

## Application Study: Replacing Aging Technology Cam Timers with Modern Technology Using Din Rail Mount Multifunction Timers



**Summary:** This application study explores the replacement of aging 324C cam timers with modern technology using Din Rail Mount Multifunction Timers, specifically the ATC model 175MD. While the 324C cam timers have served well for decades, their limitations in terms of size, repairability, fixed timing range, and lead time for replacements can be addressed with the 175MD timers. These modern timers offer flexibility in voltage compatibility, compact size, and ease of replacement in case of malfunction, thus saving both time and money. The study outlines various configurations and functions for using the 175MD timers to replicate the capabilities of the 324C cam timers, including Stop Cycle, Repeat Cycle, and various load control options. This application study provides detailed guidance on implementing the transition, making it essential for anyone looking to optimize their electrical automation processes.

**Background:** Our 324C cam timers have been used for a wide range of applications as one of the very first ways to automate electrical processes since the 1960s. The cam timers offered a robust life expectancy of up to 10,000,000 operations and had the ability to automate up to 12 or more processes from one sustained or momentary start control input with On Delay, Off Delay, or Repeat Cycle timing operations. Available timing ranges went from 3 seconds all the way to 72 hours max.

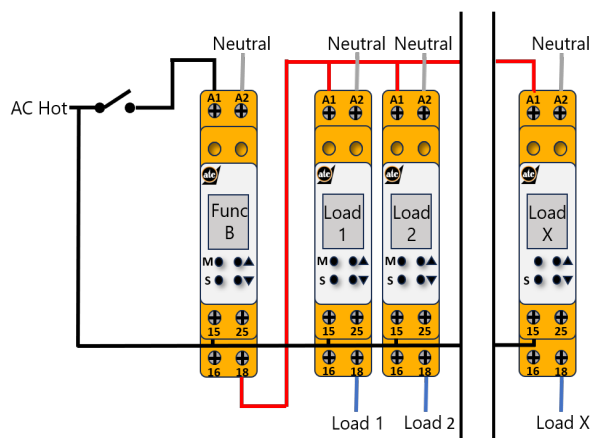
This robust and reliable design is not without its drawbacks. Its size, build construction that doesn't allow for easy repair, lack of a universal power supply, timing range fixed from the factory and the inability to expand the number cam operated switches. All these potential shortcomings can be overcome using modern technology. The final drawback of this type of timer is the lead time for a replacement. As this must be ordered with fixed voltage, frequency, time range, and number of cams/switches each of the 324C series is built to order and not a stock item.

**The Challenge:** This application study explores the replacement of aging 324C cam timers with modern technology using Din Rail Mount Multifunction Timers, specifically the ATC model 175MD. While the 324C cam timers have served well for decades, their limitations in terms of size, repairability, fixed timing range, and lead time for replacements can be addressed with the 175MD timers. These modern timers offer flexibility in voltage compatibility, compact size, and ease of replacement in case of malfunction, thus saving both time and money. The study outlines various configurations and functions for using the 175MD timers to replicate the capabilities of the 324C cam timers, including Stop Cycle, Repeat Cycle, and various load control options. This application study provides detailed guidance on implementing the transition, making it essential for anyone looking to optimize their electrical automation processes.

**The Solution:** The first 175MD timer will be used to control each of the others. This timer will set the total cycle time and the set function will determine the cycle, Repeat Cycle, or Stop Cycle.

- For Stop Cycle Operation using a sustained start switch, the 175MD should be set to Function B Interval with power being applied through a sustained start switch to terminal A1 of the 175MD in reference to the common AC neutral at terminal A2, no control contact needed. The "On" time should be set for the duration of the maximum duration of the timing cycle desired. The sustained start switch will need to be opened and closed to start the timing cycle over again.
- The normally open contacts, terminals 15 and 18 of this first 175MD timer will be used to supply voltage to the A1 terminal of the other 175MDs in reference to the common AC neutral at terminal A2. Based on the 8 amps at 120 VAC current rating you could conceivably control and power up to 240 175MD timers in this method.

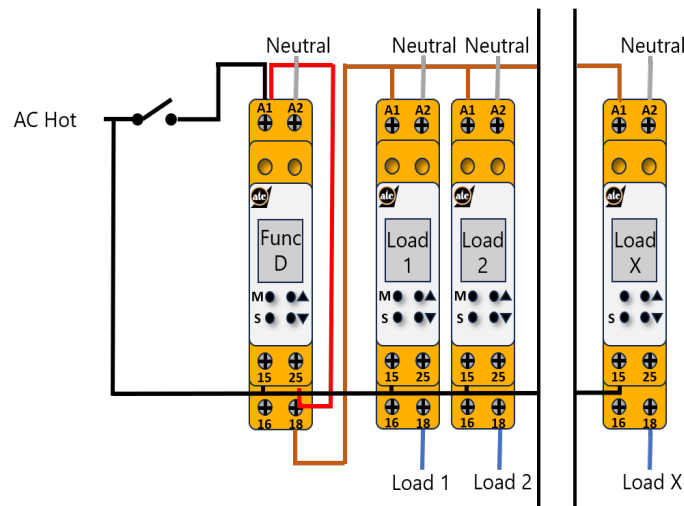
### Stop Cycle with Sustained Start



For Repeat Cycle operation using a sustained start switch, the 175MD should be set to Function D Asymmetrical Cyclic ON First with the AC hot leg applied to terminal A1 and the sustained start switch applied to the control contact input at terminal 25 of the 175MD with reference to the common AC neutral to terminal A2. For this method the "On" time needs to be set for 1 second less than the max duration of the timing cycle required and the "Off" time should be set to 1 or 2 seconds second to ensure the 175MD resets the timing duration of the other timers prior to the next cycle. The timing cycle will repeat so long as power is maintained through the sustained start switch. The sustained start switch will need to be opened and closed to start the timing cycle over again from the beginning.

The normally open contacts, terminals 15 and 18 of this first 175MD timer will be used to supply voltage to the A1 terminal of the other 175MDs in reference to the common AC neutral at terminal A2. Based on the 8 amps at 120 VAC current rating you could conceivably control and power up to 240 175MD timers in this method.

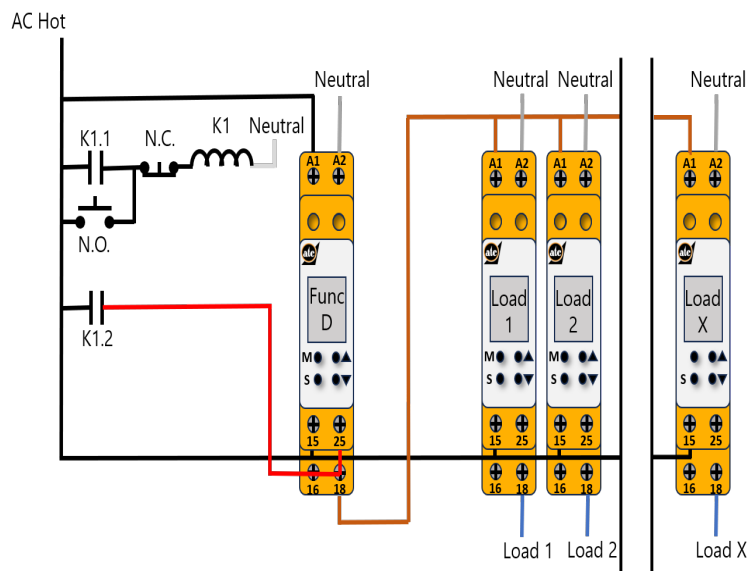
### Repeat Cycle with Sustained Start



For Repeat Cycle using a momentary start switch will use the 175MD should be set to Function D Asymmetrical Cyclic ON First and will need an external DPDT ice cube relay. The AC hot leg is run to the A1 terminal of the 175MD and the common of the relay of the first and second set of the normally open contacts of the ice cube relay. The momentary start switch will be wired across the first set of normally open contacts. The coil of the ice cube relay will be wired to the output of the first set normally open contact terminal of the ice cube relay in reference to the common AC neutral along with the 175MD timers A2 terminal. The output of the second set normally open terminal needs to be wired to the control contact, terminal 25 of the 175MD timer. For this method the "On" time needs to be set for 1 second less than the max duration of the timing cycle required and the "Off" time should be set to 1 or 2 seconds second to ensure the 175MD resets the timing duration of the other timers prior to the next cycle.

- The normally open contacts, terminals 15 and 18 of this first 175MD timer will be used to supply voltage to the A1 terminal of the other 175MDs in reference to the common AC neutral at terminal A2. Based on the 8 amps at 120 VAC current rating you could conceivably control and power up to 240 175MD

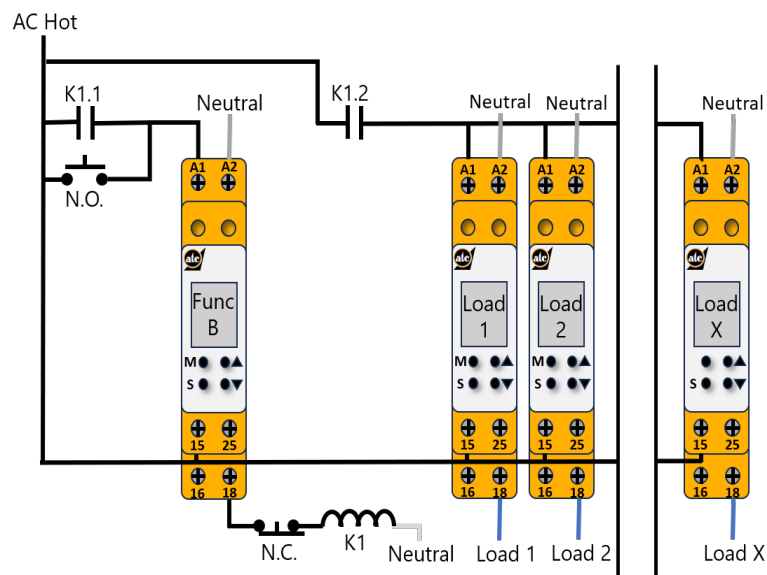
### Repeat Cycle with Momentary Start



For Stop Cycle using a momentary start, there are 2 options:

- The first option will use the 175MD should be set to Function B Interval and will need an external DPDT ice cube relay with one set of the normally open contacts in parallel with the momentary start switch, then wired into A1 of 175MD to supply voltage to the timer with reference to the common AC neutral to terminal A2. The normally open contacts of the 175MD, terminals 15 and 18 should be used to supply voltage to coil of the external DPDT ice cube relay.
- The ice cube relay's second set of normally open contacts should be used to supply voltage to the A1 terminal of the other 175MDs in reference to the common AC neutral at terminal A2.

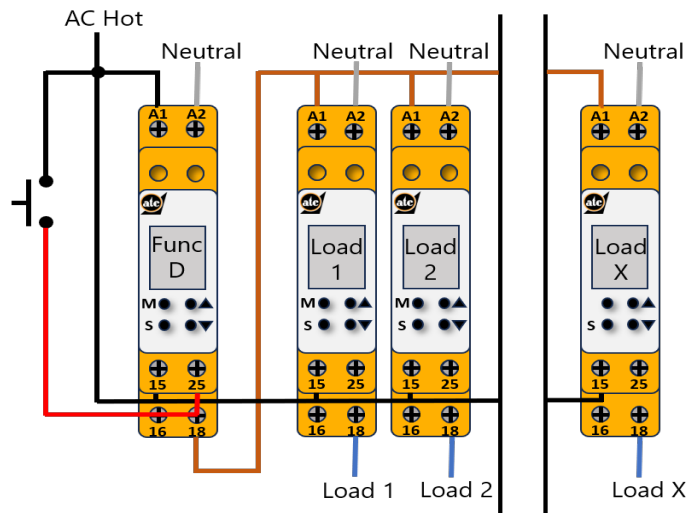
### Stop Cycle with Momentary Start Option 1



The second option would be set to Function D Asymmetrical Cyclic ON First with the AC hot leg applied to terminal A1 and the momentary start switch applied to the control contact input at terminal 25 of the 175MD with reference to the common AC neutral to terminal A2. For this method the "On" time needs to be set for 1 second less than the max duration of the timing cycle required and the "Off" time should be set to 1 or 2 seconds second to ensure the 175MD resets the timing duration of the other timers prior to the next cycle.

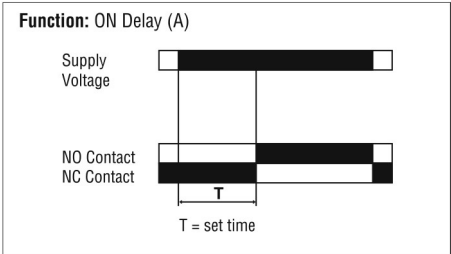
- The normally open contacts, terminals 15 and 18 of this first 175MD timer will be used to supply voltage to the A1 terminal of the other 175MDs in reference to the common AC neutral at terminal A2. Based on the 8 amps at 120 VAC current rating you could conceivably control and power up to 240 175MD timers in this method.

### Stop Cycle with Momentary Start Option 2

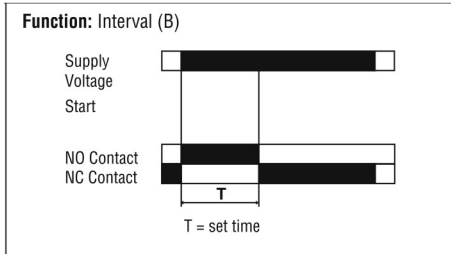


The following 175MD timers will be controlled to turn on from the first 175MD or ice cube relay as described above and be used to individually control the number of independent loads that were originally controlled by the cam switches of the 324C cam timer. The set function and timing duration for these 175MD timers are dependent on how long and how many times you want the individual load active during the overall timing cycle provided by the first 175MD timer.

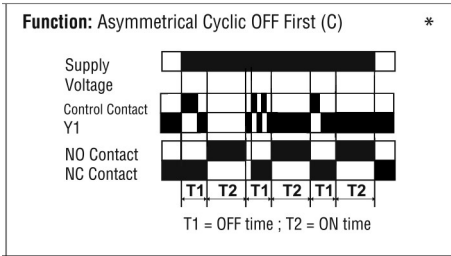
- For the load being off for T time and then on for the duration of the total cycle time, Function A On Delay will be used.



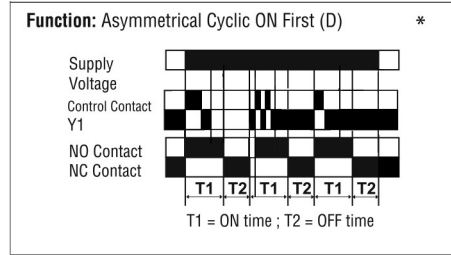
- For the load being on for T time and then off for the duration of the total cycle time, Function B Interval Delay will be used.



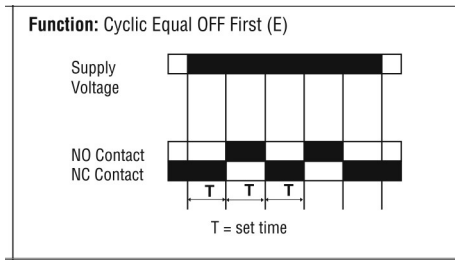
- To have the load being off for T1 time followed by on for T2 time repeated until the end of the total timing duration, Function C Asymmetrical Cyclic Off First will be used. For this method, you will need to jump terminal A1 to terminal 25 of the 175MD.



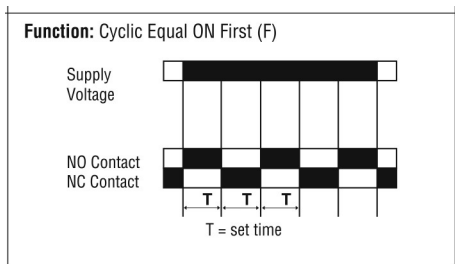
- To have the load being on for T1 time followed by off for T2 time repeated until the end of the total timing duration, Function D Asymmetrical Cyclic ON First will be used. For this method you will need to jump terminal A1 to terminal 25 of the 175MD.



- To have the load being off for T time followed by on for T time repeated until the end of the total timing duration, Function E Cyclic Equal Off First will be used.



- To have the load being on for T time followed by off for T time repeated until the end of the total timing duration, Function F Cyclic Equal On First will be used.



- For the load being off for T1 time then on for T2 time followed by off again for the duration of the total cycle time, Function H Pulse Output will be used.

