

TOPIC 6: CONTROLLER OPERATIONS

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Office of Traffic, Safety & Technology</p> 	 <h1 style="text-align: center;">Traffic Signals 101</h1> <h2 style="text-align: center;">Topic 6 Controller Operations</h2>	<p>In this topic you will be introduced to traffic signal controller operations.</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Office of Traffic, Safety & Technology</p> 	<h2 style="text-align: center;">Controller Operations</h2> <p style="text-align: center;">– Econolite Controllers</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>KMC8000</p>  </div> <div style="text-align: center;"> <p>ASC8000</p>  </div> </div>	<p>KMC8000</p> <ol style="list-style-type: none"> 1. Oldest of the three controllers displayed here. 2. The most rugged of the three. 3. The most difficult to install. 4. Least capable of the three without extensive external wiring/equipment. <ul style="list-style-type: none"> ▪ More external connections. ▪ More complicated wiring. <p>B. ASC8000</p> <ol style="list-style-type: none"> 1. Newer, and less rugged as the previous controller mentioned. 2. Less wiring with less difficulty. 3. Capabilities increased greatly.



Controller Operations

– Econolite Controllers



C. ASC2

1. Great capability with least external connections.

D. ASC2S

1. Same as ASC2 except for surface mount technology.
2. Surface mount technology results in small-size, light-weight. ($\approx 7 \times 9 \times 15$ inches/ $\approx 8\frac{1}{2}$ lbs.)

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Controller Operations

– Econolite Controllers



E. ASC2M & KMC10,000

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Controller Operations



ASC3

Eagle 2070 Product Sheet

Naztec 2070 Product Sheet

Source: www.econolite.com



F. ASC3 controller

1. Newest, with great capability.
2. Fully compliant with NEMA TS2.

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Controller Operations

➤ NEMA (National Electrical Manufacturers Association) Controllers

- NEMA's involvement in controller design helped greatly to simplify installations
- Standardization of A, B, C (1, 2, 3) connectors
- Operating limits standardized
- Standardization of timed intervals
 - Passage time
 - Maximum green time
 - Gap reduction
 - Walk & Ped Clearance
 - Many more intervals with proper operation dictated by NEMA

NEMA Controllers

1. Standardized connectors
 - Standard "pin-outs".
 - Standard Input/Output (I/O) names.
 - Connectors physical identical/interchangeable.
2. Operating limits
 - Operating temperature range. -30°F to 165°F.
 - Humidity range. >95% @40°F to 110°F.
 - Operating voltage. 89 to 135 VAC.
 - The above three specifications are but a few of many. Many other parameters have contributed to a better product.

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Controller Operations

– Dual-ring and Concurrent group Controllers

DUAL RING STRUCTURE

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Dual-ring and concurrent group controllers.

A. A dual-ring controller operates similar to TWO separate controllers.

- Ring 1 contains phases $\phi 1$, $\phi 2$, $\phi 3$, $\phi 4$.
- Ring 2 contains phases $\phi 5$, $\phi 6$, $\phi 7$, $\phi 8$.
- No more than one phase from either ring can time at any given time.

B. An 8 ϕ (eight-phase) usually has two CONCURRENT groups.

- Concurrent Group 1 contains phases $\phi 1$, $\phi 2$, $\phi 5$, $\phi 6$.
- Concurrent Group 2 contains phases $\phi 3$, $\phi 4$, $\phi 7$, $\phi 8$.
- Phases from one group cannot time with phases of the other group.

C. Combining two rings with two concurrent gives the following:

- $\phi 1$ or $\phi 2$ allowed to time with $\phi 5$ or $\phi 6$ and vice-versa.
- $\phi 3$ or $\phi 4$ allowed to time with $\phi 7$ or $\phi 8$ and vice-versa.

D. Barriers.

- Phase(s) must terminate their timing and cross the “BARRIERS” together.

E. Exceptions.

- The model of the current discussion has been about a “dual-ring, two concurrent group, eight-phase controller configuration.
- IT CAN ALL BE CHANGED, within limits, TO PERFORM SPECIAL OPERATIONS.



Controller Operations

– Conflict Monitor Unit (CMU)



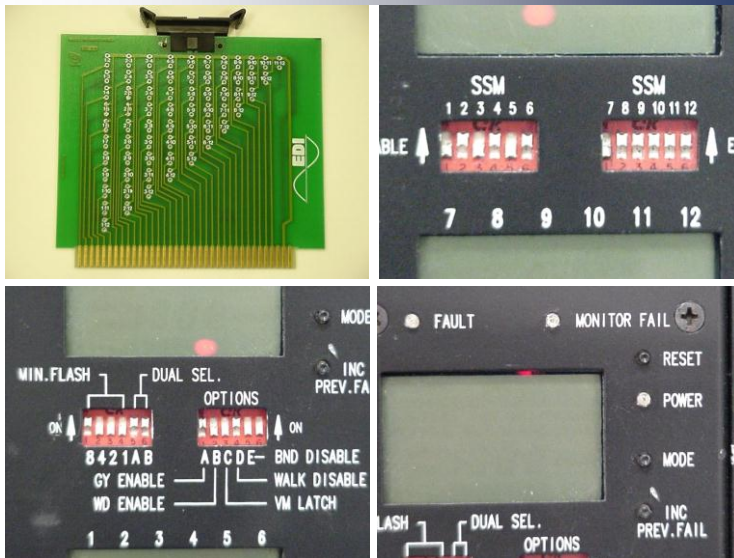
Conflict Monitor Unit. (CMU)

- A. When the CMU recognizes a “fault”, it will put the intersection to FLASH.
- B. Not an integral part of the controller.
- C. Monitors condition of the controller.
 - Internal controller voltages monitored.
 - Certain controller programming monitored.

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Controller Operations



- D. Monitors field indications AT THE POINT THE CIRCUITS LEAVE THE CABINET.

Checks for:

- Conflicts.
- Red failure.
- Dual indication.

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