



## Installation Instructions

# Energy Meter

For CTV Symbio™ 800 Upgrade Systems



**Model Number:** All CTV Symbio 800 upgrade systems.

This document applies to service offering applications only.

### **⚠ SAFETY WARNING**

Only qualified personnel should install and service the equipment. The installation, starting up, and servicing of heating, ventilating, and air-conditioning equipment can be hazardous and requires specific knowledge and training. Improperly installed, adjusted or altered equipment by an unqualified person could result in death or serious injury. When working on the equipment, observe all precautions in the literature and on the tags, stickers, and labels that are attached to the equipment.



# Introduction

Read this manual thoroughly before operating or servicing this unit.

## Warnings, Cautions, and Notices

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

- ⚠ WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- ⚠ CAUTION** Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
- NOTICE** Indicates a situation that could result in equipment or property-damage only accidents.

## Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Trane advocates the responsible handling of all refrigerants.

## Important Responsible Refrigerant Practices

Trane believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

**⚠ WARNING**

### Proper Field Wiring and Grounding Required!

Failure to follow code could result in death or serious injury. All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in **NEC** and your local/state/national electrical codes.

**⚠ WARNING**

### Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labeling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

**⚠ WARNING****Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Trane personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Trane personnel should always follow local regulations.

**⚠ WARNING****Electrical Shock, Explosion, or Arc Flash Hazard!**

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

- Install the product in an appropriate electrical/fire enclosure per local regulations. Do not install the product in hazardous or classified locations.
- Do not use the product for life or safety applications.
- Do not exceed the product ratings or maximum limits. Products rated only for basic insulation must be installed on insulated conductors.
- Current transformer secondaries (current mode) must be shorted or connected to a burden at all times.
- Remove all wire scraps, tools, replace all doors, covers and protective devices before powering the equipment.

**⚠ WARNING****Hazardous Voltage!**

Failure to disconnect power before servicing could result in death or serious injury.

Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

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## Revision History

Document updated to reflect Service Offering number.



# Components and Package

The energy meter is applicable for all Symbio™ 800 upgrade controls for Trane or customer-provided non-AFD starters.

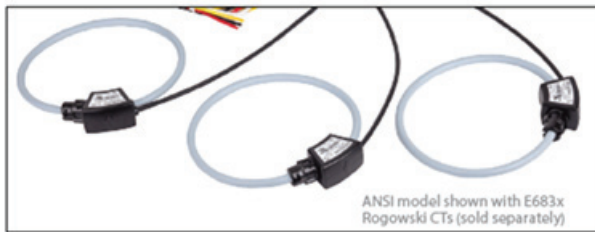
**Table 1. Main components in package**

Package Number	Starter Application	Modbus RTU Power Meter	ROGOWSKI 12-inch CTs
0185-0428-0100	480V and Low line voltage	1	3

**Figure 1. Energy meter**



**Figure 2. Rogowski CTs**

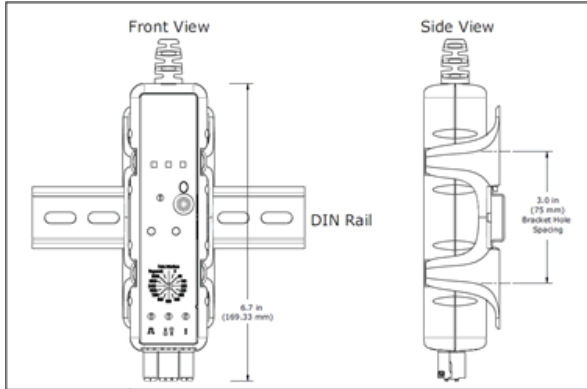


# Installation

## Mounting

1. Energy meter is installed on a DIN rail. Locate an appropriate location in the starter panel. Install included DIN rail. Mount energy meter with strap tunnel as shown in the following figure.

**Figure 3. Mount energy meter with strap tunnel on rail**



2. Install three CTs (current transformers) on power line, following guidelines below:
  - Install Rogowski CTs in 600Vac or less applications only.
  - Do not install on the load side of a variable frequency drive (VFD).
  - To get the correct sign on bi-directional data, observe the load arrow (un-directional data does not care).

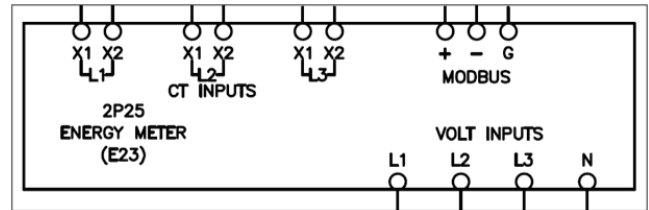
## Field Wiring and Schematics

### Wiring Installation

**Note:** Referenced schematics are found in section "Schematics," p. 6.

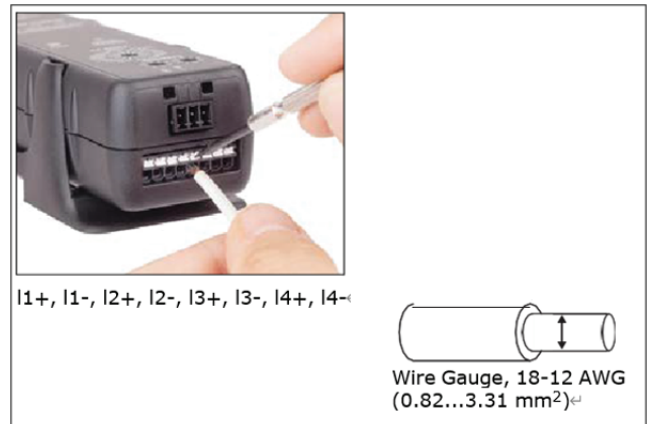
- Terminal meter connection

**Figure 4. Terminal meter connection**



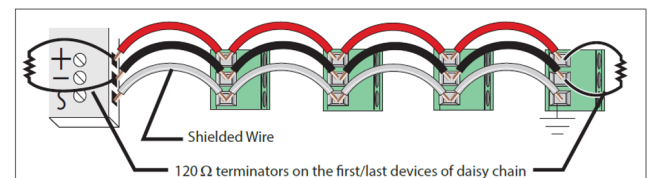
- CT wiring  
Connect CTs to the energy meter per details in schematic and the following figure.

**Figure 5. CT's wiring of energy meter**



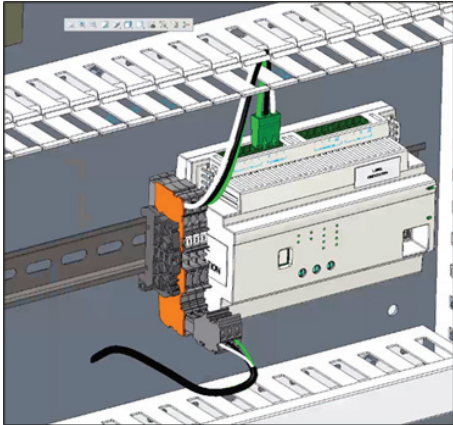
- Stepdown transformer wiring  
Connect transformer to starter per details in schematic.
- RS-485 communication wiring  
RS-485 communications are by shielded 14 – 26 AWG cable. See the following figure.

**Figure 6. RS-485 communication of energy meter**

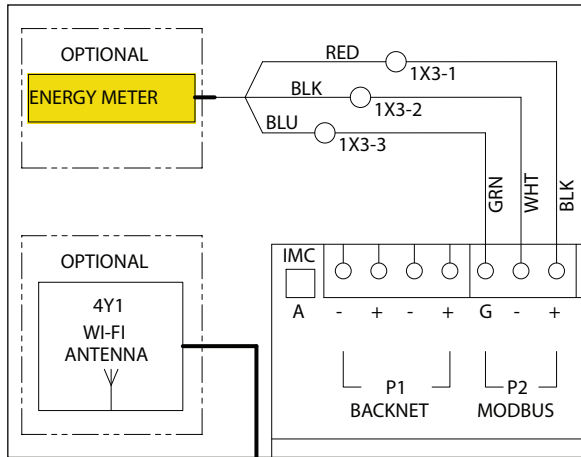


The communications wiring will be terminated at the Modbus distribution terminal (1X3) at the Symbio™ 800 controller using the 3-pole connectors as shown in the schematic and the following figure.

**Figure 7. Modbus distribution terminal**



**Figure 8. Communication wiring, ref. 50712738**

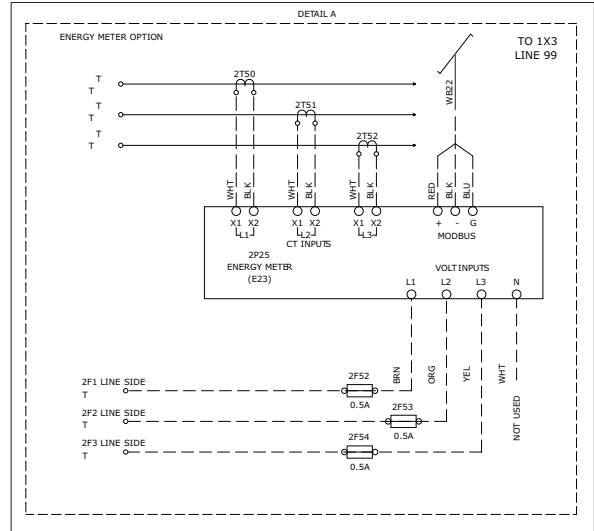


## Schematics

### 480 Volts and Lower Application

Wire Rogowski CTs in current input. Wire fused inputs to line voltage. See detail in schematic 5071-2756.

**Figure 9. Schematic of energy meter wiring 480V and lower, ref. 50712756**



**Table 2. Schematic matrix**

Drawing	Description
5071-2756	Energy meter option, 480V and low

## Software Setting and Configuration

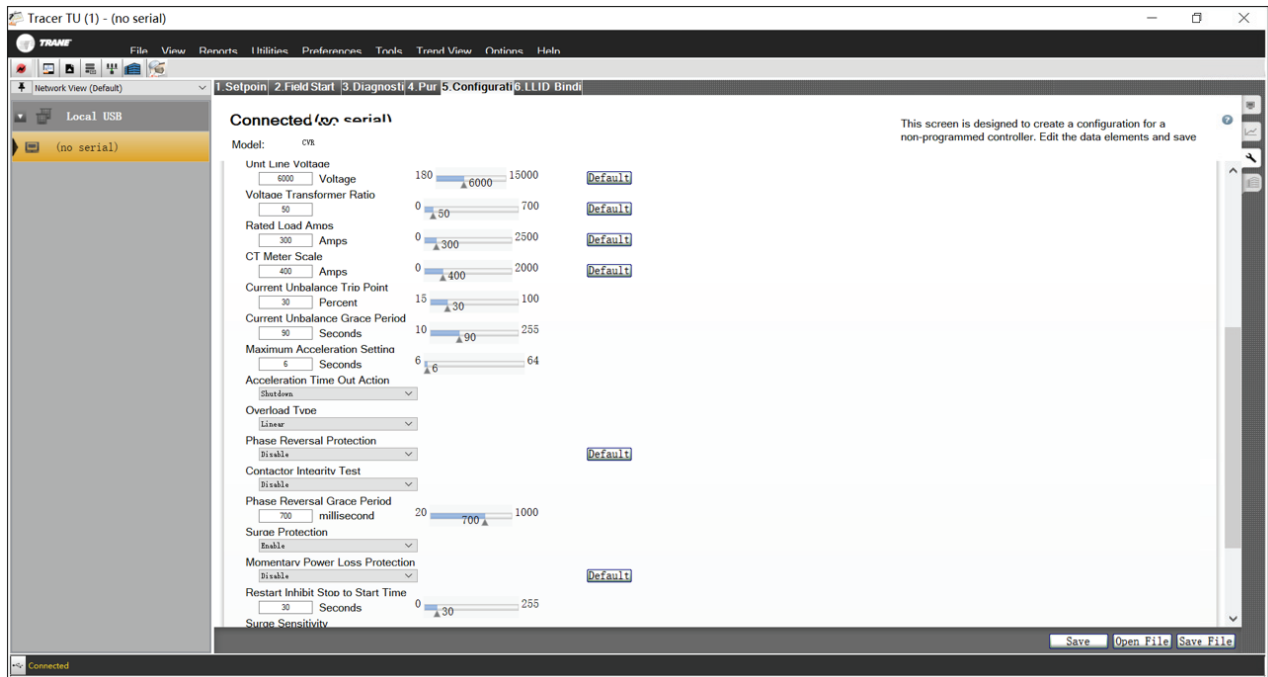
1. Select power meter address as '15', set CT AMPS as energy package in [Table 1, p. 4](#).
2. Select E683 CTs as ROGOWSKI CT.

**Figure 10. CT AMPS rotary switch and address rotary switch of energy meter**



3. Double check voltage rate, voltage transformer ratio of starter in 'Configuration interface'.

Figure 11. Configuration interface - voltage rate and voltage transformer ratio



- Set CT AMPS and PT ratio of energy meter in 'Configuration interface'.

Figure 12. Configuration interface - CT AMPS and PT ratio

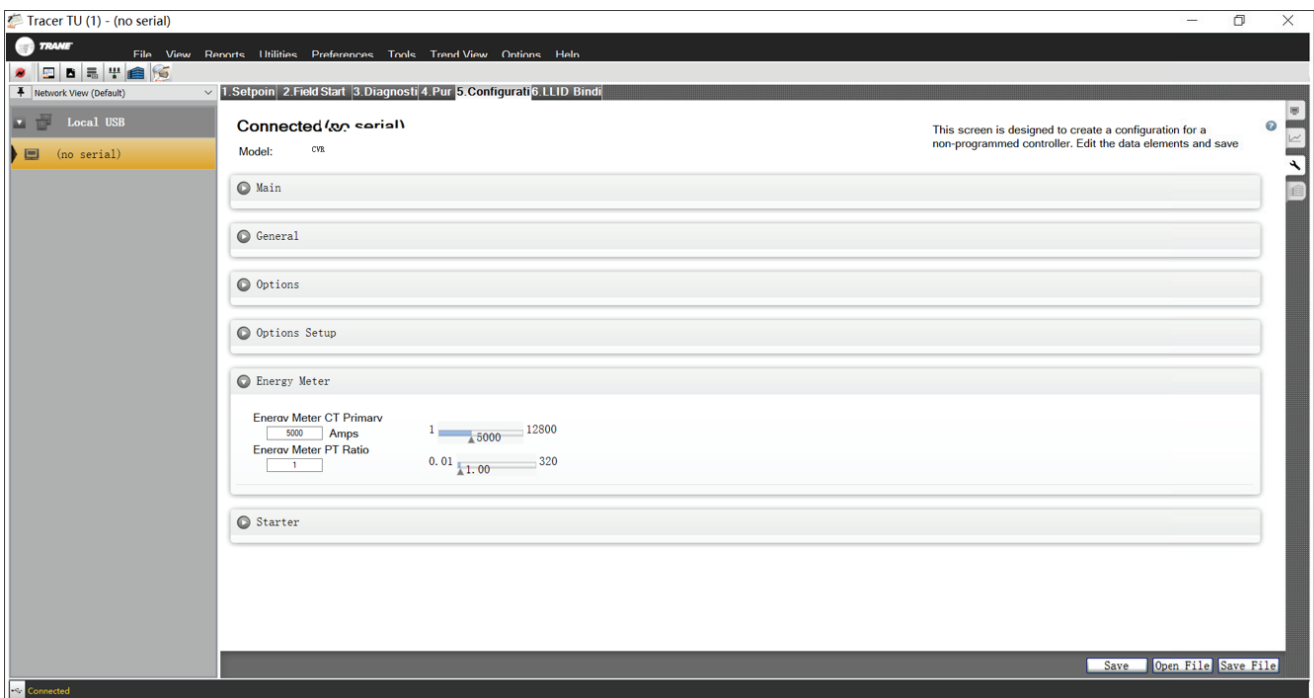


Table 3. Energy meter configuration

Starter Voltage	Catalog Number	CT Primary	PT Ratio
< 481	Rogowski-12"	5000	1

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