KiwiRail

Points Systems Manual

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1. General

1.1 Hand Operation – Securing / Isolating of Motor Points

NOTE
See Instructions for securing / isolating Type **M5, TD84M** & **M23A MKII**; all are Dual Control Non-winding types.

The following steps are to be taken to correctly secure & isolate motor points owing to a signal/points indicator or points failure before a movement is authorised to proceed over them.

When permission has been obtained from the Signaller withdraw the crank handle from the detection holder in the crank handle box. Crank handle boxes are shown on the S&I Diagram for that location.

When a motor points failure affects one or both motors of a cross over, the motors of both ends must be isolated and hand operated. Both motors must remain isolated until the movement is completed.

However, where one of the motors for that set of points in the route is part of a crossover, isolation of it may affect the parallel route and before securing these points, a check must be made with the Signaller / Train Control to ensure that this action will not interfere with a movement on this route.

Starting from the furthest set of motor points and working towards the locomotive:

- Isolate the motor points as described in Instruction for the type of motor points concerned.
- Insert the crank handle into the points motor and rotate the handle to move the points to the required position. Rotation of the handle must continue until the internal locking mechanism prevents further movement.
- Confirm with the Signaller that the above steps have been taken and the position of each set of hand operated motor points.

NOTE
When the motor points have failed and they are lying in the correct position for the intended movement they **must** first be hand operated to the opposite position and then back again to ensure that the internal locking mechanism has been engaged.

NOTE
Hand operated motor points must remain isolated until the authorised movement is completely clear of them.

In some cases it may be necessary for the motors points to be left in the secured position. When instructed by the Signaller the crank handle is to be removed from the motor points, the weather proof

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cap is to be closed and locked. The isolating rings must be left in the hand operating position and the crank handle replaced into the bottom of the location box, but not into the detection holder.

The location box is then to be locked and the Signaller advised. Under these conditions it will not be necessary to certify security of the motor points for further movements for the route set.

Picture showing crank handle in the bottom of the location box, but not in the detection holder.

When it is not possible to close and lock the weather proof cap then the procedure as outlined above must be applied for all subsequent movements while the motor points are in the defective condition.

In the signal box, where the controls for the motor points allow, the control lever must be placed in the position to reflect the setting of the hand operated motor points before authorising a movement to commence. When not required the lever must be placed in the position it occupied before the failure occurred.

1.2 Location of Crank Handles

The crank handles are held in a detection holder which is fitted in a specially built box at the signals location building usually near the main line points. Crank handle boxes are shown on the S&I diagram for that location.

NOTE
CTS2 crank handles are part of the points machines.

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1.3 Restoration to Normal Power Operation

The power must not be restored to the motor points until instructed by the Signaller.

To restore the power carry out the following:

1. Remove the crank handle from the motor points, ensure isolator is set for power operations, replace and lock the weatherproof cap.
2. Return to the crank handle box and replace the crank handle into the detection holder and rotate to the detect position.
3. Lock the crank handle box and advise the Signaller who will confirm power operation by testing the motor points in both normal and reverse.

NOTE

Stand clear of motor points when restoring them to power operation as the points blades may move when the power is connected.

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2. CTS2 Motor Points

The CTS2 point machine comprises a metal tie that houses the motor unit and a point lock and detection unit. The modular design permits the replacement of individual components without removing the tie, allowing the other parts to be left in service. If replacement of the motor unit is required, it is possible to leave the point lock and detection unit in position, maintain the locking of the switch point and allow train movements on the signal indication by using a special adapter.

CTS2 Points Machine with locked cover

2.1 Switch Machine Configuration

The CTS2 switch point machine has a modular configuration and is composed of the following principal components:

- Metallic Tie.
- Motor Unit.
- Point Locking and Detection Unit.
- Hand Crank.

2.2 Metallic Tie

The tie includes the plates mounted permanently on the track. The tie (the electric point machine casing) is a steel construction. The steel sleeper can support as many loads as pre-stressed reinforced concrete sleepers.

The sleeper bottom is ribbed to increase resistance to sliding in gravel and is bored for draining any eventual rainwater.

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CTS2 Points Machine Isolator Ring

2.3 Isolating Points

2.3.1 Hand Crank

The CTS2 points are supplied with a fixed hand crank to allow manual operation. The hand crank mechanism has been designed to avoid vandalism and improper machine usage.

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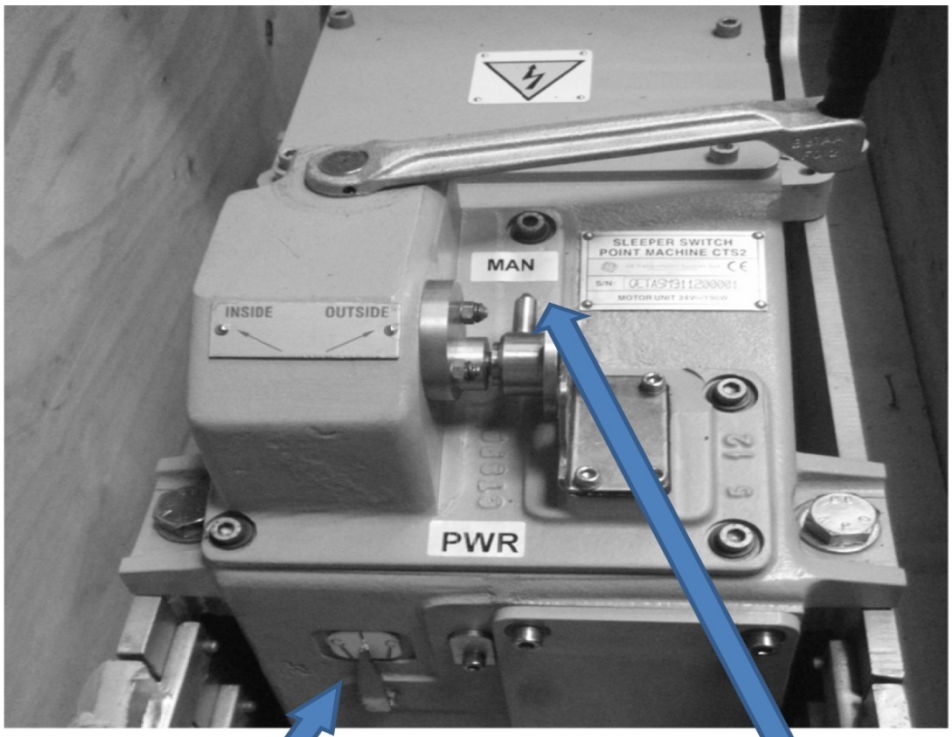
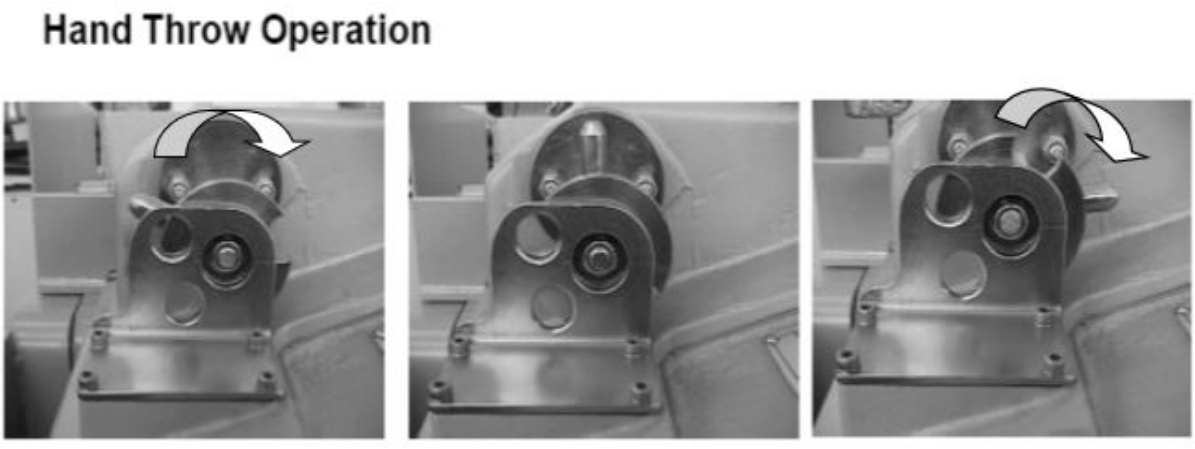


External mechanical indicator shows the points are in the unlocked position Note: When hand winding these points No movements should pass over the points when the indicator shows the points in the unlocked position		
	Selector in power (**PWR**) position **note**: pad lock has been removed	Selector in (**MAN**) position for manual operation

Picture showing Hand Crank

The external mechanical indicator shows the locked and closed position of the points.



Picture showing Hand-Throw Operation

Rail Personnel

1. Remove the padlock and chain.
2. Move the selector from the initial position to the final setting, as shown in the hand-throw operation above
3. The control and detection circuits are not typically connected when the selector is in the position illustrated in the final setting above.
4. Use the crank handle to move the points to the correct position for movement.
5. Secure the points in the isolated position using the chain and padlock.

NOTE
The movement of the crank hand lever while moving the selector makes engagement of the selector easier.

NOTE
The point blades move independently of each other.

IMPORTANT

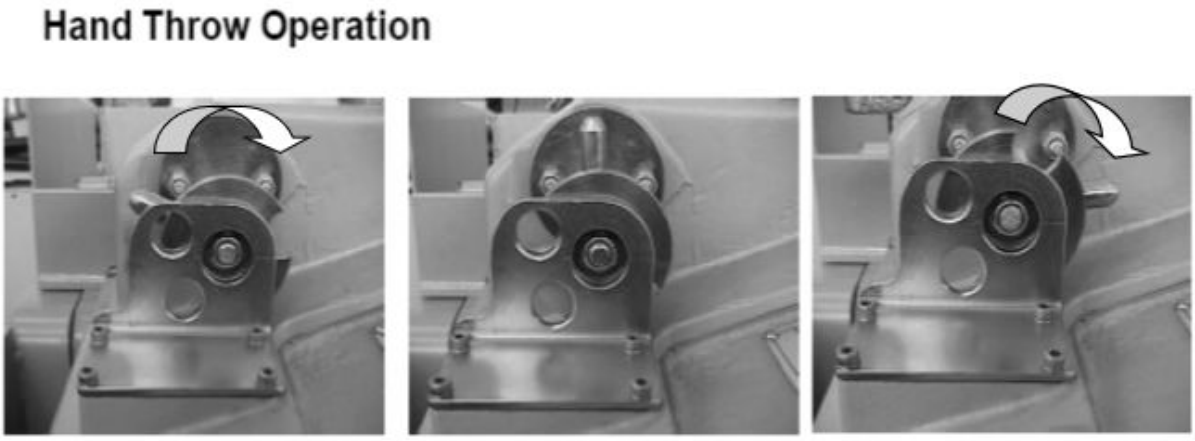
1. When detection is lost, and the train controller requires them to be isolated in normal or reverse, the mechanical indicator must be used to check if the points are in the correct setting and locked.
2. If they are in the unlocked position, use the crank handle to move the points to the required setting until the indicator shows the points are locked in the correct setting.
3. The hand crank will keep moving at the end of the points travel. The external mechanical indicator must be used to check the points are locked in the correct position.
4. The crank handle needs to be turned completely until it is stopped internally at the end of the travel but may then be backed off a part turn so the handle can be folded down and parked for the lid to be closed.

 © KiwiRail

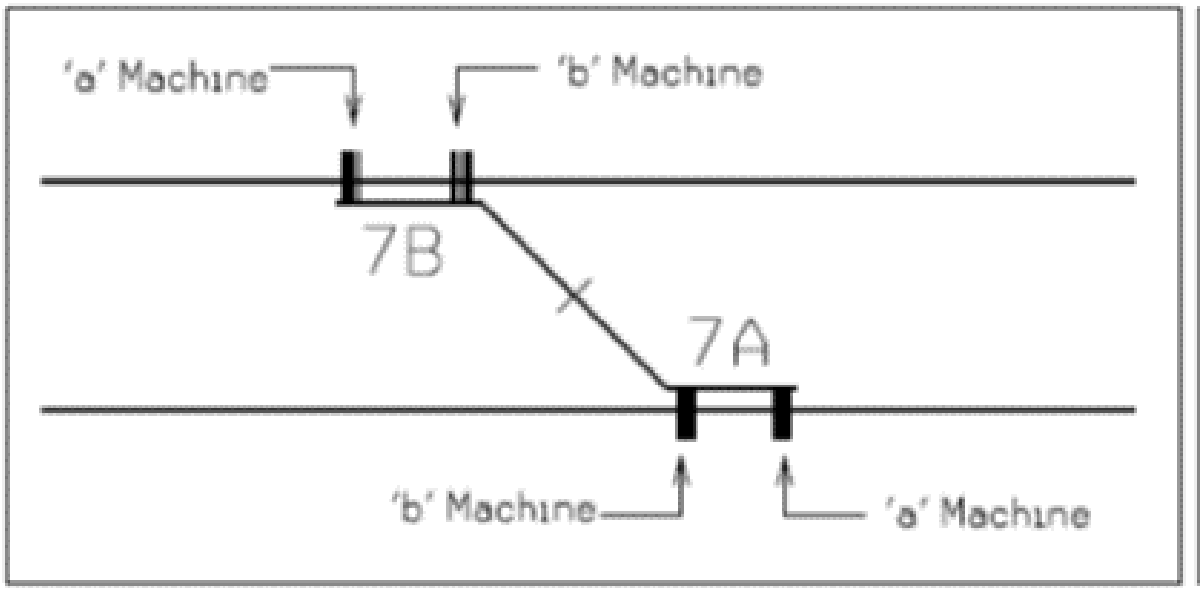
Picture showing External Mechanical Indicator in locked position

 © KiwiRail

3. Dual Machines Fitted on Long Turnouts

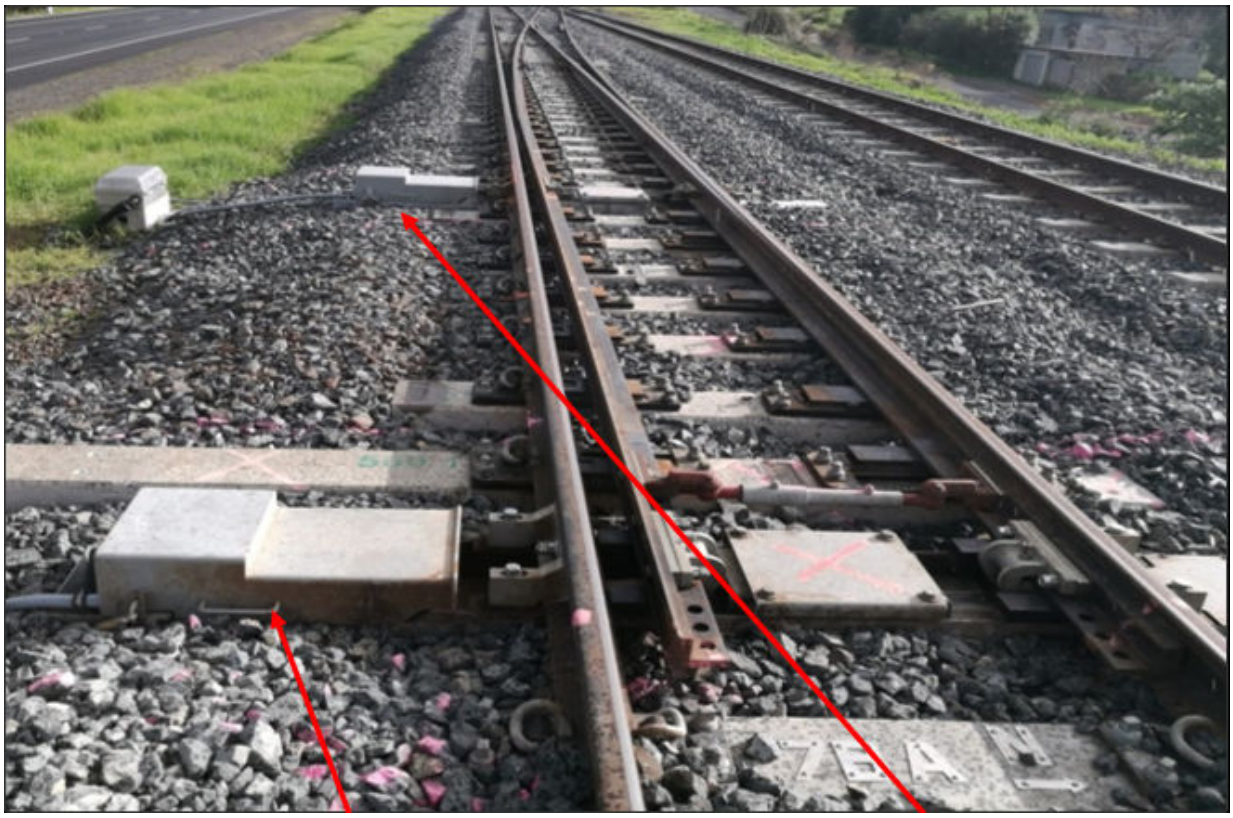


Hand-Thrown Operation



Dual Machine Points (approx. 4 metres apart)

© KiwiRail



***Left Arrow** - the 'a' Points Machine*

***Right Arrow** - the 'b' Points Machine*

3.1 Isolating and Hand-Thrown Operation

Rail Personnel

1. Start at the ‘a' points machine.
2. Remove the padlock and open the motor cover
3. Move the selector from the PWR position to the MAN position.
4. Hand wind the ‘a’ machine until the points unlock. The external mechanical indicator shows the points in the unlocked position (Fig.1 below).
5. For absolute certainty that the clutch has disengaged from previous settings, watch the points blade move slightly away from the stock rail before proceeding to the ‘b’ machine.

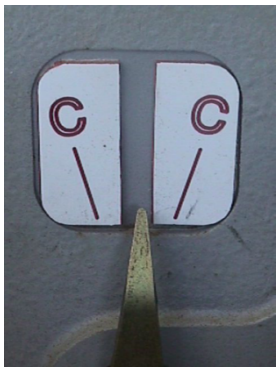


Figure 1: Unlocked position

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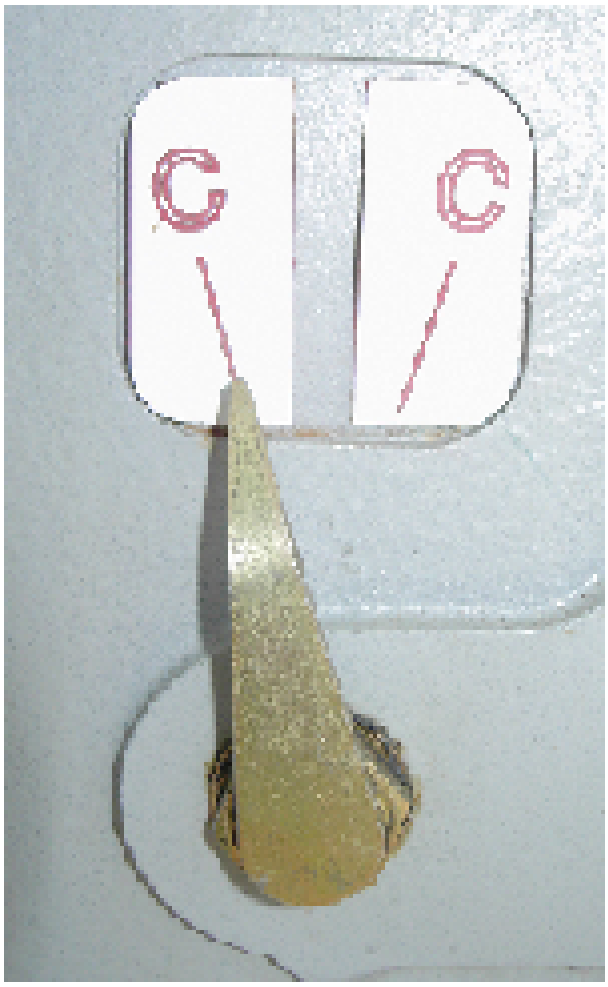

Figure 2: Locked Position

6. Move to the ‘b’ points machine.
7. Remove the padlock and open the motor cover.
8. Hand wind the ‘b’ machine while observing:
   a. The points unlock, and ‘b’ switch blades start moving, and
   b. The ‘a’ machine hand lever will start rotating, and the points blades move by spring action caused by the switch travel at the ‘b’ machine.
9. At the end of the switch travel, continue winding the ‘b’ machine until the mechanical indicator shows the points are in the correct position and locked (Fig. 2 above).
10. If necessary, secure the points in the isolated position with a padlock through the hasp.
11. Return to the ‘a’ machine.
12. Complete the remaining hand winding until the mechanical indicator shows the points are locked in the correct position (Fig. 2 above).
13. Secure the points in the isolated position with a padlock.

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IMPORTANT

1. When detection is lost, and the train controller requires them to be isolated in normal or reverse, the mechanical indicator must be used to check if the points are in the correct setting and locked.
2. If the indicator is in the unlocked position (Figure 1), use the crank handle to move the points to the required setting until the indicator on each machine shows the points are locked in the correct setting (Figure 2).
3. The hand crank will keep moving at the end of the points travel with added resistance. The external mechanical indicator must be used to check the points are locked in the correct setting, as shown in (Figure 2).
4. The crank handle needs to be turned completely to until it is stopped internally at the end of the travel but may then be backed off a part turn so the handle can be folded down and parked for the lid to be closed.

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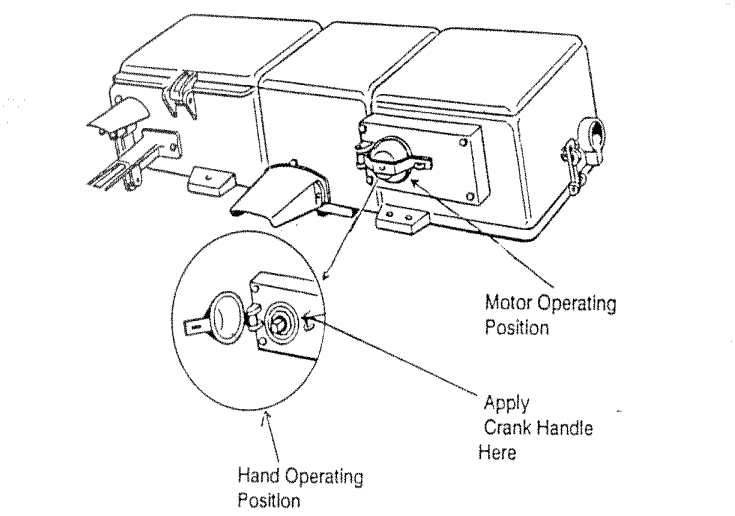
4. Type M2 Side Winding

The equipment contains a crank handle and a detected crank handle socket.

The isolation method is by withdrawing the crank handle from its detector box.



Type M2 Side Winding - Westinghouse

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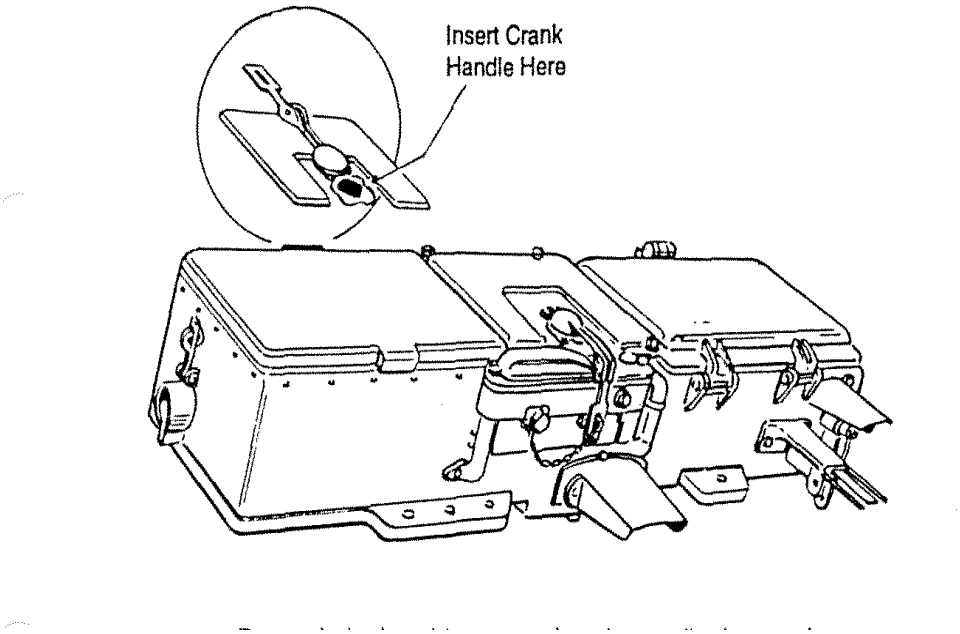
5. Types M3 and M3a Top Winding

The equipment contains a crank handle, a spring-loaded plunger, and a secure location for the crank handle.



Types M3 and M3a Top Winding - Westinghouse

5.1 Isolation Method

Rail Personnel

1. Remove the padlock to gain access to the crank handle opening. This allows a spring-loaded plunger to come out and the isolating switch to open.
2. To allow the crank handle to be placed onto the cranking shaft, remove the weather-protective cap by placing the crank handle onto the nut of the cover and unscrewing the cap.
3. When instructed by the Signaller to leave the points in the isolated position, the weatherproof cap must be replaced, but do not replace the isolating arm and plunger.
4. Lock the padlock to the bottom of the clasp so it will not be lost. This will also stop the isolating arm from re-energising the motor points when the cover assembly is back in place.

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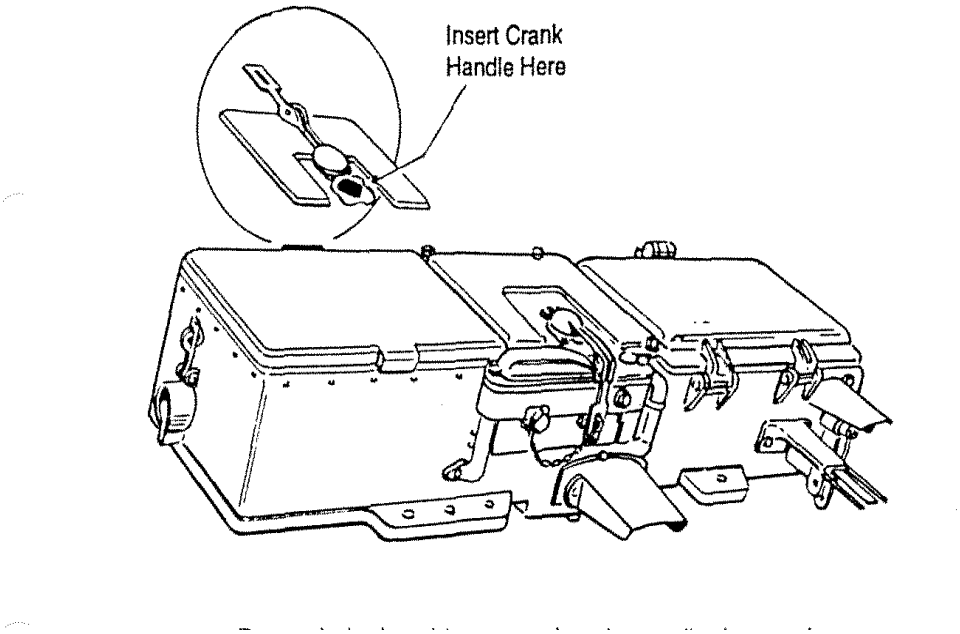
6. Type M3a (MK2) Top Winding

The equipment contains a crank handle, a spring-loaded plunger, and a secure location for the crank handle.



Types M3a (MK2) Top Winding - Westinghouse

6.1 Isolation Method

Rail Personnel

1. Remove the padlock to gain access to the crank handle opening. This allows a spring-loaded plunger to come out and the isolating switch to open.
2. When instructed by the Signaller to leave the points in the isolated position, lock the padlock to the bottom of the clasp so it will not be lost. This will also stop the isolating arm from re-energising the motor points when the cover assembly is back in place.

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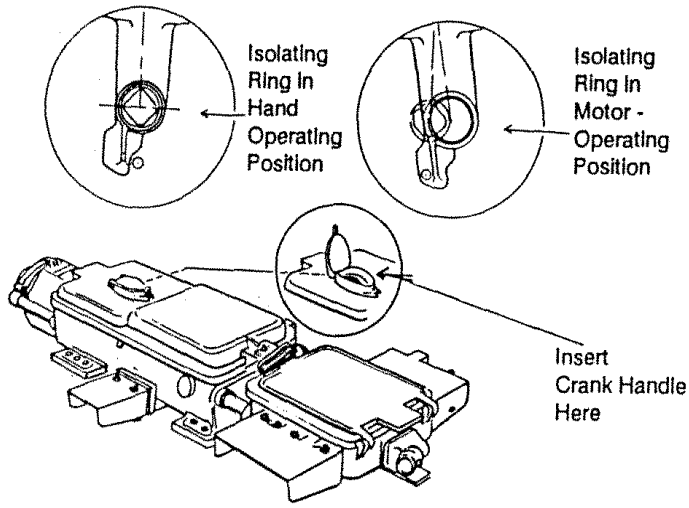
7. Type GRS, SGE and Nippon Top Winding

The equipment consists of a crank handle, isolation ring and detected crank handle socket.



Type GRS, SGE and Nippon Top Winding

7.1 Isolation Method

Rail Personnel

1. Isolate the power by moving aside a guard ring before it is possible to insert the crank handle.
2. When instructed by the Signaller to leave the points in the isolated position, leave the isolating ring in the hand operating position.
3. Relock the weatherproof covers for the GRS and SGE points.

NOTE

Nippon points, unless modified, cannot have the weatherproof cover locked while the points are in the isolated position. All that is required is to leave the points weatherproof cover unlocked. Lock the padlock to the points, so it is not lost.

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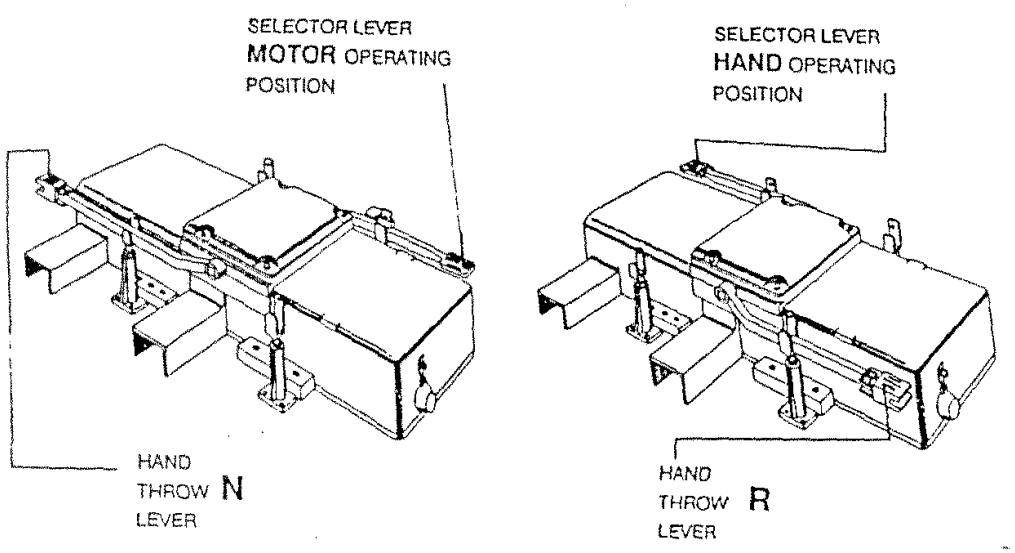
8. Type M5 Dual Control Non-Winding

The equipment contains a short selector lever and a long hand throw lever.



Type M5 Dual Control Non-Winding – Westinghouse

NOTE
The short selector lever is used to isolate the power from the motor. The hand throw lever is lettered N on one side and R on the other. This lever is used to hand operate the points after the power is isolated.

8.1 Normal Operation

Rail Personnel

1. Lock the short selector lever in the motor operating position for normal operation.
2. Ensure the short selector lever (the motor / hand lever) has ‘motor’ facing upwards stamped on the lever when in normal and ‘hand’ facing upwards when in the isolated setting.

8.2 Isolation Method

Rail Personnel

1. Place the hand throw lever in the position the points blades are in before hand operation.
2. If the points fail in normal, the hand throw lever must be placed so that the N on the handle is facing upwards. If the points fail in reverse, the hand throw lever must be placed so that the ‘R’ on the handle is facing upwards.
3. Place the selector lever in the hand operate position to isolate the motor. The points can now be operated as required
4. If the points are required to be left isolated, the selector lever must be left in the hand operating position.

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8.3 Restoring Points

To restore the points to normal operation after manual operation:

Rail Personnel

1. Return the points to the same position before manual operation with the hand throw lever.
2. Move the selector lever to the motor operating position and secure it with the AS padlock.

8.4 Clearing an Obstruction

IMPORTANT
When the points fail in the midway position because of an obstruction in the blades, both levers must be operated together to allow the obstruction to be cleared.

Rail Personnel

1. Unlock the AS padlock on the selector lever and move this lever toward the hand operation position until it stops.
2. Lift the hand-throw lever slowly towards the other position until it stops. Operate both levers together until the selector lever can be moved fully to the hand operate position.
3. Move the hand-throw lever as required to remove the obstruction.
4. When the obstruction is clear, then restore the points to normal operation by:
   a. move the selector lever toward the motor selector position until it stops.
   b. Lift the hand-throw lever slowly towards the other position until it stops.
   c. Operate both levers together until the selector lever can be moved fully to the motor operating position.
   d. Secure hand operate/motor selector lever with the AS padlock.

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9. Type TD 84M Dual Control Non-Winding

The equipment contains a short selector lever, long hand throw lever, two hand-operated securing latches and pointers (one on sleeper and one on points rodding).

Type TD 84M Dual Control Non-Winding – Westinghouse

9.1 Normal Operation

Rail Personnel

1. You must lock the short selector lever and the long hand throw lever together with an AS padlock in the motor operating position for normal operation.
2. Ensure the short selector lever (the motor / hand lever) has ‘motor’ facing upwards stamped on the lever when in the normal position and ‘hand’ facing upwards when in the isolate position. The short selector lever is used to isolate the power from the motor.
3. If the points fail in normal, you must place the hand throw lever so that the N on the handle is facing upwards. If the points fail in reverse, you must set the hand throw lever so that the R on the handle is facing upwards.

IMPORTANT
When the TD84M motor points are isolated, you must hold the selector (motor/manual) lever firmly, as the lever is tensioned and will spring with some force.

9.2 Isolation Method

Rail Personnel

1. Unlock the AS padlock and lift the latch next to the motor/hand lever.

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2. Move the motor/hand lever to the hand position.
3. Ensure the lever clicks into position on that end.
4. When instructed by the Signaller to leave the points in the isolated position, leave the selector lever with the hand label facing upward and lock the lever in that position with the AS padlock.
5. If the points have failed in the normal position and the pointers on the sleeper and on the points rodding line up, this indicates there is no need to move the points to the opposite position and back. You can tell the Signaller the points are locked in normal.

9.3 Manual Operation

Rail Personnel

1. Use the hand throw lever to position the points as instructed by the Signaller.
2. Restore the points to normal operation after manual operation:
    a. Lift the latch to release the motor/hand lever.
    b. Move to the motor position.
    c. Ensure the lever clicks into position on the opposite end.
    d. Secure with the AS padlock.
3. To restore the points to normal operation when the points are in the reverse setting.
    a. Lift the latch to release the hand-throw lever.
    b. Move the hand-throw lever to the normal position.
    c. Ensure the lever clicks into position on the opposite side.
    d. Lift the latch to release the motor/hand lever.
    e. Move to the motor position.
    f. Ensure the lever clicks into position on the opposite end.
    g. Secure with the AS padlock.

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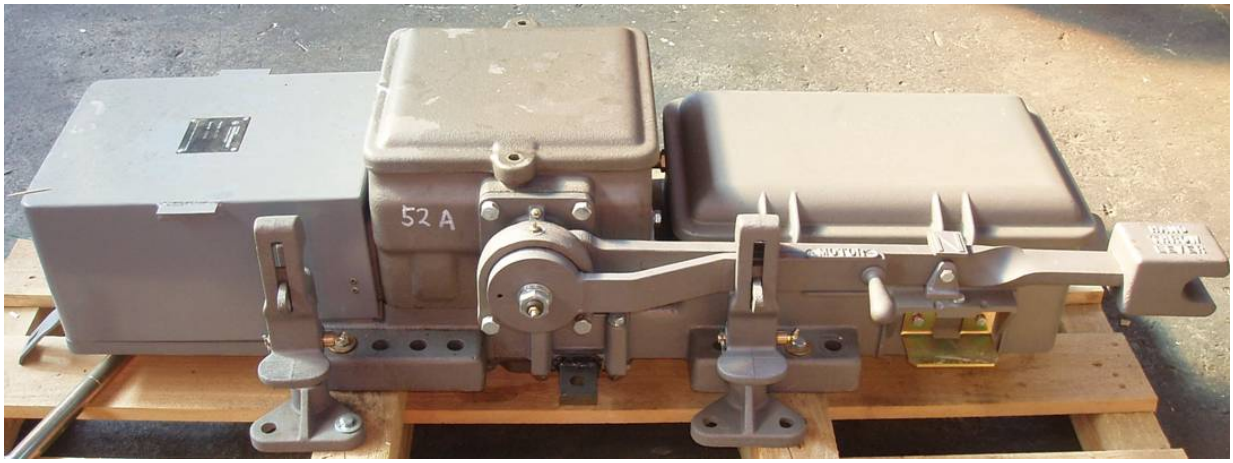
10. Type M23A MKII Dual Control Non-Winding

The equipment contains a short lever, long lever, two spring-loaded foot-operated securing latches and normal and reverse marking on the sleeper.



Type M23A MKII Dual Control Non-Winding – Westinghouse

10.1 Normal Operation

Rail Personnel

1. The short lever is locked with an AS padlock in the motor operating position for normal operation.
2. Ensure the short selector lever (the motor/hand lever) has ‘motor’ facing upwards stamped on the lever when in the normal position and ‘hand’ facing upwards when in the isolate position. The short selector lever is used to isolate the power from the motor.
3. Operate the long lever for the points after the power has been isolated. The long lever is lettered ‘N’ (normal) on one side and ‘R’ (reverse) on the other.

IMPORTANT
When the M23A motor points are isolated, the short lever must be held firmly, as the lever is tensioned and will spring with some force.

10.2 Isolation Method

Rail Personnel

1. Unlock the AS padlock and push the latch down with your foot.
2. Move the short lever to the hand position.
3. Ensure the short lever locks into position on that end, closing the latch.
4. Place the long lever in the position the points blades are in before you move the short lever.
5. If the points fail in normal, you must place the hand throw lever so that the N on the handle is facing upwards. If the points fail in reverse, you must set the hand throw lever so that the R on the handle is facing upwards.
6. When instructed by the Signaller to leave the points in the isolated position, leave the short lever with the hand label facing upward and lock the lever in that position with the AS padlock.

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10.3 Manual Operation

Rail Personnel

1. Use the long lever to position the points as instructed by the Signaller.
2. To restore the points to normal operation after manual operation:
   a. Push the latch down with your foot to release the short lever.
   b. Move to the motor position.
   c. Ensure the short lever clicks into position on the opposite end.
   d. Secure with the AS padlock.

10.4 Clearing an Obstruction

Rail Personnel

1. Unlock the AS padlock and push the latch down with your foot.
2. Move the short lever to the hand position.
3. Ensure the short lever locks into position on that end, closing the latch.
4. Move the long lever toward the reverse position (move the long lever as required to clear the obstruction).
5. Restore the points with the long lever in normal and the short lever in the motor operating position.

IMPORTANT
A loud click will be heard while moving the short lever to the hand position; this is normal.

IMPORTANT
When the M23A motor points are isolated, you must hold the short lever firmly, as the lever is tensioned and will spring with some force.

IMPORTANT
When the power is restored, and the motor moves for the first time, a loud click will be heard; this is normal.

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11. Type HR NG (Unistar) Motor points – Hand Operating Instructions

11.1 Introduction

- This type of points motor is mounted between the rails.
- It can be installed on slab track or on sleepers.
- The crank handle is not detected and is locked in an AS padlocked box.
- The power isolation plunger can be padlocked in the *Power* or *Isolated* position.

Wellington Station

Unistars are in use on:

- 51A&B Crossover

Waitematā (Britomart) Station

Unistars are in use on:

- 37A&B / 39A&B Crossover
- 45A&B / 47A&B Double-Slip Crossing

The crank handles are located in the locked signals equipment room M6815

NOTE
Any points issue in Waitematā (Britomart) get a priority call out from the Signals Maintenance Representative who can provide access to this room.

11.2 Equipment

- Crank handle
- Isolation plunger
- Secure location for crank handle

11.3 Isolate and Hand Operate Method

Step	Action
1.	Before starting manual operation, confirm with the Train Controller: a. The point numbers that need hand operating b. The setting that they are to be left in: i. Normal or Reverse, and ii. Power or Isolated.
2.	a. Visually check the gap between the points blade and stock rail for obstructions. b. Clear any obstructions with the crank handle. Hands must not be used to clear obstructions.

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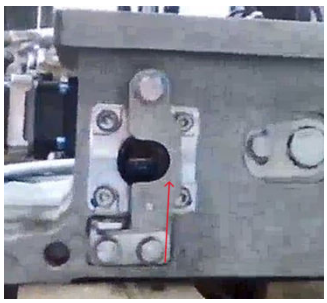
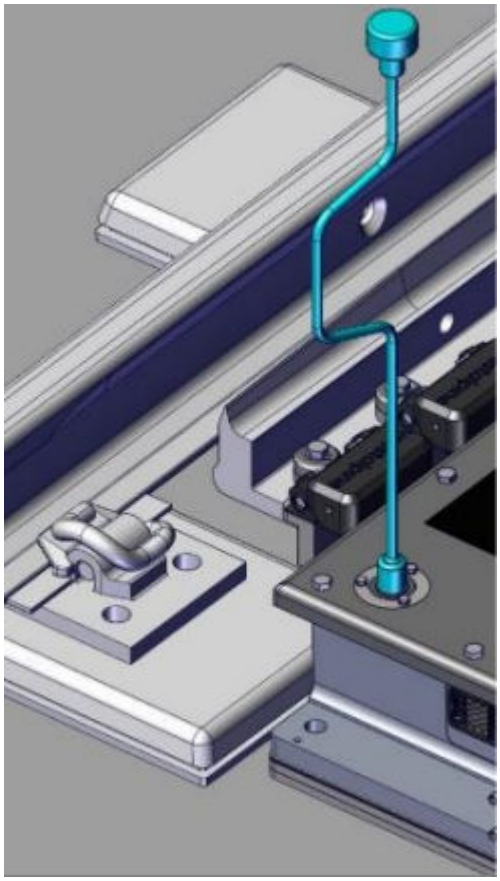
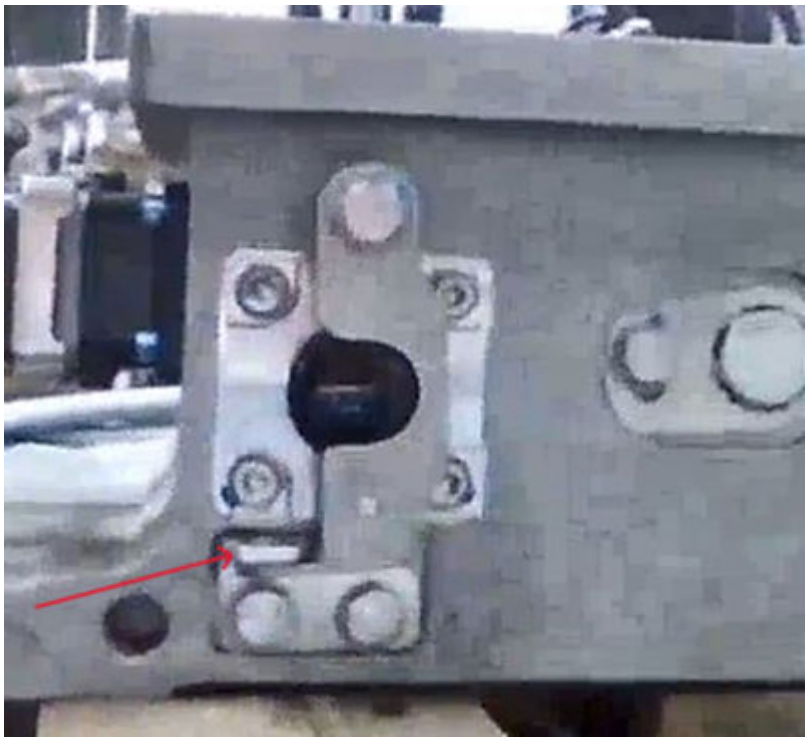
Step	Action
3.	a. Unlock the padlock b. Lift the catch upwards to release the black plunger *Figure 1 Catch lifted to release plunger* *Figure 2 Plunger out = Power Operating* 

Step	Action
	Figure 3 Plunger in secured by catch = Power Isolated c. Push the plunger inwards and at the same time lower the catch to hold the plunger in **NOTE** If the plunger cannot be pushed in, the crank handle must be turned a little at the same time as pushing in the plunger
4	 a. Put the crank handle onto the the exposed nut on the top face of the points motor
5	a. Select the direction of the points by turning the handle clockwise or counter-clockwise until the crank cannot be turned anymore and the points blade is hard up against the stock rail.

11.4 Leave Isolated Process

Step	Action
1.	Plunger pushed in and secured with catch.

Step	Action
2.	Padlock the catch in this position:  AS padlock location *Figure 5 Plunger in secured by catch = Power Isolated*

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