CT selection guide

> To browse all available and supported CTs, visit the **online store**. For a detailed list of all CT models that have been tested to be compatible with the eGauge meter, including legacy CTs that may not be fully supported or available anymore you may view the eGauge CT Compatibility List.

Introduction

A typical eGauge installation will measure the amperage of multiple conductors via multiple CT sensors. The CT sensors are installed around the current carrying conductors of the load or generation source you wish to monitor.

Choosing appropriate CTs for your installation involves selecting the **mechanical dimension** and the **amperage rating** (in Amps). CTs can be used to monitor the main utility feed conductors for a facility or residence, conductors that feed sub panels, and conductors for individual circuits such as pumps, motors, air conditioning, car chargers, and lighting loads.

CTs can also be used to monitor conductors from generators as well as renewable energy systems such as solar PV systems, wind generators and hydro power systems.

CTid

eGauge branded CTs are enabled with CTid technology.

CTid is a technology created by eGauge which allows the eGauge meter to obtain information about a connected CT or Sensor. This information can include model, manufacturer, serial number, amperage rating (if CT), and other information about the sensor. The information is stored on a chip embedded in the CT or Sensor and can only be read by EG4xxx model units (eGauge Core and eGauge Pro). When inputs are scanned for CTid sensors, they are configured through port scanning instead of the user's traditional drop-down selection box.

CTid enabled sensors also contain a locator LED that can be activated from the eGauge configuration interface. This can be used to identify which sensor is connected to which port, in the event the leads were switched or untraceable.

For additional information about CTid and information on configuring please see this article.

Configuring non-CTid CTs

For information on configuring sensors without CTid, see this article.

Determining how many CTs to use

- 3-phase, 4-wire wye (with neutral) distribution panel feeds or individual loads require 3 CTs, one on each phase.
- 3-phase, 3-wire delta (without neutral) distribution panel feeds or individual loads require 2 CTs, on each phase not connected to the eGauge's N terminal. See the eGauge 480V or 600V delta and 120V or 240V delta documentation for wiring diagrams.
- Split-phase (phase-to-neutral) loads such as 120V residential outlets require a single CT.
- Single-phase (phase-to-phase) loads such as 240V residential hot water heater require 2 CTs. If the measured load is purely single phase (no current on the neutral) such as many residential solar inverters, a single CT can be used. See configuration example 2.9 Appliances in the configuration guide for more details.
- Revenue-grade accuracy monitoring requires a high-accuracy CT on each phase of the equipment to be monitored. See section 5 for more information.

Some single-phase loads such as HVAC systems, dryers, and hot tubs are not balanced and will always require a CT on each phase. For example, a hot tub may have a 2-pole breaker, but use 240V for heating and 120V for lighting and pumps, which means current will be on the neutral. Facility main feeds and sub panel feeds are also not balanced.

eGauge offers these examples as a reference. The nature of the current on an appliance should be verified by a qualified electrician or via the appliance documentation before ordering.

Selecting the mechanical dimension of the CT

CTs are available in a number of different physical sizes. The inner diameter of the CT must be large enough to fit around the conductive wire you wish to monitor. The outer dimensions must be

small enough to be installed inside the circuit panel or switch gear. The tables below are provided as general sizing guidelines using eGauge CTid-enabled CTs and the alternative J&D CTs.

SKU (eGauge CTid CTs)	Diameter	Wire Size
EG-ECS09-*xxx*	9mm (0.35")	#14 to #2 AWG
EG-ECS20-*xxx*	20mm (0.79")	1/0 to 3/0 AWG
EG-ECS36-*xxx*	36mm (1.42")	4/0 AWG to 400 MCM
EG-ERA-106-*xxxx*	106mm (4.17")	Bus bar / parallel feeds, up to 2775A
EG-ERA-178-*xxxx*	178mm (7.01")	Bus bar / parallel feeds, up to 6935A
EG-ERA-271-*xxxx*	271mm (10.67")	Bus bar / parallel feeds, up to 6935A

SKU (standard CTs)	Diameter	Wire Size
JD-SCT-010-*xxx*	10mm (0.39")	#14 to #2 AWG
JD-SCT-016-*xxx*	16mm (0.63")	1/0 to 3/0 AWG
JD-SCT-024-*xxx*	24mm (0.94")	4/0 AWG to 400 MCM
JD-SCT-036-*xxx*	36mm (1.42")	4/0 AWG to 400 MCM
AE-RCT-178-*xxxx*	178mm (7.01")	Bus bar / parallel feeds, up to 6935A
AE-RCT-271-*xxxx*	271mm (10.67")	Bus bar / parallel feeds, up to 6935A

Selecting the current rating of the CT

High-accuracy split-core CTs (eGauge ECS-R and AccuCTs) are available. High accuracy CTs can be identified by a CT type code of ECS-R or ACT.

High-accuracy eGauge CTs with CTid are available in 9mm (0.35"), 20mm (0.79"), and 36mm (1.42"). Alternative high-accuracy split-core CTs are also available in 20mm (0.79"), 32mm (1.26"), and 80mm (3.15"). All high-accuracy have an error of 0.5% from 1% to 100% of their rated current.

High-accuracy CTs can be paired with any eGauge main unit. For revenue grade readings, all conductors must be monitored, including single-phase (phase-to-phase) balanced and unbalanced loads.

eGauge meters may be ordered with an optional 0.5% certificate report. The total system (eGauge meter and CTs) will have an error no greater than 0.5%. This pairing meets the ANSI C12.20 0.5% accuracy class.

When high-accuracy CTs are used with a meter without the optional 0.5% certificate report, the result will be a system with no greater than a 1% error. This pairing meets the ANSI C12.1 accuracy class.

Some reporting agencies may require certified units, so it is important to determine if you will require a certificate with the eGauge meter. Certified units must be specified during ordering; a certificate cannot be generated for a meter once it is purchased from eGauge.

Rope CTs

Rope CTs (Rogowski coils) are excellent for bus-bars and large switch-gear applications. Self-powered rope CTs are flexible and easy to install with a fixed current rating. Rope CTs require a minimum amperage and are not for use in residential or low-current scenarios.

Direct Current CTs

DC (direct current) CTs are available for use with the eGauge to monitor DC amperage. Split-core DC CTs are available in 16mm (0.63"), 24mm (0.94"), and 36mm (1.42").

DC CTs require the eGauge Sensor Hub and must be powered via 5Vdc, either through the USB port or 2-pin connector.

Extending CT leads

If the standard 8-foot leads connected to the CT is not long enough, CT leads may be extended up to 100 feet. While it is possible to extend CTs further, voltage drop, interference, and damage during wire pulls become more of a concern as the distance increases.

CT leads may be extended using the eGauge Sensor Hub and 600V rated CAT5 or CAT6 cable. No external power is required for the Sensor Hub when used for extending CTs.

CTs may also be extended with 600V rated twisted pair wire. STP (shielded twisted pair) is recommended, as it will reduce noise and interference. Be sure to use properly rated Ethernet cable for the voltage that will be present.

It is often **not recommended** to ground any part of the CT leads or shielding around the leads. Signal grounding is different than electrical grounding, and in some cases will cause problems that can invalidate readings. Consult with an electrical engineer if grounding is considered.

Three-phase inverter notes

For inverters with three-phase outputs, 3 CTs are recommended. When inverters are not actively producing (in standby-mode, such as during the evening), they consume a small amount of power. Three-phase inverters have been seen not to consume the same amount on each phase during this mode, so using a single CT may cause anomalous behavior in the graph which can show as night-time generation or over-consumption.

Further, some brands of three-phase inverters don’t produce on all 3 phases in some circumstances. In this case, a single CT would give erroneous readings and could be very inaccurate.