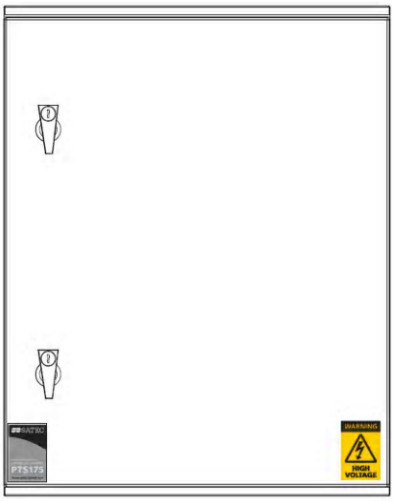
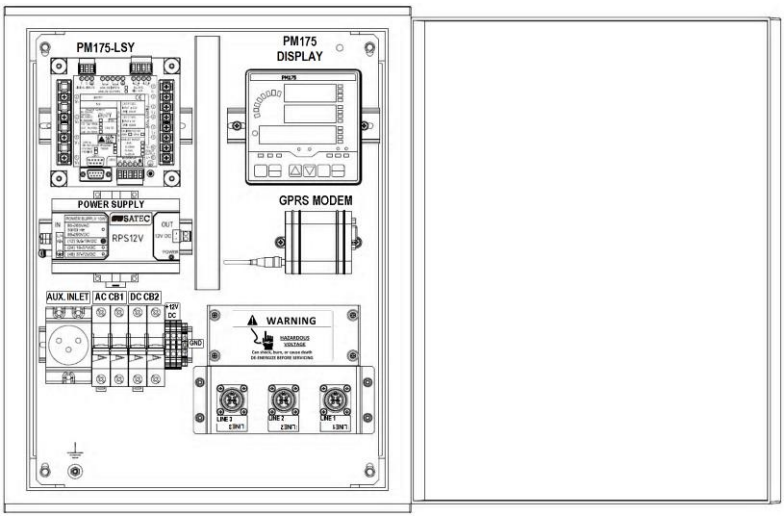
PTS175 POLE TOP SENSOR
MV ANALYZER

Installation and Operation Manual





LIMITED WARRANTY

The manufacturer offers the customer a 24-month functional warranty on the instrument for faulty workmanship or parts from date of dispatch from the distributor. In all cases, this warranty is valid for 36 months from the date of production. This warranty is on a return to factory basis.

The manufacturer does not accept liability for any damage caused by instrument malfunction. The manufacturer accepts no responsibility for the suitability of the instrument to the application for which it was purchased.

Failure to install, set up or operate the instrument according to the instructions herein will void the warranty.

Only a duly authorized representative of the manufacturer may open your instrument. The unit should only be opened in a fully anti-static environment. Failure to do so may damage the electronic components and will void the warranty.

The greatest care has been taken to manufacture and calibrate your instrument. However, these instructions do not cover all possible contingencies that may arise during installation, operation or maintenance, and all details and variations of this equipment are not covered by these instructions.

For additional information regarding installation, operation or maintenance of this instrument, contact the manufacturer or your local representative or distributor.

WARNING

Read the instructions in this manual before performing installation and take note of the following precautions:

1. Ensure that all incoming AC power and other power sources are turned OFF before performing any work on the instrument.
2. Before connecting the instrument to the power source, check the labels on the back of the instrument to ensure that your instrument is equipped with the appropriate power supply voltage, input voltages and currents. Failure to do so may result in serious or even fatal injury and/or equipment damage.
3. Under no circumstances should the instrument be connected to a power source if it is damaged.
4. The instrument must be primarily protected against lightening arrester installed as close of possible to the POLE top sensors (PTS) located over the lines. The PTS175, HV arresters and PTS must be properly grounded to the earth.
5. Only qualified personnel familiar with the instrument and its associated electrical equipment must perform setup procedures.
6. Do not open the instrument under any circumstances when it is connected to a power source.
7. Do not use the instrument for primary protection functions where failure of the device can cause fire, injury or death. The instrument can only be used for secondary protection if needed.

Read this manual thoroughly before connecting the device to the current carrying circuits. During operation of the device, hazardous voltages are present on input terminals. Failure to observe precautions can result in serious or even fatal injury or damage to equipment.

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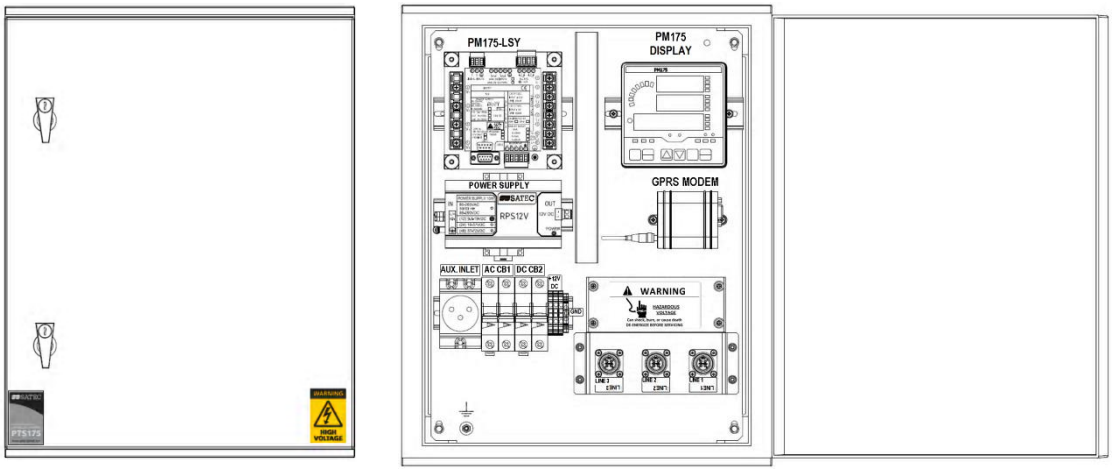
Chapter 1 General Information



The LINDSEY MV Line Post Sensors (or also known as Pole Top Sensor – PTS) replace standard MV line insulators and incorporate a built-in CT and PT like.

The PTS converts the high voltage and current to a small voltage signal instead of the normal 120 Volt and 5 Amp outputs of standard CTs and PTs. Based on SATEC Model PM175-LSY Power Quality / Energy Meter to fully interface with the low level sensor outputs for line voltage and current. Full measurements and data can be obtained from the PM175, including waveforms and harmonics. The PTS175 consisting of a robust plastic enclosure incorporating the PM175, HV protected input connections and a GPRS modem providing real-time data communication to a customer Monitoring System, makes installation easy and simple.

The PTS175 covers three Medium Voltage ranges: 11kV, 22kV and 33kV.

Each range represents a PTS175 model:

- **PTS175-15KV[1]** – for 11kV (L-L) distribution lines
- **PTS175-25KV[1]** – for 22kV (L-L) distribution lines
- **PTS175-35KV[1]** – for 33kV (L-L) distribution lines

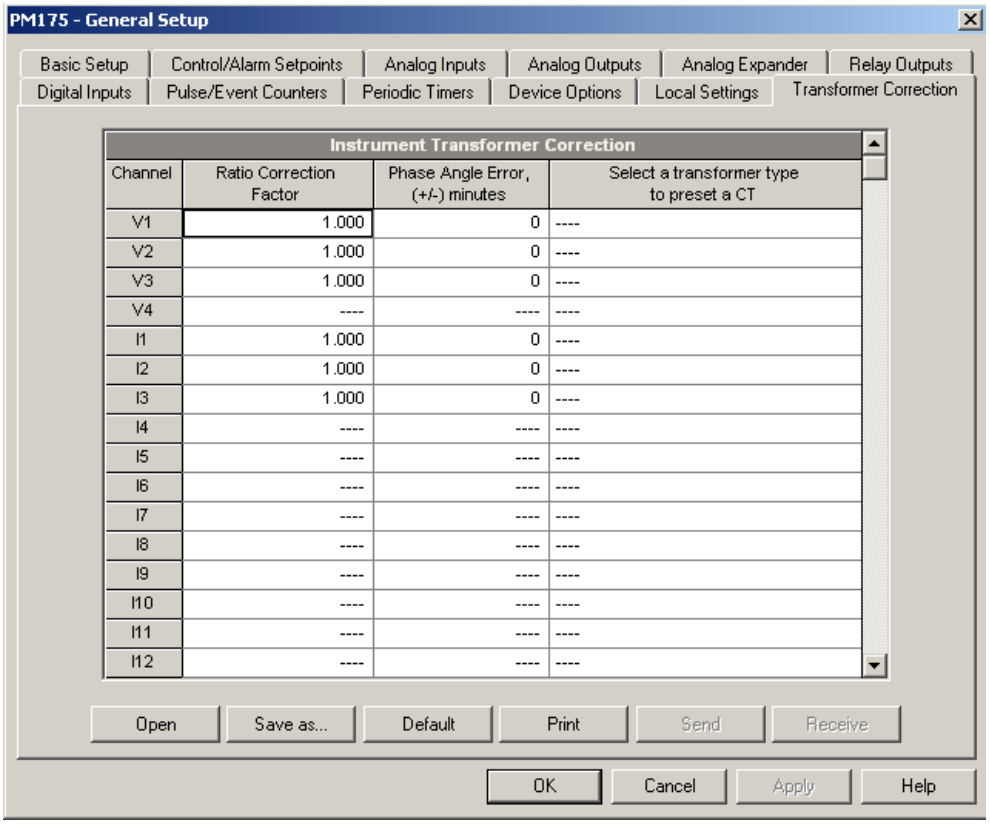
Refer to PM175 Installation and Operation Manual (BG0415 REV.A7), for device setup and monitoring

Note[1]: The PM175 meter in the PTS175 MV Advanced Analyzer is factory setup as follows:

- Wiring mode: 4LL3
- CT Primary current (A): 300
- PT ratio:
  - For 15kV: 22.5
  - For 25kV: 53.1
  - For 35kV: 160.9
- PT multiplier: x1

Each Pole Top Sensor set includes the manufacturer test report showing V & I gain linearity and phase shift results, this information must be applied to the PM175-LSY through the General Setup\Instrument Transformer Correction menu using PAS™.

Refer to PM175 Installation and Operation Manual (BG0415 REV.A7) to use PAS software



Chapter 2 Installation

This chapter discusses the following types of physical installations for the PTS175:

- Mechanical Installation
- Electrical Installation

2.1 Site Requirements

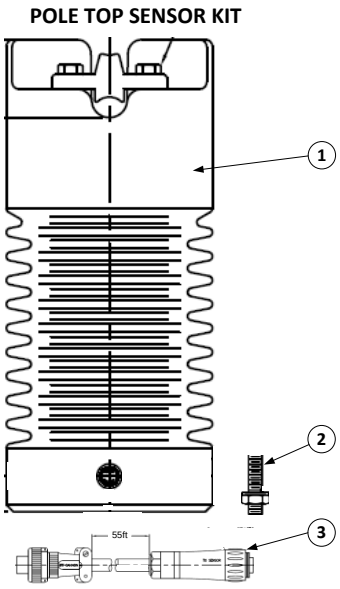
- Environmental conditions: as specified in Technical Specifications in Appendix A
- Electrical requirements: as specified in Technical Specifications in Appendix A

See Technical Specifications in Appendix A for more details

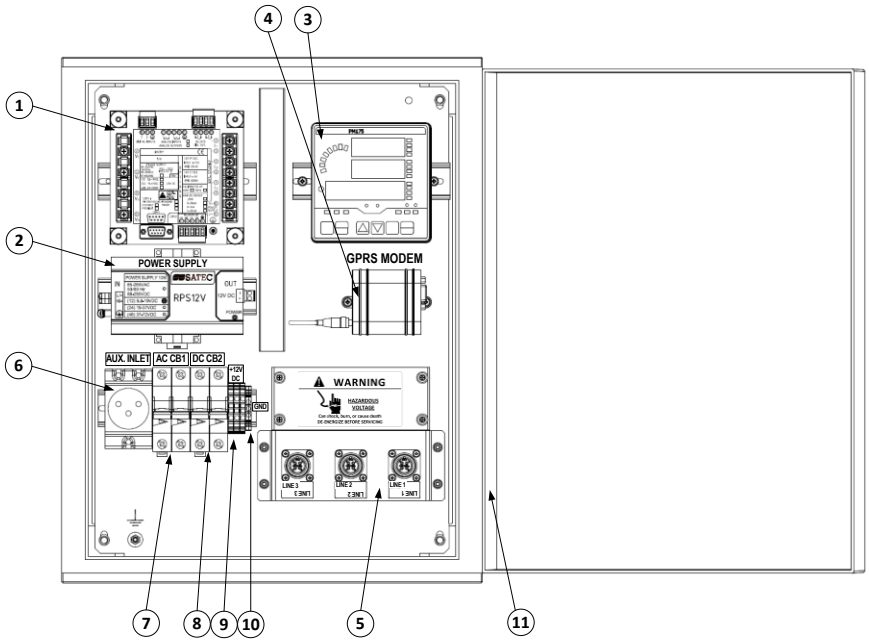
2.2 Package Contents

The PTS175 package contains the following items:

- PTS175 – MV ANALYZER
- Technical Documentation CD
- Kit of Pole Sensors including:
  - 3 x PTS
  - Optional accessories (depending on the options ordered, if any)
  - 3 x 55ft Cables



1. PTS (15, 25 or 35kV)
2. Stud
3. 55ft cable



1. RPM075 – PQ Analyzer
2. AC/DC PS – RPS-ACDC
3. RDM175 - DISPLAY
4. GPRS MODEM + Ant.
5. SURGE Prot. ASSY. – PTS input
6. Aux. AC INLET for Laptop
7. AC input Circuit Breaker
8. DC input Circuit Breaker
9. 12VDC Input term.
10. GROUND term.
11. PTS175 enclosure

2.3 Mechanical Installation

Refer to the figures provided in this section to properly perform the mechanical installation.

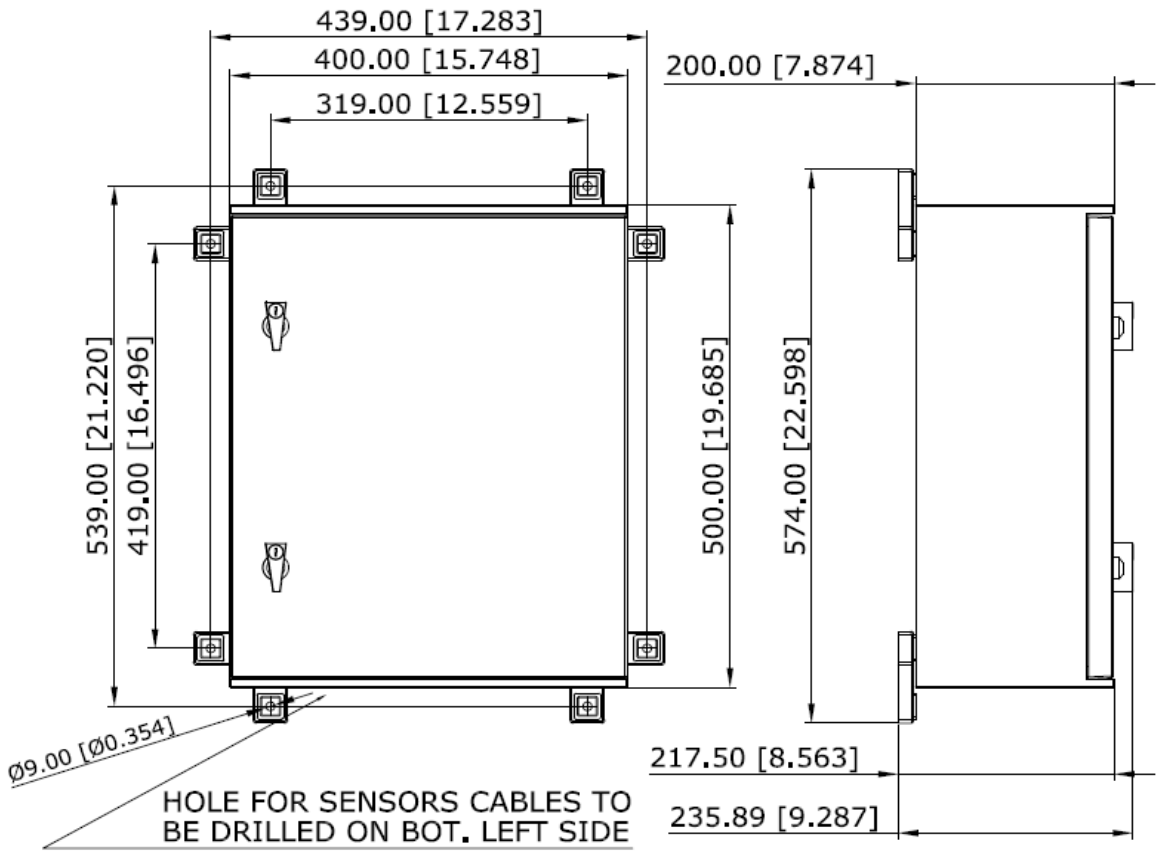


Figure 2-1 Dimensions

2.4 Electrical Installation

To setup and configure the PTS175 use PM175 Installation and Operation Manual (BG0415 REV.A7)

Typical Installation

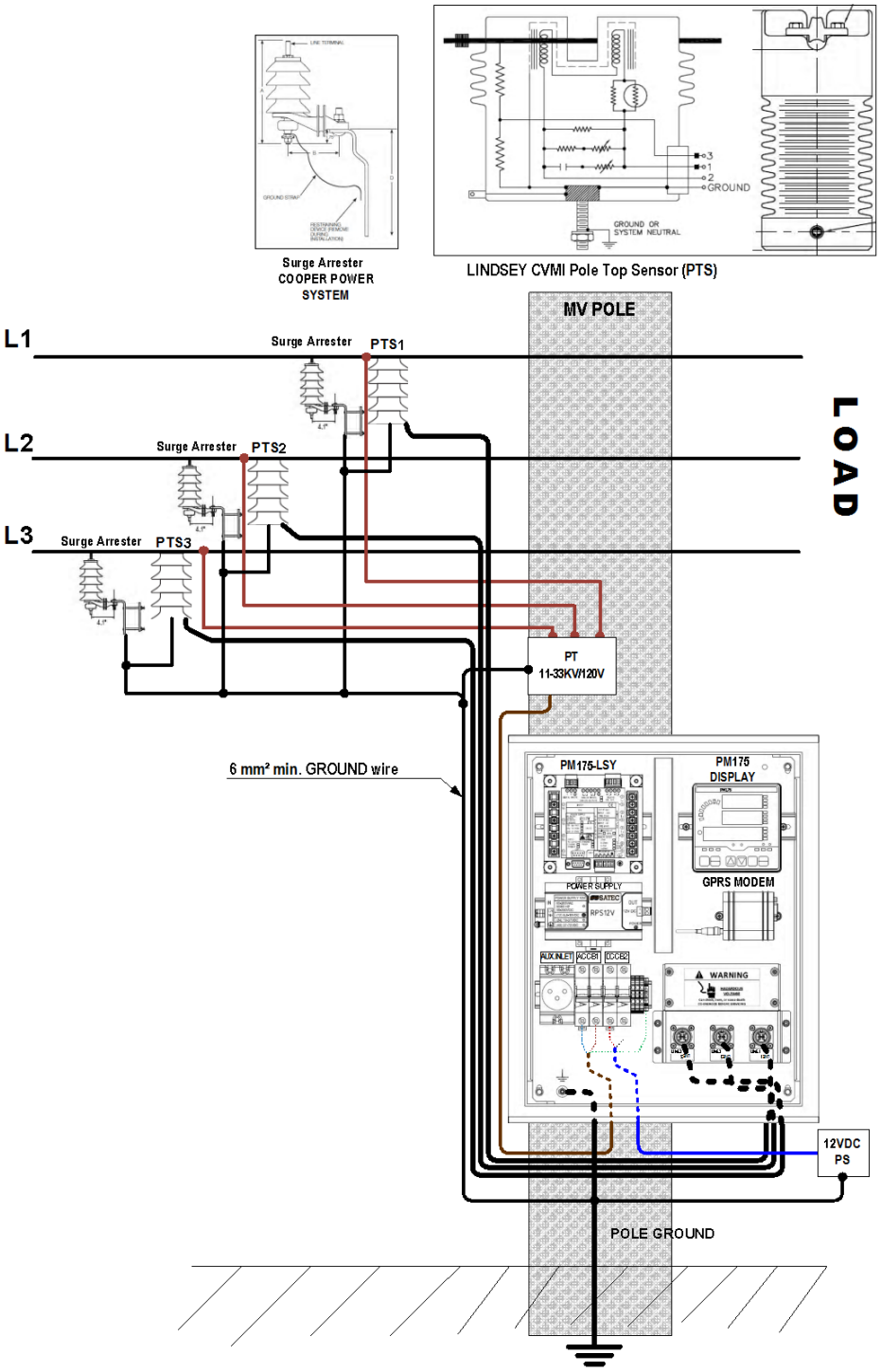


Figure 2-2 Typical Installation Diagram

Installation Procedure

Only qualified personnel familiar with the instrument and its associated electrical equipment must perform installation and setup procedures.

The equipment installation shall conform to the following instructions:

a) Circuits Breakers (AC and DC) in the PTS175 must be "OFF"

b) HV Arresters must be installed closed to the PTS on the MV lines.

c) HV Arresters and PTS must be directly grounded to earth

d) The PTS175 MV Analyzer must be directly grounded to earth

To keep the PTS175 Ingress Protection (IP65) while installing cables from PTS, Power Supply and GROUND to the PTS175 MV Advanced Analyzer, use IP65 gland cable

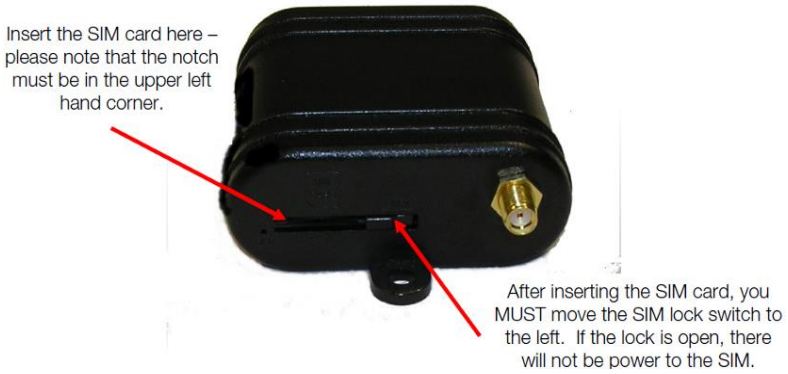
The PTS175 supports two different power supply sources:

- AC Power supply – 88-265 VAC – 50/60Hz, applied to CB1
- DC Power supply – 12VDC (can be from an external backup unit), applied to CB2

Perform the PTS175 installation by following instructions:

1. Plug each PTS cable to the appropriate connector on the Surge Protector ASSY. (PTS175 - item 5)
2. Connect AC power supply to CB1 and/or DC power supply to CB2
3. connect GROUND wire to PTS175 GROUND nut ⏚

2.5 GPRS modem installation



The Modem antenna must be positioned perpendicularly to the PTS175 enclosure.

Chapter 3 Using PAS Software

The support PAS software is a configuration and data acquisition tool that allows you to configure all of the PTS175/PM175 features, monitor your meters on-line, retrieve recorded files and view reports.

Refer to PM175 Installation and Operation Manual (BG0415 REV.A7) to use PAS software

Appendix A Technical Specifications

PTS – Pole Top Sensor:

A.1 Electrical Ratings:

PTS MODEL	9650/E1104	9660/E1304	9670/C14C0
Insulation Class	15kV	25kV	35kV
Impulse	110kV	150kV	200kV
AC withstand – 1mn	34kV	40kV	50kV
Voltage Ratio	1400:1	3300:1	10000:1
Current Ratio	600A:10V	600A:10V	600A:10V
Low Frequency dry flashover	80kV	110kV	125kV
Low Frequency wet flashover	60kV	85kV	100kV

A.2 Mechanical:

PTS MODEL	9650/E1104	9660/E1304	9670/C14C0
Insulation Class	15kV	25kV	35kV
Cantilever strength (ultim. lbs)	2800	2800	2800
Weight (lbs)	39	49	59
Shipping weight (lbs)	44	54	64

A.3 Operating Temperature

Temperature range: -40°C to +65°C

A.4 Conductor Diameter range

The two-sided keeper is made of aluminum (for aluminum conductor) or galvanized ductile iron (for copper conductor) and can accommodate a 0.25 inch to 1.25 inch diameter conductor

A.5 Basic Construction

The Multicore Sensor is molded from POLYSIL, a high dielectric strength, anti-tracking polymer concrete developed by Lindsey Manufacturing Company under EPRI contract

PTS175 MV ANALYZER

A.1 Environmental Conditions

Operating temperature: -30°C to 55°C (-22°F to 131°F)

Storage temperature: -30°C to 85°C (-40°F to 185°F)

Humidity: 0 to 95% non-condensing

A.2 Construction

Dimensions see Figure 2-1

Weight: 8.5 kg (18.74 lbs)

Materials

Case enclosure: Reinforced Polyester

Packaging case: Carton and Stratocell® (Polyethylene Foam) brackets

Labels: Polycarbonate (UL94-V0)
Ingress Protection: IP65

A.3 Power Supply inputs

120/230 VAC-DC Input:

Rated input: 85-265VAC 50/60/400 Hz, 88-290VDC, Burden 9VA
Lightening withstanding: 10,000A

12 VDC Input:

Rated input: 12 VDC ± 10%, 10W
Lightening withstanding: 1000A

All Power supply sources must be grounded to earth

A.4 Input Ratings

Voltage Inputs

Primary Measuring range: 11-33 KVAC line-to-line, 6.35-20 KVAC line-to-neutral
Input impedance: 1000 kΩ

Current Inputs

Primary Measuring range: up to 600A

Sampling Rate measurement

128 samples/cycle.

Lightening withstanding: 10,000A

A.5 Real-time Clock

Accuracy: typical error 1 minute per month @ 25°C
Typical clock retention time: 2 years

A.6 Standards Compliance

Accuracy:

Meet IEC62053-22, class 1

Electromagnetic Immunity:

Comply with IEC 61000-6-2:
IEC 61000-4-2 level 3: Electrostatic Discharge
IEC 61000-4-3 level 3: Radiated Electromagnetic RF Fields
IEC 61000-4-4 level 3: Electric Fast Transient
IEC 61000-4-5 level 4: Surge
IEC 61000-4-6 level 3: Conducted Radio Frequency
IEC 61000-4-8: Power Frequency Magnetic Field

Electromagnetic Emission:

Comply with IEC 61000-6-4: Radiated/Conducted class A
Comply with IEC CISPR 22: Radiated/Conducted class A

Safety/Construction:

Meets UL/IEC 61010