eGauge Systems LLC

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Current Transformer (CT) Selection Guide

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This guide is intended to help you select the right quantity and type of current transformers (CTs) needed for an eGauge installation.

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

CTs can be used to monitor the main utility feed conductors for a facility or residence, conductors that feed sub panels, and individual circuit conductors 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.

Single-phase loads require a single CT
2 phase loads require 2 CTs *except as described below
3 phase loads require 3 CTs

*If a load is balanced - meaning the *same current* is flowing - across all phases, then a single CT can be used to measure one amperage. eGauge can be configured to apply the amperage reading to the second and/or 3rd phase, as long as eGauge has a voltage reference to each phase in the system.

Example: a split phase 240V electric water heater. One CT can be used on one phase then that amperage reading can be applied to the other voltage in the configuration section of eGauge installation. Most residential 240V PV inverters are also balanced, but not all 3 phase inverters. For PV inverters with 3 phase outputs, we recommend 3 CTs.

Unbalanced loads such as air conditioners and dryers are not balanced and will always require a CT on each phase. Facility main feeds and sub panel feed are also not balanced. CTs are available in a number of different physical sizes. The inner diameter ID 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 work inside the circuit panel or switch gear.

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

Picking the type of CT involves selecting the *mechanical dimension* and the *current rating* (in Amps).

Selecting the mechanical dimension of the CT

CTs are available in a number of different physical sizes. The inner diameter ID 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 work inside the circuit panel or switch gear.

General Sizing Guidelines

0.4"	CT	#14	to	#2 AWG
0.75"	CT	1/0	to	4/0 AWG
1.25"	CT	250	to	400 MCM
2.0"	CT	400	to	750 MCM

6" Rogowski coil "rope" CTs are good for bus bar and parallel feed conductors (or any installation with limited space, assuming the current does not drop below 20A or go above 4800A)

Selecting the current rating of the CT

CTs are available with in a wide amperage range from 20A to 4800A. An easy way to select the amperage needed is to match the breaker or disconnect rating that you or measuring with the CT you choose. For example if you are monitoring a 50A circuit, then a 50A CT would be appropriate. If you have a 15Amp breaker, then the closest larger rated CT, a 20A CT, should be used.

If the circuit or service is determined to have a maximum amperage that is well below the rated breaker ampacity, you may choose a lower amperage CT.

Example: a typical residential service is rated for 200A with 2 phases feeding the home. Although the service is rated to have up to 200A on a single phase at any given moment, the reality may be that neither phase will pull over 100A ever. In this situation 2 100A CTs would work.

> *eGauge offers this examples as a reference. The nature of the current should be verified by a qualified electrician before ordering.*

Split core CTs are available with set amperage ratings. The load you wish to monitor should fall within the range from 10% to 100% of the CT being used to monitor that current. CTs should not be used to monitor currents above their rating.

Split core CTs can be extended with standard twisted pair wire to cover much longer distances. If you need to extend a CT wire farther than approximately 100 ft, contact eGauge support to see if a custom factor will be necessary in your software settings.

Example: a 50A CT would be a good choice to monitor a load that is typically between 5 and 50A. Accuracy begins to diminish when a current is below 10% of the CT rating.

The 6" Rope CT has excellent performance from 20A to 4800A. They are provided with a given lead wire length that can not be extended but can be shortened. 8ft, 12ft or 40ft lengths are available - please designate at time of ordering.

Appendix

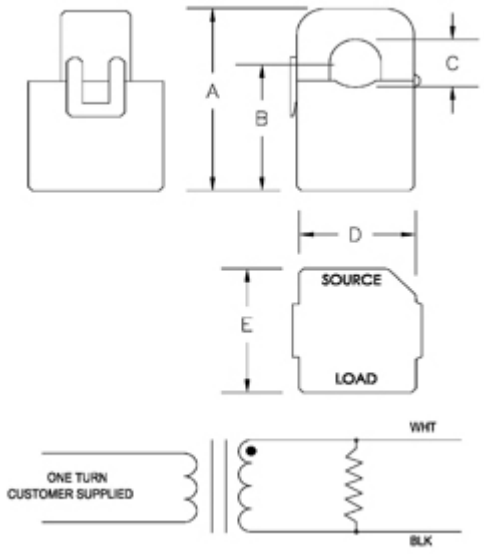

Figure 1

Part number	A	B	C	D	E
CTS040-xx	1.56″	1.00″	0.40″	1.00″	1.05″

Figure 1b

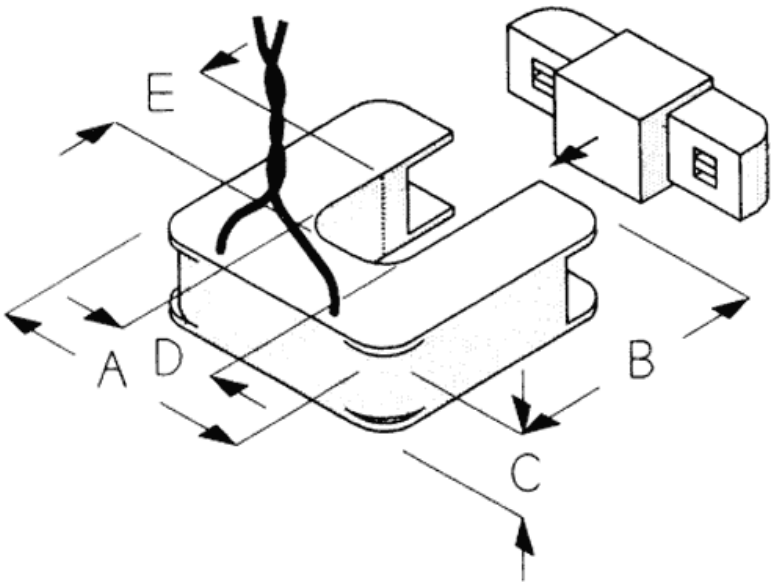

Figure 2

Part number	A	B	C	D	E
CTS075-*xxx*	2.00″	2.10″	0.67″	0.75″	0.75″
CTS125-*xxx*	3.25″	3.35″	1.06″	1.25″	1.25″
CTS200-*xxxx*	4.75″	5.00″	1.20″	2.00″	2.00″

Figure 2b

Part numbers of available CTs:

Current rating	0.40″ ID	0.75″ ID	1.25″ ID	2.00″ ID
5A	CTS040-05			
10A	CTS040-10	CTS075-10		
20A	CTS040-20	CTS075-20		
30A	CTS040-30	CTS075-30		
50A	CTS040-50	CTS075-50		
75A	CTS040-75			
100A		CTS075-100	CTS125-100	
200A		CTS075-200	CTS125-200	CTS200-200
400A			CTS125-400	CTS200-400
600A			CTS125-600	CTS200-600
800A				CTS200-800
1500A				CTS200-1500

Figure 3

Rope CTs (all rope CTs are 6″ diameter):

Current rating	8' cable	12' cable	40' cable
20-4800A	CTR8	CTR12	CTR40

Figure 4