

SYDNEY TRAMWAY MUSEUM

MELBOURNE TRAMWAYS Z2 CLASS TRAMCAR

Instruction Manual for Car No.111



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SOUTH PACIFIC ELECTRIC RAILWAY CO-OPERATIVE SOCIETY LIMITED

SYDNEY TRAMWAY MUSEUM

MELBOURNE TRAMWAYS

Z2 CLASS TRAMCAR

INSTRUCTION BOOK FOR No.111

Second Edition

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MELBOURNE TRAMWAYS Z2 CLASS TRAMCAR

INSTRUCTION MANUAL FOR No. 111

GENERALLY

The tram is a bogie saloon car. It has electronic resistance power control and dynamic and motor shaft disc brakes. Magnetic track brakes are fitted for emergency stopping. It is also equipped with a number of auxiliary devices and controls that are sufficiently non-standard to warrant special consideration when compared with most other Museum fleet cars.

Although superficially the same as the Museum's PCC car No.1014 there are significant differences which render the PCC car operating instructions generally irrelevant. Therefore, to avoid damage to the tram, members are directed not to attempt to drive it until they have undergone essential tuition.

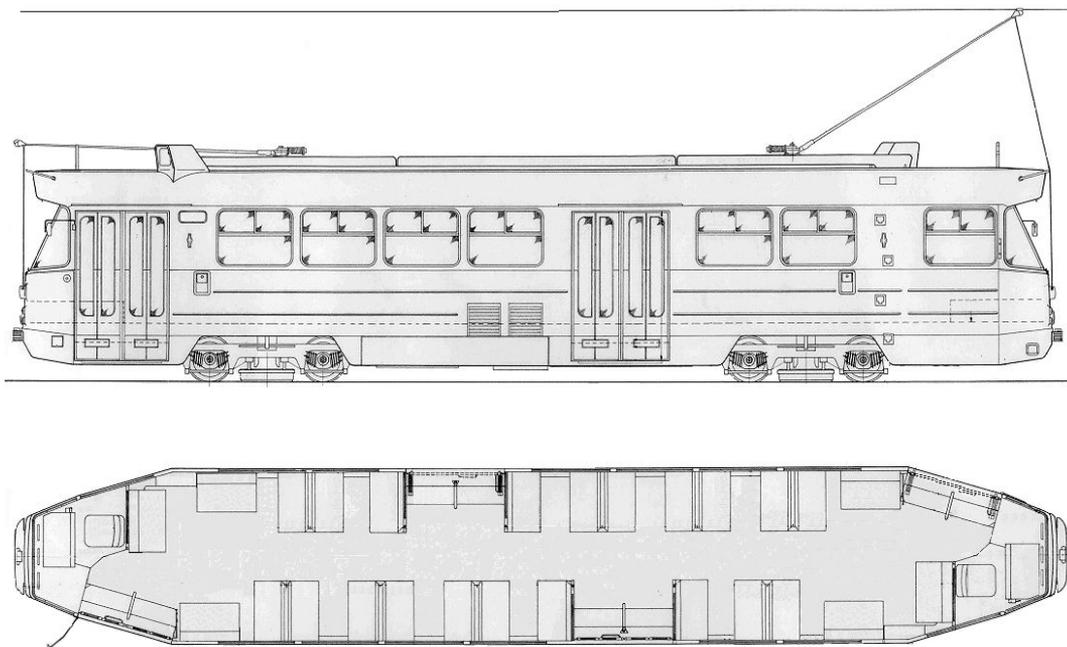


Figure 1: Side Elevation and Plan View

THE TRAM

It is double ended with driving controls at each end. Egress doors are fitted to both sides, controlled by the driver.

CURRENT COLLECTORS

The tram is equipped with trolley wheel fitted poles at each end; each pole is fitted with two ropes and trolley rope reels. Note: *the reels are simply to control slack in the rope. They do not act as catchers or retrievers in the event that the trolley pole leaves the overhead wire.*

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The trolley ropes have a knot in them at such a distance from the trolley head that if the pole is correctly lowered and stowed under the roof hook these knots will be visible to the driver.

Do not run the tram with a trolley pole leading (i.e. “spear pole”) unless someone is controlling the trolley cords from outside the tram.

DRIVER’S EQUIPMENT

The driver requires a Yale type lock key to gain access to the tram and open the control equipment. Two other smaller keys are attached to the key tag to gain access to certain control equipment lockers in case of emergency.

ELECTRICAL SAFETY

The tram has an all-metal body. Should it run onto non-conducting rails or be badly derailed, all metal parts on the tram should be considered “live” until the trolley pole is removed from the overhead wire.

The trolley wire above the tram should be de-energised before any person climbs onto the roof.

ROOF ACCESS

The tram is fitted with fold down steps on each side of the car.

The roof is a fibreglass shell that may be slippery when wet. Persons climbing onto the roof must take special care in such a situation.

For access to the roof by Traffic Staff, please see procedure STM6160.

COUPLINGS

The car is provided with a coupling pocket on each bumper bar and a standard “long” Melbourne bar must be used to couple the Z2 to another car for towing or propelling.

TRUCKS

The tram is fitted with two four-wheel bogies with one motor per axle. There are rubber inserts between the wheel centres and the steel tyres to reduce noise. Rubber blocks take the place of conventional steel springs to further reduce noise.

CONTROL PEDALS

Below the driver’s console will be found three pedals to be used for normal operation of the tram. From the left, facing forward, are the safety pedal, the service brake pedal and the acceleration pedal.

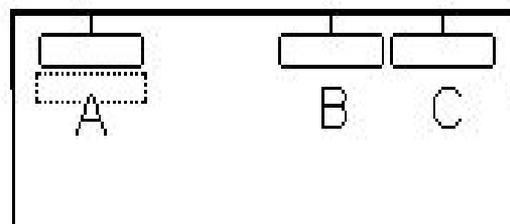


Fig 1: Control Pedal Layout

- A: Safety Pedal; Heel Rest
- B: Service Brake Pedal
- C: Acceleration Pedal

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CONTROL SYSTEM

In essence it is a Series Parallel automatic acceleration tram with electric and disc braking, the resistances for both functions being controlled by an electronic device called the Tramiac. It has 300 volt motors in permanent series pairs, 1 & 3 and 2 & 4.

The motors are 57 kW (76.4 hp) each. The accelerator pedal controls the rate of acceleration, the further the pedal is pushed, the faster the tram picks up speed. It has 9 steps with an increase in pressure beyond step 5. The cutting out of resistances is entirely automatic and it is not possible to hold any particular resistance notch, only vary the rate the Tramiac steps through them.

Before step 5 the tram accelerates to full speed in 'full-series' configuration, the rate governed by how far the pedal is pushed, automatically cutting out resistances and engaging field shunts as the speed increases. Pushing the pedal past step 5 causes the acceleration and speed to increase until transition to series-parallel occurs, (This can be thought of as the same as parallel operation on other types of tram), with all resistances back in circuit and resistances progressively cut out as the speed increases. In museum service there should be little call for series-parallel operation. Do not push the pedal past the point where it increases in pressure.

BRAKING SYSTEMS

The tram is fitted with three braking systems:- dynamic and disc brakes for normal service and magnetic track brakes for emergency stopping.

The Brake Pedal, operated by the right foot, controls all braking. This must be depressed for braking to take place. There are 11 steps of increasing brake force as the pedal is pushed further. The pedal should be eased back before the final stop, like with an air brake tram.

At full service braking the spring pressure behind the pedal increases. Pushing the pedal all the way down past the stronger spring will activate emergency braking using the track brakes.

Braking is of dynamic form until the tram speed drops to about 7 km/h. Below this speed braking automatically transfers to the disc brakes fitted to each motor.

When about to drive, the Safety Pedal must be operated first using the left foot and depressed to the Detent/Stopper. This should be a comfortable footrest which must remain in place while the tram is in motion. If the Safety Pedal is released or pushed all the way down while the tram is moving, full emergency braking including the track brakes will occur.

In normal circumstances, when the tram is stationary and the safety pedal is released and/or any pair of doors is opened the disc brakes will be locked on, securing the tram.

Interfering with or circumventing the Safety Interlock (Dead Man) equipment will result in prosecution by ONRSR as it is a criminal offence, punishable by law with a fine and or jail sentence to interfere with this equipment.

The braking circuitry is similar to PCC car. If one set of motors is cut out there is no dynamic braking and the car must be returned to the depot at low speed as the disc brakes are not intended to be service brakes on their own.

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TRACK BRAKES

If use of track brakes is essential, the Brake Pedal should be pushed hard to the floor. The Safety Pedal also operates the track brakes. If the driver's foot is taken off the Safety Pedal *or* the pedal is depressed fully, the track brakes will also operate. As well as lowering the Track Brakes, the Gong and a buzzer will sound and sand will be applied to the rails.

The track brake is a **severe** brake and **MUST NOT** be used for normal braking.

If the track brakes operate, they can usually be released by releasing all pedals then start again in the normal way. If there is any problem, turn the Forward/Reverse then battery switches "Off", wait 30 seconds then put them "On" again in the usual sequence, then try to restart the tram.

The track brakes operate off the battery supply and will still activate if the pole has come off the wire or the substation has tripped.

MOTOR ALTERNATOR SET / BATTERIES

Control power at 24 volts DC is provided by a motor-alternator set under the tramcar floor feeding a rectifier unit. This is in circuit with a 24-volt battery located under the tram floor, accessible from outside the car. Turning either battery switch to **START** will power up the 24v control systems and cause the M/A to operate if traction power is available to the tram. Turning either switch to **STOP** will isolate the batteries from the control circuits and cause the M/A set to stop running. However the end door key switches are still in circuit and the key can be used to open or close these end doors.



Apart from ensuring the panel in the front of the battery box is properly secured there is no reason for traffic staff to interfere with this box or the wet cells within.

The STM added an additional battery isolating switch under the tram. It's location is identified by a red arrow on the side of the car. The battery switch must be turned off when the tram is stabled at the end of the day to prevent

the small amount of current the leading door circuit draws from flattening and damaging the batteries.

ACCESS TO THE TRAM

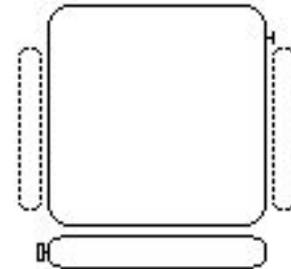
If the tram has been stabled correctly with all doors closed, locate the battery isolator switch under one side of the car (indicated by the red arrow) and turn the handle clockwise, then go to one of the end doors and insert the control panel key into the key switch on the LHS door pillar. Turn the key to the right (clockwise) and hold it until the doors are fully open. Release the key and remove from the switch. The doors will not open (or the tram even start if the

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doors were left open so you can gain entry without the key) if the battery is still isolated (or failed).

DRIVER'S SEAT

The driver's seat is height adjustable by means of a pneumatic cylinder. To elevate, ensure the battery switch is ON and depress a button on the right hand side of the seat pedestal. When sufficient air has been pumped into the pneumatic ram release the switch. To reduce the height or firmness of the seat, pull out this switch to release air. The seat may "float" at or near maximum height in spite of the air pressure in the system so the driver should make due allowance for this when entering or leaving the driving cab.



Fold up armrests are provided, while a knob on the left side of the backrest can be rotated to adjust the lumbar support

DRIVER'S CONTROL CONSOLE

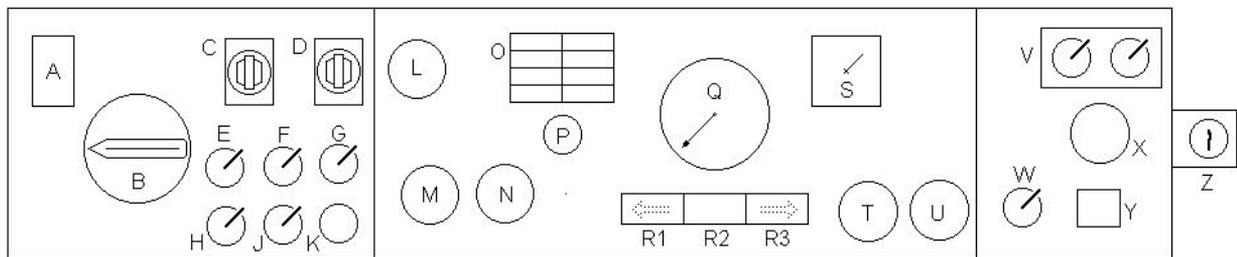


Figure 3: Driver's Control Panel

The main tram operating controls are in a lockable console behind the windscreen at either driving position. To open the console the door access key is used, being inserted in the key switch at the RH end of the panel. To open, insert the key and turn it clockwise through 90° and lift the console cover back towards the windscreen.

DRIVER'S CONTROL PANEL (Fig. 3)

- A: Pantograph controller (out of use).
- B: Forward/Reverse switch.
- C: Battery Motor Alternator switch:
- D: Lights switch.
- E: Demister switch.
- F: Windscreen washer pump switch.
- G: Windscreen wiper switch (2-speed).
- H: Driver's cabin fan switch.
- J: PA control switch.
- K: Socket (former remote microphone jack)
- L: Brake release button.
- M: Sander button.
- N: Manual disc brake hold button.
- O: Indicator panel. (Fig 4)

POWER OFF	LINE BREAKER
DISC BRAKE	BATTERY

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SLIP	TRACK BRAKE
NEXT STOP	DISC O/RIDE

- P: Indicator panel lights test button.
- Q: Speedometer (km/h).
- R1: Left turn flashing indicator push button.
- R2: Turn/emergency indicators cancel push button
- R3: Right turn flashing indicator push button.
- S: Auxiliaries power voltmeter.
- T: Gong push button.
- U: Horn button.
- V: Right hand side door switches.
- W: Left hand side door switch.
- X: Doors open warning light.
- Y: Former auxiliary power warning light.
- Z: Control panel lock.

DESTINATION INDICATORS

Electronic dot-matrix destination indicators are provided for destination and route number displays and are coded from a keypad fixed to the rear of the destination box cover.

Destination operating procedure:-

1. Switch on the battery.
2. Turn F/R switch to forward. The controller will display the last destination entered.

TO CHANGE DESTINATION:

3. Press "A". The controller will display the following:
ENTER DESTINATION
A=???
4. Press "CLR" to clear the last destination entered.
5. Enter the destination reference number. See the Appendix to this manual for the codes. The list on the destination box cover is no longer applicable.
6. The controller will search for the destination reference number and if correct the information will be displayed. If the destination number is not available the number will be cleared and an error message will be displayed. Repeat procedure from Step 5.

When the destination is found the controller will ask for the route number. The following message will appear:

ENTER ROUTE NUMBER
R=???

7. Press "CLR" to clear the last route number entered.
8. Type the route number (up to four digits) and press "ENT". If no route number is required simply press "ENT" without typing any numbers.

See the Appendix for the [destination codes](#).

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HOT WEATHER VENTILATION

To make the tram as cool as possible during hot weather, the temperature control switch is to be set on **AUTO**. The Auto setting will switch ceiling fans on when the tram starts to heat up. The fan control switch is in the control cubicle behind the driving position at the No.1 End of the tram.

Another method to help keep the tram cool is to open all vents and windows and pull down the sunblinds on the side affected by the sun (if passengers will leave them down).

There is an air scoop below the control desk on the side wall of the tram which may be opened as necessary, and an electric fan above the driver's right side window which is operated from the control panel.

DRIVER'S SUN PROTECTION BLINDS

Roller blinds are provided behind the windscreen and beside the driver. The windscreen blind locks in any position and may be released by moving a toggle at the left hand end of the spring mechanism.

The side blind is held by a lazy tong mechanism. If the blind is fully extended the driver must reach up behind the blind and release the mechanism.

EXTERNAL MIRRORS

The tram is fitted with two pairs of external rear vision mirrors, one pair each end. The mirror on the left hand side may be swung out before the driver starts the tram from this end. If so operated, the mirror must be swung in towards the windscreen before the driver changes end.

A right hand mirror is also provided at each end, which may be extended by the driver, as required, by pulling a lanyard below the mirror mechanism housing. The mirror should retract when the driver releases the lanyard. It will be the driver's responsibility to ensure the mirror is retracted when no longer required.

Drivers should take note of locations of tight clearances such as trackside vegetation and shed entrance doors and make sure the tram's external mirrors will clear before proceeding.

CONTROL GEAR CABINETS

There are a number of control gear cabinets on the tram that should not be opened or interfered with in any way by traffic staff. They are mentioned here for the purpose of getting a failed tram back to the depot for changeover.

EACH END OF TRAM, adjacent to entry doors:- Electronic control gear. Ensure that the cabinet door is securely locked. The No2 end cabinet contains the Tramiac.

EACH END OF TRAM, behind driver's cabin:- No.1 end - High Tension Control circuit breaker reset, ventilation master switch and door interlock overrides. (Open small inset door only.)

No.2 end – Fans, heaters, etc., P.A.

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CENTRE STEP WELL (RHS):- Hydraulic disc brake controller. A hand priming pump is provided in this compartment.

UNDER SEAT (RHS), opposite centre entry doors)
Motor cut-out switch. A reflector patch on the pillar above the seat, and a similar patch on the access door below the seat mark the position of this switch. The cut-out switch panel access door may be unlocked and locked using a 5 cent coin.



LIGHTS

Saloon Lights: These are controlled from the Driver's console. At intervals, when switched on, the lights will momentarily extinguish. This is normal as the lamp circuit automatically reverses to reduce the burning of the fluorescent tubes.

Door Courtesy Lights: These are controlled from the relevant door switch.

Headlights and Tail Lights: These are controlled by the saloon lights switch and automatically change ends as the F/R switch is operated.

Emergency Flashers: These will operate automatically when any door is opened and may be cancelled by pressing the red button "R2" on the control panel.

Turn Indicators: These may be operated as required and cancelled by pressing the red button "R2" on the control panel.

Driver's Cabin Light: This is turned on and off with a switch located behind the right hand end of the front sun protection blind.

If the lights do not come on (with the trolley pole on live overhead) check the lights circuit breaker in the circuit breaker cupboard.

If the trolley wheel is not on live overhead and battery switch is ON, the headlights and tail lights will glow but there will be no inside lights, except for two small lights over each door.

TRAM CONTROLLER / TO DRIVE TRAM

Release the rear trolley pole and place it on the trolley wire. Open access door using key provided. Turn the battery switch to START, then turn the control key switch further clockwise against a return spring while turning the forward/reverse (F/R) switch to the direction the tram is to move.

Check the warning gong and sander operation (push button operated), push the panel test (P) button to check the panel lights. Operate all doors; check that the red panel light goes out when all the doors are closed.

Before moving the tram, check the operation of the Safety Interlock (Dead Man) equipment by removing the left foot from the Safety Interlock pedal and pressing the right foot down on the Power pedal. The tram should NOT move. However if it does, immediately fail the tram and record the problem on the Tramcar Pre-operation Checklist sheet (STM6031).

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Press the safety pedal down to the detent with the left foot resting the heel on the heel rest provided, ring the warning bell, press the right foot gently on the acceleration pedal and the tram should move off. Remember that the pedal controls the rate of acceleration and does not directly control the 'notch' the tram operates in. Only a light touch is needed in museum service, as there is no need to accelerate at a rapid rate.

A tip for drivers who have not driven this tram for a while - Before turning the tram on with the battery switch, which starts the MG set and the cooling fans, and thus makes a lot of background noise, get into the driving position and press each of the pedals down slowly. You should hear faint clicks as each 'step' of the pedal is detected and encoded by the micro switch mechanism under each pedal. This will help give you a 'feel' for how far to push the pedals to operate the tram. And remember that each end may be slightly different in feel.

STARTING ON AN UP GRADE

When starting uphill, depress the DISC BRAKES push button to prevent the tram rolling backwards. Depress the safety pedal. Then move the acceleration pedal down slightly and release the Brake button. If the tram rolls backwards quickly depress this button again and the tram will stop. Depress the accelerator pedal slightly further and release the push button. **DO NOT** push the pedal too far down and then release the brake button. The tram will then attempt to accelerate rapidly and may cause discomfort to your passengers and possibly trip the substation.

Do not use the door switches to hold the tram while starting on an upgrade.

STARTING ON A DOWN GRADE

When starting on a down grade, depress the safety pedal, push the disc brake release button (L) for 2 or 3 seconds. The brakes should release and the tram then begin to roll without the emergency brake applying. The brake pedal **must** be used to control and stop the tram. **Do not use the Black brake release button if the tram is on an uphill slope.**

CHANGING ENDS AT TERMINUS

- a. Set the door operating switches for travel in the opposite direction.
- b. Turn the forward/reverse switch to "OFF".
- c. Close and lock the control panel lid, remove the key and leave the tram through the exit door.
- d. Place the new trailing pole on the overhead wire; **make sure the rear vision mirror is folded toward the windscreen.**
- e. Place the new leading end pole under roof hook provided, swing the rear vision mirror into the driving position, if required.
- f. Operate the control panel access to the driving configuration.

NOTE: The driver will change both trolley poles on this tram. This is to ensure that the power is not interrupted to the MG set and the electronics in the tram while changing ends. Remember to double check the leading pole before moving off. You should be able to see knots in the two ropes from the driver's position if the pole is properly stowed.

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SANDING GEAR

The tram is fitted with sand boxes and sand is dropped on the rails by pressing the button marked “M” on the control panel diagram. Sand will also automatically be dropped if the controller detects wheel spin or slides. The sand boxes are filled through access hatches to the right of the end doors. These are locked and generally will be filled by workshops staff.

SLIP INDICATION

If the slip indicator light comes on, push the sand button.

If the tram goes into **dynamic slide**, usually under heavy braking, the indicator light flashes continually and the buzzer keeps sounding, even when the tram has been stopped. To correct this, turn the F/R switch to **OFF**, the battery switch **OFF**, wait 30 seconds and turn the battery back **ON** again, then turn the F/R switch back to Forward.

Note: When sand is being used manually or automatically, such as under slide conditions, the sand button lights up.

DOORS

Access to the tram is by folding doors at each end of the tram opposite the driver’s position and in the centre. Each opening is under the driver’s control from the control panel at either end of the tram.

The doors are operated by electric power. The bottom and middle step treads of the centre doors are fitted with pressure sensitive pads which prevent the doors from closing if any person is standing on the step. If a passenger is still leaving the tram when the door switch is moved to **CLOSE**, there is a six second delay after pressure is removed from the step treads before the doors will begin to close.

All doors are fitted with pressure sensitive edges and will reopen if obstructed, wait six seconds then attempt to reclose.

In normal operations the tram will not start with any door open. If a door becomes defective the door circuit may be bypassed to allow the tram to be driven carefully back to the depot for changeover.

If the doors become defective and cannot be opened the driver will open a hatch above the door and raise a red weight until the doors begin to open. They may then be pushed fully open. To enable the doors so opened to be closed, the hatch cover door must be firmly closed. Conductors must be aware of the emergency door release procedure.

Should a door fail to close properly, check the step well for discarded rubbish such as a drink can before using the door interlock override controls.

BELL SIGNAL

A single stroke, “blue light”, pull cord system is fitted to the tram. This causes an illuminated panel above the left side of the windscreen to light up, a bell to ring and a red light to show on the driver’s control panel.

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When a passenger operates a bell cord a sign (NEXT STOP) will illuminate on the front bulkheads, a warning bell will sound and a “Next Stop” light will glow on the driver’s control desk. Being a single stroke system one door, at least, may need to be opened momentarily to reset this signal. If the conductor uses the system to signal the tram to proceed when all doors are closed then the driver must also operate one of the door switches momentarily to reset the signal.

WARNING GONGS & HORNS

The tram is fitted with push button operated tramway-type warning gongs which must normally be used in ordinary service. In addition, self contained air horns are also fitted for emergency use only.

WINDSCREEN WASHER WATER FILL POINT

At the right of each end entrance door is a flap which, when raised, allows access to the water filling point.

STABLING TRAM

When stabling the tram during runs, switch the F/R control to OFF, and lock the control desk cover.

When stabling the tram in the tram-shed, close all doors except at the end the driver will exit the tram, switch the F/R control to OFF, turn battery OFF, reset all door switches to close and then close and lock the control desk cover and then exit the tram through the remaining open doors. Close these doors by inserting the key in the door access switch outside the tram and turning it to the left (anti-clockwise). Hold the key over until the doors have fully closed. Remove the key and remove the trolley pole from the overhead wire, securing it under the hook provided.

Go to the red arrow on the side and locate and turn off the battery isolating switch. Ensure that the doors are closed first as this switch turns off ALL onboard systems and any open door will be unable to be closed till the battery isolator is turned back on.

FAULT FINDING

Most fault finding operations should only be done under the direction of the workshop supervisor or other qualified workshop personnel. Traffic staff are not to start cutting out motors or other control features without authorisation. Some cutouts disabled or otherwise reduce the effectiveness of various safety features of this car and failure to take this into account could result in an accident and/or further damage to the car.

Passengers are not to be carried when any safety feature is disabled. The car is to be returned to the depot empty. Another tram should be used to return passengers to the museum if required.

DOORS FAIL TO CLOSE / DOOR OPEN INTERLOCK WILL NOT RELEASE

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If any of the doors fail to close properly, the tram will not take power. First check there isn't anything physically preventing the doors from operating properly, like a crushed drink can for example.

If no obstruction can be found, locate the door override switches in the No.1 End cubicle behind the driver, small door, . Operate one switch and try to move the car. If unsuccessful, reset the first switch and try the second.



The car should be immediately returned to the depot.

LINE BREAKER RESET

If the line breaker light comes on push the L/B reset button. The reset button may need to be held down for 30 seconds.

If the L/B is on and you hold down the button for 30 seconds it will turn the L/B off. Press the reset button again to turn it back on again.

If the L/B light still stays on, turn the F/R switch and the battery switches OFF, wait 30 seconds then then back ON.

If the light remains on call the museum for assistance from the maintenance staff. If so instructed cut out a pair of motors. Reset the L/B. If L/B light goes out, try to restart the tram.

If the L/B light stays on cut the motors back in and cut out the other pair of motors. Reset the L/B switch. If L/B light goes out, try to restart the tram. If successful, drive the tram back to the depot for changeover but do not go over 15 km/h.

When driving with one pair of motors cut out there is no dynamic braking. The driver has only the disc brakes to stop the tram with the track brake as emergency braking. The disc brakes are not intended to be used as the main service brake so speeds must be kept low.

MOTOR CUTOFF SWITCH

The motor cutout switch should only be operated under the direct instruction of the maintenance manager or other suitably qualified maintenance staff member.

When it becomes necessary to operate the motor cutout switch, use a 5 cent coin to open (and close) the latch. Move the motor switch handle to the left to cut out motors 1 and 3, to the

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right to cut out motors 2 and 4. When the motor switch handle is in the centre position all motors are in circuit.



The motors are numbered in the bogies from the No.1 end of the tram, that is, motors 1 and 2 are in the bogie at the No.1 end, and motors 3 and 4 are in the bogie at the No.2 end.

SHOULD DISC BRAKES FAIL TO RELEASE

This procedure is only to be done under the direct instruction of the Maintenance Manager or suitably qualified workshop staff.

If the tram fails to respond after turning off the F/R and Battery Switches and waiting 30 second before restarting, test to see if it responds from the other cab.

If so, proceed very carefully with a competent traffic staff member advising what to do from the other cab.

If Disc Brakes still fail to release, gain access to the Hydraulic Hand Pump in the cabinet at the trailing face of the exit stair well, No. 2 end leading.



A second person should then be able to release the Disc Brakes by pumping this Hand Pump for some time. The tram can then be driven at reduced speed, the Foot Brake stopping the tram normally. Hand pumping will be required every time the brakes need to be released. The pressure gauge indicates brake pressure and not the pressure built up in the accumulator, it will not move while the pump is building up pressure.

Return the tram to the depot for a changeover.

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TOWING OR PROPELLING TRAM

This procedure is only to be done under the direct instruction of the Maintenance Manager or suitably qualified workshop staff.

In the event that the Z2 car cannot be driven and must be moved by other means, it may be necessary to tow or propel the tram back to the depot.

Before attempting manually release the brakes, staff should endeavour to push or tow the tram with an authorised driver riding in the vehicle and operating the safety pedal and brake release button. This staff member will then be able operate the brakes if required. Only proceed to mechanically releasing the brakes if brakes can not be released by any other means suggested above under brakes.

If it becomes necessary to manually release the brakes, the tram must be properly coupled to another vehicle for braking purposes **BEFORE** proceeding to release the brakes mechanically.

When this is done it will be necessary to release each brake separately. To do this, the brake release lever on each side of each truck is unpinned and pulled out to its fullest extent. Then with the aid of a stout bar the lever is pulled out at least one further notch on the release lever and pinned there. Try then to move the tram. If successful, push or tow it as required.

Before uncoupling the Z2 car each brake must be reset to **ON**.

Under normal circumstances, the Z2 tram should not be used to tow other disabled vehicles. The auto-notching makes it difficult to drive this tram at low speed and damage to both the Z tram and the tram being towed could result.

CAR DETAILS

CLASS: Z2
No. in Class: 15
Built: 1978, Clyde Eng./MMTB
Length: 16m
Width: 2.67m
Weight: 19t
Motors: 4 x ASEA LJB 23/2 57kW
Last Used in Melbourne: 11th March 2003
Arrived Loftus: 27th March 2003
Returned to service at Loftus: 17th August 2003

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Appendix

SCC 2000 destination codes

The electronic destination computers have been reprogrammed since the tram arrived at Loftus and the destinations on the bulkhead have been largely changed. Not only are a wide selection of Melbourne destinations available, but a full range of Bendigo, Sydney and Loftus destinations as well.

1	CITY	57	FLEMINGTON RACECOURSE
2	MELBOURNE UNIVERSITY	58	SHOWGROUND
3	MELBOURNE CENTRAL	59	WEST COBURG
4	MUSEUM	60	ZOO ROYAL PARK
5	CITY FLINDERS ST	61	ABBOTSFORD STREET
6	FLINDERS & SPENCER ST	62	N. MELBOURNE
7	CITY LATROBE ST	63	VICTORIA MARKET
8	CITY MARKET ST	64	S. MELBOURNE CITY ROAD
9	CITY SPENCER STREET	65	E. BURWOOD & NTH BALWYN
10	CITY SPRING STREET	66	E. BURWOOD
11	CITY SWANSTON	67	CAMBERWELL DEPOT
12	CITY WILLIAM ST	68	RICHMOND
13	CITY VIA ELIZABETH	69	WARRIGAL & R'DALE ROADS
14	CITY VIA HAYMARKET	70	WATTLE PARK
15	CITY VIA LATROBE ST	71	RIVERSDALE
16	CITY VIA NORTH MELB	72	GLENFERRIE & R'DALE ROADS
17	CITY VIA WILLIAM ST	73	HAWTHORN
18	DOMAIN ROAD	74	BURNLEY
19	COMMERCIAL & ST KILDA ROAD	75	OLYMPIC PARK
20	ST KILDA & HIGH ST	76	MELBOURNE PK
21	ST KILDA JC	77	SPORTS & ENTERTAINMENT CENTRE
22	ALL ROUTES	78	PRINCES BR
23	CHARTER	79	ST. KILDA
24	CITY CIRCLE	80	LUNA PARK
25	GRAND PRIX GATE 5	81	EXHIBITION
26	---	82	CONGRESS CENTRE
27	---	83	ST KILDA FITZROY ST
28	---	84	ALBERT PARK BEACH
29	GRAND PRIX GATE 5 & 8	85	S. MELBOURNE ALBERT ROAD
30	GRAND PRIX GATE 5&8 GATE 9&10	86	SOUTHBANK DEPOT
31	MELBOURNE CRICKET GROUND	87	W. PRESTON
32	SPEC. EVENT	88	PRESTON BELL STREET
33	SORRY NOT IN SERVICE	89	THORNBURY
34	# TEST	90	NTH FITZROY FERGIE ST
35	NTH COBURG	91	BRUNSWICK ST & VIC PDE
36	COBURG	92	BUNDOORA
37	BRUNSWICK DEPOT	93	LATROBE UNIVERSITY
38	MORELAND & F. COBURG	94	PRESTON DEPOT
39	OPTUS OVAL PARKVILLE	95	NORTHCOTE
40	EAST COBURG	96	E. MELBOURNE HODDLE ST
41	MORELAND	97	SWANSTON VIA LAT. ST
42	E. BRUNSWICK	98	ELIZABETH VIA LAT. ST
43	BRUNSWICK RD	99	WILLIAM ST VIA LAT. ST
44	NTH CARLTON	10	NORTH BALWYN
		0	
45	ELLIN AND LYGON STS	10	MONT ALBERT
		1	

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46	ART CENTRE	10	BALWYN
		2	
47	KINGS WAY	10	KEW DEPOT
		3	
48	CLARENDON & PARK STS	10	DOCKLANDS
		4	
49	S. MALB BEACH	10	PT MELBOURNE
		5	
50	AIRPORT W.	10	CAMBERWELL
		6	
51	MOONEE PDS	10	C'WELL STN
		7	
52	NIDDRIE	10	C'WELL JCT
		8	
53	ESSENDON DEPOT	10	CAMBERWELL LEURA GROVE
		9	
54	FOOTSCRAY	11	GARDINER
		0	
55	MARIBYRNONG	11	GLENFERRIE & MALVERN ROAD
		1	
56	M'NONG RVR	11	TOORAK MALV. DEPOT
		2	
113	TOORAK G'FERRIE RD	16	CITY – RUSSELL ST
		9	
114	ORRONG & TOORAK RDS	17	CITY – QUEEN ST
		0	
115	MALVERN BURKE ROAD	17	CITY – SPENCER ST
		1	
116	W'TREE AND G'FERRIE RDS	17	BUNDOORA – RMIT
		2	
117	ORRONG AND D'NONG RDS	17	POINT ORMOND
		3	
118	KEW COTHAM ROAD	17	ELSTENWICK RWY STN
		4	
119	GLENFERRIE STATION	17	LEICHHARDT
		5	
120	KOORYONG	17	ASHFEILD
		6	
121	HAWTHORN & DAND'NG RD	17	MORTLAKE
		7	
122	MALVERN TOWN HALL	17	CABARITA
		8	
123	MALV. DEPOT	17	CONCORD
		9	
124	BALACLAVA JUNCTION	18	MORTLAKE
		0	
125	BALACLAVA STATION	18	ENFIELD
		1	
126	GLEN IRIS	18	LILYFEILD
		2	
127	TOORONGA ROAD & HIGH ST	18	RAILWAY
		3	
128	N. RICHMOND	18	CIRCULAR QUAY
		4	
129	SWAN AND CHURCH STS	18	GLADESVILLE
		5	
130	TOORAK ROAD & CHAPEL ST	18	RYDE
		6	
131	WINDSOR	18	DRUMMOYNE

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		7	
132	PRAHRAN	18	ROZELE
		8	
133	CARNEGIE	18	BIRCHGROVE
		9	
134	GLENHUNTLY STATION	19	ABBOTSFORD
		0	
135	GLENHUNTLY DEPOT	19	FIVEDOCK
		1	
136	ELSTERNWICK HOTHAM ST	19	HAROLD PARK
		2	
137	ELWOOD MILTON ST	19	CANTURBURY
		3	
138	E. BRIGHTON MALVERN	19	EARLWOOD
		4	
139	E. BRIGHTON	19	COOKS RIVER
		5	
140	S. CAULFEILD NORTH ROAD	19	DULWICH HILL
		6	
141	S. CAUL. JCT	19	BONDI BEACH
		7	
142	EAST MALVERN	19	WAVERLY
		8	
143	CAULFIELD STATION	19	BONDI JUNCTION
		9	
144	CAULFIELD	20	BOTANY
		0	
145	CITY Q'BERRY ST	20	BROONTE BEACH
		1	
146	LOFTUS	20	COOGIE BEACH
		2	
147	SUTHERLAND	20	CLOVELLY
		3	
148	ROYAL NAT PK	20	MAROUBRA BEACH
		4	
149	SPECIAL	20	LA PEROUSE VIA MALABAR
		5	
150	CROSS ST	20	KENSINGTON
		6	
151	TRAMWAY GATES – PITT ST	20	WYNYARD
		7	
152	TEMPTATION CREEK	20	LANE COVE
		8	
153	SYDNEY TRAMWAY MUSEUM	20	CHATSWOOD STATION
		9	
154	GUY	21	CROWS NEST
		0	
155	AUDLEY	21	THE SPIT
		1	
156	SHRDLU JCT. VIA GRAVY BAY	21	CREMORNE
		2	
157	WARATAH LOOP	21	TARONGA ZOO PARK
		3	
158	PRINCES HWY	21	RUSSELL STREET
		4	
159	EAST PRESTON	21	BALLARAT ROAD
		5	
160	EAST PRESTON – BELL STREET	21	WILLIAMSTOWN ROAD

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		6	
161	LATROBE UNI	21	FOOTSCRAY R'WAY
		7	
162	NORTHCOTE	21	PYROTECHNIC FACTORY
		8	
163	CLIFTON HILL	21	AMUNITION FACTORY
		9	
164	COLLINGWOOD SMITH & JOHNSON STS	22	NUT FACTORY
		0	
165	EXHIBITION	22	PICTURE THEATRE TRAM
		1	
166	EAST BRUNSWICK – BLYTH ST	22	CENTRAL DEBORAH GOLD MINE
		2	
167	NORTH FITZROY – PARK ST	22	CHARING CROSS
		3	
168	CITY – SPRING ST	22	CITY DEPOT
		4	
225	NORTH BENDIGO	23	GOLDEN SQUARE
		4	
226	NORTH BENDIGO JOSS HOUSE	23	GOLDEN SQUARE VIOLET ST
		5	
227	EVENT SHUTTLE	23	CITY CHARING CROSS
		6	
228	BENDIGO STATION	23	BRIDGE ST & WEEROONA AVE
		7	
229	QUEEN ELIZABETH OVAL	23	TRAMWAYS AVE
		8	
230	KANGAROO FLAT	23	VIEW & BARNARD STS
		9	
231	LAKE WEEROONA	24	VIOLET ST
		0	
232	BENDIGO TRAMWAYS	24	GOLD MINE
		1	
233	TRAINING TRAM	24	JOSS HOUSE
		2	
		24	BRIDGE STREET
		3	