MOORE INDUSTRIES

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4-Wire Economy Isolator/Converter **ECT**

ECT

4-Wire Economy Isolator/Converter

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Introduction

This is the users' manual for Moore Industries' line of 4-wire, Economy Signal Isolator/Converters, the ECTs. Available in configurations that accept a variety of inputs, the principle function of the ECT family of products is to provide low cost isolation between instruments at either end of a process loop. ECTs furnish up to 2500 Vrms isolation between transmitting and receiving devices. The dual channel model provides isolation for two loops while the single channel model isolates solitary process loops.

It can also function as a low-cost signal converter. Configurations accommodate either single or dual inputs and provide accurate single or dual outputs. Inputs and outputs are available in a variety of industry standard ranges. Refer to the ordering information tables for more information.

The ECT is a highly cost-effective means of protecting process signals from distortions associated with ground loops, motor noise, and other common types of ambient electrical interference.

Options

The following paragraphs describe the options available with the ECT family of transmitters:

- ***EM – Externally Mounted Transformer***, for use with the 0-5AAC input configuration, this option consists of a tuned, toroidal transformer that physically separates high-level current input from the receiving device in a process loop. This provides the added convenience of allowing the servicing of receivers without having to interrupt process signals.
- ***TX – Transmitter Excitation***, available for use with the 4-20mA input configuration, TX-equipped ECTs provide power for a 2-wire transmitter in the process loop, eliminating the need to provide separate power supplies for the non-isolated transmitters. Dual input units provide power for 1 TX per input.

Specifications

Performance	**Accuracy:** ±0.1% of span; dc inputs above 1500V experience additional zero shift of ±0.1% of span
	Isolation: 2500Vrms between input and ouput
	Input Overrange: 250% of full scale for dc current inputs; 200V peak-to-peak, max. for dc voltage inputs; 600V peak-to-peak max., for ac voltage inputs
	Output Current Limiting: 25mA, typical; 30mA, max.
Performance (continued)	**Ripple:** 10mV (measured across 250ý resistor)
	Burden: 2W, max.
	Response Time: 100msec, max., to 99% of output (400msec, max., from 0-99% of output, for 0-5A input)
	RFI/EMI Protection: No effect at 10V/m @ frequencies between 20-500MHz
Ambient Conditions Ratings	**Temperature Range:** -20°C to +70°C (-4°F to +158°F)
Ambient Conditions Ratings (continued)	**Temperature Effect:** ±0.007% of span/°C, typical; ±0.015% of span/°C, maximum
	Humidity: 0-95% non-condensing
Adjustments	Front panel potentiometer
	Span: ±10% **Zero:** ±5% (non-interactive when span is set first)
Weight	**Single Channel:** 185 g (6.5 oz) max.
	Dual Channel: 280 g (9.9oz) max.

ECT 4-Wire Economy Isolator/Converter

Ordering Information

Unit	Input	Output	Power	Option	Housing
ECT Economy Isolator/ Converter	**4-20MA** into 25Ω **10-50MA** into 10Ω **2X4-20MA** into 25Ω **-10MATO+10MA** into 50Ω **0-150AC** into 100KΩ **0-250 AC** into 160KΩ **0-5AC** into 0.002Ω **0-50MV** into 1MΩ **0-200MV** into 1MΩ **0-500MV** into 1MΩ **0-10V** into 1MΩ **1-5V** into 1MΩ **2XO-10**V into 1MΩ **2X1-5V** into 1MΩ (Consult factory for pricing and availability of other ranges)	**4-20MA** **10-50MA** **2X4-20MA** **2X0-10V** **2X1-5V** **1-5V** **0-10V** (Dual output available with single input. Consult factory for pricing and availability of other ranges)	**24DC**, ±10% **117AC**, 50/60Hz, ±15%DC **230AC**, 50/60Hz, ±15%	**-EM** Externally-mounted input transformer for current input (available with 0-5AAC input only) **-TX** 24V transmitter excitation for powering a 2-wire transmitter.	**ECD** Thermoplastic, economy DIN-style housing mounts on 32 mm G-type (EN50035) and 35 mm Top Hat (EN50022) rails

When ordering, specify: Unit / Input / Output / Power / Options / [Housing]
Model number example: ECT / 0-5AAC / 4-20MA / 117AC / -EM [ECD]

Calibration

Prior to shipment, every ECT is subjected to rigorous testing by our team of skilled technicians. Every product Moore Industries manufactures, sells and services is guaranteed to meet the strict quality standards that have become synonymous with our company name.

Before placing your ECT into service, a bench check of basic operation is recommended to ensure that the unit hasn't sustained any damage during transit, and to set zero and span for your application.

Every unit should be:

- Checked to verify that the appropriate ECT model has been ordered for the intended application.
- Connected in a calibration setup (described later in this section) and checked for desired output.
- Adjusted for desired zero and span.

Setup

Table 1 lists the equipment you will need to bench check the ECT. These materials are not supplied by Moore Industries, but should be available in those environments suited for calibration and maintenance of electronic instruments. If an item is not available, contact the factory.

Table 1. *Gathering the Equipment for 4-Wire ECT Calibration*

Device	Specifications
Voltage/Current Calibrator	Adjustable, calibrated to an accuracy of ±0.025% (EDC Model CR 103 or MV 105, or equivalent) Rotek Model 811A (or equivalent) recommended for calibrating EM-equipped units
Power Supply	Calibrated, 24Vdc, ±10%, nominal
Load Resistor	250Ω (±0.01%) precision
Multimeter	Calibrated to an accuracy of ±0.025%, minimum (Keithley Model 197, or Fluke Model 8840 or 8842, or equivalent)
Screwdriver	Standard (Blade-type), head width 3.1 mm (0.125 in), maximum

Figure 1 shows the setup for ECTs configured for 24Vdc, and 117 or 230Vac power. Use this setup for calibrating your unit(s) even if they are equipped with the TX option. Though the dc-powered ECT is protected against polarity reversals, particular attention should be paid when connecting the dc power source.

Figure 2 shows the setup for calibrating ECTs equipped with the EM option.

To calibrate dual channel units, use the appropriate setup to check one channel at a time.

Moore Industries recommends that the procedures in this section be carried out at a techncians' bench or in a similar, lab-type environment. Do not calibrate the ECT in the field, or installed in the application.

Figure 1. *Calibrating the 4-Wire ECT*

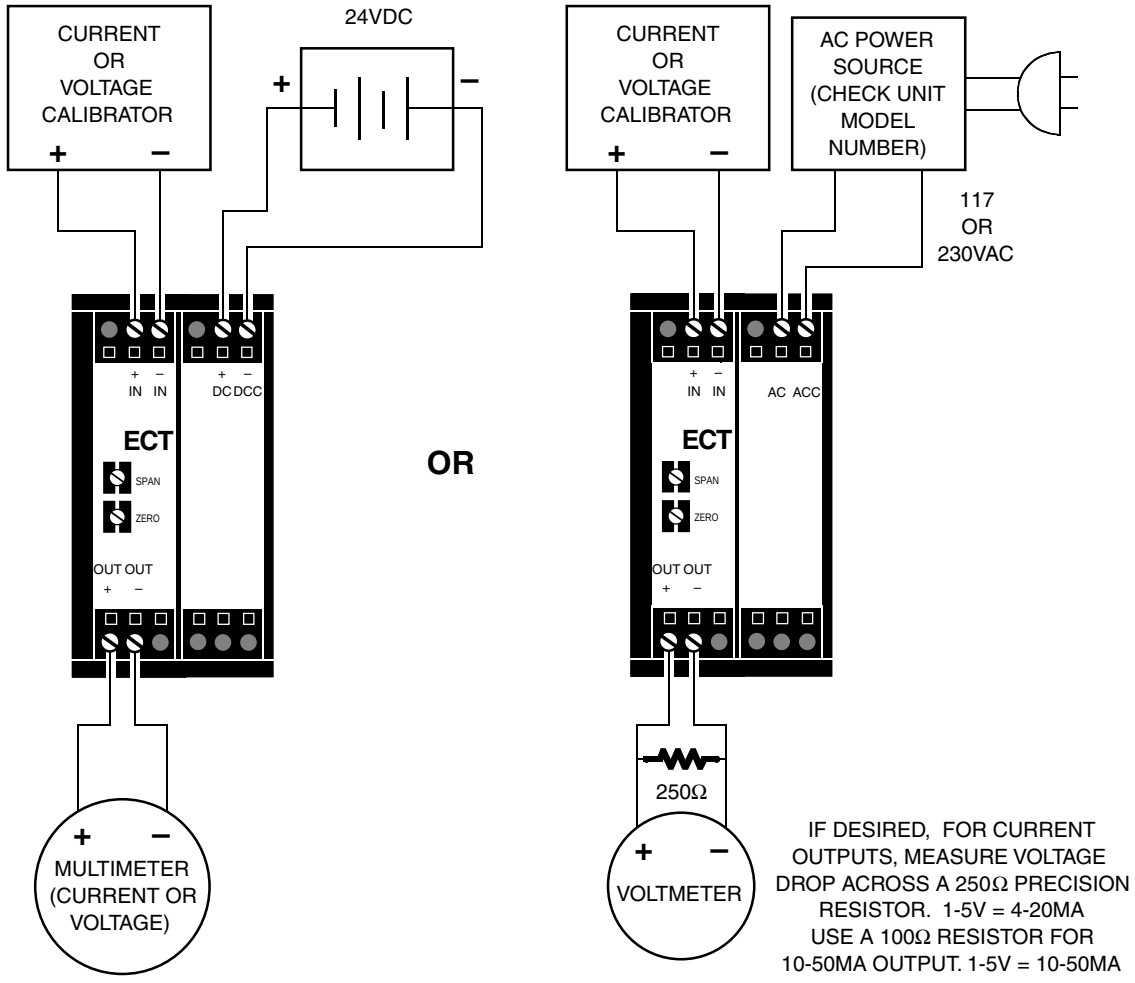

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Figure 2. *Calibrating the 4-Wire ECT When Equipped with the EM Option*

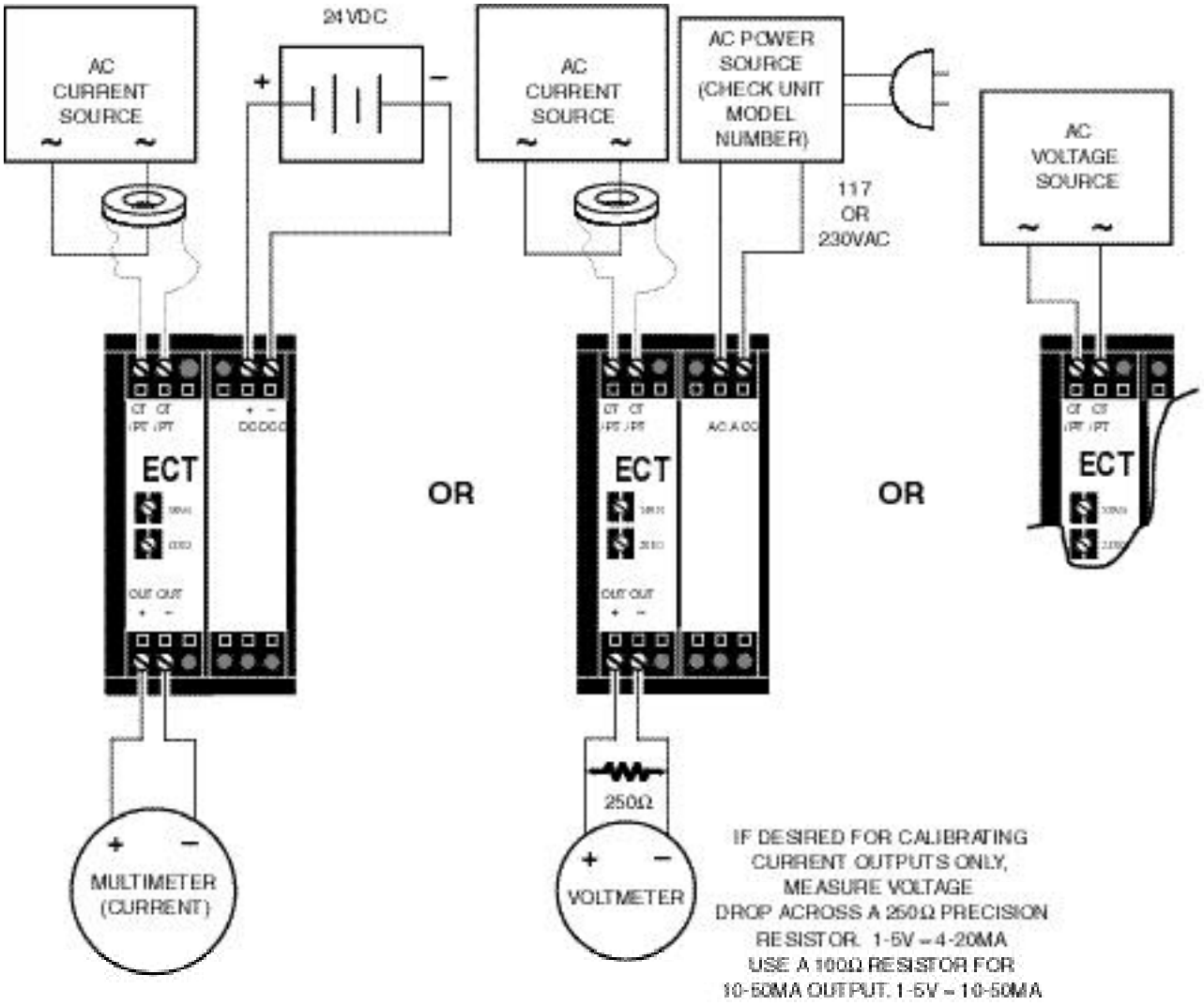
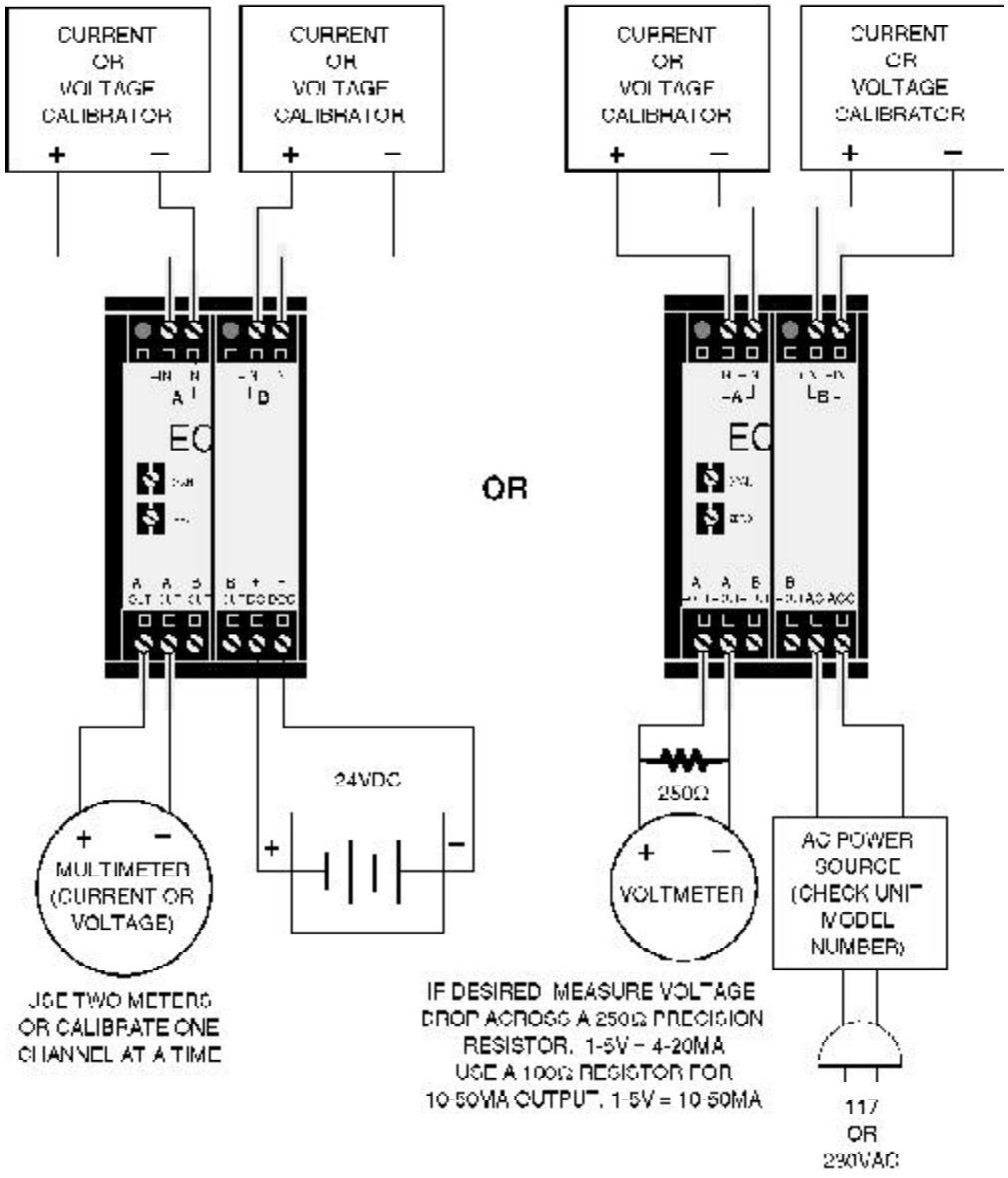


Figure 3. *Calibrating the Dual Connection 4-Wire ECT*



Procedure

With the unit incorporated into the setup shown in Figures 1, 2, or 3 as appropriate:

1. Apply the appropriate power to the unit being calibrated.
2. Set the Current/Voltage Calibrator (Calibrator) to 100% span (full scale input) for the type of ECT being calibrated. Check the model number on the unit label for rated input range.

   For example, for a 4-20mA input unit, set it to 20mA; for 1-5V, set it to 5V; etc.
3. Adjust the Span potentiometer (pot) until the multimeter reads 20mA, ±0.1% of rated span. If measuring the voltage drop across the precision resistor, adjust the pot until output is 5V, ±0.1%.
4. Set the Calibrator to 0% of the rated span for the type of ECT being calibrated.

   For example, 4mA for a 4-20mA input unit; 1V for a 1-5V input unit.
5. Adjust the Zero pot until the multimeter reads 4mA, ±0.1% of rated span. If measuring the voltage drop across the precision resistor, adjust the pot until output is 1V, ±0.1%.
6. Repeat steps 2 through 5 for each input and output channel until the ECT output is stable at both 0 and 100% of rated input span, or until the voltage across the precison resistor is stable and within rated unit accuracy at both zero and 100% of input span.

Installation

Figure 4 shows the physical dimensions of the 4-wire ECT including both types of DIN rail. The single and dual channel units are the same size. To install, set the appropriate lip on the top edge of the DIN rail and pivot downward until the unit snaps into place.

Recommended Ground Wiring Practices

The following ground wiring practices must be followed to ensure proper performance of the ECT:

- Any Moore Industries products in a metal case, housing or enclosure should be grounded. Units in DIN housings, for example, should be mounted on a grounded rail.
- All input signals to, and output signals from, Moore Industries' products should be wired using a shielded, twisted pair technique. Shields are to be connected to an earth or safety ground at the unit itself.
- The maximum length of any unshielded input and/or output signal wiring is 2 inches.

Electrical Connections

Figures 5, 6, and 7 illustrate typical types of 4-wire ECT installation. Figure 5 illustrates the connections for standard, 4-wire units, ac- or dc-powered. Figure 6 shows the connections for units equipped with the EM option. Figure 7 shows the connections for transmitter excitation, which applies only to those units equipped with the TX option. Figure 7 shows the connection for the dual channel model of the ECT. Figure 9 shows the connections for the dual 4-wire ECT with the -TX option.

CE Conformity

Installation of any Moore Industries products that carry CE the certification (Commission Electrotechnique) ***must*** adhere to the guidelines above in order to meet the requirements set forth in applicable EMC (Electromagnetic Compatibility) directives (EN 55011, EN 50082-1, EN 50082-2, etc.). Consult the factory for the most current information on products that have been CE certified.

Figure 4. *Dimensions of the Standard 4-Wire ECT*

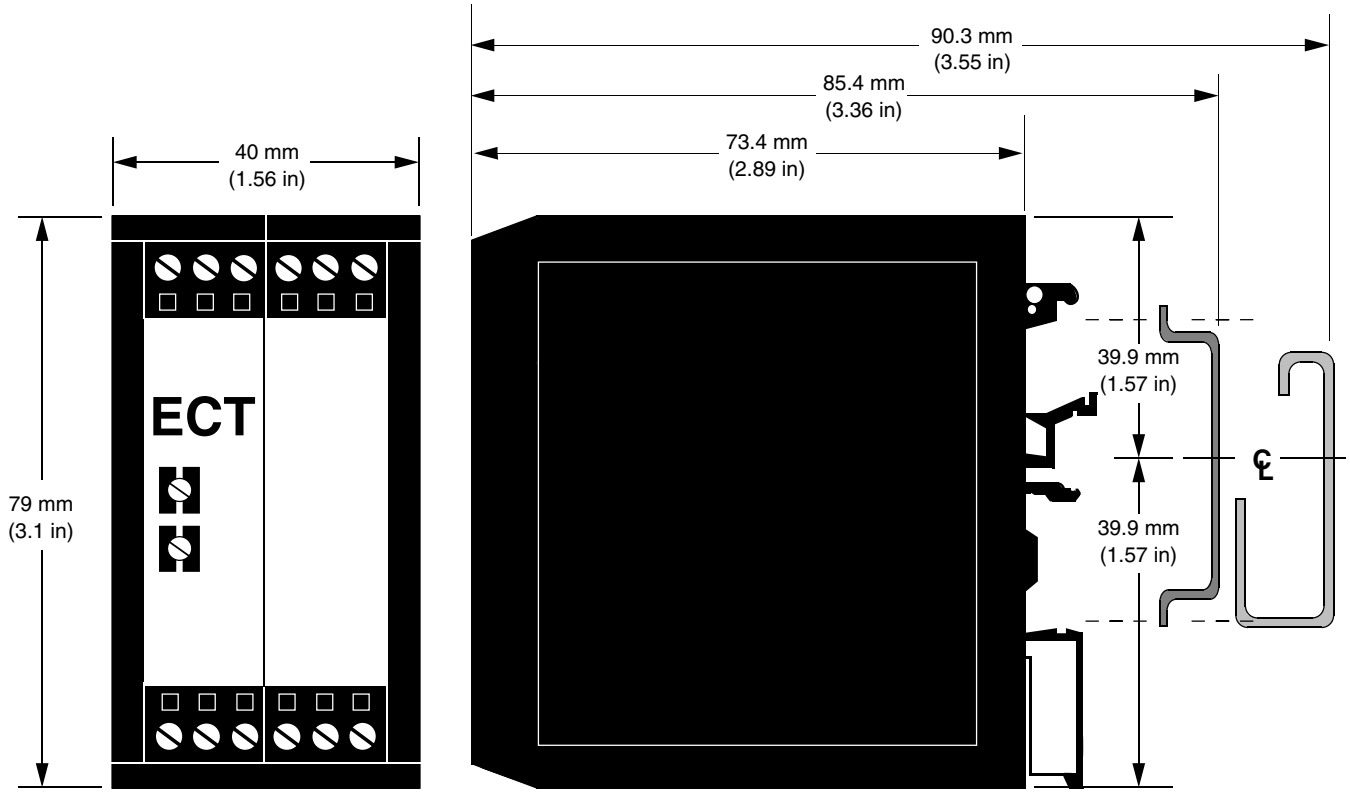


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Figure 5. *Connecting the 4-Wire ECT*

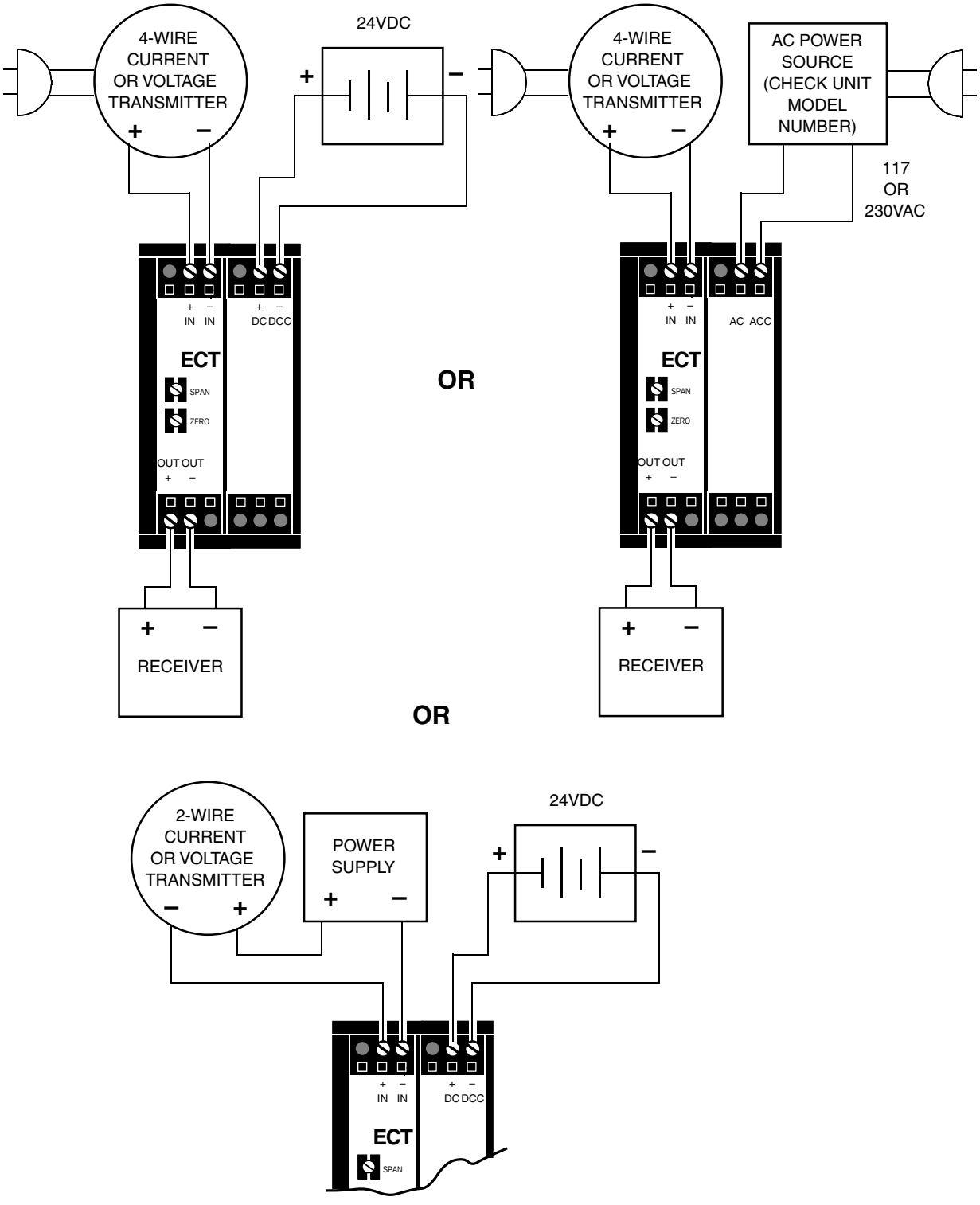


Figure 6. *Installing the 4-Wire ECT with -EM Option*

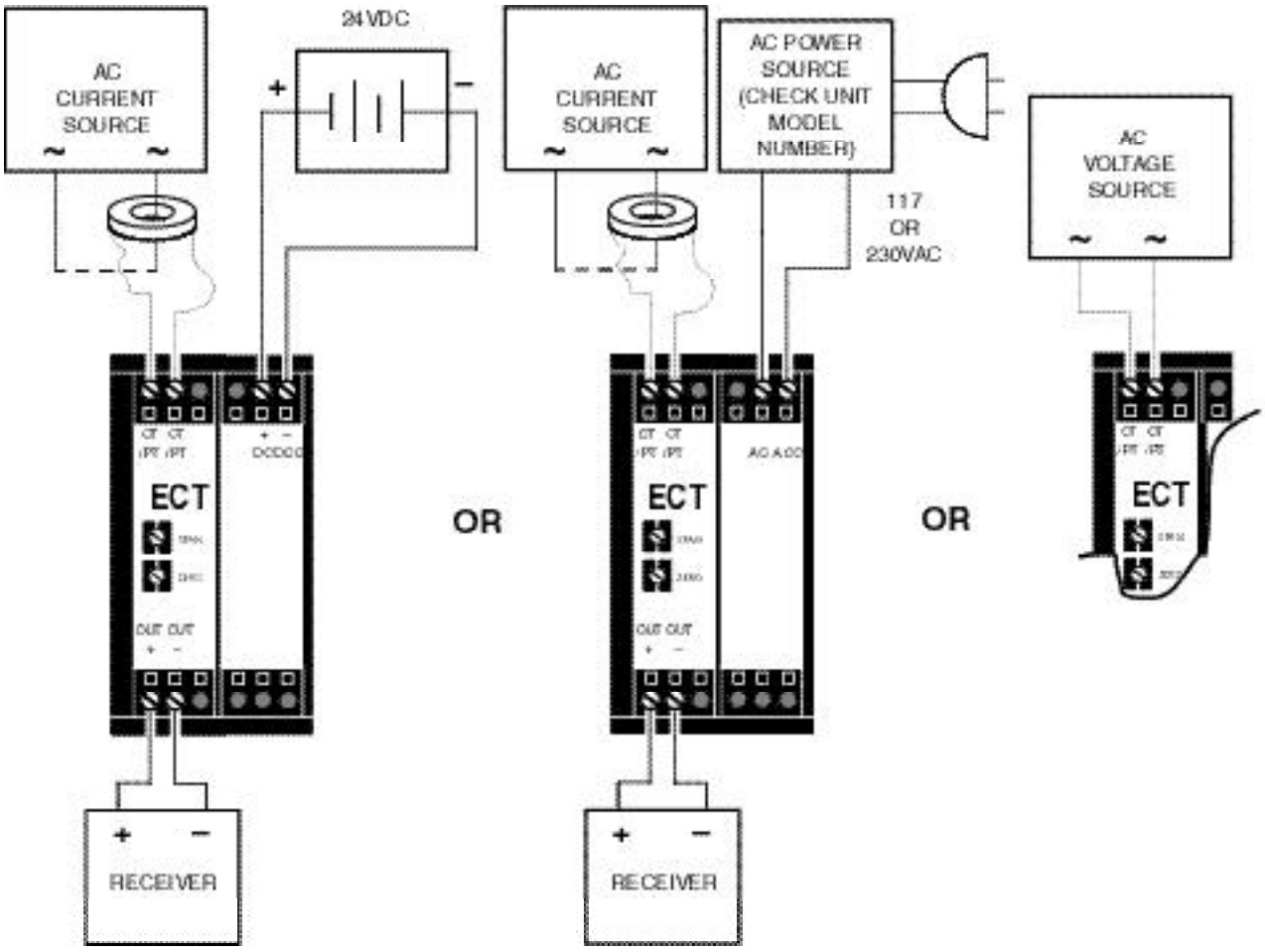


Figure 7. *Installing the 4-wire ECT with the -TX option*

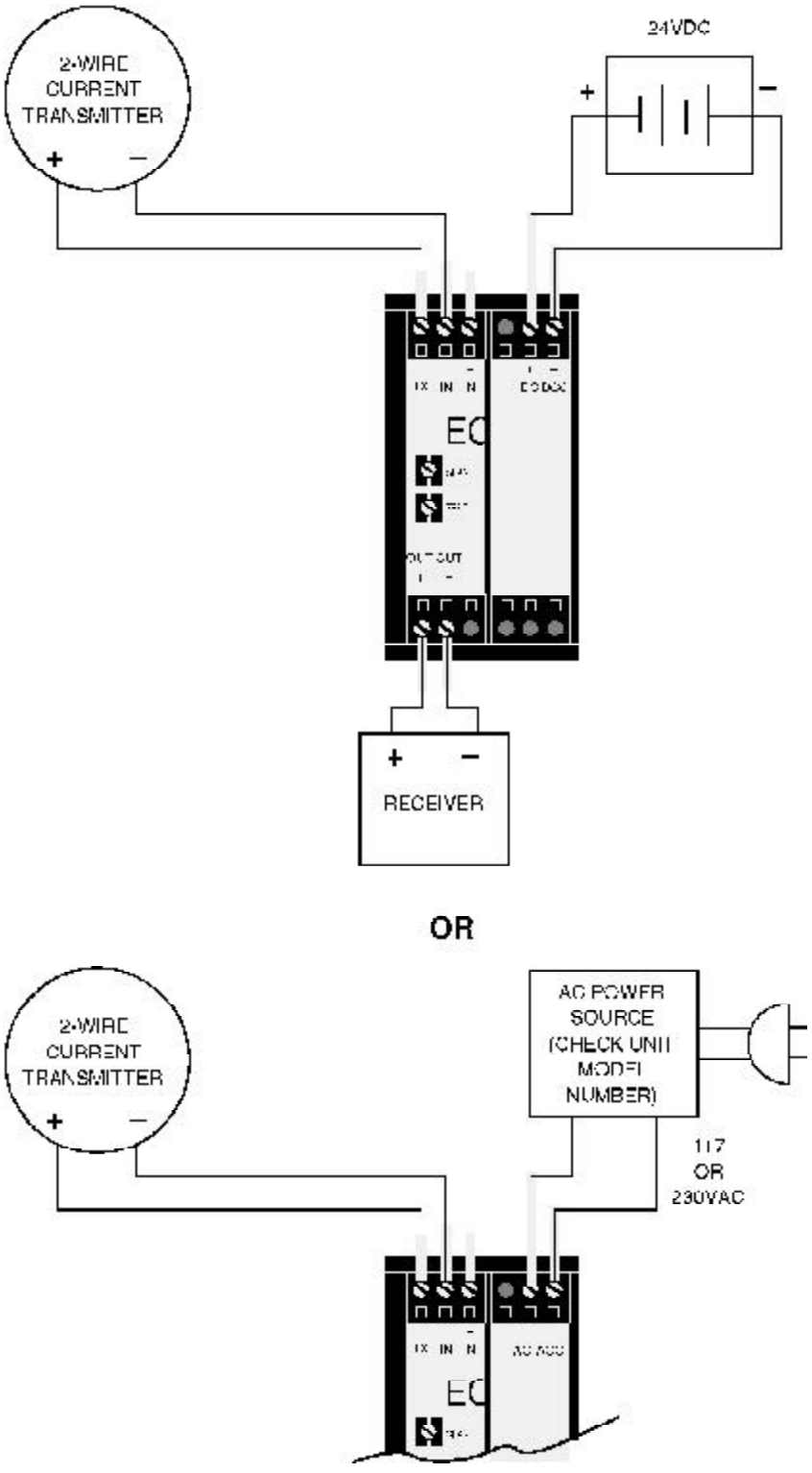


Figure 8. *Installing the Dual 4-Wire ECT*

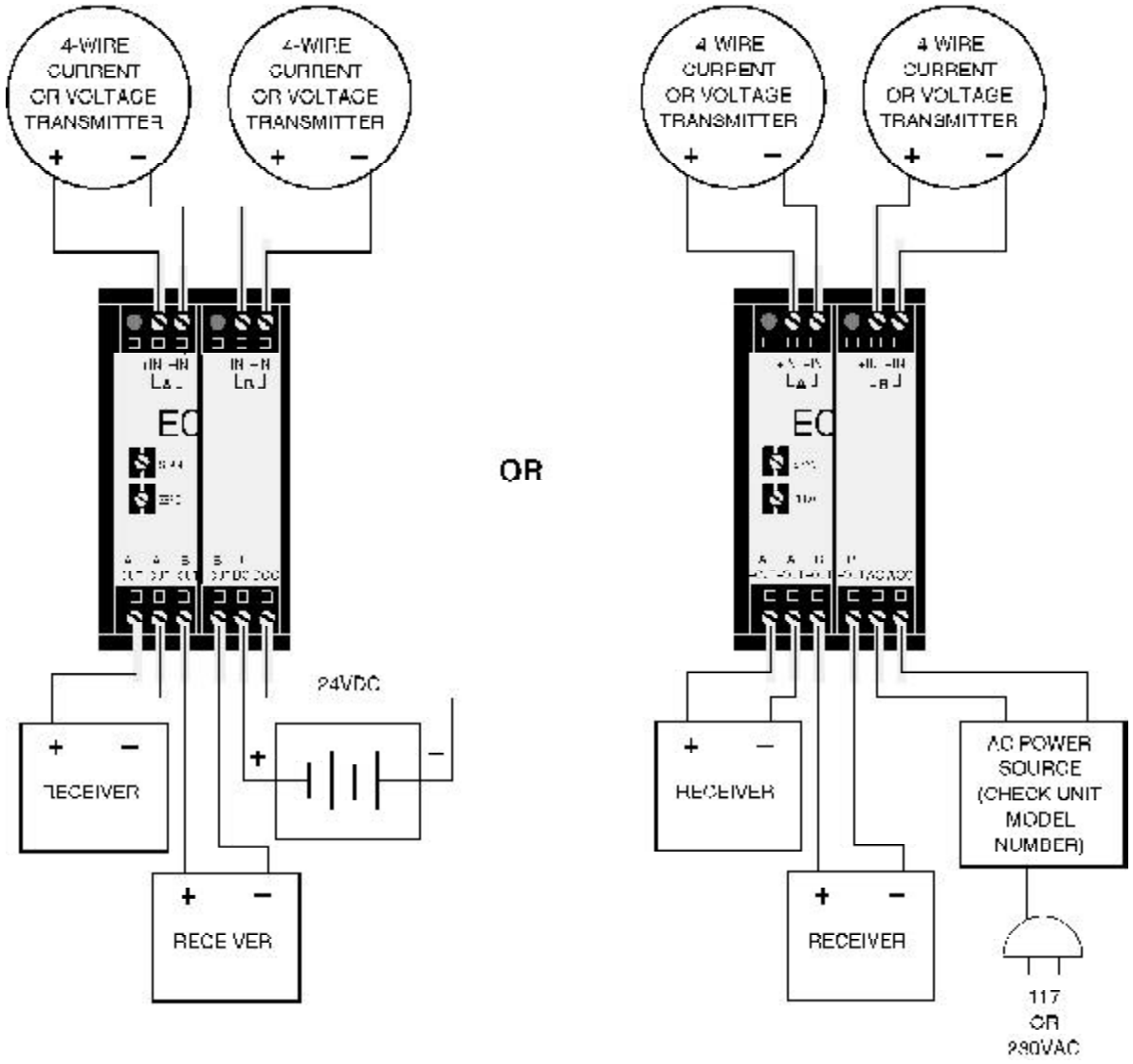
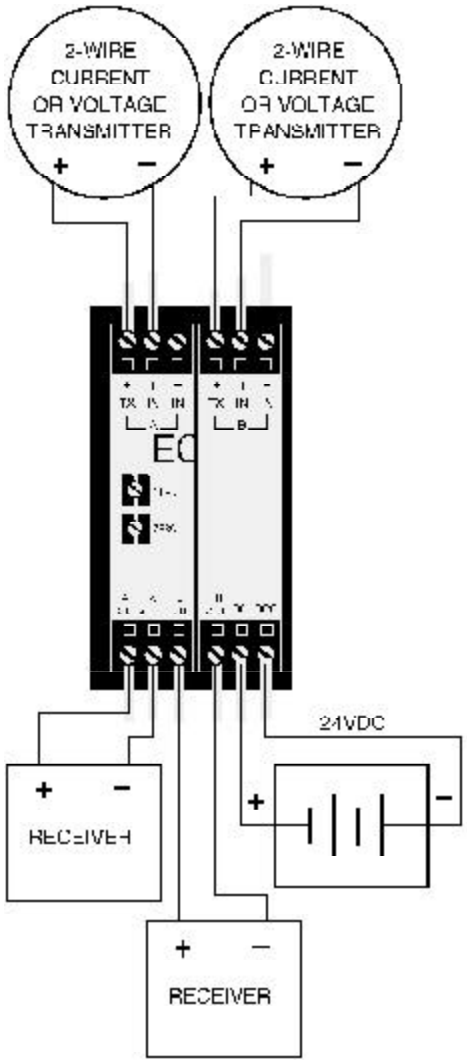


Figure 9. *Installing the Dual 4-Wire ECT with the -TX option*



Customer Support

Moore Industries is recognized as the industry leader in delivering top quality to its customers, both in products and services. We perform a battery of stringent quality assurance checks on every unit we ship. If any Moore Industries product fails to perform up to rated specification, call us for help. Our highly skilled staff of trained technicians and engineers pride themselves on their ability to provide timely, accurate, and practical answers to your process instrumentation questions.

If problems involve a particular ECT, there are several pieces of information you can gather ***before*** you call the factory that will help our staff to get you answers more efficiently. When you call, please have:

- The model number of the unit in question
- The serial number of the unit in question
- The job number (if available)
- The purchase order under which the unit was shipped (if available)

Factory phone numbers are on the back cover.

Declaration of Conformity

EMC Directive 89/336/EEC

Manufacturer's Name: Moore Industries-International, Inc.
Manufacturer's Address: 16650 Schoenborn Street
North Hills, CA 91343-6196
USA

Declares that the product(s):

Product Name: **ECT**

	MODEL	/	INPUT	/	OUTPUT	/	POWER	/	OPTIONS	/	HOUSING
Model Number(s):	**ECT**		*		*		*		*		*

*Indicates any input, output, option and housing as stated in the product data sheet.

Conforms to the following EMC specifications:

EN50081-2, 1993, Generic Emissions Standard, Industrial Environment.
EN50082-2, 1995, Generic Immunity Standard, Industrial Environment.
EN61010-1, 1995, Safety requirements for electrical equipment for measurement and control use.

Supplemental Information:

None.

May 19, 2000
Date

Fred Adt
Quality Assurance Director

Robert Stockham
Moore Industries-International, Inc.

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Declaration of Conformity

EMC Directive 89/336/EEC

Manufacturer's Name: Moore Industries-International, Inc.
Manufacturer's Address: 16650 Schoenborn Street
North Hills, CA 91343-6196
USA

Declares that the product(s):

Product Name: **ECT DUAL**

	MODEL	/	INPUT	/	OUTPUT	/	POWER	/	OPTIONS	/	HOUSING
Model Number(s):	**ECT**		*		**2X**	*	*		*		*

*Indicates any input, output, power, option and housing as stated in the product data sheet.

Conforms to the following EMC specifications:

EN50081-1, 1992, Generic Emissions Standard; Residential, Commerical and Light Industry.
EN50082-1, 1992, Generic Immunity Standard; Residential, Commerical and Light Industry.
EN61010-1, 1995, Safety requirements for electrical equipment for measurement and control use.

Supplemental Information:

None.

November 23, 1998
Date

Fred Adt
Quality Assurance Director

Robert Stockham
Moore Industries-International, Inc.

European Contact: Your Local Moore Industries Sales and Service Office

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RETURN PROCEDURES

To return equipment to Moore Industries for repair, follow these four steps:

1. Call Moore Industries and request a Returned Material Authorization (RMA) number.

   Warranty Repair –
   If you are unsure if your unit is still under warranty, we can use the unit's serial number to verify the warranty status for you over the phone. Be sure to include the RMA number on all documentation.

   Non-Warranty Repair –
   If your unit is out of warranty, be prepared to give us a Purchase Order number when you call. In most cases, we will be able to quote you the repair costs at that time. The repair price you are quoted will be a "Not To Exceed" price, which means that the actual repair costs may be less than the quote. Be sure to include the RMA number on all documentation.

2. Provide us with the following documentation:
   a) A note listing the symptoms that indicate the unit needs repair
   b) Complete shipping information for return of the equipment after repair
   c) The name and phone number of the person to contact if questions arise at the factory

3. Use sufficient packing material and carefully pack the equipment in a sturdy shipping container.

4. Ship the equipment to the Moore Industries location nearest you.

The returned equipment will be inspected and tested at the factory. A Moore Industries representative will contact the person designated on your documentation if more information is needed. The repaired equipment, or its replacement, will be returned to you in accordance with the shipping instructions furnished in your documentation.

MOORE INDUSTRIES

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