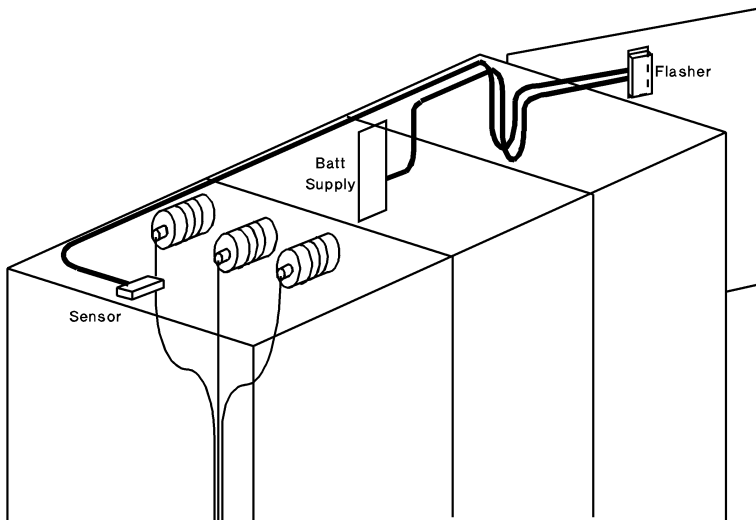


*New indoor and outdoor High Voltage instrumentation sensors
For SAFER electrical environments*

SURETECH™ Cable LIVE Flasher

The SURETECH Cable LIVE Flasher SAFELY measures AC voltage on HV / MV cables, switchgear, transformers, bus-bars etc, and translates the voltage to flash out on a single LED (Light Emitting Diode), what that voltage is. The user can request (or program with PC) ONE, TWO or THREE digit resolution, depending on the level of operating staff. The Cable LIVE Flasher senses voltage through cable insulation (but not through earth screens). Besides the flashing LED output, the SURETECH Cable LIVE Flasher can also provide a range of other outputs such as 4-20mA, potential free contacts, data loggers, and RS232. The SURETECH Cable LIVE Flasher does not need VTs (Voltage Transformers) to measure voltage at any level, but rather relies on measuring the electric field around the cable. The SURETECH Cable LIVE Sensor can be fitted with signal processing options for a wide range of applications. In certain circumstances, the CLF can be installed live, without disrupting consumers. Best of all, the SURETECH CLF is value engineered for low cost reliable sensing.



- Top left: System layout diagram showing HV chamber left with sensor mounted on top; wired to Flasher on right & mounted on LV panel door; wired to sub-station battery supply in LV panel
- Top right: CLF Kit components, Flasher top left with earth stud, LV panel label centre, voltage sensor top right, Cable (bottom left) for RS232 / opto isolator alarm; Cable (bottom right) to connect Sensor to Flasher
- Bottom left: LV panel outside showing LED mounted in bolt through LV panel with CLF label
- Bottom right: CLF Voltage Sensor for mounting in HV chamber





General Features:

- ✓ Capacitively coupled to MV / HV source through air, results in **THE SAFEST POSSIBLE CABLE LIVE MEASUREMENTS**
- ✓ CLF HV sensor enclosure has resin potted components for long life and reliability, dimensions: 80x50x25mm
- ✓ CLF flasher is single hole mounted to the inside of a panel, dimensions: 100x50x25mm
- ✓ Integral cable connection facilitates “Plug-and-play” installation
- ✓ Transient suppression protects sensor against lightning and fault induced transients
- ✓ Wide selection of input and output options including LED flasher, logic, analogue and RS232
- ✓ Wide selection of auxiliary power supply options
- ✓ Galvanically isolated from HV source
- ✓ Accuracy is around 2%, and even better where environmental stability is maintained
- ✓ Frequency accuracy 0.01%
- ✓ For use on 50Hz and 60Hz systems
- ✓ Engineering backup to provide you support for design, applications information, installation & calibration, maintenance
- ✓ Patent pending

Typical Applications:

- ✓ Cable LIVE sensing for normal MV / HV operational cross-checks
- ✓ Cable LIVE sensors for the detection of cable theft
- ✓ Cable LIVE sensor for indication and protection
- ✓ Cable LIVE sensors for switch interlocks
- ✓ Safety interlocks in HV / MV panels
- ✓ Phase rotation sensor configuration available
- ✓ Sync signals for generator synchronisation configuration available
- ✓ HV / MV panel voltage alarms (upper & lower)
- ✓ HV / MV line re-closer or tap-changer voltage control
- ✓ HV / MV panel voltage measurements
- ✓ HV / MV frequency counter
- ✓ HV / MV Line fault location
- ✓ Measure voltage on the rotor of a motor or generator as it spins
- ✓ Monitor and measure induced voltages on power circuits.

Installation procedure:

| | | | |
|--|---|--|--|
|  | <p>CLF flasher is mounted to the front of LV panel with one 10mm hole using a M10 bolt including locknut behind and round panel nut, with flasher LED mounted inside the M10 bolt. Earth stud is shown</p> |  | <p>CLF sensor is mounted inside the MV chamber on an earthed panel, and close to the MV cables; mounting should be above or next to one of the outer phases. Ensure that the sensor is earthed through the mounting plate in HV / MV chamber</p> |
|  | <p>Once the CLF flasher module is mounted behind the front panel, and sensor is mounted in HV chamber, sensor cable earth is connected to earth stud, and connector clicked into flasher with RJ45 connector. RS232 cable is also clicked into flasher with supplied RJ12 connector. With different connectors no mistake can be made with wrong connectors</p> |  | <p>Power is supplied to flasher from sub-station battery from 10V-40V using screw connectors on top of flasher. Earth connection is also provided.</p> |

Flasher Output Operation:

The user can select either 1, or 2, or 3 digit resolution. Output is a string of LED flashes (**F**), separated by one second delay between digits (s...), and three seconds delay between readings (s...s...s...). The operator simply counts the number of flashes (**F**) to determine the voltage. A zero is flashed out as a very short flash **f**. The CLF can be ordered to be factory or field programmed for 1, 2, or 3 digit resolution

- ✓ E.g. if the CLF is programmed to 1 digit, and the voltage is say 80%, the CLF would flash as follows:
 - ✓ **FFFFFFF**s...s...s... **FFFFFFF**s...s...s... [repeated]
- ✓ E.g. if the CLF is programmed to 2 digits, and the voltage is say 73%, the CLF would flash as follows:
 - ✓ **FFFFFF**s... **FFF**s...s...s... **FFFFFF**s... **FFF**s...s...s... [repeated]
- ✓ E.g. if the CLF is programmed to 3 digits, and the voltage is say 11,4kV, the CLF would flash as follows:
 - ✓ **F**s... **F**s... **FFFF**s...s...s... **F**s... **F**s... **FFFF**s...s...s... [repeated]

RS232 Output Operation:

RS232 output can be fed to a PC / Laptop computer, using 9600Bd 8bits, no-parity, 1 stop bit format. Output stream is typically as follows: (Year-DayNo-Time, #Dig=No Digits for Flasher [settable], ScIV = Scaled voltage=6.35kV, VthThr = Voltage Threshold for alarm etc.) Parameters are remembered in EE Memory

```
2005 001 02:50:39
Set=d #Dig=3 RawV=00885 ScIV=00635 VtrThr=00200 VtrCnt=00 Alarm=0

2005 001 02:50:40
Set=d #Dig=3 RawV=00885 ScIV=00635 VtrThr=00200 VtrCnt=00 Alarm=0

2005 001 02:50:41
Set=d #Dig=3 RawV=00885 ScIV=00635 VtrThr=00200 VtrCnt=00 Alarm=0
```

Advantages of CLF:

- ✓ CLF can differentiate between induction on the cable, or back-fed voltage
- ✓ CLF can differentiate between three phases alive, from only one phase alive
- ✓ Accurate voltage measurements can be made, even to determine brown-out levels, and QOS pre-checks
- ✓ Even when the cable is de-energized, the user can know that the CLF is still healthy
- ✓ Lesser skilled people dispatched to an MV substation should be able to count and report flash counts over the radio / telephone etc.
- ✓ Unskilled labour could tell the boss whether the unit is flashing AT ALL
- ✓ Easy installation for new or retrofit equipment
- ✓ Ultra SAFE, Ultra low cost measurements for a **SAFETY CRITICAL APPLICATION**

ONE sensor covers all voltages

For outdoor applications, the CLF sensor should be ordered as the SURETECH ODLLS (Out Door Live Line Sensor). For indoor applications, the SURETECH Voltage Proximity sensor is used. Only the mounting distance changes for different voltages: the following distances are coarsely calibrated by mounting distance. Fine calibration by means of PC interface at factory OR in field.

| Voltage | Nominal mounting distance |
|---------|---------------------------|
| 3.3 kV | 50 mm |
| 11 kV | 150 mm |
| 33 kV | 300 mm |
| 66 kV | 600 mm |
| 132 kV | 1200 mm |
| 400 kV | 2500 mm |

Outputs Available:

| Output type | Options & extras | Ranges |
|--------------------------|---|--------------------------------------|
| LED Flasher | Standard | 1digit OR 2 digit OR 3 digit flasher |
| Opto-Isolated transistor | Low or high voltage thresholds / alarms | Factory OR field settable |
| RS232 | Scaled Voltage, high / low alarms, RT Clock, etc. | Input to Windows Hyperterm |

Power Supply Options:

| Auxiliary Power Supply | Tolerance | Power requirement |
|---------------------------------|-----------------|-------------------|
| Battery (galvanically isolated) | 10 Vdc to 40Vdc | 1 Watt |

Extended capabilities available:

- ✓ Accurate voltage difference measurements over time
- ✓ Logging of voltage for QOS pre-checking
- ✓ Brown-out & voltage dip logging
- ✓ Logging rates from once per second to higher
- ✓ High / Low voltage threshold alarms
- ✓ PC RS232 data logging of voltage
- ✓ Harmonic voltage modules available for QOS pre-checking before expensive QOS instruments are deployed
- ✓ PC Graphical User Interface software available for ease of installation, monitoring and PC logging
- ✓ Frequency, phase measurements

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