

REAL TIME ON / OFF TIMER

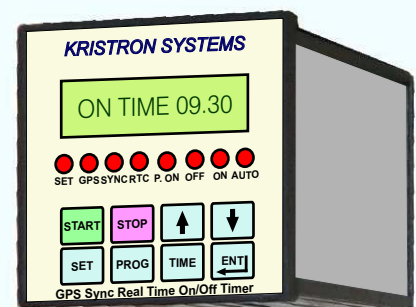
for Current Interruption with GPS Interface



Real Time On / Off Timers are used for switching Cathodic Protection Rectifiers On and Off continuously for Cathodic Protection current interruption surveys. Kristron Systems have developed very high accuracy current interrupter timers using GPS Technology for perfect synchronisation of all interrupters during survey. In GPS synchronized interrupter, the Timer in the interrupter receives the real time signal from GPS satellites which provide highly stable and accurate real time reference. This ensures that timers in all CP units across the pipeline have the same real time and remain synchronized under all conditions without any possibility of timing error.

SALIENT FEATURES OF KRISTRON SYSTEMS INTERRUPTER TIMERS

- Micro-controller based Digital Circuitry.
- Bright Alfa Numeric LCD panel for timing display & programming.
- Lithium battery backed real time clock.
- Auto and Manual Modes of operation.
- Facility for programming of ON & OFF cycle time of DC current interruption from 0.1 sec to 999.9 seconds.
- Interruption START and STOP time is user programmable, i.e. On/Off operation can be started, say at 08.00 hrs on 1st January 2005 and stopped at 18.00 hrs on 5th January.
- Eight key dust proof membrane keypad for programming.
- Permanent NVRAM storage for programme.
- Typical timing accuracy of 0.5 sec per day in non-GPS mode and 1mS in GPS mode.
- Facility for synchronisation with another timer & facility for synchronisation through SCADA.
- Remote Start / Stop & Reset facility
- Night Sleep Feature.



OPERATION BRIEF

Timer has two modes of operation as far as clock timings are concerned. One is the RTC mode and the other is GPS mode. In RTC mode, the timer will use the internal clock of timer for real time operation. In GPS mode, the satellite clock is used. If the unit is unable to track the satellite, i.e. not in sync, then the internal clock is used. In GPS mode, when the timer is able to synchronise with the satellite, the internal clock is updated accordingly.

WHAT IS GPS?

The global positioning system is a satellite-based navigation system consisting of a network of 24 orbiting satellites that are eleven thousand nautical miles in space and in six different orbital paths. The satellites are constantly moving, making two complete orbits around the Earth in just under 24 hours. One can receive satellite signals anywhere in the world, at any time. The biggest benefits over previous land-based navigation systems is GPS works in all weather conditions.

WHY GPS ?

The conventional Electronic clock has limited time accuracy. Most commonly used Industrial real time clocks claim accuracy of ± 15 seconds per month i. e. $\frac{1}{2}$ second per day. Thus if on/off switching is for 1 second each, two such timers can remain synchronised for not more than 48 hours. Further the clock accuracy depends on various factors like external temperature, ageing of components, etc.

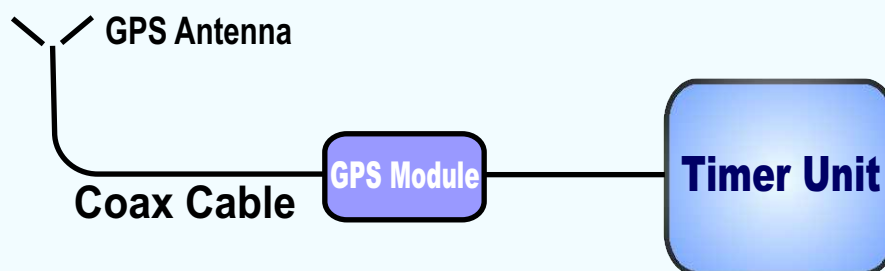
GPS uses the accuracy of Satellite clock which is a stable atomic clock. Atomic clocks are the most stable clocks in the world and do not suffer from external factors like temperature and ageing or environment. Thus the systems located miles apart can retain synchronisation over life time of the equipments !!!

SYSTEM CONFIGURATION

The system consists of

1. GPS Antenna.
2. Coaxial cable with MCX connectors.
3. GPS Interface Module.
4. Timer with User Interface.

The block diagram is shown below



Timer unit communicates with GPS module retrieving the time information for synchronisation purpose. The time clock inside the timer is always maintained at the same time as the Satellite clock. Another timer which is located at a distance from this timer will also derive the time information from the satellite and thus both timers will remain in synchronisation with each other with time difference less than a few milliseconds.