

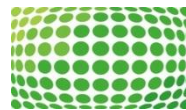


Medium Voltage Products

Passive Optical

Intelligent Distribution Transformer

“Fine tune your distribution system to its most efficient operation for any given time of the day or year”



SmartSenseCom
INCORPORATED

Intelligent Distribution Transformer

The Intelligent Distribution Transformer (IDT) is SmartSenseCom's and Power Partners' primary device for measuring power flows at the end of the feeder for both network management and customer load monitoring. Incorporating PPI's decades of transformer design experience, this device monitors current and voltage at both the high voltage and low voltage bushings on the transformer. It also measures top oil temperature in accordance with IEEE C57.12.00-2010. All sensors and electronics are self-contained within the device and factory calibrated for easy installation and safe operation.

The IDT's capabilities include steady-state transformer monitoring, reporting of anomalies such as rapid changes in voltage, current, temperature, smart metering at the transformer, and distributed control and protection applications. Designed to interface with any communications system, the data feedback allows utilities to fine tune the distribution system for its most efficient operation at any given time of the day or year. The unique sensors are highly accurate and stable in harsh environments, are not subject to saturation, have almost no temperature variation, and consume little power.



Advantages

Intensity Modulated Optical Measurements offer numerous advantages as compared to typical CT's and PT's

- Exceeds .15 Class metering grade accuracy at all levels of voltage and current
 - <0.1% ratio error from $0V - 4 \times V_n$
 - <0.1% ratio error from $0.5\% I_n - 20 \times I_n$
 - <.053° phase error
 - Full wave form reproduction through entire operating range
- Highly reliable and stable with no temperature or EMI sensitivity.
- No field calibration required
- No saturation, Ferro-resonance, or residual magnetism

The integration of current, voltage, and oil temperature measurements into a trusted, field proven transformer, provides a number of benefits

- Highly accurate and reliable end-of-line transformer and feeder monitoring with user specified alarms and fault driven data capture
- Reports impact of EV and PV penetration on the system
- Provides information required to drive fault location, volt/var optimization and other DMS applications
- Easy installation with no additional monitoring equipment or external connections
- PPI transformer performance

This combination of stable optical measurements and a proven transformer creates a high performance instrument that delivers highly accurate, DMS ready information that accurately monitors the condition of the network and the transformer over the course of its life.

Technical features

- Suitable for both metering and protection
- < 50 μ sec latency
- Current and voltage measurements to the 64th harmonic
- Exceeds 30 year life
- Wide area communications ready. Ideal for use with DMS and fault location systems.
- Secure wire and wireless communications supported
- Data formats to include DNP3 and IP
- Measurement and monitoring transmission IEC 61850-3 and FIPS 140-2 compliant
- Real time monitoring/notifications and analytics package

IDT Monitoring Features

Type	Exceeds Metering Grade Accuracy
Standard applied	IEEE C57.13 – 2008 IEEE C57.13.6 – 2005
Installation	Outdoor Poletype
Current Measurement	Passive optical
Voltage Measurement	Passive optical
Highest voltage for equipment	Up to 34.4kV
Ambient temperature	-60°C to +90°C

The IDT adds capability to the well-known Power Partners single phase, oil-filled, pole-mounted distribution transformers. These transformers are specifically designed for servicing residential overhead distribution loads. They are also suitable for light commercial loads, industrial lighting and diversified power applications. These transformers are designed for the application conditions normally encountered on electric utility power distribution systems. The IDT is also available in 3 Phase models.

Transformer Ratings

- 5-1000 kVA
- 65° C temperature rise
- 60 hertz standard, 50 hertz optional
- Low voltages: 120/240, 240/480 and 277
- High voltages: 2400 through 34,400 Volts
- Insulation levels:

Rated Voltage Ranges	Insulation Class	Basic Impulse Level (kV)
480-600	1.2	30
2160-2400	5.0	60
4160-4800	8.7	75
7200-12470	15.0	95
<i>Optional 125 kV BIL, 12000 volts available.</i>		
13200-14400	18.0	125
19920-22900	25.0	150
<i>Optional 125 kV BIL, 19920 volts available.</i>		
34400	34.5	200



Standard Features:

- Lifting lugs.
- Cover-mounted high voltage porcelain bushing(s) with eyebolt terminal (10-100 kVA) or spade terminal.
- Low voltage insulators are available in fiberglass reinforced polyester material or porcelain (both eyebolt and spade terminals).
- Low voltage neutral grounding strap (furnished on 10-50 kVA single HV bushing units).
- ANSI support lugs (hanger brackets).
- Cover has 13 mils minimum of polyester coating providing 15 kV dielectric insulation of tank ground parts from live parts and increased resistance to corrosion.
- Self-venting and resealing cover assembly.
- The core/coil bolt-in pads are 180° apart.
- Embossed low voltage leads.
- Oil filled plug with cover ground strap.
- Tank ground pad.
- Laser etched anodized aluminum nameplate with bar coded serial number.
- The paint finish process applies a durable, corrosion resistant finish to the product. The finish meets or exceeds all the performance requirements of ANSI C57.12.28. The multi-step process includes an epoxy primer uniformly applied by cationic electro-deposition and a urethane top coat.



Instrumentation Specifications

High Side Current Measurement

Model	IDT
Type	Passive optical
Standard applied	IEEE C57.13 – 2008 IEEE C57.13.6 – 2005
Rated primary current	<1 – 150A
Rated Overcurrent Factor	2x
Rated secondary current	Not applicable
Burden	Not applicable
Class	Exceeds 0.15S Class (TCF = 0.074%)
Accuracy Limit Factor	Not applicable
Security factor	Not applicable

Low Side Current Measurement

Model	IDT
Type	Passive optical
Standard applied	IEEE C57.13 – 2008 IEEE C57.13.6 – 2005
Rated primary current	<100 – 4000A
Rated Overcurrent Factor	2x
Rated secondary current	Not applicable
Burden	Not applicable
Class	Exceeds 0.15S Class (TCF = 0.074%)
Accuracy Limit Factor	Not applicable
Security factor	Not applicable

High Side Voltage Measurement

Model	IDT
Type	Passive Optical
Standard applied	IEEE C57.13 – 2008 IEEE C57.13.6 – 2005
Rated primary voltage	2400 – 34,400V
Rated secondary voltage	Not applicable
Burden	Not applicable
Class	Exceeds 0.15S Class (TCF = 0.074%)

Low Side Voltage Measurement

Model	IDT
Type	Passive Optical
Standard applied	IEEE C57.13 – 2008 IEEE C57.13.6 – 2005
Rated primary voltage	120 – 480V
Rated secondary voltage	Not applicable
Burden	Not applicable
Class	Exceeds 0.15S Class (TCF = 0.074%)

Top Oil Temperature Measurement

Type	Measurement Type	Range	IEEE Standard	
IDT	Passive Optical	-60-150°C	C57.12.00-2010	

Event Driven Monitoring Platform

Information	Normal (Steady Green)	Caution* (Flash Yellow)	Alarm* (Flash Red /Audible)	Available Detail (Bandwidth Dependent)
Primary Voltage	$95\% \leq V \leq 105\%$ of nameplate rating (typ)	$90\% \leq V < 95\%$ $105\% < V \leq 110\%$	$V < 90\%$ $V > 110\%$	<ul style="list-style-type: none"> RMS – 5 minute refresh Fault <ul style="list-style-type: none"> [30] sec prior [30] sec after restore
Secondary Voltage	$95\% \leq V \leq 105\%$	$90\% \leq V < 95\%$ $105\% < V \leq 110\%$	$V < 90\%$ $V > 110\%$	<ul style="list-style-type: none"> RMS – 5 minute refresh Fault <ul style="list-style-type: none"> [30] sec prior [30] sec after restore
Primary Current	$I \leq 120\%$	$120\% < I \leq 180\%$	$I > 180\%$	<ul style="list-style-type: none"> RMS – 5 minute refresh Fault <ul style="list-style-type: none"> [30] sec prior [30] sec after restore
Secondary Current	$I \leq 120\%$	$120\% < I \leq 180\%$	$I > 180\%$	<ul style="list-style-type: none"> RMS – 5 minute refresh Fault <ul style="list-style-type: none"> [30] sec prior [30] sec after restore
Top Oil Temperature	$T \leq 100\text{ }^{\circ}\text{C}$	$100^{\circ} < T \leq 120\text{ }^{\circ}\text{C}$	$T > 120\text{ }^{\circ}\text{C}$	Actual – 5 minute refresh

* Near Real Time Alarm Depending on Communications Latency

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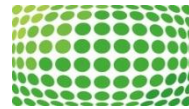
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