

# GENERAL NOTES

FED RD DIVISION	STATE	PROJECT
2	OHIO	

9  
46

LAK-20/84/283/306/615

**Special Skip** - presence of this signal prevents the phase from being serviced. Any vehicle and/or pedestrian calls shall be stored in memory and served at the next appropriate time in the sequence after the signal has been removed.

**Rest in Walk** - actuation of this function causes the timer to rest at the end of the Walk interval when no opposing demand is present.

The following external functional inputs shall be provided on a one per timer basis:

**Force-off** - actuation of this signal simulates MAX timer termination.

**Stop Timing** - application of this signal suspends all timing operations until the signal is removed. When Stop Timing is released any intervals timing except Added Initial, will be reset and timed in their entirety. Added Initial shall retime only the guaranteed Initial portion. While stop timing is applied all detector actuations shall be remembered.

**Rest in Red** - by applying this signal, the timer will Rest in Red. An adjustable Red Clearance shall be provided to prevent the possibility of a green-yellow-green signal indication. It shall be possible to delete the Red Clearance from appearing when not sequencing to Rest in Red. This external output shall be provided to allow remote Call Away to Red Rest.

## E) TIMER OUTPUTS:

The following outputs per phase shall be provided through the MS connector to activate external devices:

**Green Output** - shall provide a closure to ground when the timer is in any green interval of this phase.

**Yellow Output** - shall provide a closure to ground when the timer is in yellow clearance phase.

**Walk Output** - shall provide a closure to ground when the timer is in WALK of this phase.

**Pedestrian Clearance Output** - shall provide a closure to ground whenever the timer is not in green of this phase, but has a vehicle or pedestrian call in memory on the phase.

**Check Output** - shall provide a closure to ground whenever the timer is not in green of this phase, but has a vehicle or pedestrian call in memory on the phase.

**NOTE:** Red and Don't Walk signal circuits on any phase shall be automatically energized by the absence of Green, Yellow, Walk or Ped Clearance outputs on the same phase. This will prevent a timer output malfunction from resulting in a dark signal indication, when using load switching relays with normally closed contacts or solid state switches with appropriate logic circuitry on these functions.

## F) OPTIONAL FEATURES:

The following are additional features which shall be supplied with the timer when called for in the plans or specifications:

**Volume Density** - this feature provides Added Initial (AI) and Time Waiting Gap Reduction (TWGR) on a per phase basis. AI allows determination of the Initial interval time in relation to the number of vehicles between the detector and the intersection stop line, while in the red and yellow of this phase. It includes a guaranteed initial period and a minimum number of actuations before adding initial time.

## XXV - SPECIFICATION FOR A 2 THRU 4 PHASE DIGITAL SOLID STATE TRAFFIC TIMER - Continued

In essence, AI shall remember the number of detector actuations during the Yellow and Red of the phase. At the start of Green, (guaranteed) INITIAL is timed, and a pre-set minimum number of actuations are deleted from the count. The remaining actuations are multiplied by the time pre-set for each additional actuation and added to the initial interval.

With TWGR the first opposing call received by the TWGR shall start a time based incremental reduction of the extension interval to some predetermined minimum in ten equal steps over a period set by the "TIME TO REDUCE TO MINIMUM GAP"

Normally, when the TWGR function gaps out a full extension period from the time of actuation is provided. This function is "Guaranteed Last Car Passage". As a programmable option the timer will include "NO LAST CAR PASSAGE", where upon the termination of the gap, the phase goes directly to YELLOW.

Volume density features shall operate concurrent with pedestrian timing.

**Pedestrian Phases** - where called for vehicle phases shall provide Walk and Ped Clearance timing. Pedestrian timing shall suspend vehicle Initial and Extension, and when it terminates, shall put the timer into an extension interval allowing MAX to begin, if there is opposing demand. The MAX timer shall not start during a pedestrian interval and vice versa, except with volume density operation, where the pedestrian functions time concurrently.

Where required an exclusive pedestrian phase shall be provided with Walk and Ped Clearance timing. It shall be used to replace one vehicle phase and sequence as a separate phase for timing.

**Vehicle Overlaps** - It shall be possible on three and four phase timers to provide up to four separate overlap signal outputs which can be the sum of any two or three vehicle phases. The overlap combinations shall be easily programmable on an insertable printed circuit board. The overlap signals shall be developed internally and provided with protective clearance intervals.

**Coordination** - where required in plug-in circuit board shall be provided allowing coordination of the timer from auxiliary equipment, using the input parameters of yield and force-off. There shall be one yield circuit brought out through the MS connector.

For the Force-off all phases application, circuitry shall be available on the same board to provide memory of the force-off signal. Therefore, if the phase is in initial and its force-off signal occurs, the signal will be remembered and respond to when the phase enters extension and there is opposing demand, unless the next force-off signal occurs first and eliminates the memory.

## G) TIMING:

All timing shall be accomplished using digital methods and be derived from the power line frequency for accuracy. The following time setting ranges shall be provided for all intervals where required.

## XXV - SPECIFICATION FOR A 2 THRU 4 PHASE DIGITAL SOLID STATE TRAFFIC TIMER - Continued

- INITIAL, WALK, PED. CLR., and TIME TO REDUCE (TWGR) 0 to 50 seconds with 1 second increment.
- EXTENSION, YELLOW, AND MIN. GAP (TWGR) - 0 to 19.9 with 0.1 second increment.
- RED CLEARANCE - 0 to 19.9 seconds with 0.1 second increment.
- ADDED TIME per act. (AI) - 0 - 9.9 seconds with 0.1 second increment.
- NUMBER OF ACTS TO MIN. - 1 to 99 actuations.
- MAX I, MAX II - 1 to 199 seconds with 1 sec. inc.

The time setting devices for the following intervals shall use the following color codes:

INITIAL, EXTENSION AND VOLUME DENSITY - Light Green  
MAXIMUM - Dark Green  
YELLOW CLEARANCE - Yellow  
RED CLEARANCE - Red  
WALK - Blue  
PEDESTRIAN CLEARANCE - Orange

All time setting devices shall be mounted on the front of the timer and clearly marked as to function. No tools or special equipment shall be required to program the timer for operation. Time setting devices shall be pushbuttons or similar approved means that can be conveniently operated by an installer with a gloved hand.

The time storage means shall be centralized making it possible to remove phase modules and replace with similar units without reprogramming the time settings in central memory. This centralized memory shall be consistent for all environmental changes and not be affected by a loss of power. No auxiliary power source shall be required to maintain time setting memory.

## H) INDICATORS:

Indicators shall be provided on the timer front panel to display all functions timing and timer terminations. Operating modes in effect such as rest states and MAXIMUM II shall be indicated. Phase(s) timing shall be indicated by the "This Phase" indicator on its respective phase module. When the "This Phase Next" has been decided an indicator lamp shall illuminate on the Phase Module(s) next to time. Vehicle and Pedestrian actuations in memory shall be indicated. Vehicle calls shall also be indicated momentarily on a separate light when received.

All indicating lights, other than the digital display, shall be replacable from the front without tools and rated for 20,000 hours of operation. A switch on the timer front panel shall be provided to de-energize the indicators.

The means for indication of time setting shall utilize easily readable numbers.