

New Information

# Metering Devices

## IQ Sentinels

### IQ Energy Sentinel/ IQ Power Sentinel

#### Applications

- Electrical load and energy monitoring

#### Metered/Monitored Parameters

##### IQ Power Sentinel

- Currents, voltages
- Power: real, apparent, reactive
- Frequency
- Power factor
- Energy: watt hours
- Demand

##### IQ Energy Sentinel

- Power: watts
- Energy: watt hours
- Watt demand

#### Communications

- Interface capability to computer network for data collection, storage and/or printout via Cutler-Hammer PowerNet software or to CED

#### Physical Characteristics

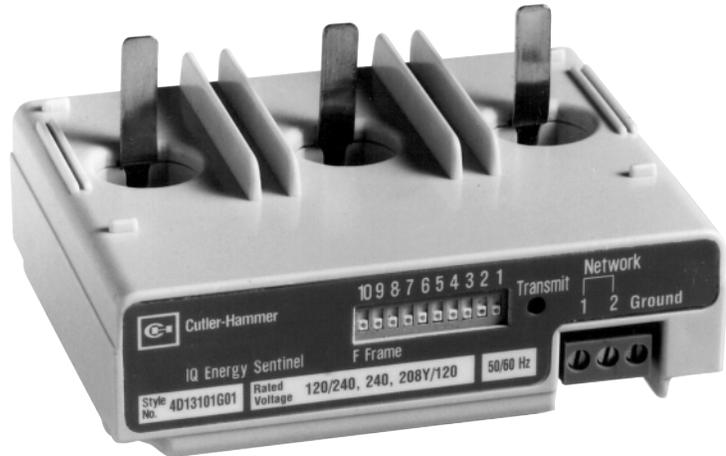
- Space saving
- Series C circuit breaker mounting available
- Universal mounting for all applications

#### Listings/Certification

- UL and CSA listed
- IQ Power Sentinel – CE mark

#### Ratings

- Application to 600V, no PTs required
- Single-phase 3-wire  
Three-phase 3- or 4-wire



### General Description

IQ Sentinels are highly accurate, microprocessor-based submeters, designed to monitor power, energy, currents, voltages, power factor, frequency, apparent power, and reactive power. They represent an alternative to installing separate watt-meters, watt-hour meters, watt demand meters, ammeters, volt-meters, and more.

IQ Sentinels are available with two different capabilities:

- The Energy Sentinel version which monitors watts, watt-hour, and watt demand
- The Power Sentinel version which monitors watts, watt-hour, watt demand, currents, voltages, power factor, frequency, apparent power and reactive power.

IQ Sentinels provide a unique cost-effective method to implement energy submetering at lower levels in the electrical distribution system.

The ability to monitor electrical distribution systems down to the machine or process level at an industrial facility has become essential to providing key benefits such as verifying the accuracy of the utility bill, identifying and tracking energy usage to the loads that consume it, developing a facility energy profile to establish a

baseline, allocating energy costs to create accountability, etc.

An optional door-mounted interface is available to display the energy parameters monitored by the IQ Sentinels. See Central Energy Display II, TD.17.25.T.E page 1.

Submetering application examples for the IQ Sentinels include energy demand monitoring, 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.

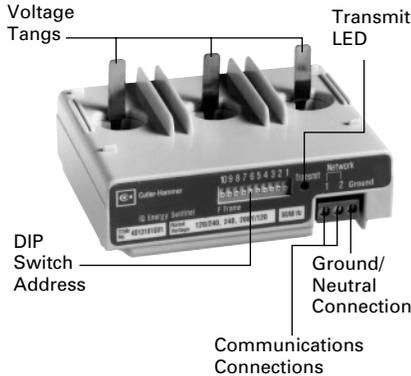
Industrial applications include departmental billing and process/assembly line energy cost analysis. IQ Energy Sentinels may be substituted for watt transducers when monitoring machine tool and equipment performance within plants.

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

Circuit Breaker Mount Applications



F-Frame Series C Circuit Breaker with IQ Energy Sentinel



IQ Energy Sentinel, Breaker Mount



Universal Mount IQ Sentinel with and without CTs

**IQ Energy Sentinel Features**

- Monitors (accuracy stated full scale)
  - Watts ±1.0%
  - Watt Demand ±1.0%
  - Watt Hours ±1.0%
- Built-in CTs version up to 400 amperes or external CTs version up to 4000 amperes
- Breaker, Panel or DIN-rail mounted
- Powered directly off the line
- Built-in communication capability
  - Address set by DIP switches
  - Communication at 9600 baud
  - Noise immune INCOM protocol
- Choice of operator interfaces
  - IQ Central Energy Display
  - Breaker Interface Module (BIM)
  - NetPower Bill energy billing software
  - Cutler-Hammer PowerNet software
- UL and CSA listed

**IQ Power Sentinel Features**

- Monitors (accuracy stated full scale)
  - Ac line current (each phase) ±0.5%
  - Ac line-to-line voltage ±0.5%
  - Ac line-to-neutral voltages ±0.5%
  - Watts (each phase and total) ±1.0%
  - Vars (each phase and total) ±1.0%
  - VA (each phase and total) ±1.0%
  - Apparent Power Factor (each phase and total) ±2.0%
  - Displacement Power Factor (each phase and total) ±2.0%
  - Demand (total watts) ±1.0%
  - Frequency ±0.1%
  - kW-hours ±1.0%
- Built-in CTs version up to 400 amperes
- Panel or DIN-rail mounted
- Powered directly off the line
- Built-in communication capability
  - Address set by DIP switches
  - Communication at 9600 baud
  - Noise immune INCOM protocol
- Choice of operator interfaces
  - IQ Central Energy Display
  - Breaker Interface Module
  - NetPower Bill energy billing software
  - NetPower software
- UL and CSA listed
- CE mark

**IQ Sentinels Benefits**

- One device replaces multiple meters and/or transducers
- Improved system accuracy
- Savings in product 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. For further information see section on Cutler-Hammer PowerNet Systems
- Designed to interface directly with NetPower Bill, energy billing software
- Flexibility – displays what is needed where it is needed
- NetPower Bill software

**Energy Sentinel Specifications**

**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**

Protocol: INCOM  
Speed: 9600 Baud  
Compatibility: Cutler-Hammer PowerNet 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 D x W x H (inches)**

F 3.20 x 4.12 x 1.30; CT window size② 0.59  
J 4.04 x 4.12 x 1.28; CT window size② 0.77  
K 4.04 x 5.31 x 1.25; CT window size② 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

**Other Specifications**

UL File Number E64983  
CSA File Number LR106359-1

- ① 40°C (standard) maximum for Series C circuit breakers.
- ② CT window available for cable before stripping insulation.
- ③ Acceptable for Universal IQ Energy Sentinels only.

**Power Sentinel Specifications**

**Nominal Full Scale Current**

400 amperes

**Current Accuracy Range**

1%-125% of full scale

**Current Overload Capability**

250% of full scale

**Power Factors**

All

**Nominal Operating Line-to-Line Voltages**

G01 208	G03 480
G02 400	G04 600

**Maximum Operating Voltage Fluctuation**

G01 ±20%	G03 ±10%
G02 ±10%	G04 ±10%

**Maximum Power Consumption**

G01 2 VA	G03 5 VA
G02 5 VA	G04 6 VA

**Frequency**

50/60 Hz

**Communications**

Protocol: INCOM  
Speed: 9600 Baud  
Compatibility: Cutler-Hammer PowerNet compatible

**Dimensions D x W x H (inches)**

4.36 x 5.31 x 3.00

**Shipping Weight**

1.10 pounds

**Environment**

Indoor use only

**Maximum Operating Altitude**

2000 meters

**Operating Temperatures**

-25° to 70°C      -13° to 158°F

**Storage Temperatures**

-40° to 85°C      -40° to 185°F

**Maximum Relative Humidity**

80% for temperatures up to 31°C decreasing linearly to 50% at 70°C

**Transient Overvoltage Category**

Overvoltage Category III

**Pollution Degree**

2 (IEC 664)

**UL Listed**

File Number E185559

**CSA Listed**

**CE Marked**

**Terminal, Cable and Wiring Guidelines**

Sentinel	Cutler-Hammer Series C Terminal	Wire Size (Single Conductor)	Wire Types
F-frame J-frame K-frame	624B100G02, G17, G18, G19 T250KB, TA250KB T350K, TA350KB	#14-1/0, #4-4/0, #4-4/01, #14-1/0 AWG #4-350 kcmil #250-500 kcmil	THW, THHN, XHHW THW, THHN, XHHW THW, THHN, XHHW
Universal Energy Sentinel with Internal CTs Universal Power Sentinel with Internal CTs	T350K, TA350KB	#250-500 kcmil	THW, THHN, XHHW

**System Voltage Reference Wiring**

Energy Sentinel with Internal or External CTs Power Sentinel with Internal CTs	#24-#10 AWG #24-#10 AWG
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**Current Transformer Wiring**

Universal with External CTs	#12 AWG (maximum)
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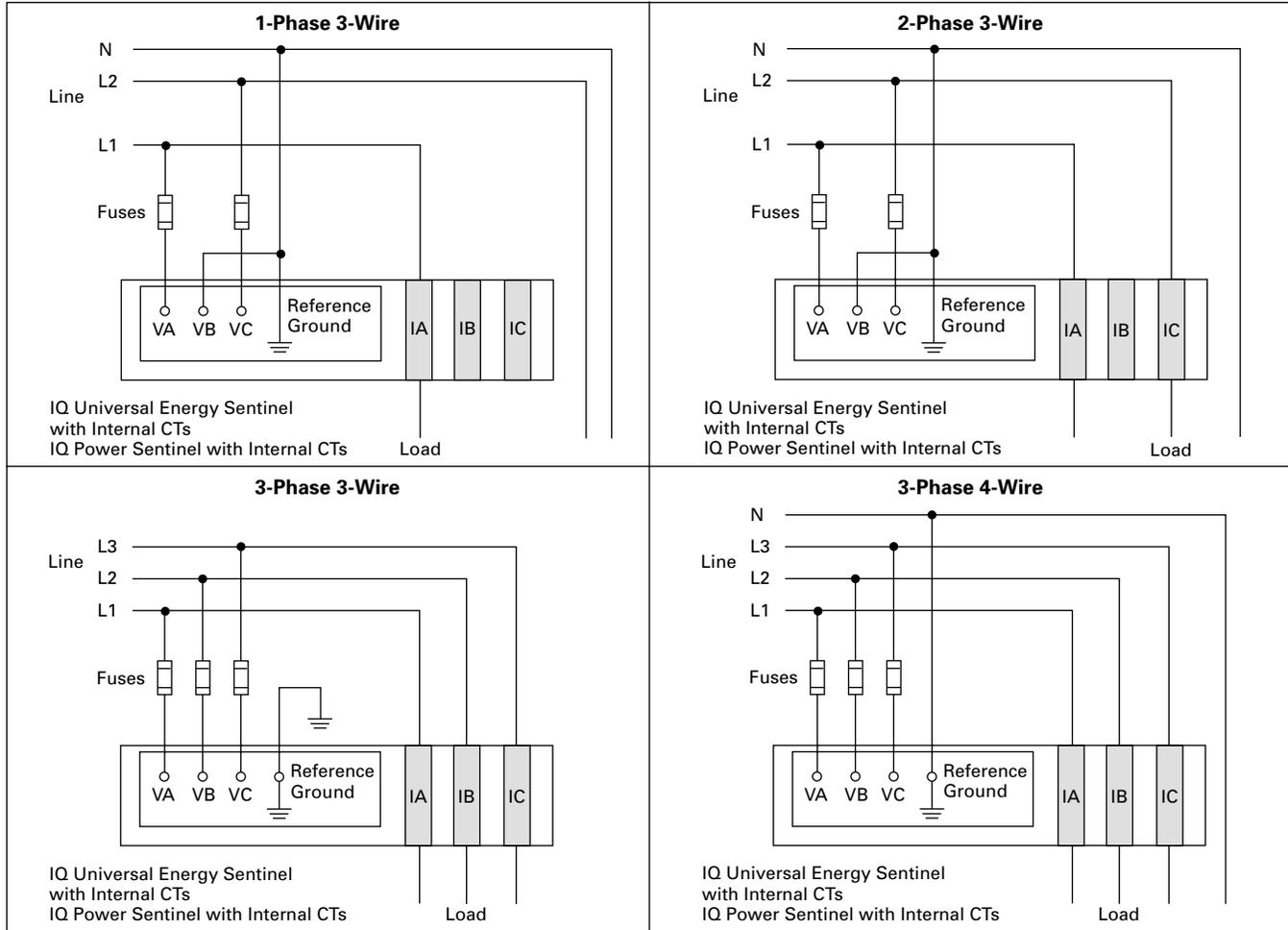
**Ground Reference Wiring**

Energy Sentinel with Internal or External CTs Power Sentinel with Internal CTs	#22-#12 AWG (minimum 600V rated) #22-#12 AWG (minimum 600V rated)
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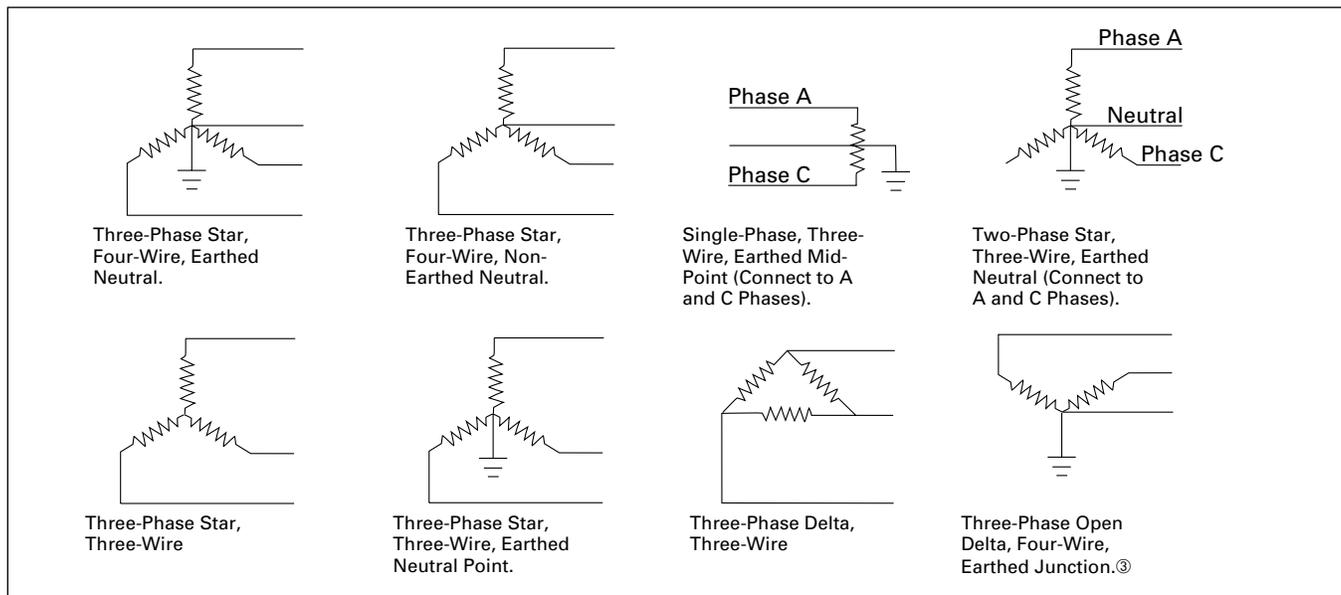
**Communications Wiring**

Energy Sentinel with Internal or External CTs Power Sentinel with Internal CTs F-frame J-frame K-frame	Cutler-Hammer IMPCABLE or Belden 9463 family Cutler-Hammer IMPCABLE or Belden 9463 family
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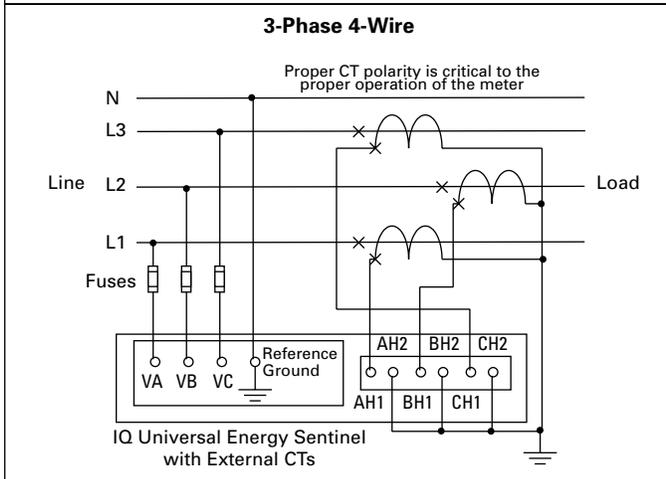
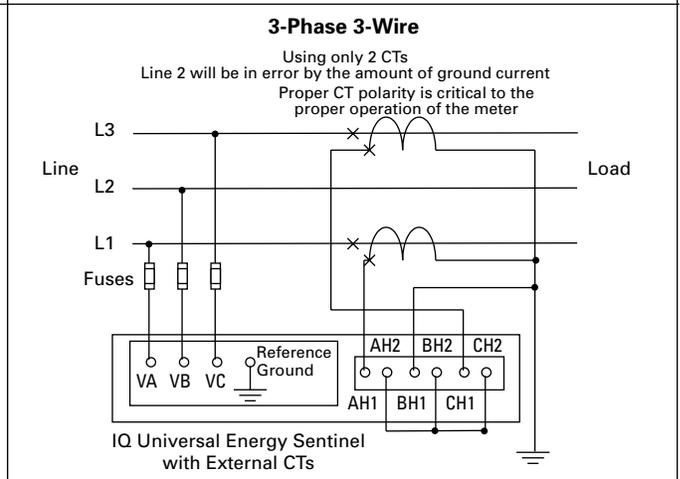
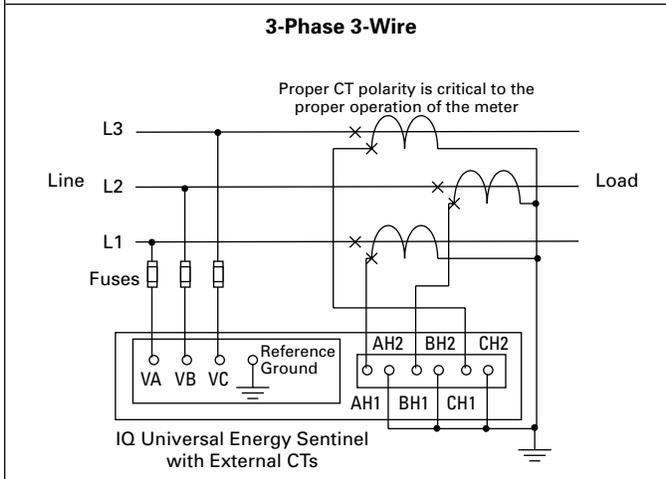
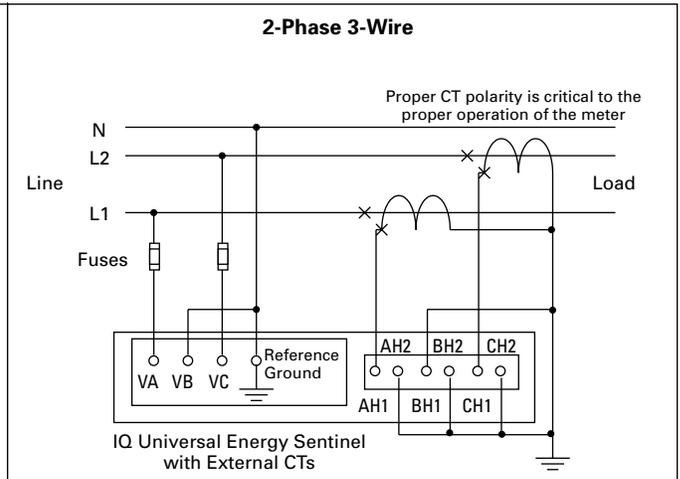
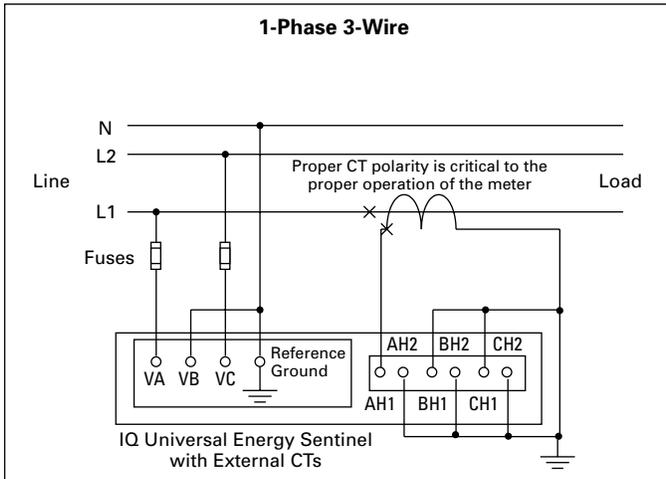
**Field Wiring – IQ Universal Energy Sentinel with Internal CTs  
IQ Power Sentinel with Internal CTs**



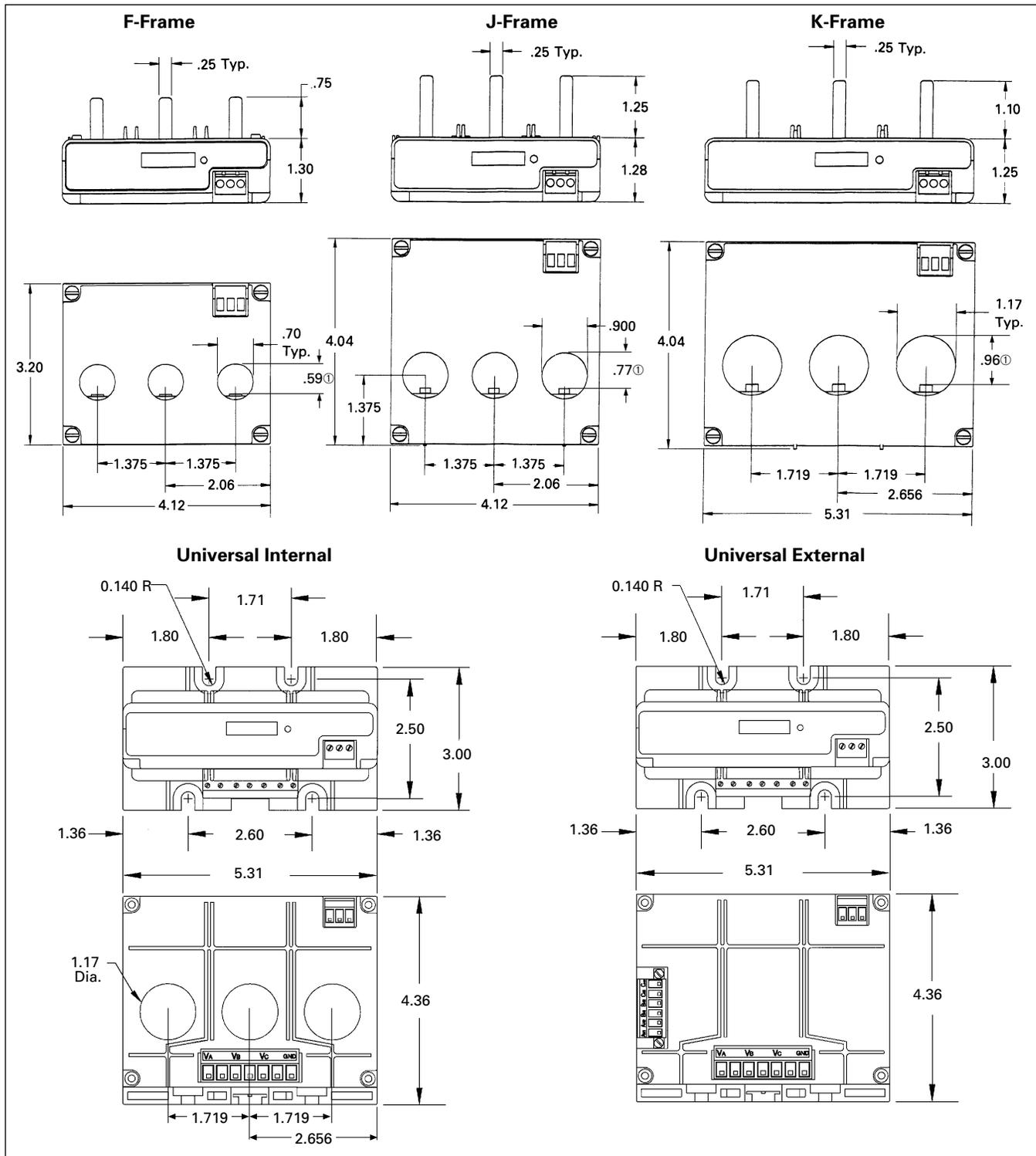
**Acceptable System Configurations**



Field Wiring – IQ Universal Energy Sentinel with External CTs



Sentinel Dimensions (in Inches)



**Note:** The IQ Energy Sentinel is available as any of the five types shown above. The IQ Power Sentinel is available only as universal mount with internal CTs.

① Hole clearance available for cable before stripping insulation.

## Ordering Information

### IQ Energy Sentinels

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

### IQ Power Sentinels

Description	Voltage Rating – Vac	Current Rating Maximum Amperes	Catalog Number
Universal with Internal CTs	120/240, 240, 208Y/120	400	<b>IQPSUI208</b>
Universal with Internal CTs	220/380, 230/400, 240/415	400	<b>IQPSUI400</b>
Universal with Internal CTs	480, 480Y/277	400	<b>IQPSUI480</b>
Universal with Internal CTs	600, 600Y/347	400	<b>IQPSUI600</b>

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