

ENERCEPT® H804X SERIES

4-20mA Output kW 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



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Installer's Specifications

Input Voltage	208 to 480 VAC
Number of Phases Monitored	1 or 3
Frequency	50/60 Hz
Maximum Primary Current	2400 A continuous per phase
CT case isolation	600 VAC
Internal isolation	2000 VAC rms
Operating temp. range	0° to 60°C (32° to 122°F) (<95%RH, non-condensing)
Storage temp. range	-40° to 70°C (-40° to 158°F)
Accuracy	±1% of reading from 10% to 100% of the rated current*
Output Type	4-20mA
Supply Power (loop)	9-30VDC; 30mA max.
CT	100A to 2400A

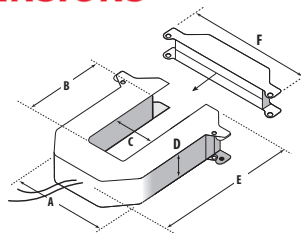
* Meter accuracy specified with conductors centered in the CT window.

QUICK INSTALL

Disconnect and lock out power before installation.

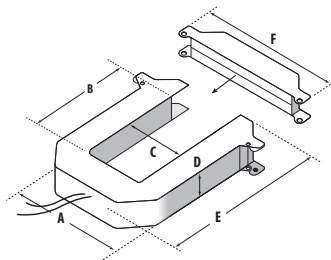
1. Connect the voltage leads to the phase conductors.
2. Snap the CT onto the conductor (observe color matching).
3. Connect the 4-20mA output wires (observe polarity).

DIMENSIONS



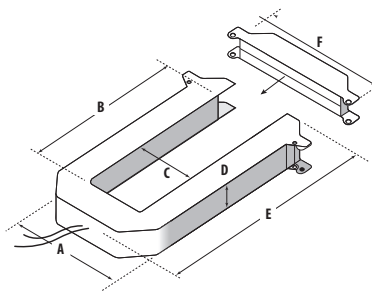
SMALL 100/300 Amp

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 =	5.9"	(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)

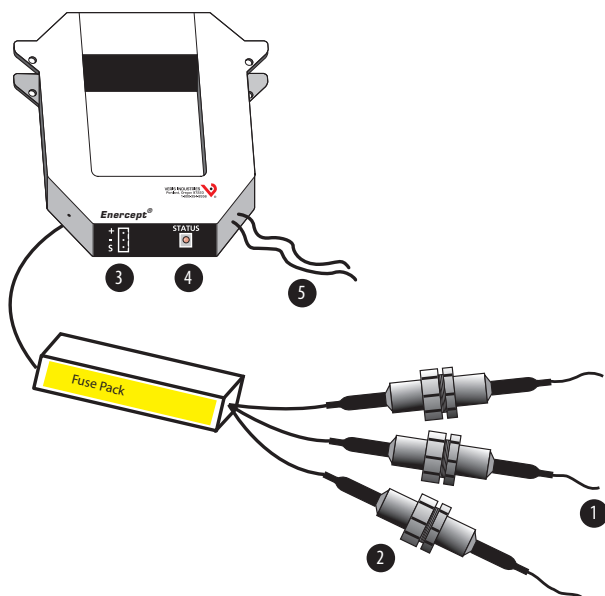
OPERATION

The H8040 Series devices combine microprocessor-based kW transducers and high-accuracy split-core instrument grade current transformers (CTs) in a single unit. 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.

The H8041 and H8042 are for single-phase or balanced-load applications at 208V and 480V, respectively. The H8043 and H8044 are the three-CT versions of the product for use on 208V and 480V with unbalanced loads.

These devices are used in chiller optimization, performance contracting, and energy management. The 1% total system accuracy conforms to ANSI C12.1 metering standards.

PRODUCT DIAGRAM



1. Voltage Leads: input range is 208 to 480V, 50/60Hz.
2. Fuses: maximum current draw 60mA. Fuses provided by the factory are rated 1/2A, 600VAC, 200 KAIC. Replace only with fuses of the same type and rating.
3. 4-20mA 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 exceedance.
5. External CTs (3-phase version only): 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



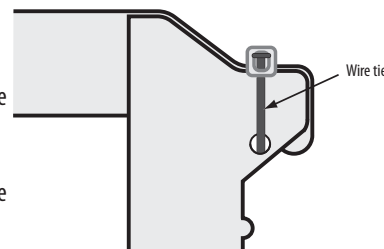
Disconnect and lock out power before installation.

The Enercept meter, including the current transformers (CTs), voltage connection fuses, and fusepac, 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. The following installation conditions should be considered during the installation process:

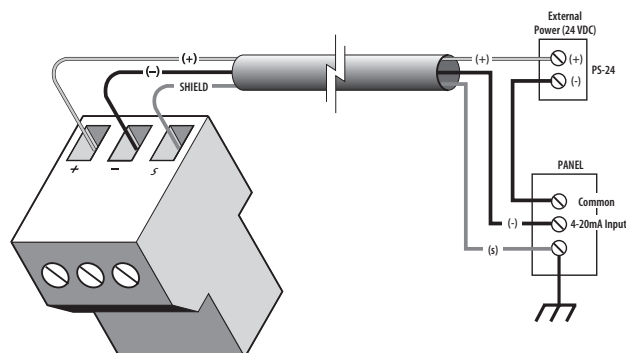
- Review the equipment enclosure for ventilation openings. Wires will cross many of these openings in a normal installation, however, do not install the Enercept where it will substantially block ventilation openings in the enclosure.
- The Enercept meter and the wiring installed within a wiring space or gutter should not exceed 75 percent 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.
- The arrangement of CTs within the equipment must also be considered to ensure the bending radius of conductors is not adversely affected.
- Review the arrangement and location of the CTs within the equipment. The CT must not create undue strain on the conductor. A CT may require appropriate support in order to address such a condition.

1. Connect the voltage leads to the 3 phase 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. Connect the red lead first to the conductor most conveniently located to the output connector. See the Wiring section on the following page.

2. Snap the CT onto the conductor. Observe color matching. 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.



3. Attach the 4-20mA output wires as shown. Observe (+), (-), and Shield polarity. Insulate any exposed wiring.



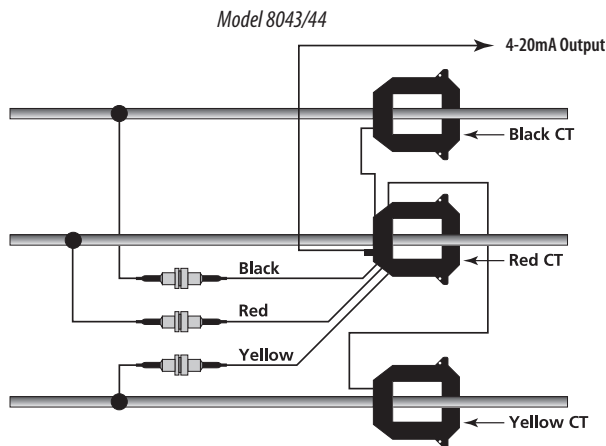
4. Check power reading (these calculations are approximations only).

Expected power:
 $\text{kW} = \text{Volts} \times \text{Amps} \times 1.732 \times \text{PF} / 1000$
 $\text{kW} = \text{Horsepower} \times 0.746$

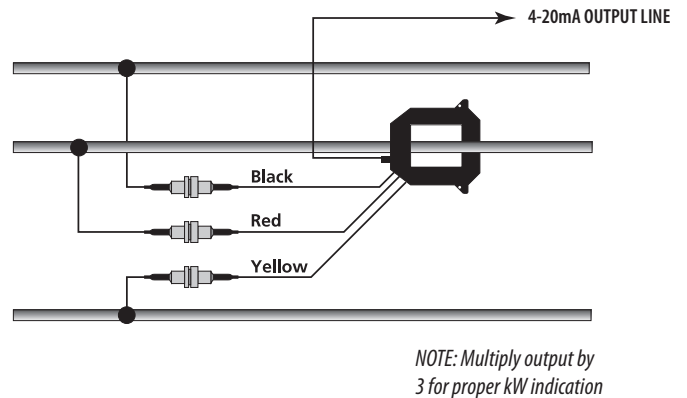
4-20mA response:
 $\text{kW demand} = \text{kW} \times (\text{mA out} - 4) / 16$

WIRING

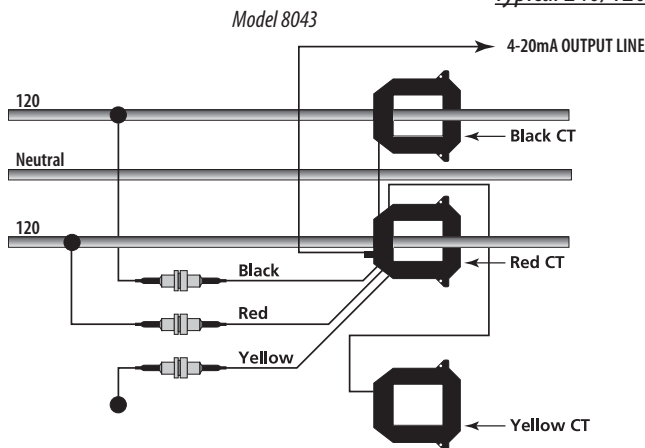
Typical 208/480 VAC 3Ø, 3- or 4-Wire Installation



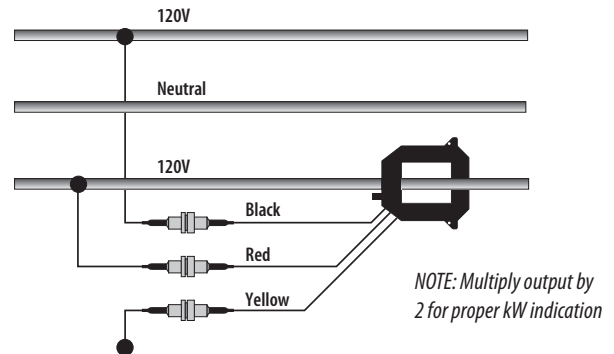
Model 8041/42 (Use on balanced loads only)



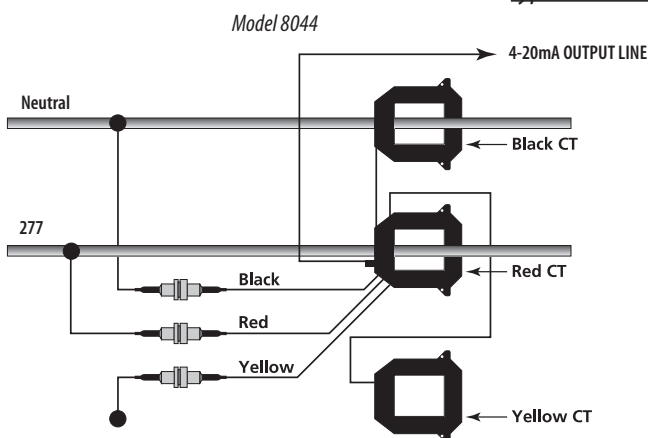
Typical 240/120 VAC 1Ø, 3-Wire Installation



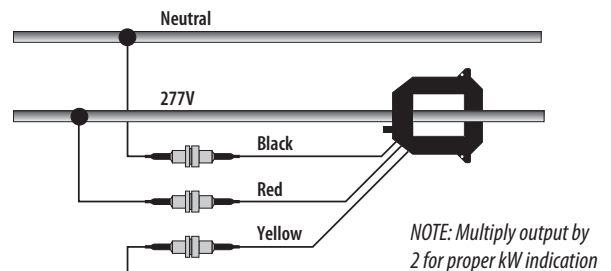
Model 8041



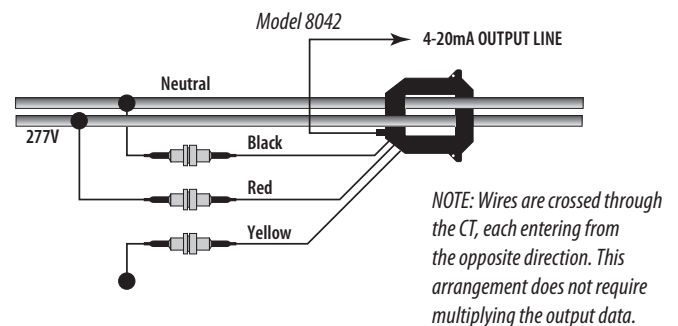
Typical 277 VAC 1Ø, 2-Wire Installation



Model 8042



Alternative 277 VAC 1Ø, 2-Wire Installation



TROUBLESHOOTING

Problem	Solution
Status LED does not blink	Check fuses and voltage connections. Status LED should blink regardless of CTs or output connections.
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 H8042, use an amp-clamp to ensure that all three phases are passing the same approximate current. If phases are unbalanced, try the H8043/H8044 models.
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 use a higher rated CT. If the LED blinks slowly (i.e., about 1 blink in two seconds) 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.

NOTES

- DO NOT GROUND THE SHIELD INSIDE THE ELECTRICAL PANEL. All wires, including the shield should be insulated to prevent accidental contact to high voltage conductors.
- The cable should be mechanically secured where it enters the electrical panel.
- The cable should be shielded twisted pair wire BELDEN 1120A or similar.



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!

MAXIMUM READINGS

Model	3Ø Power (kW)	1Ø Power (kW)
H8041-0100-2	36.03	24.00
H8041-0300-2	108.1	72.00
H8041-0400-3	144.1	96.00
H8041-0800-3	288.2	192.0
H8041-0800-4	288.2	192.0
H8041-1600-4	576.4	384.0
H8041-2400-4	864.6	576.0
H8042-0100-2	83.14	55.43
H8042-0300-2	249.4	166.3
H8042-0400-3	332.6	221.7
H8042-0800-3	665.1	443.4
H8042-0800-4	665.1	443.4
H8042-1600-4	1330	886.7
H8042-2400-4	1995	1330
H8043-0100-2	36.03	36.03
H8043-0300-2	108.1	108.1
H8043-0400-3	144.1	144.1
H8043-0800-3	288.2	288.2
H8043-0800-4	288.2	288.2
H8043-1600-4	576.4	576.4
H8043-2400-4	864.6	864.6
H8044-0100-2	83.14	83.14
H8044-0300-2	249.4	249.4
H8044-0400-3	332.6	332.6
H8044-0800-3	665.1	665.1
H8044-0800-4	665.1	665.1
H8044-1600-4	1330	1330
H8044-2400-4	1995	1995



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