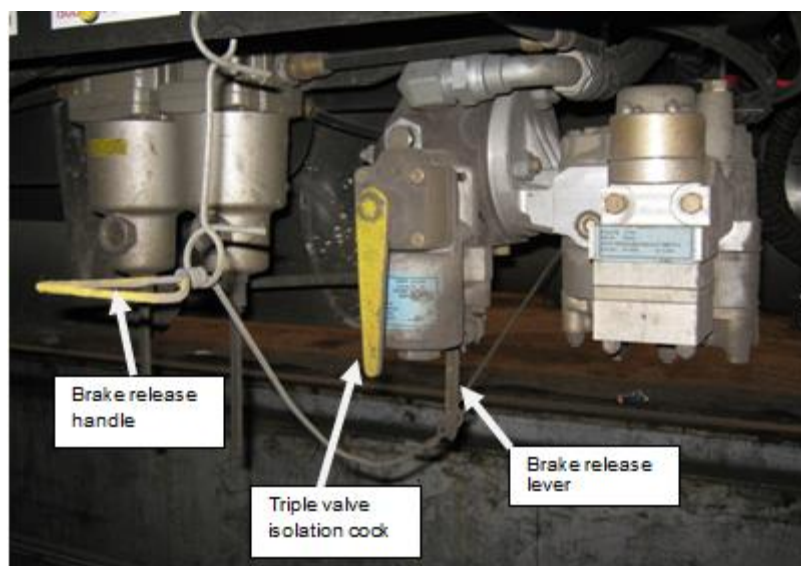


Figure 34: AK/AKC/AKS/AKV/AKL Triple valve isolation and brake release lever / handle located B-Side of cars and vans.

For AKS isolation and cut out cocks, see figures 34, 35 and 37 below.

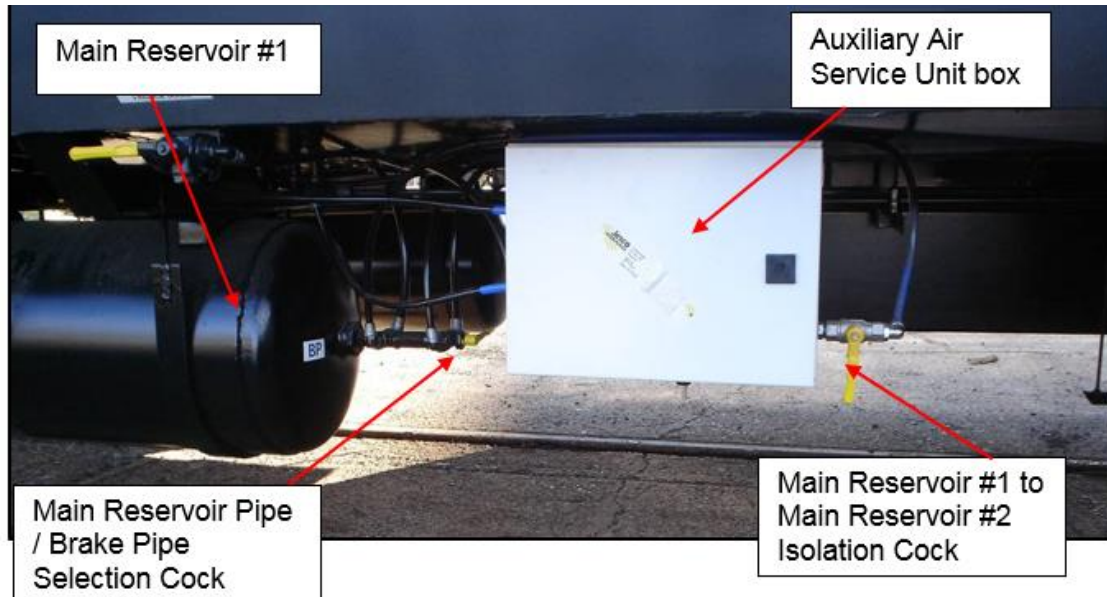


Figure 35: AKS MR/BP selection and MR isolation cock – location shown A-Side of car



Figure 36: AKS Main Reservoir Drain Prevention Cock under B2 door

NOTE: The main reservoir prevention cock provides the air supply to the brake cylinders. For normal operation, this cock must be left in the open (in service) position as shown.

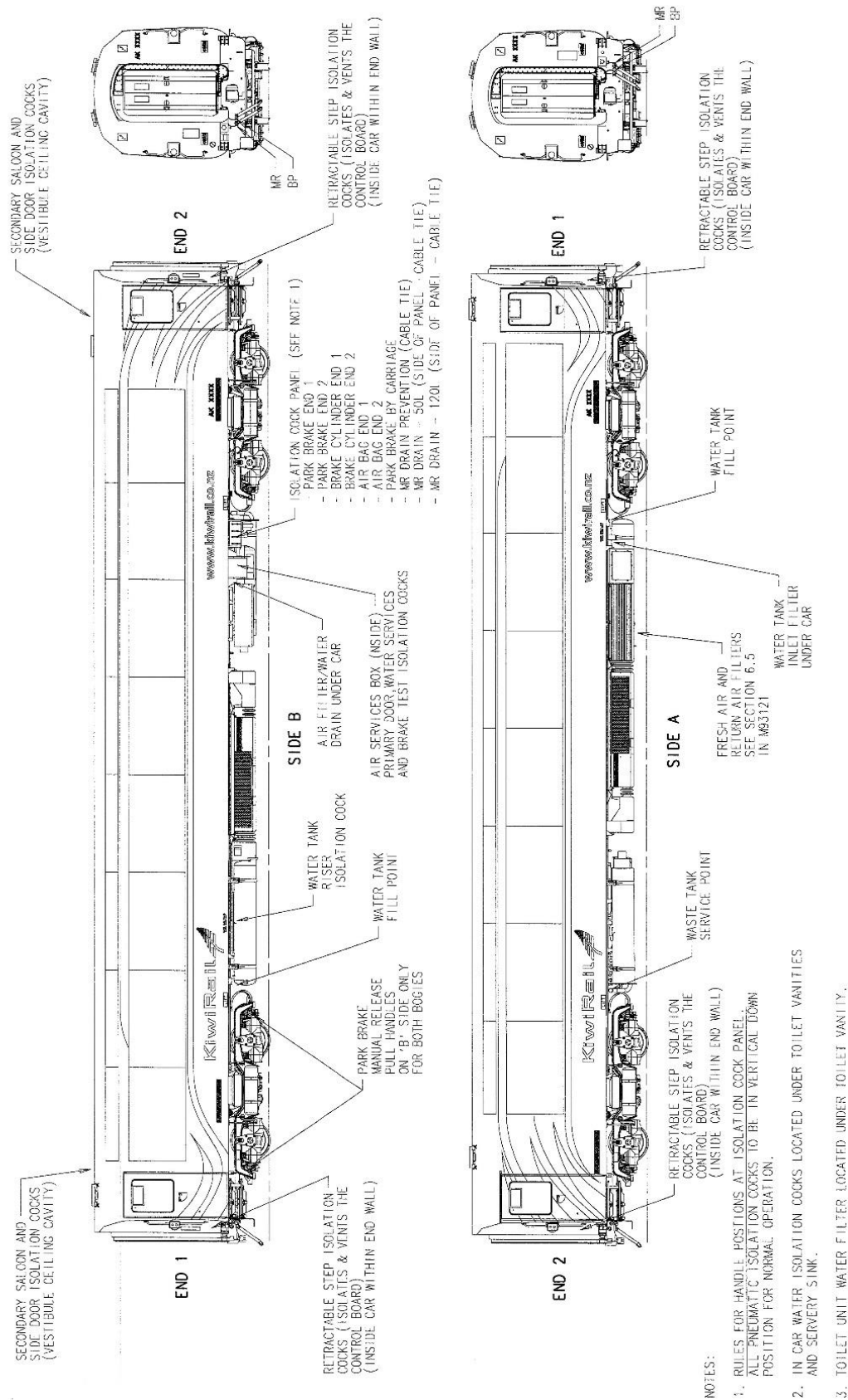


Figure 37: AK and AKC Isolation cock locations

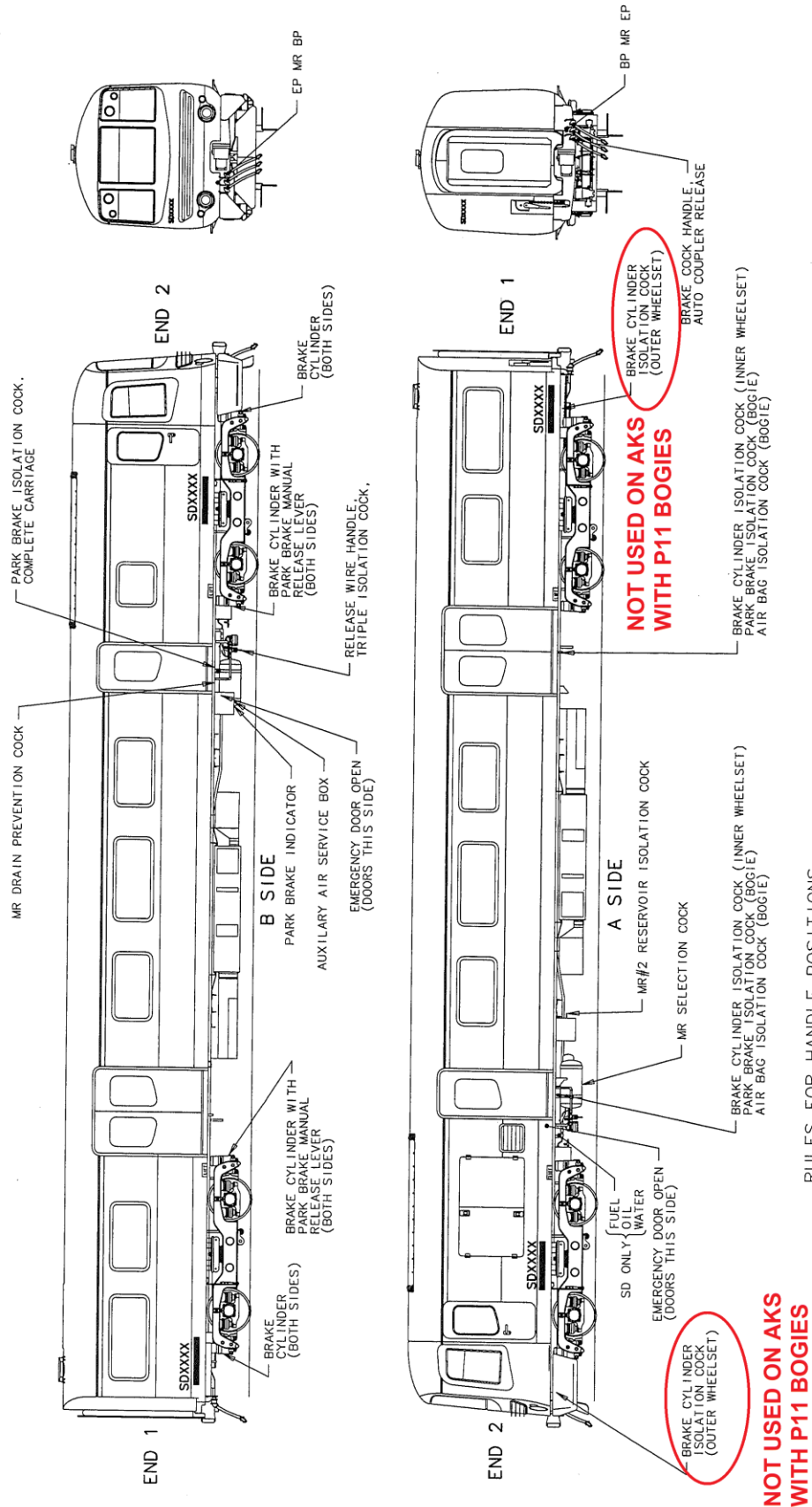


Figure 38: SD Isolation cock location drawing - same a AKS

12. AIR CONDITIONING SYSTEM

Each AK and AKC car is equipped with an under-floor mounted air-conditioning (HVAC) unit. All control functions are accessed via the HVAC panel on the switchboard. Note that each car's HVAC system operates independently. Current operating conditions and alarms can be viewed on the HVAC monitor located to the right of the HVAC panel.



Figure 39: HVAC panel.

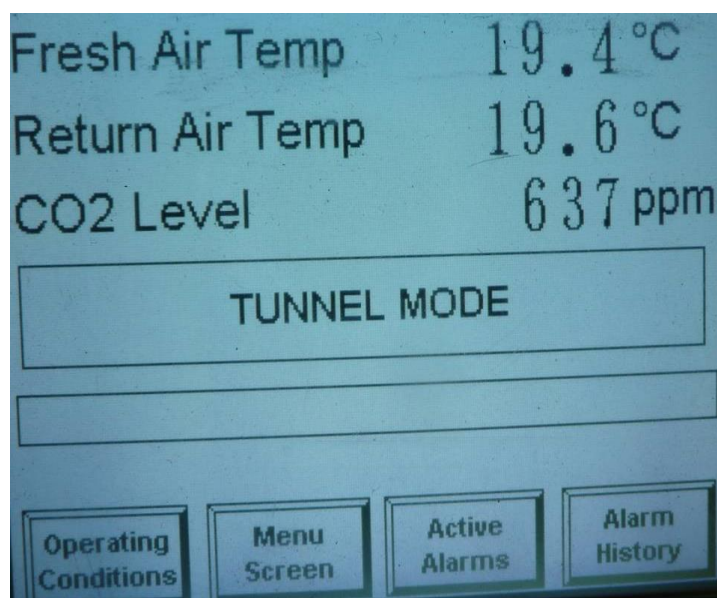


Figure 40: HVAC monitor.

12.1 AK HVAC NORMAL OPERATION

Each HVAC unit will initially operate in standby mode. To begin operation, first select one of the four available temperature settings that range from 21°C to 24°C and then switch the unit to "On". The HVAC unit will default to "Auto" mode. While in this mode, it may switch to any of the following sub-modes depending on internal conditions or commands received from the TMS:

- Fast warm up mode
- Cooling mode
- Heating mode
- Vent mode
- Tunnel/brake mode
- Reduced power mode
- Emergency fresh air mode.

These modes are described in more detail below.

12.1.1 Fast warm up

This mode is used to speed up control of saloon temperature. For the first 30 minutes of operation or until the heating set point is achieved:

- All heating stages will be used
- Fresh air dampers will be fully closed
- Return air dampers will be fully opened
- Exhaust air dampers will be fully closed
- Extract fan will remain off.

The Fast Warm Up indicator on the air conditioning display will illuminate orange when the unit is operating in this mode.

NOTE: it is possible to force the HVAC unit into this mode by pushing the "Fast Warm Up" button on the touch screen. Pushing the "Reset" button will cause the unit to return to "Auto" mode.

12.1.2 Cooling Mode

The unit switches to this mode if it detects an internal temperature that is above the 'Heating' set point and no relevant faults exist. The cycles will cycle on and off depending on the internal temperature; however this cycling is constrained by a minimum run-time of 3 minutes and a maximum of 10 starts per hour. This prevents rapid cycling between On / Off.

12.1.3 Heating Mode

The unit switches to this mode if it detects an internal temperature that is below the 'Heating' set point and no relevant faults exist. There are four stages of heating that may be used. These stages are selected based on a combination of:

1. How far the temperature is from the set point and
2. How long it has been below the set point.



When the internal temperature reaches the set point, the heating turns off in a staged manner.

12.1.4 Vent Mode

This mode is used when the internal temperature is within the 'dead band' 0.5°C either side of the 'Heating' set point. In Vent mode, only the supply and toilet fans will operate. Dampers will be controlled as required by CO₂ and enthalpy sensors. The condenser fans may also operate, in order to control the head pressure in the condensers.

12.1.5 Tunnel / brake mode

The unit switches to this mode when a command is received from the Tranzlog. The 'Tunnel / Braking' signal is 'High' while in normal operation and 'Low' to trigger Tunnel / Brake mode, meaning that the system will default to this state if a wire breaks.

While in this mode the fresh air and exhaust dampers will close, overriding the CO₂ and enthalpy sensors. The toilet fan will also stop and the return air damper will be set to 100% recirculation.

12.1.6 Reduced power mode (cooling)

In this mode the system limits the amount of power available to the HVAC unit. The unit will operate as it does in cooling mode, but only one of the two refrigeration systems will run at a time.

It is possible to set the unit to this mode manually by activating the 'Reduced Power Mode' switch on the switchboard.

12.1.7 Reduced power mode (heating)

In this mode the system limits the amount of power available to the HVAC unit. The unit will operate as it does in heating mode, but only the first heating stage will be used.

It is possible to set the unit to this mode manually by activating the 'Reduced Power Mode' switch on the switchboard.

12.2 EMERGENCY FRESH AIR MODE

The unit will automatically switch to this mode if there is an AC power failure. To switch the unit to this mode manually, activate the 'Emergency Fresh Air' switch on the switchboard.

When in this mode the HVAC unit will stop all heating and cooling functions. Fresh air dampers will open and one fan will operate on battery power for 90 minutes.

12.3 FAULT INDICATIONS

If any of the following faults exist, the supply fans will continue to operate but heating or cooling functions will cease:

- Low pressure fault
- High pressure fault
- 50° automatic reset over temperature fault
- 70° manual reset over temperature fault ('Heater' circuit breaker must be manually reset on the switchboard).

HVAC system warning / indicator lights		
Label	Colour	Description
FRESH AIR	Green	Green when fresh air damper open, off when closed.
FAST WARM UP	Orange	Orange when mode selected.
COOLING FAILURE	Amber	Amber when one HVAC refrigeration system circuit has failed but still achieves temperature set-points.
FILTER BLOCKED	Amber	Amber when differential air pressure sensors on fresh air and return air filters reach pre-set limit.
SYSTEM FAULT	Red	Red when system cannot achieve within 2°C of temperature set-point within any 15 minute period due to refrigeration circuit(s) or heater element(s) failure or supply fan(s) failure.

12.4 AKS HVAC SYSTEM

The AKS has a domestic portable 3.5KW unit mounted to the top of the bar fridge in the crew rest area. This unit will only heat or cool the crew rest area meaning that the curtain that separates the crew rest area from the luggage area, must be kept closed for unit to work.

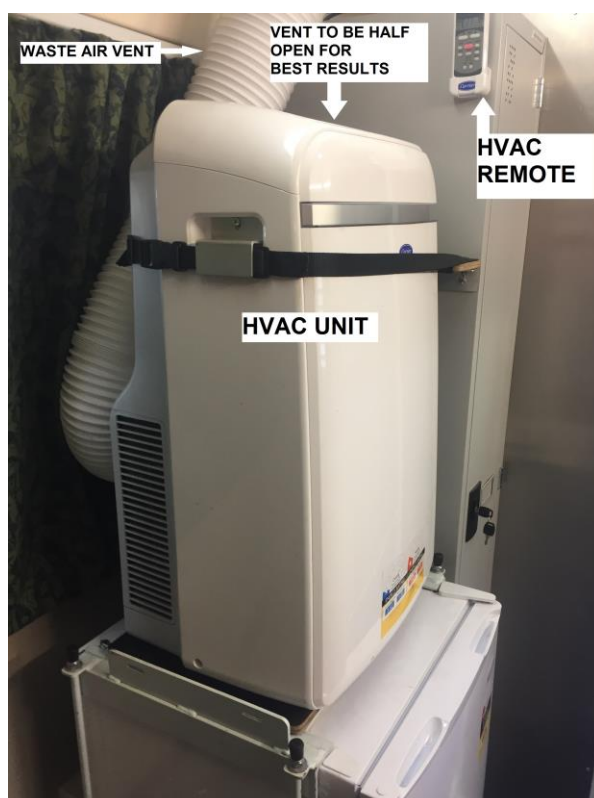


Figure 41: AKS HVAC.

13. PASSENGER INFORMATION SYSTEM

The Passenger Information System consists of four electronic features:

- PA – public address system by microphone. AK, AKC and AKV, AKS receives PA announcements only.
- PIDS – passenger Information display system by screen and at-seat audio, AK and AKC only.
- Car ID – exterior LED display and manual interior display. AK and AKC only.
- Hearing loops – to assist hearing aids. AK and AKC only.

13.1 PA (PUBLIC ADDRESS SYSTEM)

A hard-wired microphone is located in the Train Manager's Office in the AKC car. Transmissions from this are trainlined from the receiver in the nearby electrical control cabinet through all cars and AKV vans via overhead loud speakers. While PA announcements are being made, the sound through the at-seat headsets will be muted.

A portable radio (wireless) microphone is also available and should be kept in the TM's Office in a secure place where it will not roll on to the floor. It should be used in close proximity to an electrical control cabinet (to be close to the receiver). It has a range of approximately one car length, i.e. its range is limited to the local car in which it is being used. This allows PA announcements to be made while the operator moves through the local car.

Fixed microphones are also located on the electrical control cabinets of every AK/AKC car and AKV van. A rectangular perforated aluminium plate covers the microphone and receiver. This located to the left of the TMS/Help Call Light Panel. This microphone is controlled by a 3-position key switch on the PA/PIDS panel of the switchboard. The positions of the PA key switch are:

- | | |
|---------------|---|
| Off | The microphone on the electrical control cabinet is OFF but the PA system will still relay trainlined announcements from the TM's fixed microphone and from other cars. |
| Remote | The wall-mounted microphone is activated and the announcement will be made to all cars and AKV vans on the train. |
| Local | The wall-mounted microphone is activated and the announcement will be made to the local car only. |

When a PA microphone is used, the transmission is relayed through the overhead loud speakers. Any pre-recorded audio playing at the time will be muted while the PA announcement is playing, then will return to normal volume once the announcement is completed. If a local PA announcement is made, it will mute the pre-recorded audio in the local car only.

The PA system can be used to advise passengers of the following:

1. Safety information-routine briefings
2. Emergency information
3. Delays and disruptions, e.g. tranships
4. Arrival information for intermediate and terminal stations
5. Commentary on features of interest en-route by TM (English language only)



6. Café opening/closing times and menu/specials information
7. Specialised tour group announcements.

NOTE: The PA system will continue to operate through the 24VDC system if the 230VAC power fails. Volume levels are pre-set on the amplifiers in the End 2 vestibule ceilings of every car. These should be set by maintenance staff.

13.2 PASSENGER INFORMATION DISPLAY SYSTEM (PIDS)

The PIDS system is comprised of audio and visual features. A pre-recorded audio, a commentary of *en-route* points of interest and other background and historical information, plays through at-seat headsets plugged into jack-points between pairs of seats. The jack-point units have individual channel and volume controls. The commentary is recorded in English, Chinese Mandarin. Each language is allocated to a separate channel.

LCD PIDS screens mounted above the aisles in all cars display a map of the route of the train. When each pre-recorded audio plays, a more detailed map of the area through which the train is passing is displayed along with a red line on the route indicating the progress thus far. At the end of the segment of audio the screen reverts to the larger scale map.

The audio and visual segments activate when pre-loaded GPS trigger points are passed. An audible "bong" sounds on the PA a minute prior to each GPS point, along with a yellow backed script message along the top of the screen. When the audio is playing, a green strip appears along the top of the screen.

Each car triggers individually. The PLC of the PIDS Controller in the End 2 vestibule ceiling of every car processes the content. The PA is the 'master' system and the PIDS audio is the 'slave'. The volume levels on the amplifier in each car are pre-set and should be set by Maintenance staff. The automated audio and visual are loaded via laptop by the contractor servicing the PIDS system.

The PIDS screens run from the 230VAC system and have their own CB. The PIDS audio runs from the 24VDC system with a separate CB and will continue if the 230VAC fails. Because the PA is the 'master', turning off the PA CB (DC2) will stop the PIDS audio. **NOTE:** this will also turn off the PA.

To start up the PIDS, turn the PIDS key-switch on the PA/PIDS panel of the car's switchboard to the ON position. Each car must be switched on separately. A wind up period of some minutes occurs before a "KiwiRail" logo appears on the screens. This will change to a map when a starting trigger point is passed a few hundred metres from Auckland, Wellington and Christchurch Stations.

The AUDIO SELECT channel selector on each car's switchboard should be set to Channel 5 before commencement of the journey. Each passenger can select a channel from the seat jack-point. A channel would be selected at this key switch for local car use only.

Shutdown is begun by turning the PIDS key switch on the switchboards to OFF. Every car requires to be switched off independently and should be done as soon as practicable after arrival at Auckland Britomart, Wellington and Christchurch Stations. A shutdown timer will run for 15 minutes before the system is powered down completely. This is to allow time for the PIDS Controller unit to finish communicating with the station server. It is possible to turn the system off immediately using the CBs.

NOTE: This should be done only in an emergency as it does not shut the system down cleanly and therefore carries a risk of data corruption.

AKC cars have WIFI adapters to exchange data with station servers located at Waltham Depot and Wellington depot; and GPRS modems to send GPS waypoint information and for on-track fault diagnosis. Post journey diagnosis and remedy is undertaken by the contracted PIDS designer and servicer (E3 Solutions).



13.3 CAR ID – LED DISPLAYS

A Hanover-designed LED unit is fitted above the windows of all four exterior doors on AK cars, and on the two End 2 doors of AKC cars. These can be used to display an alphabetical letter to identify each car.

On the switchboard of each car, visible through the glass panels on the electrical control cabinet is a Hanover control panel from where car IDs can be changed. Press the red 'F' button then the 'up' arrow. Numbers appear which correspond to letters of the alphabet, e.g. 1=A, 2=B. Once the desired selection is reached, push the 'F' button again and the selection will appear on the control panel display screen. If a number greater than 9 is required, select 1 then push the 'cross' arrow. This will move the 1 to the left which then makes the right available for further 'up' arrow movements. Then push 'F' to set the selection. This panel controls the display for all doors in that particular car. Each car's ID will need to be set independently.

Extra messages may be uploaded into the car ID PLC, such as "Out Of Service" or "Charter"; however, these must be pre-programmed against a number code via laptop and USB cable by maintenance staff. Car IDs are determined each day for each train by operations supervisors.



Figure 42: Hanover car ID displays.

13.4 HEARING LOOPS

AK car saloons are fitted with hearing loops around their perimeters. These create a magnetic field that transmits an audio signal to hearing aids when the wearers use the T-switch, activating the built in transformer. The function of the hearing loop is primarily to boost PA sound levels within the saloon.

In AKC cars, a hearing loop is fitted only around the till and counter area. A microphone is located near the till which will boost sound in this area for passengers using the hearing loop. Providing the microphone is powered, speech can be at normal levels.

14. CCTV SYSTEM

The Petards "eyeTrain" CCTV system comprises:

- 4 cameras in each AK and AKC car
- 2 cameras in each AKV van
- 1 DVR (recorder) in each car & van, containing removable memory modules
- 1 touch screen monitor in the server of each AKC
- A maintenance laptop, which may be connected to any DVR to review and/or download images
- An off-board playback PC, for viewing the contents of the memory modules.

The system will automatically start when power is applied, and shut down when power is removed. No operator intervention is required.

Camera images may be viewed at the touch screen monitors, individually, in sequence, or in groups of 4.

For more detailed information, refer to the following Petards documents:

Title	Notes
eyeTrain User Manual	
eyeTrain CCTV Generation 4 Training Notes	Powerpoint presentation, overview of system
eyeTrain Technical Description	
eyeTrain CCTV Training Notes System Module	Powerpoint presentation, overview of system & equipment
eyeTrain Monitor Module	Powerpoint presentation about using the monitor
Off-Train Playback Module Training Notes	Powerpoint presentation about using the off-train PC and Playback software "Cryptovision"
ReView Manual	ReView software allows the user to preview and transfer on-train, limited amounts of background video data recorded by the eyeTrain™ CCTV system, without having to remove the storage modules
CCTV Maintenance Manual	
Training Presentation, Maintenance Training	Powerpoint presentation
Training Presentation, Maintenance Laptop	Powerpoint presentation

15. SMOKE DETECTORS

There are 4 smoke detectors in each AK car:

- 2 in the saloon
- 1 in the vestibule, End 1
- 1 in the toilet, End 2.

There are 4 smoke detectors in each AKC car:

- 1 in the lounge
- 1 in the servery area
- 1 in the toilet, End 1
- 1 in the vestibule, End 2.

There are 2 smoke detectors in each AKS support vehicle:

- 1 each located $\frac{1}{4}$ of the car length in from each end of the saloon.

These smoke detectors are powered via the on board 24VDC battery backed up circuits. When operational the LEDs on the smoke detectors flash faintly.

If a smoke detector is activated it creates an audio alarm at the smoke detector as well as an alarm throughout the train, via the Train Management System. - to Section 18: Train Management System (TMS) for more details.

16. EMERGENCY BRAKE OPERATION AND OVERRIDE

16.1 EMERGENCY STOP BUTTON

These are located:

- On the bulkheads at both ends of all AK/AKC car saloons
- Outside the Train Manager's office in each AKC
- On the open-air viewing area of AKV vans above the electrical control cabinet
- At each door control panel of the AKS. See Fig 7.
- Inside End 1 door of AKL vans.

Pushing the buttons exhausts air from the brake pipe quickly via a dump valve and applies the train's brakes. The emergency brake is reset by pulling out the button and turning the 100 Key in the button's key switch.

If the emergency stop button is pushed, it will prevent the TRAIN CLOSED light from being illuminated. An audible alarm will sound throughout the train and the TMS will guide the crew to the activated pushbutton. Refer to Section 17: [Train management system \(TMS\)](#) Train Management System (TMS) for more details.

If the emergency stop is activated in the AKS, the train closed light will go out and an audible alarm will sound throughout the train, the EBA light on the AKS switchboard will illuminate and the red strobe light located mid ceiling will strobe until the E-Stop button is reset and BP air pressure restored.

16.2 EMERGENCY BRAKE OVERRIDE FUNCTION

The emergency brake override is a feature provided specifically to cope with dangerous operating conditions within the Otira Tunnel. It is undesirable that trains stop within the tunnel, as this may endanger the lives of crew and passengers. Therefore, it is important that passengers are not able to operate the emergency brake while the train is inside the tunnel.

It is also advisable to use this feature when AK trains are operating on charter services through the Kaimai tunnel (East Coast Main Trunk Line) or the Rimutaka tunnel (Wairarapa Line).

Two key switches are located on a panel labelled EMERGENCY BRAKE in the electrical control cabinet of all AK cars and vans.

NOTE: The emergency brake override function cannot be set from the AKS. The AKS will receive the emergency brake override function signal from an AK or van.

The left key switch is labelled OVERRIDE SELECTOR and has the following settings:

- LOCO (LOCO ENGINEER)
- TRAIN MANAGER

This is used to select who is overriding the emergency brake.

NOTE: the TRAIN MANAGER setting must be selected at all times as locomotives are not currently wired for this feature. A red light will be illuminated above the key switch.

The right key switch is labelled TRAIN MANAGER OVERRIDE and has the following settings:

 CANCEL

- OFF
- START

The emergency brake override is a trainlined feature that will be GPS triggered a few hundred metres either side of the two tunnel portals. When it is activated a red light will illuminate above the "Train Manager Override" key switch. The override will remain activated until a second GPS waypoint is passed outside the tunnel.

If the GPS activation fails, the override can be set manually by turning the TRAIN MANAGER OVERRIDE key switch to START. The switch is spring loaded on a 15 minute time delay. 15 minutes after it has been set, the override command will be cancelled automatically in case the Train Manager forgets to cancel it manually

If the journey time through the Otira Tunnel exceeds the nominal 15 minutes, the override command may be extended by selecting START again to give a further 15 minutes. This can be done at any time including before the timer has wound down. It can then be cancelled manually once the train has exited the tunnel. Alternatively it will cancel automatically after another 15 minutes.

NOTE: the START and CANCEL functions are trainlined therefore control to all cars can be provided from any switchboard.

NOTE: If a passenger pushes the emergency stop button when the override function is active, the audible alarm will sound throughout the train. Use the TMS lights for guidance. The button **MUST** be reset **BEFORE** the override is cancelled. If the override is cancelled first, the brakes will apply as the override valve will be open again.



Figure 43: Emergency stop button.



Figure 44: Emergency brake override controls

17. TRAIN MANAGEMENT SYSTEM (TMS)

The AK train features a TMS that monitors the safety critical systems and allows the crew to quickly identify any devices that are operating in an unsafe state.

In the electrical cabinet of each car/van there is a programmable logic controller (PLC) which is the heart of the train management system. The PLC monitors all the devices in that car/van and communicates with the vehicles adjacent to it.

17.1 TRAIN MANAGEMENT ALARM SYSTEM

If the train goes into an unsafe state the TMS will sound an alarm throughout the train for 10 seconds to alert the crew. The following are considered to be unsafe states if they occur anywhere in the train:

- Activation of smoke detector
- Emergency brake activated
- A door opens or step extends
- End of train not correctly detected i.e. power cable or lid cap, TMS cable or air hose detached or AAR jumper lid of van not secured.

Train Safe does not rely on the below two items, but will signal that the faults exist.

- Airbag deflated.
- Park brake applied.

The TMS is able to distinguish between a train crew commanded door release and spontaneous opening caused by a malfunction or accident. When a commanded door release is detected, a brief 1 second alarm will sound to alert the passengers that the doors can be opened.

Once the TMS has detected an unsafe state, it will not signal that the train is safe again until:

- All external doors and steps are safely closed
- No emergency brakes are activated, no smoke detectors are activated
- End of train is correctly identified

Again, the below two items do not affect train safe.

- No airbag deflated.
- No park brake applied.

The TMS guides the train crew to the location of the detected unsafe condition on the train.

17.2 TMS SELF-CHECKING UPGRADE

This section covers the TMS self-checking function that provides an alert in case of an internal hardware fault.

The Self-check frequently compares TMS inputs and outputs and will warn crew if the signals disagree with each other.

AK carriages with this modification can be identified by a red light above the TMS screen.

Fault Types: all Safety Critical signals are checked.

Signal	Impact
Train Safe Light (TSL)	TSL may not indicate correctly on this carriage. Refer to other carriages for correct indication
End 1 Safe Out (E1SO)	TSL may not indicate correctly from affected TMS in End 1 direction. Treat train as two separate trainsets for train safe indication – radio comms.
End 2 Safe Out (E2SO)	TSL may not indicate correctly from affected TMS in End 2 direction. Treat train as two separate trainsets for train safe indication – radio comms.
Emergency Brake Activate (EBA)	Tranzlog will not record a Passenger Emergency Brake (PEB) application – no action by onboard staff required.
Emergency Brake Solenoid Relay Activate (EBSRA)	PEB in affected carriage may not work, position staff member in carriage to supervise
Smoke Sensor Relay (SMSR)	HVAC may continue to supply air to carriage if smoke is detected. In event of fire, turn off carriage HVAC manually via Air Conditioning Break Glass Switch located top of switchboard - if safe to do so.
Supply Fan Emergency Relay (SFER)	HVAC may continue to supply air to carriage if smoke is detected. In event of fire, turn off carriage HVAC manually via Air Conditioning Break Glass Switch located top of switchboard - if safe to do so.

CREW ACTION

If there is a fault, a “SUPERVISE” warning will be displayed on the TMS screen, a **red LED** above the TMS screen will begin flashing, and a new TMS alarm will sound.

A “SUPERVISE” warning indicates that TMS is no longer able to properly monitor or control the affected system e.g. the TSL, on that carriage. The error does not mean there is a fault with the carriage, but the affected system must be monitored manually for the remainder of the journey to ensure it is in a safe state.

A “SUPERVISE” warning will not cause any lights to illuminate on the TMS panel, nor will the “Train Closed” light on the door main control panel go out. If a “SUPERVISE” warning appears and the red LED begins blinking, it will continue to blink until the error is addressed at a depot or other maintenance facility.

When the “SUPERVISE” warning appears, it is important to communicate with the rest of the team to ensure that the train is safe and a staff member is positioned to carry out the actions listed above.

The below shows the TMS screen with a TMS SMSR Supervise fault and flashing RED LED above the TMS Screen, note that this light is only on the modified vehicles



NOTE: For an AKS alarm for loss of train safe, the train crew would be guided to the AKS from an AK by the AK TMS system and then the crew would have to look at the AKS switchboard top door to see what alarm light is illuminated.

- Smoke Detector Faulted
- Air Bag deflated (ABD)
- Park Brake Signal (PBSIG)
- Emergency brake Activated (EBA). For this there is also a red central ceiling strobe light

NOTE: The doors closed light is located on each door control panel.



Figure 45: AKS TMS Alarm Panel

17.3 TMS GUIDANCE SYSTEM

The TMS PLC has a screen on which fault messages are posted to help the crew to identify any device that is in an unsafe state.

In addition to the PLC screen there are also TMS help points located:

- On the electrical control cabinets of all cars and AKV vans
- On the open air viewing area of the AKV vans
- On the HVAC risers of all cars.

The TMS section of the panel has 3 lights:

- Left
- This car
- Right

If a device identifies an unsafe state an audible alarm will sound throughout the train and one of these lights will illuminate on each of the carriages TMS/Help Panels.

If the "Left" light illuminates it means the unsafe device is in a carriage to the left of its location when facing the TMS panel: walk in the left direction until you find a carriage with "This Car" illuminated.

If the "This Car" light illuminates it means the unsafe device is in the same carriage.

If the "Right" light illuminates it means the unsafe device is in a carriage to the right of its location: walk in the right direction until you find a carriage with "This Car" illuminated.

The PLC screen in the electrical control cabinet of the car or van indicated as THIS CAR will also provide information to allow the crew to identify the cause of the alarm. If multiple alarms occur simultaneously, the screen will scroll through each of the faults. This will identify the fault in THIS CAR only and will not appear on the screens of any other cars. They may have their own separate faults.

The TMS PLC has no memory of events, and therefore, once the alarm is cancelled or rectified, the message will disappear from the screen and the TMS lights will extinguish.



Figure 46: Train management control panel.

Examples of the messages displayed on a PLC screen are shown below:

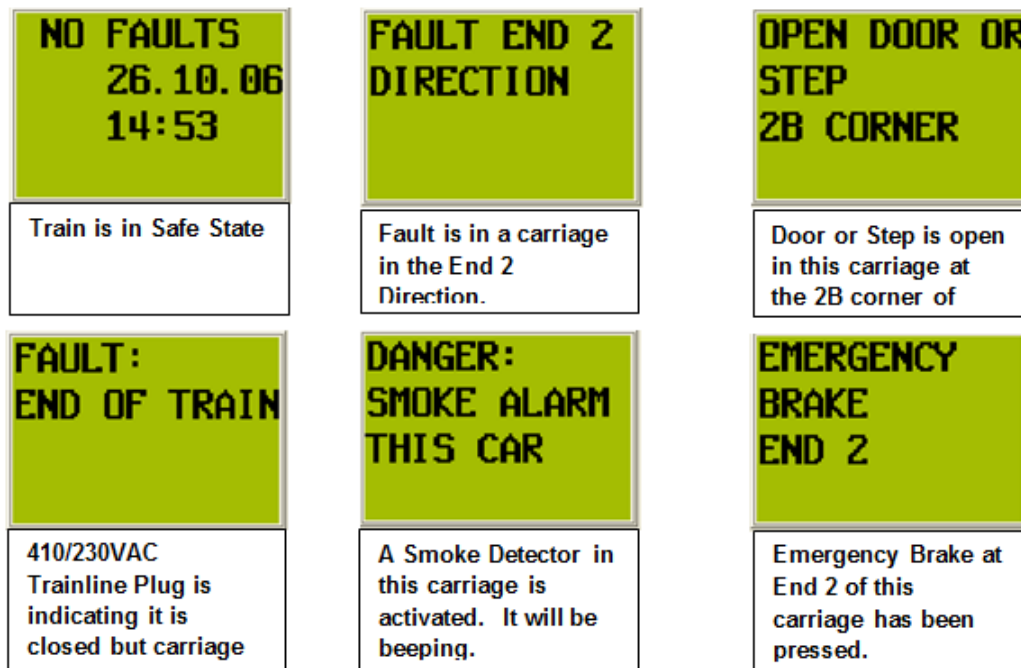


Figure 47: Messages displayed on a PLC screen.

17.4 TRAIN STATUS PANEL

Extra indicator lights in the form of a Train Status Panel have been provided in common crewed areas to provide quick information on the key statuses of the train. These are located in the AKC above the coffee machine and in the AKS on the main terminal board.



Figure 48: Train Status Panels located in AKC (left) and AKS (right).

The meaning of each of the lights is described in Table X below:

Proximity	Indicator type	Description
This Consist (AKC, AKS)	Airbag Deflated	Illuminates if <u>any</u> carriage experiences critically low airbag pressure.
	Park Brake Applied	Illuminates if there is a park brake applied on <u>any</u> carriage.
	Train Closed/Safe (AKC only)	Functions identically to other TCLs throughout the train.
	Emergency Brake Applied (AKS only)	Illuminates if any emergency brake has been pushed (or if BP drops low for a period of time).
This Carriage (AKS only)	Airbag Deflated (light only)	Illuminates if the <u>AKS</u> has low airbag pressure.
	Park Brake Applied	Illuminates if the <u>AKS</u> park brake is applied.

The "This Consist" airbag indicator lights have built in latching mechanisms, which are used to help distinguish a false alarm from a genuine deflation. They are also a push button for manual reset, and will automatically reset 5 minutes after correct airbag pressure has been restored. Refer to 11. Airbag systems for instructions on appropriate interaction with the airbag deflated reset button.

17.5 AAR JUMPER CABLES

Sockets have been provided at End 2 of AKV vans and End 1 of AKL vans and AKS support vehicles for the fitting of AAR (American Association of Railroads) jumper cables between these vehicles and locomotives. Standard long AAR jumpers as carried on all locomotives are suitable for this purpose. The short AAR Jumpers as carried on DX variant locos are not suitable as they are too short to fit between the Vehicles and loco sockets.

Two pins are active in the van sockets which transmit the following TMS signals to the locomotive cab:

- Door Open or Step Extended
- Air Bag Deflated
- Park Brake Applied.

When any of these signals are transmitted a bell alarm will sound within the cab, indicating that the "train is not safe". The LE must slow the train and communicate with the TM to determine which alarm has activated and what further action to take. If the TM cannot be contacted, then the LE will bring the train to a halt where it is safe to do so. TMS alarms within the train will also be activated, alerting the TM to the fault.

Because the alarm in the locomotive cab does not distinguish between fault types, the TM is responsible for relaying information about the fault to the LE by radio.

Correct responses to each fault type are:

- | | | |
|--------------------------|---|---|
| • Airbag deflation | = | stop to inspect or reduce speed to below 25km/h until a suitable location is found to stop and cut out the car or get to the nearest safe location for passengers to disembark. Refer Shield 2.8.3 for further detail |
| • Door fault | = | stop train and inspect |
| • Park brake application | = | stop train and inspect |

17.6 TRANZLOG

AKV vans are fitted with a Tranzlog unit that is located to the left of the electrical control cabinet. This is an event recorder that will record all TMS events as well as normal speed and braking recordings. Tranzlog units are also programmed with GPS co-ordinates for emergency brake override, tunnel mode and station mode of HVAC condenser fans.

When TranzAlpine trains run with two AKV vans, the Tranzlog in the second AKV (which will be marshalled in the centre of the consist) will automatically turn off and display an Orange light, however if the Tranzlog green light on the middle AKV switchboard bulkhead is not off, it must be turned OFF using CB DC4 in that AKV. This is to eliminate the possibility of variable data and performance from two Tranzlogs on the same consist.

Tranzlog data is uploaded and downloaded by maintenance and engineering staff only.



18. HELP POINTS

The Help Points in the carriages provide passengers with the ability to call for crew assistance.

The Help Points are located as follows:

AK car

- Electrical cabinet No. 2 End of the car.
- The air conditioning riser in the saloon.

AKC car

- Electrical cabinet No. 2 End of the car.
- Exterior of the End 1 toilet – covers, toilet and wheelchair hoist.
- Interior of the End 1 toilet.
- Lounge A-side wheelchair location.
- Lounge B-side wheelchair location.

AKV van

- B-side wall in passenger viewing area.

18.1 HELP CALL

If the Help Call button is pressed, that button will illuminate. It will also send an audible buzz throughout the train to notify the train crew a Help Call has been made. This buzz lasts for two seconds.

Once a Help Call has been received a crewmember may go to any Help Panel in the train, insert their door key and momentarily select the acknowledge position. This will cause the activated Help Call button in the train to start flashing, which acknowledges to the person requiring assistance that a crewmember is on the way.

The Help Panel will guide the crew to the help call with the use of 3 lights.

Left Help Call is in a carriage in the left hand direction, walk in this direction until you find a carriage with "This Car" illuminated.

This Car Help Call has been activated in this carriage. The crewmember will have to look

Right Help Call is in a carriage in the right hand direction, walk in this direction until you find a carriage with "This Car" illuminated.

To release a Help Call the Help Button just needs to be pressed in again to unlatch it.

NOTE: If multiple help calls are made the help guidance system will illuminate to indicate the direction of each help call. Therefore, it is possible for all 3 guidance lights to illuminate in a central carriage.



Figure 49: Help Call Point.

18.2 WHEELCHAIR HOIST DOORS (INTERNAL AND EXTERNAL) HELP BUTTON

A help button is located on the outside of the toilet wall in the AKC (refer section 19.1 [Wheelchair hoist door help button](#) for details).

19. AKC WHEELCHAIR SYSTEMS

AKC cars have a Ricon wheelchair hoist installed on each side of the car at End 1. These hoists may be operated only by the Train Manager.

19.1 WHEELCHAIR HOIST DOOR HELP BUTTON

The internal "Help" pushbuttons may be used by passengers to summon assistance at the wheelchair hoist door. When either of these pushbuttons is used, a help call is sent throughout the train to alert the Train Manager.

In order to extinguish the "Help" pushbutton the Train Manager must unlatch it by pressing it a second time.

19.2 OPENING WHEELCHAIR HOIST DOOR

This door is a manually opened sliding door.

Unlike other external doors, the wheelchair hoist door may not be operated by passengers, even when it is released.

To open the wheelchair hoist door, the Train Manager should turn the lower right key switch on the Wheelchair Hoist door control panel to DOOR (Rockwell 3825 Key) then press LOCAL RELEASE button. The door should then be pulled open manually. It will automatically latch open when it reaches the end of the outside runner.

19.3 CLOSING WHEELCHAIR HOIST DOOR

The wheelchair hoist door will not respond to a trainlined DOOR CLOSE command. To close the door, insert the door control key into the lower right key switch and turn to DOOR. Then press the UNLATCH OPEN DOOR button. The latch will release and the door can now be manually closed.

NOTE: A timer activates once the door has first been unlocked, stopping it from being closed before 30 seconds has elapsed. Once the door is closed, press the LOCAL LOCK button. Ensure that the horizontal locking pin has visibly dropped into position. Turn the key switch to RUN and withdraw the key. The door should be fully closed (home), there should not be any daylight gaps around the door at all, especially at the top lock bolt corner.

If there is daylight or any gap, reclose the door and pull the door in from the top handle by the top lockbolt, holding in place while locking the door.

19.4 OPERATING WHEELCHAIR HOIST

In order to operate the wheelchair hoist, the Train Manager must first open the doors as described above and then turn the lower right key switch on the Wheelchair Hoist door control panel to HOIST. The hoist will not operate unless the safety belt is clipped into position.

NOTE: DO NOT operate both hoists at once.

Use the remote control attached to the hoist to control the platform. The remote has the following functions:

- Platform Stow and Deploy
- Platform Up and Down.



The stow and deploy function allows the platform to be folded away when not in use, or extended out ready to be loaded or unloaded. The wheelchair hoist door should never be opened or closed unless the hoist platform is fully in its retracted position.

The up and down function allows the platform to be raised and lowered, allowing wheelchair "roll on roll off" service over the full range of platform heights.

The hoist has the ability to lift 364kg safely.

If 230VAC supply is not available (e.g. the generator is not running), avoid using the wheelchair hoist if possible. The batteries only have the capacity to power a single lift cycle without reducing the emergency back-up lighting capacity below its nominal 4hrs.

It is possible to raise and lower the platform without power by using the handle provided and pumping the platform up and down in a manner similar to a hydraulic jack.

19.5 MANUAL OPERATION WHEELCHAIR HOIST

In the event the hoist becomes inoperable under its own power it may be manually operated. Follow the manual operation decal mounted on hoist pump assembly.

19.6 WHEELCHAIR POSITIONS

Two wheelchair passengers can be accommodated in the AKC car where wheelchair-securing points are provided. The securing points are similar to retracting seatbelts, and simply pull out to wrap around the passenger.



Figure 50: Wheelchair hoist, retracted position.



Figure 51: Wheelchair hoist, extended position.



Figure 52: Wheelchair hoist control panel.

20. AKS LUGGAGE HOIST

AKS support vehicles have a Ricon walk through hoist installed at the A1 and B1 ¼ doors. These hoists can be operated by any trained staff. These hoists are only for loading/unloading over weight luggage, waste bins and food storage trolleys with a total maximum weight of 364kg.

The Hoists are powered by the 24VDC battery charger via mains power, if the mains power is out, the lifts will be powered by the batteries. The batteries will allow for a single operation of the hoist only.

Do not operate both hoists at the same time as this will destroy the power supply.

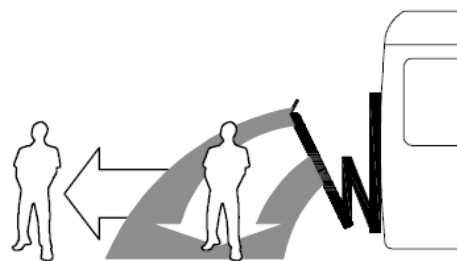
20.1 PRE USE CHECKS.

- Prior to use, visually inspect the hoist for any damage, leaking oil, broken cables etc.
If there is a problem with it, do not use the hoist and record the fault in the repair book.
- If you are not the Train Manager, advise them that you are going to use the hoist.
- Train Manager will advise the LE that you are going to use the hoist and the passenger stop will take a little longer than normal.
- Allow enough space for hoist operation and luggage unloading.
- The hoist operator must take special care to ensure the area is clear before deploying the hoist and check that there are no obstacles beneath the platform.

20.2 SAFE OPERATION PROCESS.

- The hoist is interlocked with the AKS door circuit so that if the door is not fully open the hoist cannot be given power from the Hoist Control Switch.
- Release the door locally or from an AK/AKC car.
- With the door fully open, turn the Hoist Control Switch from “Isolate” to “Select”, see Fig 51. This gives power to the hoist allowing remote operation as per the wheelchair hoists.

20.2.1 Deploying the hoist



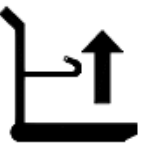
- Do not stand in front of lift while deploying.
- Verify that front rollstop is up and locked.
- Be certain that luggage fits safely on platform; it must not extend beyond edges or interfere with operation of rollstop.
- Keep arms, legs, and clothing away from moving lift parts.
- The lift is intended for 364kg of luggage. Do not overload hoist.
- Do not allow anyone to stand on bridge plate. A bent bridge plate can interfere with the platform as it raises and lowers.

- Never leave platform outside of carriage. Return platform to stowed position immediately after use.
- Once the hoist is stowed, return the hoist Control Switch back to Isolate. If this is not done the door will not have power and will not close.
 - Note: a door closed light will not be achieved unless the hoist door is closed via a closed signal for an AK/AKC car.



Figure 53: AKS Hoist Control Panel.

20.2.2 Hoist Motions for remote control pendant

Icon	Term	Description
	Deploy	Platform unfolds, or deploys, out of carriage from stowed position to floor level position.
	Down	Platform lowers from carriage floor level towards ground level. The front rollstop automatically lowers (opens) when platform reaches ground level.
	Up	Platform rises from ground level towards carriage floor level. The front rollstop automatically rises (closes) when platform leaves ground level.
	Stow	Platform folds, or stows, from carriage floor level to the stowed position.

20.2.3 Manual Operation

In the event the hoist becomes inoperable under its own power it may be manually operated.

It is possible to raise and lower the platform without power by using the handle provided and pumping the platform up and down in a manner similar to a hydraulic jack.

Follow the manual operation decal mounted on the hoist pump housing.

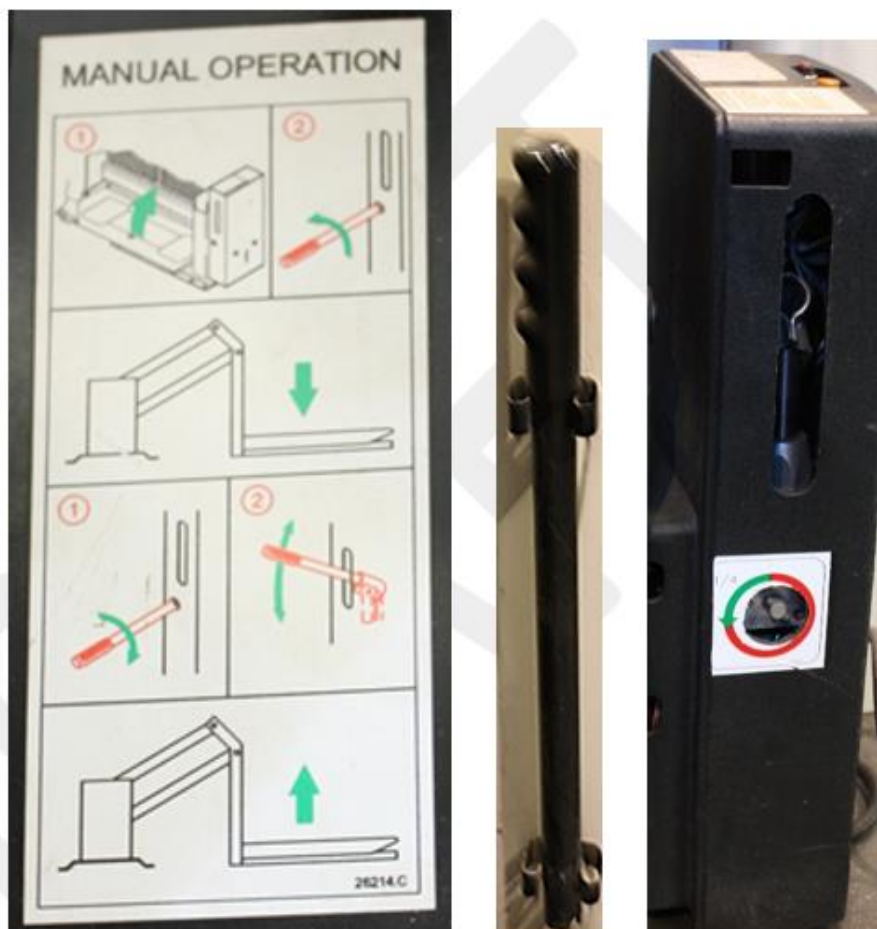


Figure 54: AKS Hoist Manual Operation Instructions.

21. AKS LUGGAGE RACKS

The AKS is equipped with luggage racks from the crew rest area to the A1 and B1 doors. The racks are segmented into 8 sections with a fold down top shelf and pull-down safety cover that keeps the luggage in place.

The loading arrangement is that the over 23kg luggage is stowed on the floor section of the luggage racks and that the 23kg or under can be stowed on the top shelves.

21.1 TOP SHELF DEPLOYMENT



The shelf has a gas strut to support the weight of the top shelf to assist when lowering and lifting it.

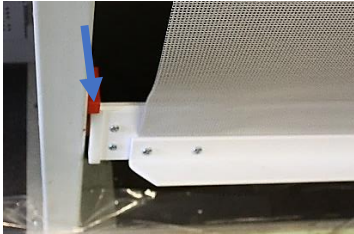
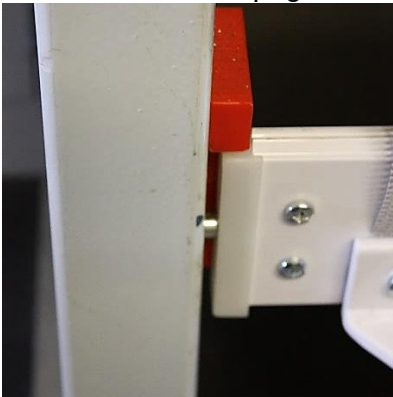
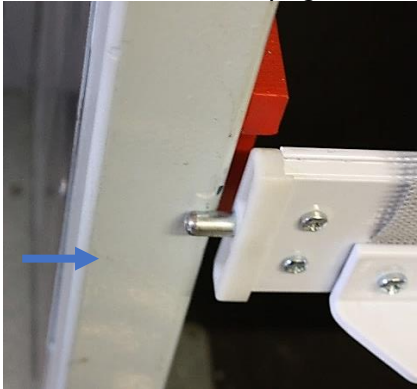
Step	Action	
1	Pull the spring-loaded lock bolt out to release the shelf.	
2	Using the centre pull handle only to avoid trapping fingers, pull the shelf down against the gas strut until it is sitting horizontal.	 

To stow the shelves back to the vertical position, reverse the process. Make sure that the lock bolts are in the locked position when the shelves are in the vertical stowed position.

21.2 SAFETY COVER DEPLOYMENT



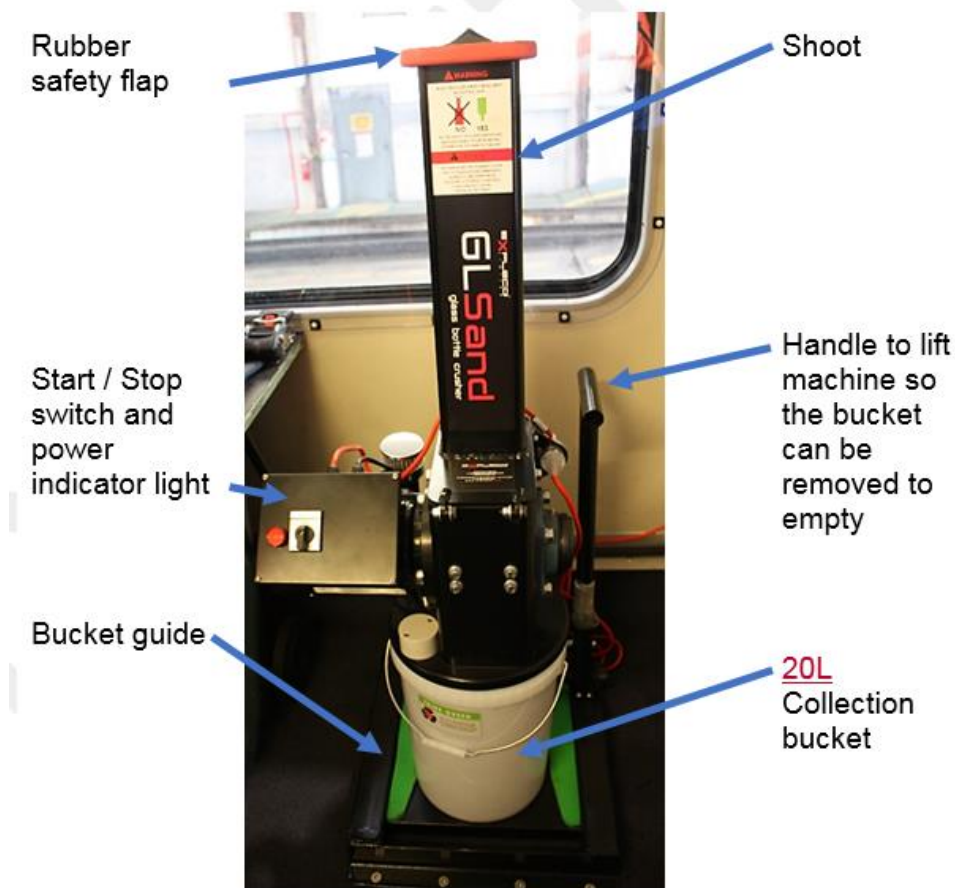
The safety cover has a spring-loaded return system and can be in the deployed or not deployed positions only.

Step	Action
1	Grab the handle and pull the cover down towards the bottom of the shelf unit. 
2	Guide the bottom of the cover and clip it under the red plastic blocks. The handle must be in the vertical position for this part.  
3	Turn the handle ensuring the locking bolts engage correctly see below. Pin locked in upright.  ✓ Pin in front of upright.  ✗

To unlock and lift the roller cover, reverse the process

22. GLASS CRUSHER

The AKS is equipped with a GLSand glass bottle crusher located in the B1 corner of the saloon. The crusher reduces bottles by a 10:1 ratio into a sand like product.



22.1 PPE REQUIREMENTS

The manufacturer recommends the use of following when using this machine.

- Dust mask
- Safety glasses
- Earmuffs

22.2 OPERATION

Training video link

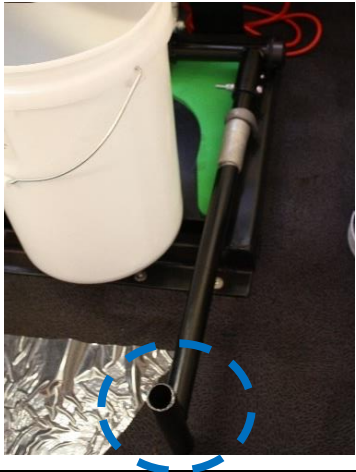
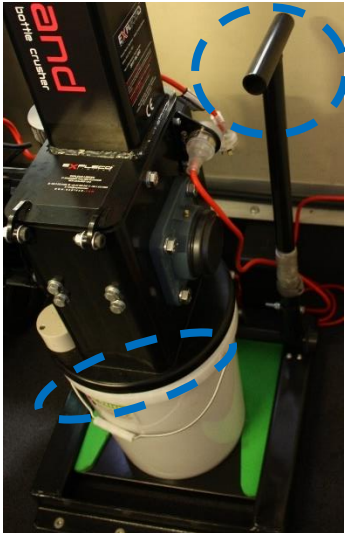
<https://www.youtube.com/watch?v=WhjiaOqI5WM>

Step	Action
1	a. Visually check the machine for any obvious damage – do not use if damage visible. b. Confirm the bucket is inserted correctly in the bottom guide and sealed to the machine.   Handle vertical Bucket fully back in guide Machine sealed the top of the bucket   Handle horizontal Gap between matching an bucket Bucket not fully back in guide c. Turn machine on, move switch to start. d. Wait 15 seconds for crusher to reach operating speed
2	Feed individual bottles through the rubber safety flap on the chute neck first. a. Remove bottle tops / caps. b. Drain excess liquid. c. One bottle at a time. For large bottles (wine) allow a few extra seconds between bottles, continue when the noise subsides. d. Check bucket fill level regularly.  • Do not put your hands beyond the rubber flaps.
3	a. Wait for 30 seconds after the last bottle to allow all glass to clear. b. Turn machine off, move switch to stop.

Step	Action
4	If the Glass Crusher jams or stops working • Do not attempt to clear it • Turn power switch to Stop • Record in the 54d book

22.3 EMPTYING OR REPLACING THE BUCKET

Note that the grinding action creates a cloud of dust in the bucket, so this must be left to settle for 10 minutes before opening the machine to remove the bucket.

Step	Action
1	Check the switch is in the stop position.
2	Bring the handle slowly forward and push it down until the top of the handle is touching the floor. 
3	Slide the bucket forward to remove from under the crusher. When the bucket is full it will weight approximately 40kg.  Two person lift, so it is recommended that the bucket is not allowed to get more than 2/3 full. Place a lid on the bucket once removed.
4	a. Slide an empty bucket back under the crusher until the bucket is fully back in the guide. b. Lift the handle slowly to the vertical position, checking that the crusher seals the top of the bucket. 

23. WHEELIE BIN SECURING

The AKS has space for four 200L wheelie bins and these are located in the B1 section of the saloon between the bi door and end wall.

The bins are placed with handles to the window so that the lid opens protecting the window from damage when loading rubbish into the bin.

The bins are secured by a ratchet strap at the top and a location block at the base.

23.1 SECURING AND RELEASING THE WHEELIE BINS

Release

1. Lift the black handle
 2. Push the red button away
- The strap will be free to pull through to get slack to unhook from the clip on the left hand side.



Securing

1. Put bin in place
2. Connect strap around front of bin
3. Pump the black handle backward and forwards until the strap is secure around the bin.



24. EMERGENCY EQUIPMENT AND EMERGENCY EGRESS

24.1 FIRE SUPPRESSION

Fire suppression systems are fitted to all AKV Generators. See 8.4 [Diesel generator set fire extinguisher system](#).

24.2 PORTABLE FIRE EXTINGUISHERS

These are located in:

AK	Behind single seat at No 2 end on B-side Behind double seats at No 1 end on A-side
AKC	In the servery on A side At No 1 end of the lounge on B-side
AKS	End 1 B side end wall. End 2 B side next to Crew rest area fridge.
AKV	Behind hinged door at No 2 end
AKL	Inside No 2 end door

24.3 FIRST AID KIT AND CABINET

AKC	First aid cabinet in train manager's office First aid kit between double seats in lounge on A-side
-----	---

24.4 DEFIBRILLATOR

The defibrillator is located as shown below:

AKC	Between double seats in lounge on A-side
-----	--

The defibrillator requires an operational inspection weekly as stated on the inspection sheet located with the unit.

24.5 EMERGENCY GLASS HAMMER

Each AK/AKC car has two emergency exit break glass hammers to allow escape via the saloon doors then via the exterior door windows, in the event that the doors are not functional.

Each AKS Support Vehicle has a break glass hammer to allow escape via the end one intercar door window if the door cannot be opened.

The hammers are located:

AK	On bulkheads End 1 and End 2 inside saloon.
AKC	On bulkheads End 1 and End 2 inside saloon.
AKS	End 1 B side end wall adjacent intercar door

24.6 GAS MASK AND FILTER (TRANZALPINE ONLY)

AKC	In the cupboard in the centre of the AKC.
-----	---



24.7 SELF-CONTAINED SELF-RESCUER (SCSR)

AK	
AKC	
AKV	
AKL	

24.8 TOOL BOX

AK	
AKC	In the cupboard in the centre of the AKC.
AKV	
AKL	

24.9 EMERGENCY FIRE AXE

Axes are provided for breaking panoramic windows, as below:

AK	Behind double seats in saloon at End 1, A Side
AKC	Train Managers office

24.10 LIGHT STICKS

AK	Behind double seats in saloon at End 2, A Side
AKC	
AKV	
AKL	

24.11 TORCHES

AK	
AKC	
AKV	
AKL	

24.12 THERMAL BLANKETS

AK	
AKC	In the cupboard in the centre of the AKC.
AKV	
AKL	

24.13 HI VIS VEST

AK	
AKC	
AKV	
AKL	



24.14 PASSENGER COUNTER

AK	
AKC	Train Managers office
AKV	
AKL	

24.15 RADIO AND BASE UNIT WITH CHARGER

One portable radio with battery charger is provided:

AKC	In the Train Manager's compartment in the AKC car.
-----	--

24.16 TRAUMA KIT

AKC	In the cupboard in the centre of the AKC.
-----	---

24.17 EMERGENCY EGRESS LADDER

Rear car if AK	End 1 vestibule
AKV	Behind the Generator room aisle door end 2
AKL	Next to the end 1 end door.
AKS	On luggage rack next to the B1 door

24.18 WHEEL CHOCKS

Wheel chocks are located:

AKV	Brackets at the end of AKV vans
AKL	Inside AKL vans
AKS	On luggage rack next to the B1 door

24.19 CABLE TIES

AKC	Train manager's office
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24.20 DANGEROUS GOODS CABINET

AKS	Between luggage rack and B1 door weather shield.
AKL	In AKL

24.21 EGRESS OTHER THAN AT A PLATFORM

Egress is possible using the side doors of AK/AKC Cars where doors can be opened and steps extended in a safe place. Side gates of AKV/AKL vans may also be used. Via the egress ladder through end of car doors for AK/AKC/AKS.

NOTE: The side egress from an AKS to ground level could be difficult as there are no steps at the doors.

Extreme care must be taken when exiting the train without a platform.



24.22 EMERGENCY EGRESS IN A TUNNEL

Provided the tunnel width is adequate, emergency egress is possible using the side doors of AK/AKC cars where doors can be opened and steps extended in a safe place. Side gates of AKV and AKL vans may also be used.

If the width of one or more tunnels is inadequate on the line to be travelled, then a ladder or ladders must be carried.

A ladder is mounted in all vans/support vehicles, and in the end AK and AKC, if it happens to be at end of train, eg, on charter service.

Clips must be fitted to vestibules of AK, AKC cars for an emergency egress ladder to be fitted when cars are running as a rear vehicle on a charter service.

When the only means of egress is through the end of the train, egress ladders located in vans can be placed as follows:

- Clipped into the base of the concertina at End 2 of AKV van (the hinged plate for extended height couplers must be bolted back into the vertical position using an 18mm socket wrench), or
- To the right side of the coupler at End 1 of AKL vans. When the AKL is used for egress, the bi-fold doors at End 1 of the AK/AKC/AKS car coupled to the AKL must be unlocked.

On the NIMT, side egress is possible in double track tunnels #1, #2 and #19; and in single track #18 (Poro-o-Tarao). Side egress is also possible in double track tunnel #1 on the Auckland-Newmarket Line. All single track tunnels #3 to #17—are of too narrow a profile to allow side egress.

On the MNL, all tunnels are of adequate width to allow egress from the side of the train. Clearance is adequate to allow doors to be opened and steps extended.

On the MDL, side egress is possible in tunnels #12 to #16 and also tunnel #17 (Otira Tunnel), but all other tunnels are of too narrow a profile to allow side egress.

On the MSL, side egress is not possible in tunnels #4 (Cliffs) and #5 (Mihiwaka) due to narrow profiles.

For the theory of Emergency Egress from an AK train and further information, refer to WR 25527/1

24.23 EMERGENCY END GATE RELEASE BOXES

The train end gate at the No2 end of the AKV is normally locked. An emergency release box is provided that is locked with an “S” key.

24.24 EMERGENCY DOOR RELEASE

The powered doors located at the corner of each AK and AKC and a ¼ along the on the sides on the AKS car can be opened manually in an emergency. Refer to sections 6.13 and 6.14 [Emergency door release](#) for more information.

24.25 EMERGENCY EQUIPMENT CUPBOARD

The following equipment for use in an emergency is located in a cupboard in the centre of the AKC car:

- trauma kit
- blankets
- light sticks
- gas masks and canisters (for Tranz Alpine only)



- tool box.

24.26 DIESEL GENERATOR SET EMERGENCY SHUT DOWN

Three push buttons are provided in the AKV to shut down the diesel generator set in an emergency.

Refer to section 8 [Diesel alternator set \(generator\)](#) for information on how to restart the diesel engine.

25. DISABLED TOILET FACILITIES

A disabled toilet is provided in the AKC car. The toilet is large enough for persons in wheelchairs. This toilet and all toilets in AK cars are provided with baby change tables.

The toilet is opened using labelled push buttons operating a motorised door. The door has collision detection and will close automatically after 20 seconds.

NOTE: Once the user is inside, the CLOSE button must be pushed—if the door closes automatically, the VACANT light will stay illuminated. The CLOSE button should not be pushed from the inside when exiting the toilet otherwise the ENGAGED light will illuminate. The door can be released from the exterior key switch using a 601 Key.

The disabled toilet has a help button installed under the left side of the vanity (within reach of the toilet). If the help button is pushed, it will alert the crew in the same way as the other help points (refer Section 18 [Help Points](#)). A light in the ceiling immediately outside the toilet will also illuminate to assist the crew to determine whether help really is required within the toilet.

26. OPERATING KEYS

For following keys are required for operating AK trains:

Key	Operates
S Key	Deadlocks on exterior of A2 doors on AK and AKC cars Hinged doors on AKV and AKL vans Hinged intercar doors on AKS Red Emergency Door Release Boxes on AKV gates and AK/AKC/ bi-fold doors AKS fridge and freezer padlocks.
144 Key	Electrical Control Cabinet--Battery Charger Door at base of ECC HVAC Circuit Cupboard at top of ECC THIS KEY USED BY MAINTENANCE STAFF ONLY
KN 200 Key	All switchboard Key Switches Help Call Acknowledge Switches
100 Key	Emergency Brake Push Button Reset Electrical Control Panel Doors for : "Controls and Distribution" "230VAC Distribution" "24VDC Distribution" Level Crossing Alarm Box on platforms at Rangiora, Waipara
Rockwell 3825 Key	Door control panels and Wheelchair Hoist Door/Hoist Panel
FIC CF 315 Key	Paddle Latch Locks on AKV Generator Compartment Doors Electrical Control Panel Main Door Rubbish Cupboard Doors
Ronis 455 Key	Ignition Key for Generator Control Panel
601 Key	Disabled Toilet Door Control Key in AKC
110 Key	Drinks Fridge under Servery Counter in AKC
Square Key	Toilet Door Lock from exterior on AK cars Additional lock on hinged doors of AKV/AKL
Round Key	Panels for Step Isolation in AK/AKC/ cars Panels for PA Amplifier/PIDS Controller/Video Recorder in Vestibule ceilings AK/AKC cars
AS Key	Level Crossing Alarm Box on platform at Rolleston All Points Levers MDL
400 Key	AKS Dangerous good box
3142 Key	AKS Fridge and Freezers built in locks.
FS880 Key	AKS Luggage Rack Covers