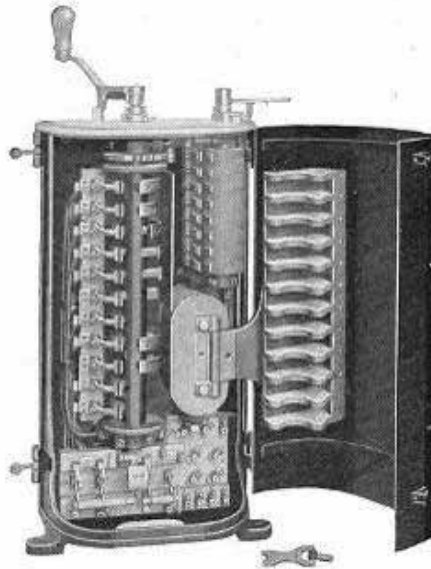


MATA Training & Fixed Guideway Safety Training Workshop



**DO NOT TURN THIS PAPER OVER UNTIL
INSTRUCTED TO DO SO**

Maintenance Guide - Exam



Employee Name _____ Employee Number _____

Date _____ Time _____

Questions

These are multiple-choice questions; mark the box next to the ones you believe best describes the procedures, equipment or statement with an "X". The "X" shall be marked inside the box provided or an incorrect answer will be recorded for that question. To pass, you are required to answer all questions marked with a "*" correctly, as these relate to safety sensitive items, and 50 percent or more of the unmarked questions correct.

1. What is a controller flashover?

- A short circuit in the controller that results in a muffled explosive noise, arcing, smoke and high temperature damage, due to the age of the trolleys and controllers, it is normal for small to medium sized flashovers to occur regularly, and more severe flashovers to occur yearly.
- A short circuit in the controller that results in a muffled explosive noise, arcing, smoke and high temperature damage, under normal conditions it is contained within the controller case.
- A fault that develops with old trolley controllers and indicates the controller requires replacement.

2*. In relation to working on the 600 VDC control circuit of a trolley, when should Blue Flag & Lock Out Tag Out protection procedures be used?

- In all situations where the chance of electrocution by 600 VDC exists, (the exceptions of essential live testing by competent personnel).
- In all situations where the chance of electrocution exists, (the exceptions of essential live testing by competent personnel and correcting minor faults during a breakdown call).
- Only when directly instructed by a member of MATA Streetcar Maintenance Management or through other written or verbal procedures.

3*. When positioning a K 35 controller in notch six, which fingers are in contact with segments:

- 20, R6, R3, R5, G, 12
- 1,R2, T, 2, R4, R5, G
- 20, R6, L, R5, G, 12
- 1, R2, R3, T, T, 2, R4, R6, R5, R7, R5, R2

4*. When positioning a B 54 controller in notch five, which fingers are in contact with segments:

- 20, R6, R3, R5, G, 12
- 1,R2, R3, T, T, 2, R4, R6, R5, R7, R5, G
- 20, R6, L, R5, G, 12
- 1,R2, R3, T, T, 2, R4, R6, R5, R7, R5, R2

5*. On a K35 controller what is the contact pressure and maximum drop for fingers on the segments (main motor barrel fingers)?

- Pressure 6 lbs, lift 1/8"
- Pressure 8 lbs, lift 1/16"
- Pressure 8 lbs, lift 1/8"

6*. On a B54 controller what is the contact pressure and maximum drop for fingers on the segments?

- Pressure 4 lbs, lift 1/8"
- Pressure 8 lbs, lift 1/16"
- Pressure 8 lbs, lift 1/8"

7*. On a K35 controller what is the contact pressure and maximum drop for fingers on the reversing barrel?

- Pressure 4 lbs, lift 1/8"
- Pressure 8 lbs, lift 1/16"
- Pressure 8 lbs, lift 1/8"

8*. One of the following statements regarding PPE (personnel protective equipment) is not true. Indicate which statement is not true:

- PPE can prevent eye damage from electrical sparks
- PPE can reduce the chance of pedestrian/motor vehicle accidents
- PPE can reduce the chance of maintenance personnel/trolley accidents
- PPE is not required to be worn by very experienced senior personnel
- PPE can prevent hearing damage

9. Marking notches clearly on the top of a controller and training drivers to only position the controller in marked notches will:

- Reduce maintenance work on controllers
- Make no significant difference
- Increase maintenance work on controllers

10. The types of trolleys operated by MATA can be categorized into two main types, these are:

- Melbourne and Gillig
- Melbourne, Oporto and Gomaco
- Melbourne and Gomaco
- Oporto and Melbourne
- Melbourne and Cable Cars

11*. How many points or notches does a K35 controller in a Melbourne car have?

- Eight, 5 series & 3 parallel
- Seven, 3 series & 4 parallel
- Eight, 4 series & 4 parallel
- Eight, 3 series & 5 parallel
- Seven, 4 series & 3 parallel

12*. A controller finger must always be aligned to sit level on the face of a segment. Along the "line of contact" of the fingertip, what is the recommended contact area with the segment?

- 1/16" in width along the line of contact, and the finger should make contact over at least $\frac{3}{4}$ of its breadth.
- 1/8" in width along the line of contact, and the finger should make contact over at least $\frac{3}{4}$ of its breadth.
- 1/8" in width along the line of contact, and the finger should make contact over at least $\frac{1}{2}$ of its breadth.

13*. What are the running points or notches (the notches you can stay in) in a K35 controller?

- Notches 5 and 7
- Notches 4 and 8
- Notches 3 and 8
- Notches 5 and 8
- Notches 4 and 7

14*. How many motors does a Melbourne car have?

- 2
- 1
- 4

15*. Melbourne trolleys have the following:

- Two trucks or double trucks
- Four motors
- GE K35 controllers
- All of the above
- None of the above

16*. 600 volt DC leaves the substation and then:

- Travels along feeders to the overhead trolley wire
- Is picked up by the trolleys pantograph
- Travels through the choke coil to the line breaker
- Travels through the controller, resistance grids, motors and wheels
- Travels into the track and returns through feeders to the substation
- All of the above
- None of the above

17*. Oporto trolleys have the following:

- One truck or a single truck
- Two motors
- GE B54 controllers
- All of the above
- None of the above

18*. One of the following statements regarding line breakers is not true. Indicate which statement is not true:

- A line breaker may be located under the floor or on the roof of a trolley.
- A line breaker is an automatic switch operated by a relay circuit through switches in the controller.
- The line breaker transfers main reservoir air pressure to the brake valve.
- The contactor closes when the controller is moved to the first power position.
- Any movement of the controller handle towards the 'off' or zero position from any notch automatically opens the contactor.
- The controller handle must be returned to the 'off' or zero position before the line breaker can be activated and power applied again.

19. How many trucks does a Melbourne car have?

- 2
- 1
- 4

20*. How many points or notches does a B54 controller in an Oporto car have?

- Eight, 5 series & 3 parallel
- Seven, 3 series & 4 parallel
- Eight, 4 series & 4 parallel
- Eight, 3 series & 5 parallel
- Seven, 4 series & 3 parallel

21*. How many motors does an Oporto car have?

- 2
- 1
- 4

22*. What are the running points or notches (the notches you can stay in) in a B54 controller?

- Notches 5 and 7
- Notches 4 and 8
- Notches 3 and 8
- Notches 5 and 8
- Notches 4 and 7

23*. What are the running points or notches (the notches you can stay in) in a K35 controller?

- Notches 5 and 7
- Notches 4 and 8
- Notches 3 and 8
- Notches 5 and 8
- Notches 4 and 7

24*. When selecting notch one on a K35 controller, how many resistances are in circuit?

- 1
- 2
- 0
- 7
- 8

25*. When selecting notch five on a K35 controller, how many resistances are in circuit?

- 1
- 2
- 0
- 7
- 8

26. Indicate which statement is true for series operation:

- The current flows through one motor or set of motors and then goes on to the next motor or set of motors before returning to ground. With two motors or two sets of motors connected in series with 600 VDC on the trolley wire, the voltage taken by each motor or set of motors would be 300 VDC, half of the 600 VDC supply voltage.
- The current flows through each motor or set of motors and then returns to ground. Full 600 VDC trolley wire voltage is applied to each motor or set of motors. This gives full speed; therefore trolleys do not start on parallel power.

27. Indicate which statement is true for parallel operation:

- The current flows through each motor or set of motors and then returns to ground. Full 600 VDC trolley wire voltage is applied to each motor or set of motors. This gives full speed; therefore trolleys do not start on parallel power.
- The current flows through one motor or set of motors and then goes on to the next motor or set of motors before returning to ground. With two motors or two sets of motors connected in series with 600 VDC on the trolley wire, the voltage taken by each motor or set of motors would be 300 VDC, half of the 600 VDC supply voltage.

28*. Why is checking the sequence of contacting and disconnecting of the fingers and segments as per controller schematic so important?

- Ensures correct operation of the motors
- Minimizes arcing in the controller
- Minimizes damage to the motors
- All of the above
- None of the above