COSI-NXCT F3

Flexible Optical Current Transformer

Our comprehensive COSI range (Compact Optical Sensor Intelligence) includes innovative digital instrument transformers for AC and DC applications. The COSI-NXCT F3 optical current sensor is the most flexible, portable optical current transformer sensor available and the easiest to install.

Three product types are available, Type A, Type B, and Closed Loop, each optimized for different applications and specifications.

Each F3 has a wrap-around sensing head around high-voltage bushings, generator buses, and other conductors in ways not possible with conventional Current Transformers.

The sensing loop is an all-dielectric cable, which connects to the standard Alstom Grid electronics, giving the user the same high performance capability and output options as the high-voltage optical CT. It is an ideal solution for installations in difficult spaces, on a temporary or permanent basis.

Type A F3 Current Transformer

The type A F3 CT is a fiber optic current sensor consisting of an electronics module, a fiberglass sensor box, and a flexible PVC conduit wrap-around sensing cable.

The sensing fiber resides in the PVC conduit, which attaches directly to the sensor box.

Standard telecommunications optical fiber cabling and wire cabling connect the electronics module to the sensor box. Because the sensor box has a wire connection to the electronics, it should not be installed in a high-voltage environment.

However, it may be installed in a low-voltage environment, allowing the sensing cable to be wrapped around a high-voltage bushing.

* GIS Optical F3 CT

Customer Benefits

- Flexible Form Factor
- Easy installation and configuration
- Improved measurement performances
- On-site calibration tool
- World-wide standard for interconnection

Flexible Form Factor

The type A F3 CT has metering grade accuracy to 0.15%, and it can measure both AC and DC currents with this accuracy from 1 A to 160 kA, depending on the number of sensing cable wraps used to measure the current.

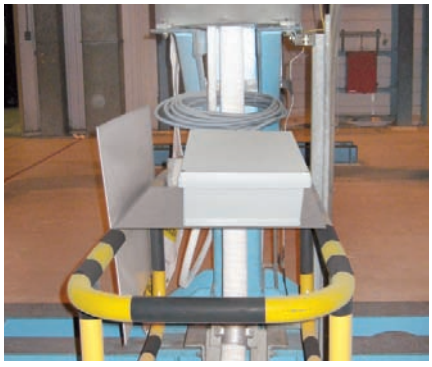
DC valve hall wall bushing

The cable length between the electronics module and the sensor box can be up to one kilometer. The sensing cable has a standard length of 20 m, but other lengths may be specified at the time of order.

The output of the type A F3 CT can be an analog voltage (11.3 V full scale) a current (1 A or 5 A formats), or digital (IEC 61850).

- **Applications include GIS metering and protection, wrap-around bushing for metering or protection, DC valve hall measurements for metering and protection, and very large aperture applications.**

Portable substation



Undersea cable metering & protection

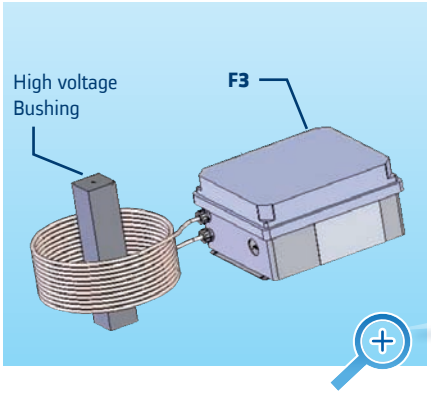
Type B F3 Current Transformer

The type B F3 CT is a fiber optic current sensor consisting of an electronics module, a fiberglass sensor box, and a flexible PVC conduit wrap-around sensing cable.

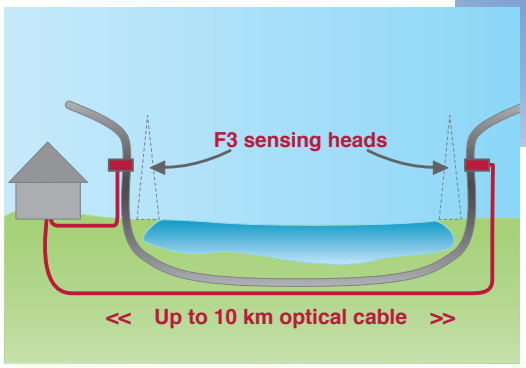
The sensing fiber resides in the PVC conduit, which attaches directly to the sensor box. Standard telecommunications optical fiber cabling connects the electronics module to the sensor box.

In the type B sensor, no wire connection is required at the sensor box, allowing it to be installed in a high-voltage environment.

The type B F3 CT is a protection grade sensor with accuracy to 1%. It measures AC currents over a bandwidth of 10 Hz to 3 kHz and can cover a range from 1 A to 160 kA, depending on the number of sensing cable wraps used to measure the current.



Measuring current at an overhead to underground line transition



Underground Power Line Protection

The cable length between the electronics module and the sensor box can be up to 10 km. The sensing cable has a standard length of 20 m, but other lengths may be specified at the time of order. The output of the type B F3 CT can be an analog voltage (11.3 V full scale), a current (1 A or 5 A formats), or digital (IEC61850).

- **Applications include GIS protection, wrap-around bushing for protection, temporary field service measurements, and underground cable monitoring.**

The underground cable monitoring application uses sensors at both ends of the underground line to measure the differential current. When the underground cable is in good condition, there is little to no difference between the two measured currents. But, when the cable between the two sensors has faulted, there is a substantial differential current.

Because the type B F3 CT sensor box can be placed up to 10 km away from its associated electronics, this line differential current protection scheme can be implemented at remote sites where there is no substation or power available (such as an overhead to underground line transition).

Closed Loop F3 CT

The Closed Loop F3 CT is a fiber optic current sensor consisting of an electronics module, a fiberglass sensor box, and a flexible PVC conduit wrap-around sensing cable.

The sensing fiber resides in the PVC conduit which attaches directly to the sensor box. Standard telecommunications optical fiber cabling and wire cabling connect the electronics module to the sensor box. Because the sensor box has a wire connection to the electronics, the sensor box should not be installed in a high-voltage environment. However, it may be installed in a low-voltage environment allowing the sensing cable to be wrapped around a high-voltage bushing.

0.1% class Closed Loop F3 metering CT for DC valve hall

The Closed Loop F3 CT uses a current feedback to null the impact of the sensed current on the sensing cable. As a result, the Closed Loop F3 CT achieves accuracies better than 0.1%. Both AC and DC currents are measured from 1 A up to >500 kA.
Because of the need to close the loop with current, the distance between the electronics module and the sensor box is limited to 100 m. The sensing cable has a standard length of 20 m, but other lengths may be specified at the time of order. The output of the Closed Loop F3 CT can be an analog voltage (11.3 V full scale), a 1 A current, or digital (IEC61850).

- **Applications include high accuracy metering, field calibration, and ultra-high current sensing. For industrial processing applications above 25 kA, including aluminum smelting, the Closed Loop F3 is sold through our OEM partner, Dynamp LLC.**

Dynamp 225 kA 0.1% class DC CT for aluminum smelting

Current Transformers specifications

- Single phase, three phase, and six phase system configurations available
- Sensor enclosure; fiberglass box;
  - **Type A and Type B:** Dimensions: 14 x 12 x 5.74 inches
    Weight: 20 lbs
    IP66
  - **Closed Loop F3:** Dimensions: 16 x 14 x 5.74 inches
    Weight: 45 lbs
    IP66
- 20-meter length wrap-around sensing fiber standard, other lengths available on request
- Programmable output scaling
- Output format options: analog voltage (IEC 60044-8 200 mV and 4 V formats), current (1 A or 5 A metering format), digital (IEC 61850)

F3 NXCT	Type A	Type B	Closed Loop
Class .1			x
Class .15s	x		x
Class .2s	x		x
Class .3	x		x
Class 1		x	
Class 5		x	
AC	x (up to 20 kHz)	x (10 Hz to 3 kHz)	x (up to 20 kHz)
DC	x		x
AC/DC	x		x
Sensor box HV isolated		x	
Max distance between electronics and sensor	1 km	10 km (no repeater)	100 m
Fiber cable required	x	x	x
Copper cables required	x		x

Applications	Type A	Type B	Closed Loop
Bushing	x	x	x
Currents > 160 kA			x
GIS	x	x	
Calibration			x
Field service	x	x	x
Metering	x		x
Protection	x	x	x
Cable monitoring	x	x	

Rated current range vs. number of fiber wraps

# of fiber wraps	Minimum rated current*	Max rated current*
1	2000 A	80 kA
2	1000 A	40 kA
5	400 A	16 kA
10	200 A	8 kA
20	100 A	4 kA

*F3 maintains accuracy class from 1% to 200% of rated current.

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