Draft – Basic Skills Gap Analysis to determine Basis Electrical/Electronic & BEB Skills

Note: *This is only an abbreviated version that will be expanded by the TWC*

**Instructions:**

This survey is designed to gather information about your electrical skills as a transit bus technician. It is anonymous and completely confidential; it does not ask for your name. The survey will be used to assess your existing skill levels so appropriate training can be provided to strengthen those skills to keep up with today’s complex buses.

To the right of each task you will find a rating scale: a, b, c, d or e. To choose the correct response, read the descriptions below and circle the one that best represents your skill level as it relates to the task.

a – You are so familiar with this task that you could instruct others.

b – You can perform this task competently your own.

c – You can perform this task but need some assistance/supervision.

d – You are aware of this task, but cannot perform it.

e – You are unaware of this task, or don’t understand what it means.

**Electrical/Electronic Skills**

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| **ELECTRICAL SYSTEMS – Fundamentals**  |
| 1 | Describe fundamentals of Ohm's law | a | b | c | d | e |
| 2 | Use multimeter to measure DC voltage (12/24V) | a | b | c | d | e |
| 3 | Diagnose circuit malfunctions (short circuits, grounded circuits and open circuits) | a | b | c | d | e |
| 4 | Describe what is meant by normally open relay  | a | b | c | d | e |
| 5 | Use equipment schematics to troubleshoot electrical faults | a | b | c | d | e |
| 6 | Perform battery load test | a | b | c | d | e |
| 7 | Diagnose cause and repair for various charging conditions | ab | b | c | d | e |
| 8 | Remove, repair and/or replace wiring, terminals and connectors | a | b | c | d | e |

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| **ELECTRONICS / MULTIPLEXING** |
| **Troubleshooting and Maintaining Multiplex Systems** |
| 1 | Interpret combinations of inputs and outputs to determine electrical faults | a | b | c | d | e |
| 2 | Operate laptop computer for diagnostic purposes | a | b | c | d | e |
| 3 | Check/repair/replace communications cable | a | b | c | d | e |
| 4 | Identify proper settings and set address/dip switches | a | b | c | d | e |
| 5 | Use LED's to troubleshoot system | a | b | c | d | e |

**ZEB Skills**

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| **ZEB Fundamentals**  |
| 1 | Describe how ZEBs are similar to and different than diesel, CNG, and hybrid buses | a | b | c | d | e |
| 2 |  Identify the major propulsion components found on a typical Battery Electric Bus (BEB) | a | b | c | d | e |
| 3 |  Identify the major propulsion components found on a typical Fuel Cell Bus  | a | b | c | d | e |
| 4 |  Describe the function of BEB major propulsion components | a | b | c | d | e |
| 5 |  Describe the function of Fuel Cell Bus major propulsion components | a | b | c | d | e |
| 6 |  Describe the principles of operation of a Fuel Cell Bus | a | b | c | d | e |
| 7 |  Describe the principles of operation of a BEB | a | b | c | d | e |
| 8 |  Describe two popular methods for recharging BEB batteries | a | b | c | d | e |
| 9 |  Describe function of High Voltage personal protective equipment (PPE) Voltage sytem on a live Voltage System on a Live VehicleDemonstrate the general sequential steps in performing the disabling of a High Voltage System on a Live Vehicle Demonstrate the general sequential steps in performing the disabling of a High Voltage System on a Live Vehicle  | a | b | c | d | e |

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| **High Voltage, Safety & Data Communication Systems** |
| 1 | Use test instrument to measure high voltage  | a | b | c | d | e |
| 2 |  Demonstrate sequential steps in performing the disabling of a High Voltage System on a live ZEB  Voltage sytem on a live Voltage System on a Live VehicleDemonstrate the general sequential steps in performing the disabling of a High Voltage System on a Live Vehicle Demonstrate the general sequential steps in performing the disabling of a High Voltage System on a Live Vehicle  | a | b | c | d | e |
| 3 | Demonstrate sequential steps in performing ZEB lock-out/tag-out procedures | a | b | c | d | e |
| 4 | Demonstrate use of High Voltage personal protective equipment (PPE)  | a | b | c | d | e |
| 5 | Demonstrate use of service tools to diagnose communication/data link faults | a | b | c | d | e |