

ENERCEPT™ H8051/H8053

Pulse Output kWh Transducers



US Patent No. 6,373,238



⚠ DANGER ⚡

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Follow safe electrical work practices. See NFPA 70E in the USA, or applicable local codes.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Read, understand and follow the instructions before installing this product.
- Turn off all power supplying equipment before working on or inside the equipment.
- Use a properly rated voltage sensing device to confirm power is off.
DO NOT DEPEND ON THIS PRODUCT FOR VOLTAGE INDICATION
- Only install this product on insulated conductors.

Failure to follow these instructions will result in death or serious injury.

CAUTION

RISK OF EQUIPMENT DAMAGE

- Enercept meters are rated for use at 50-60Hz. Do not connect this product to circuits with high harmonic energy, such as Variable Speed Drives (a.k.a. Variable Frequency Drives, Adjustable Frequency Drives) or similar sources, as these may permanently damage the product.

Failure to follow these instructions can result in overheating and permanent equipment damage.

NOTICE

- This product is not intended for life or safety applications.
- Do not install this product in hazardous or classified locations.
- The installer is responsible for conformance to all applicable codes.
- Mount this product inside a suitable fire and electrical enclosure.

FCC PART 15 INFORMATION

NOTE: This equipment has been tested by the manufacturer and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Modifications to this product without the express authorization of Veris Industries nullify this statement.

For use in a Pollution Degree 2 or better environment only. A Pollution Degree 2 environment must control conductive pollution and the possibility of condensation or high humidity. Consider the enclosure, the correct use of ventilation, thermal properties of the equipment, and the relationship with the environment. Installation category: CAT II or CAT III

Installer's Specifications

Measurement Accuracy:

System Accuracy	±1% of reading from 10% to 100% of the rated current*
Type of Measurement	One or three phase AC system

Input Voltage Characteristics:

Measured AC Voltage	208-480 VAC
Frequency Range	50/60 Hz
Fuses	1/2A, 600VAC, 200 kAIC

Input Current Characteristics:

Maximum Primary Current	100, 300, 400, 800, 1600, or 2400A**
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Meter Current Draw:

Maximum	60mA AC
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Output:

Pulse	N.O. Opto-Fet
Max. Pulse Output Current	100mA@24VAC/DC
Field Selectable Pulse Rate	1, 0.5, 0.25, or 0.1 kWh/pulse
Pulse Width	200 msec

Mechanical Conditions:

CT Case Isolation	600VAC
Internal Isolation	2000VAC RMS

Environmental Conditions:

Operating Temperature Range	0° to 60°C (32° to 140°F)
Storage Temperature Range	-40° to 70°C (-40° to 158°F)
Operating Humidity Range	<95% RH non-condensing

Safety:

US and Canada (cULus)	UL508 (open type device)
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* Meter accuracy specified with conductors centered in the CT window.

** For amperages greater than 2400A, see App Note VN19, www.veris.com/applicationnotes.aspx

QUICK INSTALL

Disconnect and lock out power to the enclosure containing the conductor before installation.

1. Set the pulse rate switches located on the bottom of the CT(s).
2. Connect the voltage leads to the source to be monitored.
3. Snap the CT(s) onto the conductor (observe color matching).
4. Connect the pulse output wires (observe polarity).

OPERATION

The H8051 and H8053 pulse output meters combine microprocessor-based kWh transducers and high-accuracy split-core instrument grade current transformers (CTs) in one unit. The H8051 is a single CT version designed for balanced loads, and the H8053 is a 3-CT version for monitoring each phase. Integration of electronics lowers hardware and installation costs. The sensors automatically detect phase reversal, so CT load orientation is not a concern. The CTs and meters are calibrated as a set, so it is necessary to color-match the CTs and voltage leads when installing.

These devices are used in tenant submetering, performance contracting, and departmental costing applications. The 1% total system accuracy conforms to ANSIC12.1 metering standards.

PRODUCT IDENTIFICATION

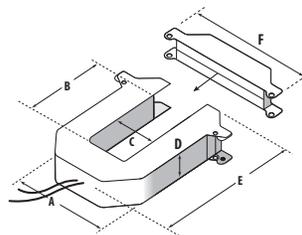
Single CT Units

MODEL	MAX. AMPS	CT SIZE
H8051-0100-2	100	SMALL
H8051-0300-2	300	SMALL
H8051-0400-3	400	MEDIUM
H8051-0800-3	800	MEDIUM
H8051-0800-4	800	LARGE
H8051-1600-4	1600	LARGE
H8051-2400-4	2400	LARGE

Three-CT Units

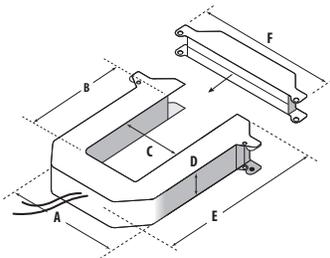
MODEL	MAX. AMPS	CT SIZE
H8053-0100-2	100	SMALL
H8053-0300-2	300	SMALL
H8053-0400-3	400	MEDIUM
H8053-0800-3	800	MEDIUM
H8053-0800-4	800	LARGE
H8053-1600-4	1600	LARGE
H8053-2400-4	2400	LARGE

DIMENSIONS



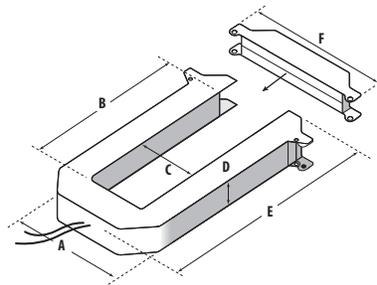
SMALL
100/300 Amp

A =	3.8" (96 mm)
B =	1.2" (30 mm)
C =	1.3" (31 mm)
D =	1.2" (30 mm)
E =	4.0" (100 mm)
F =	4.8" (121 mm)



MEDIUM
400/800 Amp

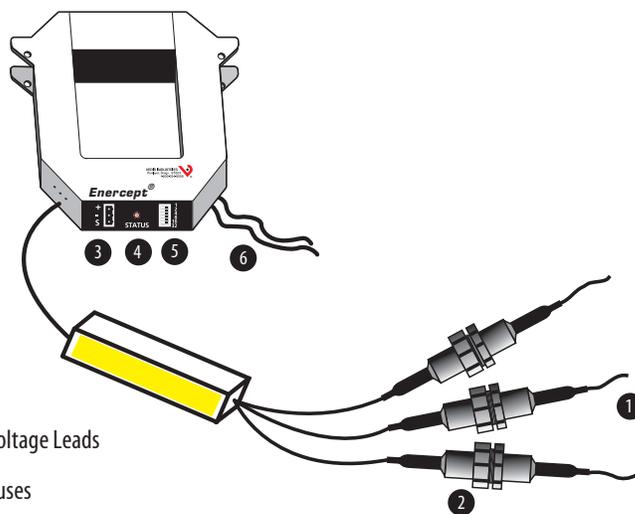
A =	4.9" (125 mm)
B =	2.9" (73 mm)
C =	2.5" (62 mm)
D =	1.2" (30 mm)
E =	5.2" (132 mm)
F =	6.0" (151 mm)



LARGE
800/1600/2400 Amp

A =	4.9" (125 mm)
B =	5.5" (139 mm)
C =	2.5" (62 mm)
D =	1.2" (30 mm)
E =	7.9" (201 mm)
F =	6.0" (151 mm)

PRODUCT DIAGRAM



1. Voltage Leads
2. Fuses
3. Pulse Output connector
4. Status LED: blink codes: slow green for normal operation; slow red for incorrect wiring or low power factor (less than 0.5); fast red for max. current exceeded.
5. Pulse Rate Switches: used to set the pulse output rate.
6. External CTs: permanently attached; do not disconnect or use with other power meters.



Color match CTs and voltage leads! Example: clamp the red labeled CT around the power conductor connected to the red voltage wire.

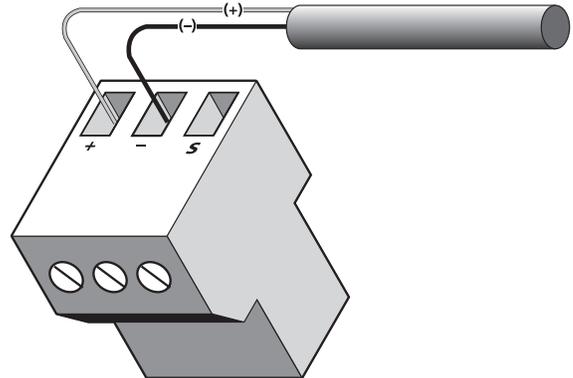
INSTALLATION

Disconnect and lock out power to the enclosure before installation.

The Enercept meter, including the current transformers (CTs), voltage connection fuses, and fuse pack, is permitted within electrical distribution equipment including but not limited to panelboards, switchboards, motor control centers, and transformers. Carefully review the equipment in which the Enercept meter will be installed. Consider the following installation conditions during the installation process:

- Review the equipment enclosure for ventilation openings. Wires will cross many of these openings in a normal installation; however, do not install the Enercept where it will substantially block ventilation openings in the enclosure.
- The Enercept meter and the wiring installed within a wiring space or gutter should not exceed 75% cross sectional fill at the Enercept meter parts as addressed in the NEC. Improper installation of Enercept meter in the wire gutter of equipment may affect the thermal performance of the equipment.
- Consider the arrangement of CTs within the equipment to ensure adequate bending radius of conductors.
- Review the arrangement and location of the CTs within the equipment. Do not create undue strain on the conductor. A CT may require appropriate support in order to address such a condition.

4. Attach the pulse output wires as shown. Observe (+) and (-) polarity. Insulate any exposed wiring.

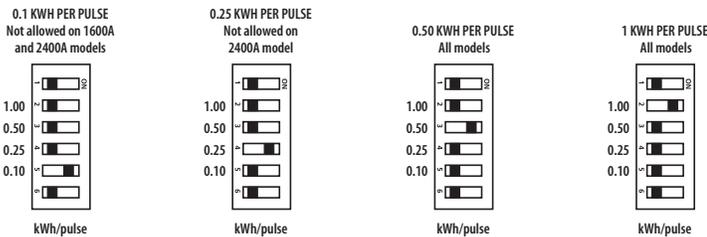


5. Check power reading (these calculations are approximations only).

Expected power:
 single-phase kW = Volts x Amps x PF / 1000
 3-phase kW = Volts x Amps x 1.732 x PF / 1000
 kW = Horsepower x 0.746

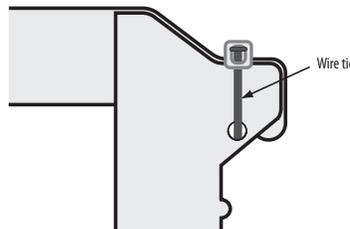
Seconds per pulse:
 S = kWh pulse setting
 seconds/pulse = (3600 x S) / kW

1. Set the DIP switches for the desired pulse rate as shown. Not all settings are allowed for each model.



2. Connect the voltage leads to the conductors, at a location that is not normally turned off. Connect voltage leads on the line side of the conductor to ensure constant power to the meter. See the Wiring section.

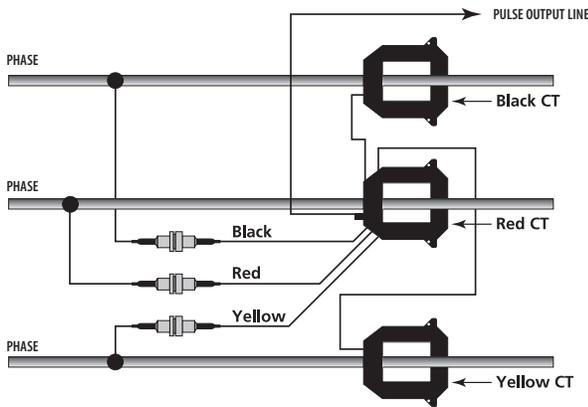
3. Snap the CT onto the conductor. If the application can exceed 20 times the rated CT current, use wire ties to secure the I-bar to the CT housing. This CT automatically detects phase reversal, so CT load orientation is not important.



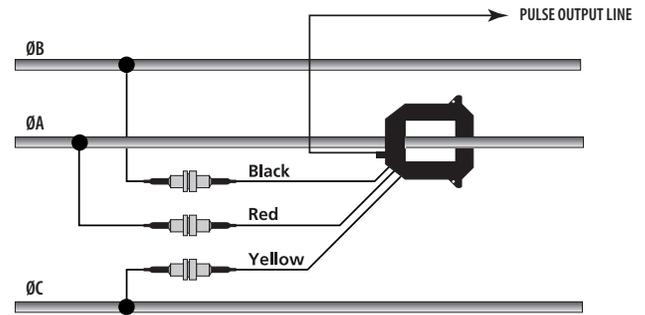
WIRING

Model 8053

Typical 208/480 VAC 3Ø, 3- or 4-Wire Installation

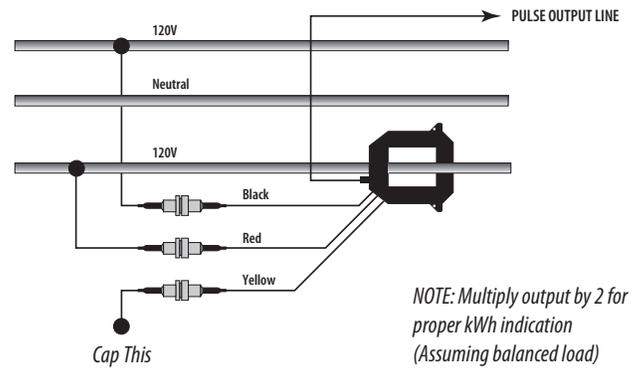
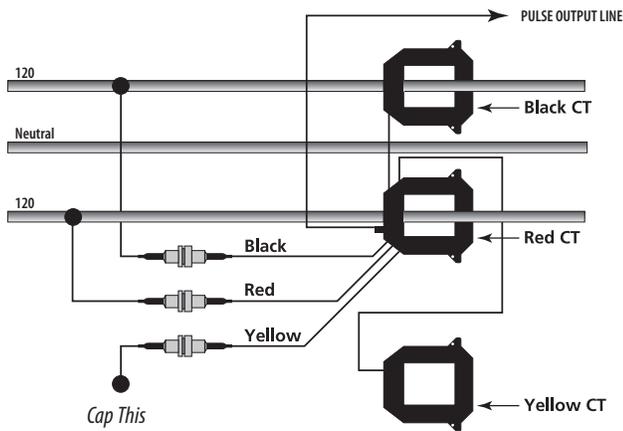


Model 8051



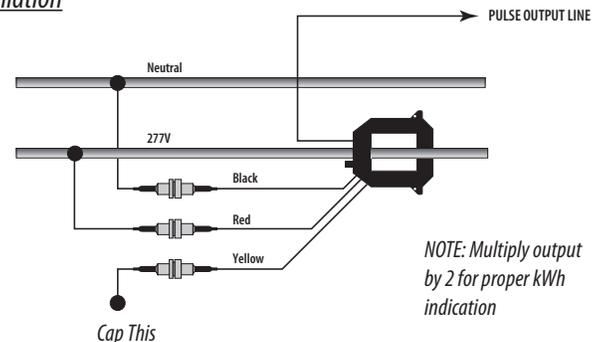
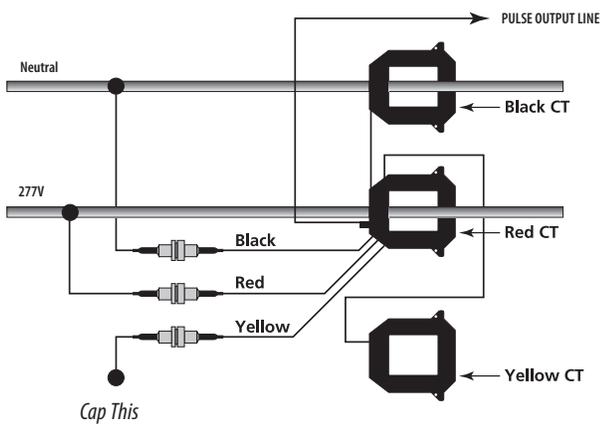
NOTE: Multiply output by 3 for proper kWh indication (Assuming balanced load)

Typical 240/120 VAC 1Ø, 3-Wire Installation



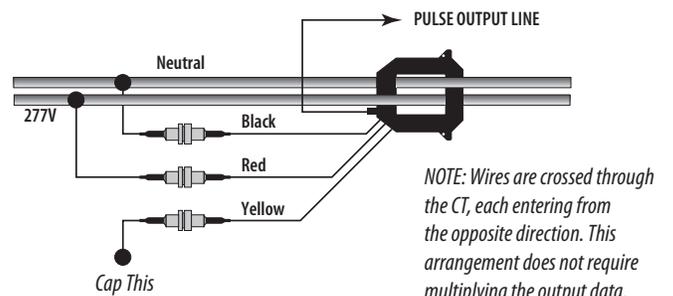
NOTE: Multiply output by 2 for proper kWh indication (Assuming balanced load)

Typical 277 VAC 1Ø, 2-Wire Installation



NOTE: Multiply output by 2 for proper kWh indication

Alternative 277 VAC 1Ø, 2-Wire Installation



NOTE: Wires are crossed through the CT, each entering from the opposite direction. This arrangement does not require multiplying the output data.

NOTES

1. Insulate all output cable wires to prevent accidental contact to high voltage conductors.
2. Mechanically secure the output cable where it enters the electrical panel.



WARNING: After wiring the cable, remove all scraps of wire or foil shield from the electrical panel. This could be **DANGEROUS** if wire scraps come into contact with high voltage wires!

TROUBLESHOOTING

Problem	Solution
Status LED does not blink	Check fuses and voltage connections. Status LED should blink regardless of CTs, pulse output connections, and DIP switch setting.
Readings seem highly inaccurate.	<ul style="list-style-type: none"> • Check that each CT is installed on the conductor with the corresponding color voltage input lead attached. In most cases, incorrect wiring will cause the STATUS LED to blink RED (slowly). However, a power factor lower than 0.5 could cause the LED to blink this way, even if the unit is installed properly. • It does not matter which side of the CT faces towards the load. • If current is below 7% of full scale maximum for the CT, use a smaller CT or wrap each wire through the CT multiple times • If using the single-phase H8051, use an amp-clamp to ensure that all three phases are passing the same approximate current. If phases are unbalanced, try the H8053 model.
Meter goes offline when load is switched off.	Voltage leads must be connected on the Line side of the conductor. The power meter cannot communicate without voltage.
Status LED blinks red.	<ul style="list-style-type: none"> • If the LED blinks quickly (i.e., about 5 blinks in two seconds), then either the pulse rate settings are incorrect or the CT used is too small. • If the LED blinks slowly (i.e., about 1 blink per second) the CTs are not installed on the correct conductors, or the power factor is less than 0.5. The meter can accurately measure these low PFs, but few loads operate normally at such a low power factor. • If the LED blinks slowly (i.e., about 1 blink per second), the monitored load might be less than 10% of the CT maximum ratings.