Document Ref: EPI-144-00

Safety Information

Please read these instructions carefully before trying to install, operate, service or maintain the ZDR. The following special notes may appear throughout the user guide (or on the equipment labels) to warn of potential hazards or to call attention information that clarifies or simplifies a procedure for users.

Symbol	Description
	The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.
	This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

Electrical Installation

Electrical equipment should be installed, operated, serviced and maintained only by qualified personnel. No responsibility is assumed by EpiSensor for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Installation, wiring, testing and service must be performed in accordance with all local and national electrical codes.

 **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH** 	
➔ NEVER work alone.	

- ➔ Use appropriate personal protective equipment (PPE) and follow safe electrical work practices.
- ➔ Only qualified electrical workers should install this equipment. Such work should be performed only after reading the entire set of installation instructions.
- ➔ If the equipment is not used in a manner specified by EpiSensor, the protection provided by the equipment may be impaired.
- ➔ Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- ➔ Turn off all power supplying the meter and the equipment in which it is installed before working on it.
- ➔ Always use a properly rated voltage sensing device to confirm that all power is off.
- ➔ Before closing all covers and doors, inspect the work area for tools and objects that may have been left inside the equipment or panel.
- ➔ When removing or installing metering or other equipment, do not allow it to extend into the energised bus.
- ➔ The successful operation of this equipment depends upon proper handling,
- ➔ Neglecting fundamental installation requirements may lead to personal injury as well as damage to electrical equipment or other property.
- ➔ Before performing Dielectric (Hi-Pot) or Megger testing on any equipment in which the energy meter is installed, disconnect all input and output wires to the energy meter.
- ➔ High voltage testing may damage electronic components contained in the meter.
- ➔ Failure to follow these instructions will result in death or serious injury.

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Installation & Safety Notes
➔ EpiSensor equipment should be installed, operated, serviced and maintained only by qualified personnel. EpiSensor does not assume any responsibility for any consequences arising out of the use of this equipment. ➔ Consult the ZDR datasheet and user guide for further installation and safety information. ➔ Each ZDR meter is individually calibrated and the current transformer cables should not be extended or interchanged.

Intended Use

Do not use this device for critical control or protection applications where human or equipment safety relies on the operation of the control circuit. Failure to follow these instructions can result in death, serious injury, or equipment damage.

Related Documents

Related installation and configuration documents are listed in the following table:

Document	Reference No.
EpiSensor ZDR Datasheet	EPI-066-00
EpiSensor ZDR User Guide	EPI-078-00

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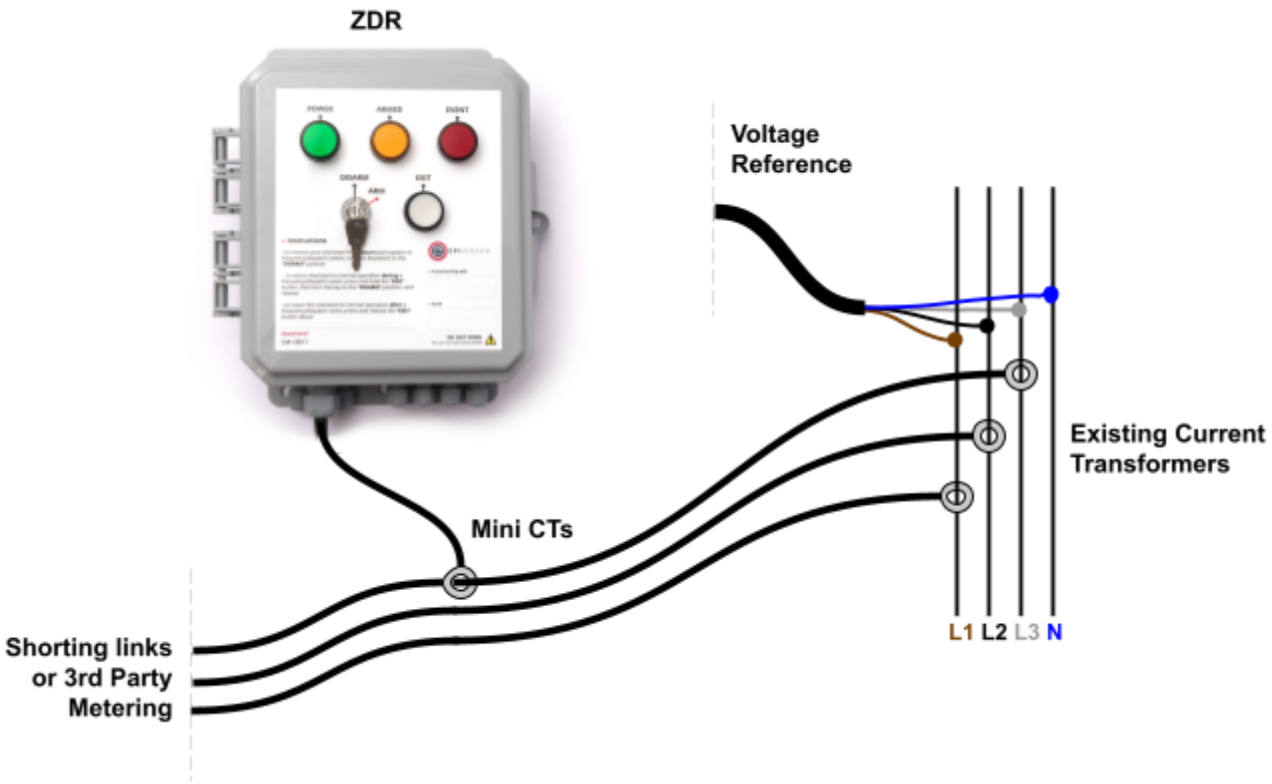
Introduction

This document describes how to monitor the secondary output of existing current transformers with ZDR. This approach simplifies the electrical installation and reduces cost and disruption of collecting electricity consumption data from customer sites and assets. This approach may not be suitable for all programs, particularly those with requirements for high accuracy metering. Mini CT's are available as an option on ZDR hardware v1.5 only and must be specified at time of order (see 'ordering information' from the ZDR user guide).

Electrical Installation

The following diagram describes how to connect the Mini CT's of the ZDR to the secondary output of existing current transformers.



Calculating the Multiplier

This formula below should be used to calculate the multiplier for the ZDR:

$$Multiplier = \frac{CT_{max\ current}}{\left(\frac{CT_{max\ current}}{CT_{turns}}\right) * miniCT_{loops}}$$

Parameter	Description
Multiplier	The CT multiplier to be configured on the ZDR
$CT_{max\ current}$	Maximum current rating of the existing CT
CT_{turns}	The number of turns on the secondary of the existing CT (e.g. if existing CT has a 200:1 ratio, this value would be 200)
$miniCT_{loops}$	The number of times that the secondary of the existing CT has been looped around the primary of the mini CT on the ZDR

Calculator available here

Configuring the Multiplier on ZDR

Log into your EpiSensor Gateway and click on the Nodes link. Go to Action > Settings for the ZDR that you would like to configure. Set the CT Ratio parameter, highlighted below, to the value calculated in the previous step, and save the changes.

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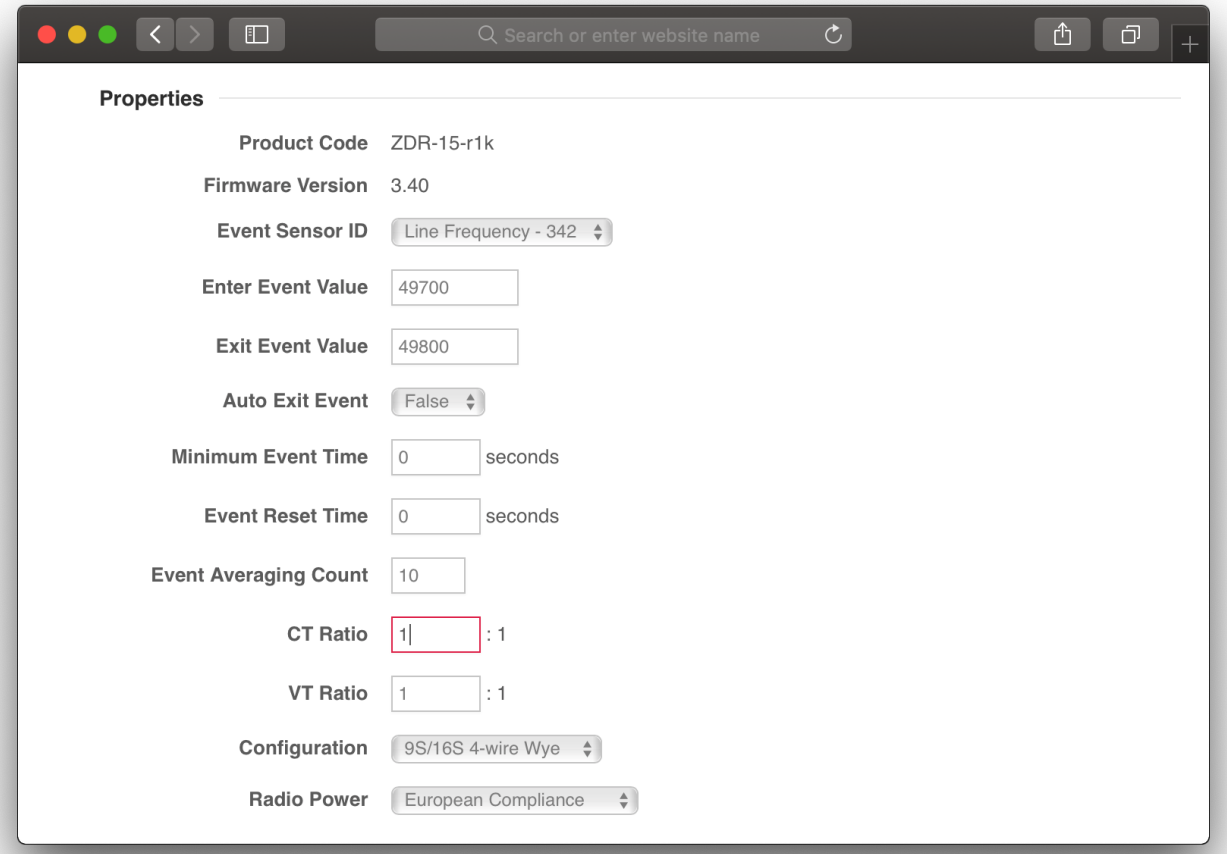
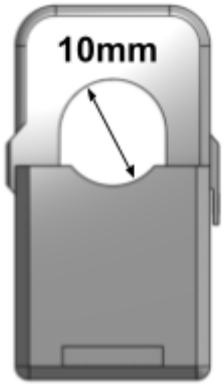


Accuracy Considerations

Monitoring the secondary output of an existing current transformers will have an impact on overall system accuracy. EpiSensor ZDR and ZEM product lines are calibrated to Class 1 accuracy. However, the error of the existing current transformers (and voltage transformers, if used) must be considered when estimating the overall system accuracy.



Each CT in the chain will also introduce a phase error of approximately 2 degrees, which can impact the accuracy of the power factor calculation in the ZDR metering chip. The aperture diameter of the mini-CT is 10mm.