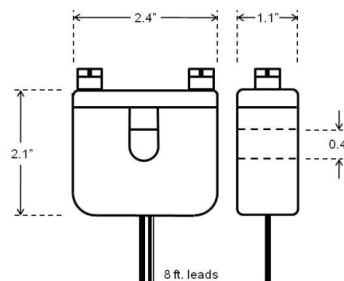




Split-core or clamp-on CTs provide an alternative to directly wiring to measurement or relay CTs in substation upgrade/retrofit applications when it is desired to add monitoring and SCADA data. This non-invasive approach provides for quicker installation with no disruption of service. Many split-core or clamp-on options though, come with the compromise of reduced accuracy, reliability and overall performance. Bitronics has solved most of the common problems seen when using this approach.

#### Bitronics Product Offering

The split-core CT option is available on all Bitronics 50 Series SCADA metering products (all variations of the M650, M651, M653, and M350A3 models). We use a split-core CT with 20A primary rating and 1000:1 turns ratio which is made in the USA and not imported from overseas as those used by some competitors. We calibrate the 50 Series meter with split-core CTs as a matched set. That is, the meter ships with the same CTs it was calibrated to operate with. Each CT is labeled with the phase it was calibrated on, so the CTs are not interchangeable. Mounting brackets are available as an accessory. Brackets bolt to any flat surface, and the split-core CT attaches to the bracket with two screws (see picture below).



#### Application

The primary application of the split-core CT is in permanently installed monitoring where it may be undesirable to cut into installed substation CT circuits to add instrumentation, but where you need to obtain accurate substation SCADA data either via serial or TCP/IP network access and may wish to also provide local panel display. The split-core CT is rated for indoor use and intended for lines having 5A nominal full scale, which are energized to no more than 600V (that is, on the low-side of an existing substation CT). The split-core CT is not intended to be the main CT on an energized load-carrying conductor including LV applications (residential/light-industrial, less than 600V) where load-carrying conductors generally supply significantly more than 5A. Neither is it appropriate for use on substation CTs that have a 1A nominal full scale.

#### Advantages of the Bitronics Split-Core Implementation:

**Concern:** *Using Split Core CTs result in reduced accuracy.*

**The Bitronics Difference:** The 50 Series meter is calibrated to linearize the response of the transformer, resulting in a significant improvement relative to the accuracy claimed by the manufacturer. As a result, the accuracy is equal to that of the standard 50 Series meter (which would operate directly in the primary CT circuit). That's the 0.2S class, defined by the IEC standard that governs revenue meter accuracy (IEC 62053- 22 & 23, and generally described as 0.2% of reading). Heat-treated high-permeability ("superm") nickel core material produces superior low-end response, phase angle response, and repeatability characteristics compared to ferrite core material used by some competitors. It is these characteristics that make it possible to further linearize the output in the calibration of the 50 Series meter to the extent that the accuracy class when using external split-core CTs is as good as the standard meter would be when operating in the primary CT circuit. Attempting to do the same kind of calibration with ferrite core CTs of comparable size would result in a de-rating of the accuracy class of the resulting meter.

**Concern:** *Most primary substation CTs in common use have rating factors of 2 (that is, they have 5A nominal full scale, but they can operate up to a maximum of 10A with rated accuracy). Users need to be able to operate in this range.*

**The Bitronics Difference:** That kind of over-range operation is supported by the Bitronics split-core CT option.

**Concern:** Many clamp-on CTs using clothes pin or hinge and snap type gates are flimsy, resulting in uncertain connection and variability in results.

**The Bitronics Difference:** The spring-tensioned two bolt gate in the core is more durable than the hinge-and-snap type gates used by some competitors. That construction also produces less variation in the magnetic characteristics as a result of repeated opening and closing of the gate. The mating surfaces where the gate closes the core are lapped for a near-perfect mating surface in order to minimize the impact on the magnetic characteristics caused by the necessity of having a break in the core.

**Concern:** Is there any danger if I disconnect the low-side leads of the split-core CT from the meter?

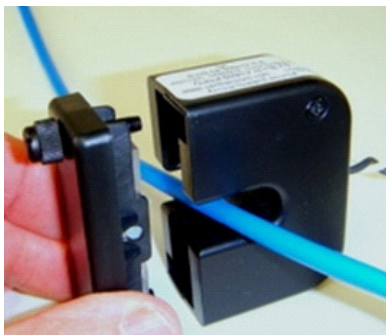
**The Bitronics Difference:** The CTs use Zener diodes to protect against changes in the magnetic characteristics of the core that could otherwise result from operating with the secondary leads open.

**Concern:** Am I limited to the 8-ft. length of the leads provided with the split-core CT?

**The Bitronics Difference:** By specifying that the split-core CT produces a current-rated output (as opposed to a voltage-rated output, which is more common) the impact of adding a reasonable extension in the wire length from the split-core CT to the meter is minimal.

**Concern:** Aren't ferrite core transformers cheaper than nickel?

**The Bitronics Difference:** In most retrofit applications, the cost savings that result from not having to cut into the primary CT circuit generally outweighs the incremental cost of using the split-core CT option. (The advantage can approach a factor of ten.) Next to the offset cost, the small differential between using high-quality nickel core transformers compared to cheap-and-dirty ferrite core transformers is well justified. Nickel core material is not brittle, a major limitation of ferrite material used by some competitors. Even the tension exerted on a ferrite core CT by its secondary windings is often sufficient to chip or fracture the core, affecting its magnetic characteristics. Rough handling can easily fracture ferrite core CTs.



The spring-tensioned two bolt gate provides for better magnetic characteristics



Available mounting bracket options



**Contact:**