

#### Controllers

The Controllers shall be capable of being operated in the full-actuated mode in the free mode and as semi-actuated in the coordinated mode. The Controllers shall be Type 8DW, keyboard entry, menu-driven mounted in an eight (8) phase cabinet. The Controller Unit shall meet all applicable requirements of the (NEMA) Standard Publication No. TS2 - Type 1, the MassHighway Standard Specifications and include the following as minimum requirements for the "Keyboard Entry Controller Unit."

- a. The Keyboard Entry Controller Unit must be type-tested and approved by the Department.
- b. The Controller Unit shall have the capabilities of operating in either a single ring or dual ring mode with two through eight-phase control.
- c. The Controller Unit shall be capable of either sequential or concurrent phase control.
- d. Overlap phases shall be programmable through the keyboard.
- e. The Controller shall be capable of operating as a volume density controller.
- f. The Controller shall have hard wire interconnect capability and internal time base coordination logic. The coordination control shall have the capabilities to operate as described under Section 815.41 "Controllers" of the Standard Specifications for Highways and Bridges.
- g. The Controller shall have a data transfer/printer port for data transfer to another Controller or printer.
- h. The Controller shall have a security code function.
- i. The Controller Unit shall have internal fire preemption control capabilities.
- j. The phase or phases selected for "call to non-actuated" (C.N.A.) modes shall be determined as needed by keyboard entries.

The Controller Unit shall be provided with a memory feature. Vehicle detector actuations received by an actuated phase module when the red or yellow indication for this traffic phase is displayed shall be remembered and shall cause the Controller Units to provide right-of-way indications for that traffic phase at the next opportunity in the normal phase sequence. A switch shall be provided for disabling the memory circuit. All vehicular phases shall be set to memory 'Non-Locking', and the pedestrian phase shall be set to memory 'Locking' as shown on the plans.

The Contractor's attention is directed to Table 2, Required Signal Light Switching Assemblies, Section 815.41, "Controllers" of the Standard Specifications for Highways and Bridges. The Contractor shall furnish the appropriate type and number of load switches and place unutilized load switches in the control cabinet for future use. Load relays shall be easily replaced using a screwdriver. Component relays requiring soldering are not acceptable.