



## IQ Energy Sentinel

### IQ Energy Sentinel Sub-Metering Devices

The IQ Energy Sentinel is the latest addition to the Cutler-Hammer line of IQ Metering devices. These solid-state products provide centralized alternatives to individually mounted ammeters, voltmeters, frequency meters, watt-hour meters, and more. All are easily retrofitted into existing systems, and communicate over the IMPACC System, a local area network designed specifically for use in electrical distribution systems.

#### IQ Energy Sentinel

The IQ Energy Sentinel is a highly accurate, microprocessor-based submeter designed to monitor power and energy. It represents an alternative to installing separate watt meters, watt-hour meters, and watt demand meters.

Key advantages include unmatched savings in space, lower installation costs, and the capability to communicate data readings in a variety of ways.

IQ Energy Sentinels with built-in CTs and communications have the added benefit of greater overall system accuracy. Conventional metering often is less accurate since external CTs and separate transducers may each have inaccuracies of 1% or more.

The IQ Energy Sentinel provides a unique and cost effective method to implement energy submetering at lower levels in the distribution system.

Submetering application examples for the IQ Energy Sentinel include energy monitoring and demand management, product cost analysis, process/machine tool efficiency and productivity improvement, and energy cost allocation or tenant billing for commercial, industrial, recreational, and residential facilities.

**Note:** For customer billing applications, consult local utility for metering requirements.



Commercial applications include energy cost allocation within convention halls, office buildings, shopping malls, hospitals, warehouses, and storage facilities.

Industrial applications include departmental billing and process/assembly line energy cost analysis. IQ Energy Sentinels may be substituted for watt transducers when monitoring machine tool and equipment performance within plants.

Recreational facilities include sports arenas, camping grounds, trailer parks, and marinas.

Multitenant residential buildings and apartment buildings can be submetered as well.

The IQ Energy Sentinel may be applied on three-phase (3-wire or 4-wire) systems as well as on single-phase (3-wire) systems.

IQ Energy Sentinels may be applied on either 50 or 60 Hz systems.

#### Breaker Mount Applications

##### New Equipment:

Designed for mounting on Cutler-Hammer Series C Circuit Breakers utilized in Cutler-Hammer assemblies such as:

- Pow-R-Line 4 Panelboards – feeder circuits
- Pow-R-Line C Switchboards – feeder circuits
- Series 2100 Motor Control Centers and Enclosed Control with circuit breaker disconnects – starter or feeder circuits
- Enclosed Starters
- Enclosed Circuit Breakers
- Pow-R-Way II Bus Plugs with circuit breaker disconnects

##### Retrofitting:

The space saving design characteristics of the breaker mount IQ Energy Sentinels allow them to be added to existing Series C Circuit Breakers at any time...often with no additional space or modifications required.

Or they may be installed when upgrading to Series C from older circuit breakers...often with no additional space or modifications required.

#### Universal Mount Applications

The Universal mount IQ Energy Sentinel with internal CTs may be utilized wherever breaker mounting is not feasible or possible. In particular they may be used on any disconnect up to 400 Amps.

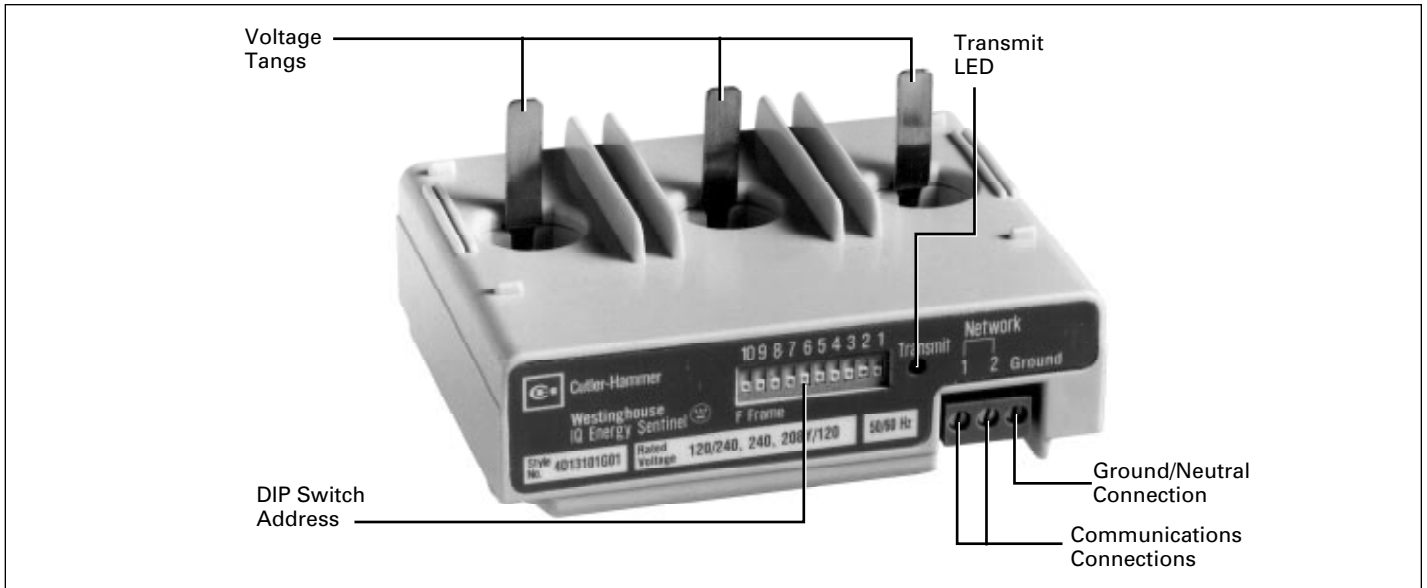
The Universal mount IQ Energy Sentinel for external CTs may be utilized for monitoring loads larger than 400 Amps, on power cable sizes larger than 500 MCM or on circuits containing more than one conductor per phase.

#### Features

- Monitors (1% of full scale accuracy)
  - Kilowatts
  - Kilowatt Demand
  - Kilowatt Hours
- Built-in CTs versions up to 400 Amps or external CT versions up to 4000 Amps.
- Breaker, panel or DIN-rail mounting options
- Powered directly off the line
- Built-in communications capability
  - Address set by DIP switches
  - Communicates at 9600 baud
  - Noise immune INCOM protocol
- Choice of operator interfaces
  - IQ Central Energy Display
  - Breaker Interface Module
  - Custom Billing Software
  - IMPACC Series III Software
- UL and CSA Listed

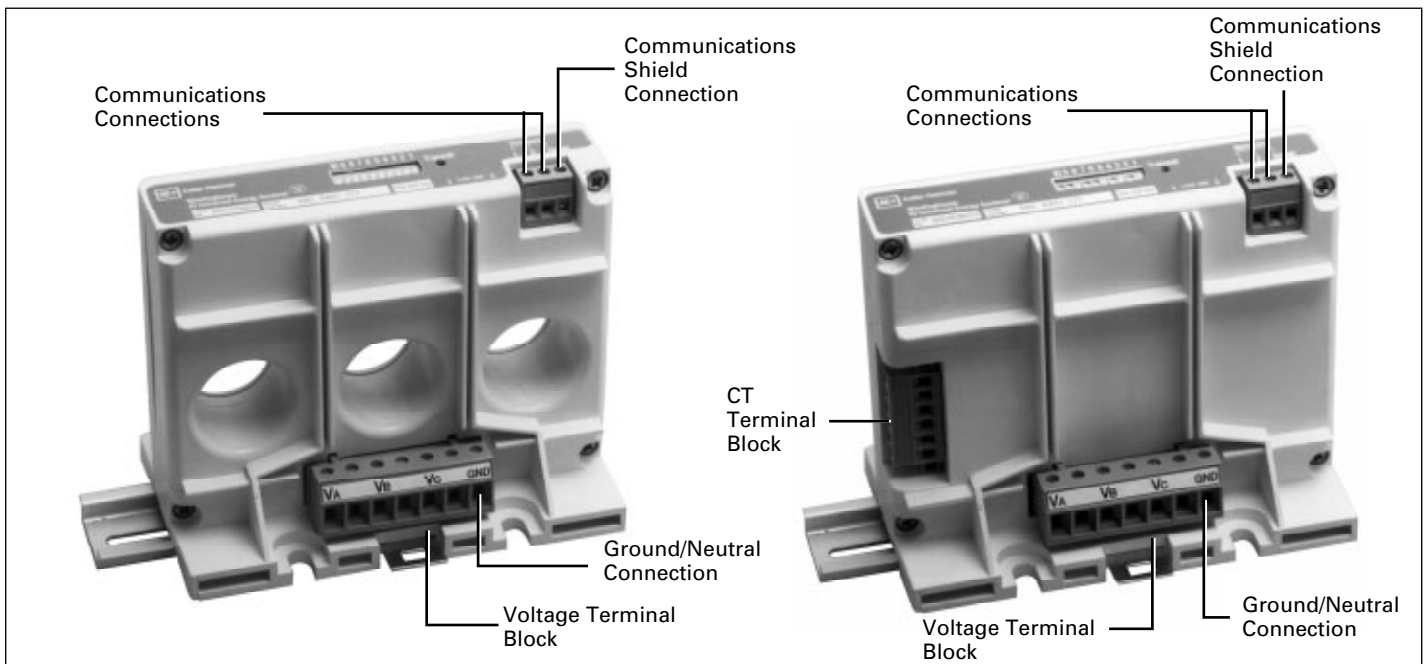
#### Benefits

- One device replaces multiple meters
- Improved system accuracy
- Savings in cost
- Savings in space
- Savings in installation cost
- No external power source is needed
- Permits remote monitoring and interconnection with programmable logic controllers and building management systems
- Flexibility - displays what is needed where it is needed
- For further information see section on IMPACC communications



### Cutler-Hammer Type Westinghouse Series C Breaker Mount

The breaker mount IQ Energy Sentinel installs in less than 10 minutes on the load side of a Cutler-Hammer Series C F-frame (150 Amp), J-frame (250 Amp), or K-frame (400 Amp) circuit breaker.



### Universal Mount With Internal CTs

The Universal mount IQ Energy Sentinel with internal CTs may be panel mounted or DIN-rail mounted on disconnects or other circuits up to 400 Amps. A pull-apart terminal block is provided on the device for connection of the system voltage reference wiring.

**Note:** The location of the ground/neutral connection differs on breaker mount IQ Energy Sentinels from the location of the ground/neutral connection on Universal mount IQ Energy Sentinels. Incorrect wiring to the ground/neutral and communications connections may result in accuracy and communication errors.

### Universal Mount for External CTs

The Universal mount IQ Energy Sentinel for external CTs may be panel mounted or DIN-rail mounted on circuits up to 4000 Amps.

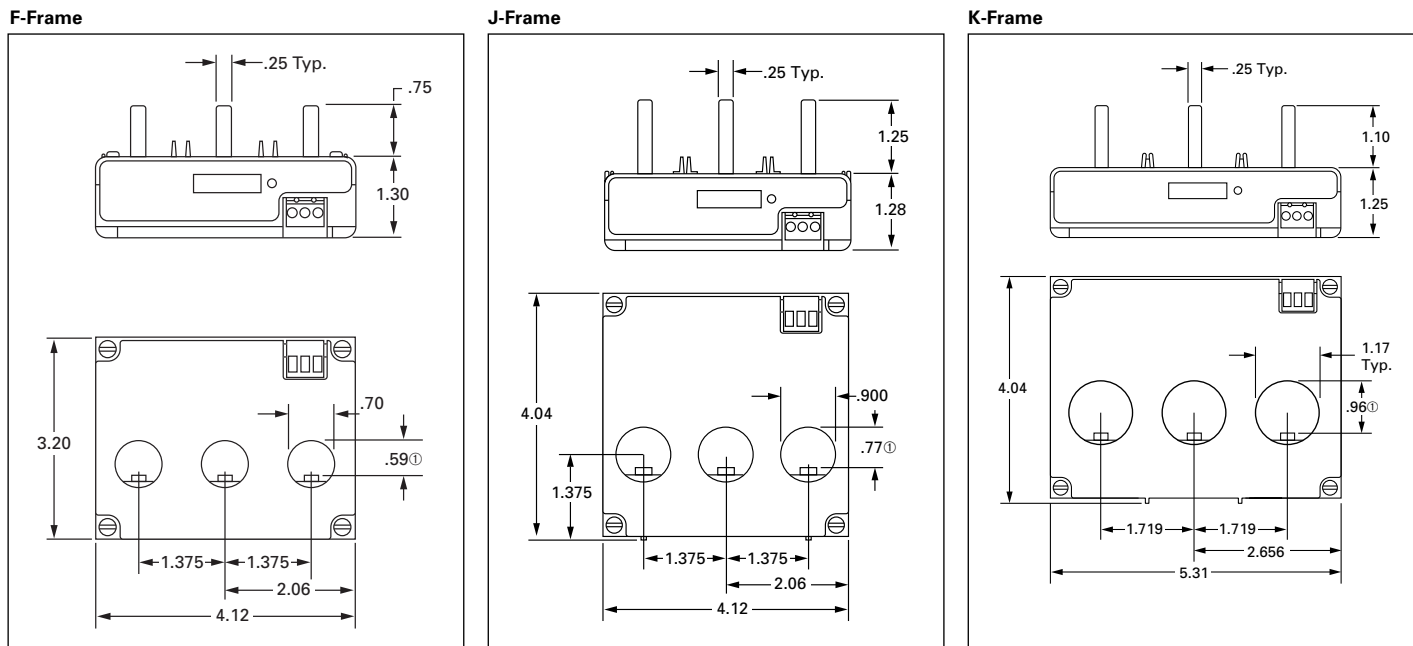
A pull-apart terminal block is provided on the device for connection of the system voltage reference wiring as well as another terminal block for connection to the user's existing 5-amp secondary CTs which may range in standard ratios from 25:5 up to 4000:5.

If the device will be disconnected without interruption of the monitored load, the use of a CT shorting block is advised.

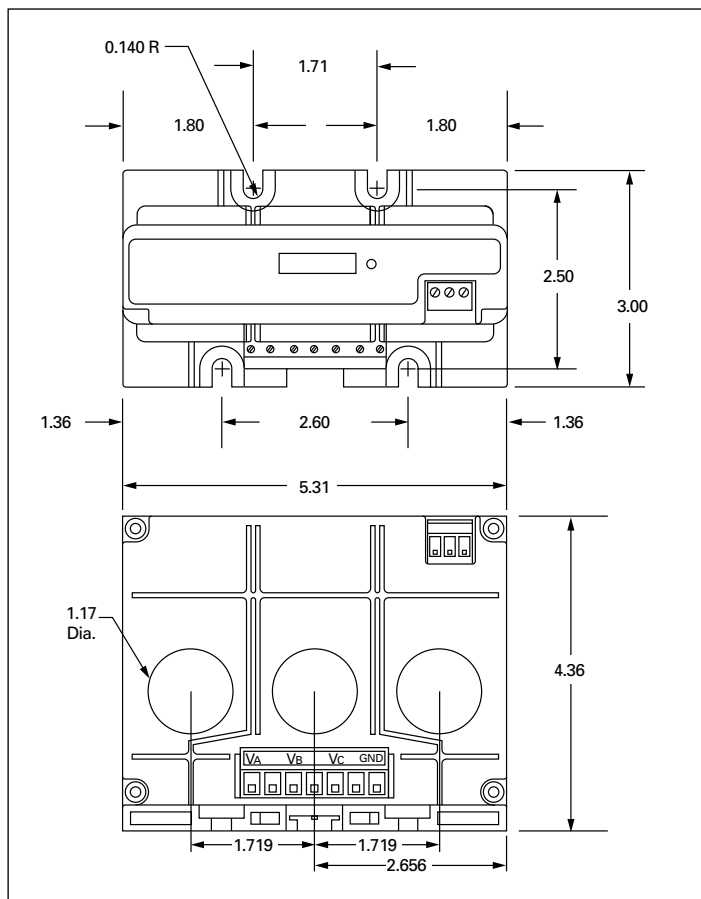
# Metering and Monitoring Devices



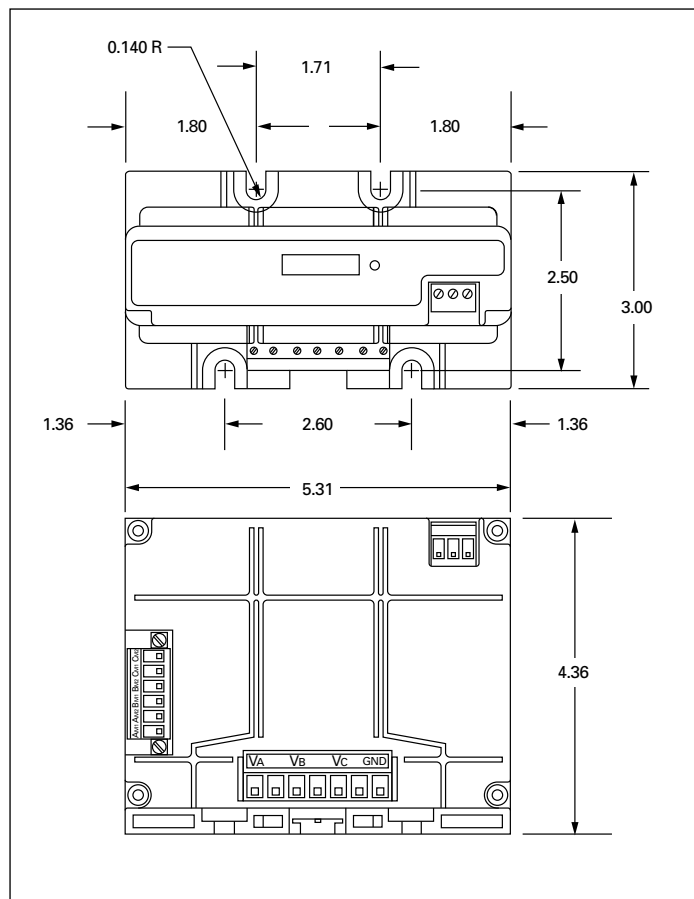
## IQ Energy Sentinel



### Universal Internal



### Universal External



① Hole clearance available for bare cable after stripping insulation.



# Metering and Monitoring Devices

## IQ Energy Sentinel

### Specifications

#### System Accuracy

Breaker Mount or Universal with

Internal CTs:

+/-1% of full scale current rating

Universal for External CTs:

+/-1% of full scale current rating plus CT accuracy

#### Current Input

Current Range: 1% to 125% of current rating

Burden: 1 VA

#### Voltage Input

Voltage Range: +/-20% of voltage rating

#### Frequency

50 or 60 Hertz

#### Power Factor Range

All (-1 to +1)

#### Communications

9600 Baud

INCOM compatible

#### Environmental Conditions

Operating Temperature: -25° to 70°C ①  
(-13° to 158°F)

Storage Temperature: -40° to 85°C ①  
(-40° to 185°F)

Operating Humidity: 5% to 95% relative humidity non-condensing

#### Dimensions DxWxH (inches)

F 3.20 x 4.12 x 1.30; hole clearance② 0.59

J 4.04 x 4.12 x 1.28; hole clearance② 0.77

K 4.04 x 5.31 x 1.25; hole clearance② 0.96

UI 4.36 x 5.31 x 3.00; hole clearance 1.17

UE 4.36 x 5.31 x 3.00

#### Weight (lbs):

F .65

J .69

K .87

UI 1.10

UE 1.10

#### Further Information

Selling Policy 25-000

User's Manual

F-frame IL 17537

J-frame IL 17538

K-frame IL 17539

UI IL 17540

UE IL 17541

Sales Aid (Commercial) SA 11919

Sales Aid (Industrial) SA 11920

Descriptive Bulletin DB 8178

UL File No. E64983

### IQ Energy Sentinels

Description	Voltage Rating – Vac	Current Rating Maximum Amps	Catalog Number
For F-frame Breakers	120/240, 240, 208Y/120	150	IQESF208
For F-frame Breakers	220/380, 230/400, 240/415	150	IQESF400
For F-frame Breakers	480, 480Y/277	150	IQESF480
For F-frame Breakers	600, 600Y/347	150	IQESF600
For J-frame Breakers	120/240, 240, 208Y/120	250	IQESJ208
For J-frame Breakers	220/380, 230/400, 240/415	250	IQESJ400
For J-frame Breakers	480, 480Y/277	250	IQESJ480
For J-frame Breakers	600, 600Y/347	250	IQESJ600
For K-frame Breakers	120/240, 240, 208Y/120	400	IQESK208
For K-frame Breakers	220/380, 230/400, 240/415	400	IQESK400
For K-frame Breakers	480, 480Y/277	400	IQESK480
For K-frame Breakers	600, 600Y/347	400	IQESK600
Universal with Internal CTs	120/240, 240, 208Y/120	400	IQESUI208
Universal with Internal CTs	220/380, 230/400, 240/415	400	IQESUI400
Universal with Internal CTs	480, 480Y/277	400	IQESUI480
Universal with Internal CTs	600, 600Y/347	400	IQESUI600
Universal for External CTs	120/240, 240, 208Y/120	4000	IQESUE208
Universal for External CTs	220/380, 230/400, 240/415	4000	IQESUE400
Universal for External CTs	480, 480Y/277	4000	IQESUE480
Universal for External CTs	600, 600Y/347	4000	IQESUE600

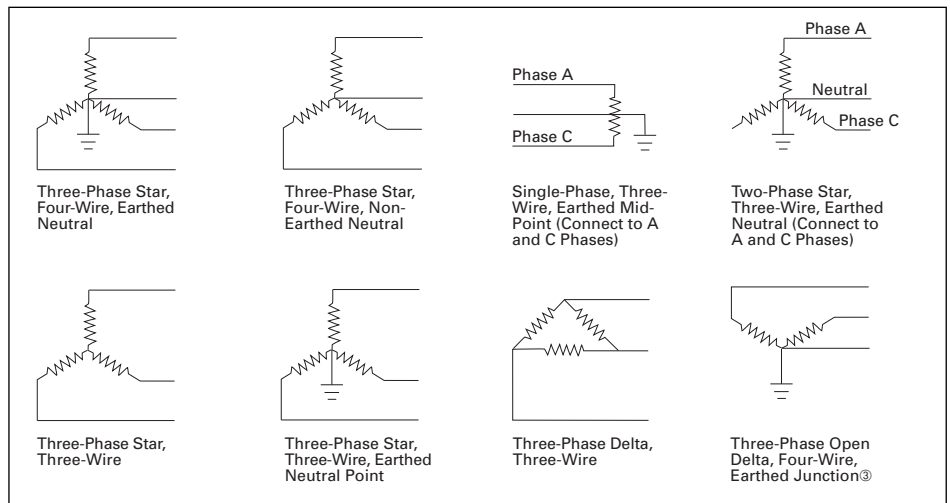
### Terminal, Cable and Wiring Guidelines

Energy Sentinel	Westinghouse Series C Terminal	Wire Size (Single Conductor)
F-frame	624B100G02, G17, G18, G19	#14-1/0, #4-4/0, #4-4/01, #14-1/0 AWG
J-frame	T250KB, TA250KB	#4-350 MCM
K-frame	T350K, TA350KB	#250-500 MCM
Universal with Internal CTs		#250-500 MCM
System Voltage Reference Wiring		#24-#10 AWG
Current Transformer Wiring		#12 AWG (max.)
Ground Reference Wiring		#22-#12 AWG (minimum 600V rated)
Communications Wiring		Cutler-Hammer IMPCABLE or Belden 9463 family

### System Voltage Considerations (Application Note)

The ground (GND) terminal of the IQ Energy Sentinel should be connected to the ground bus or other non-current carrying ground with 600V rated wire to ensure accuracy.

### Acceptable Supply Voltages



① 40°C (standard) maximum for Series C circuit breakers.

② Hole clearance available for bare cable after stripping insulation.

③ Acceptable for Universal IQ Energy Sentinels only.