



VEEDER-ROOT
INSTALLATION, OPERATION
AND SERVICE INSTRUCTIONS

Technical Manual

Issued: 5/90

Supersedes: 1/87

SERIES 7998 MINI-LX TOTALIZER

ALL MODELS

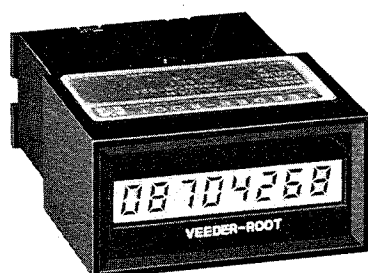
Manual No. 576013-211



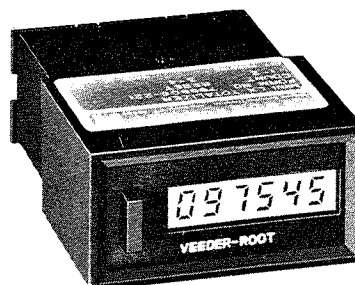
8-Digit
Panel Mount



6-Digit with reset button
Panel Mount



8-Digit
Plug-in



6-Digit with reset button
Plug-in

VEEDER-ROOT 
Digital Products



INSTALLATION, OPERATION & SERVICE INSTRUCTIONS SERIES 7998 MINI-LX TOTALIZER

TABLE OF CONTENTS

SECTION 1. INTRODUCTION

A. General	1
B. Description	1
C. Standard Specifications	1
D. Accessories	1
E. Standard Models	1

SECTION 2. INSTALLATION

A. General	2
B. Panel Mount Installation	2
C. Plug-In Mount Instructions	2
D. Moving Pins	2
E. General Wiring Practices	2
F. Wiring AC/DC Input Models	2
G. Wiring Switch Input Models	3

SECTION 3. OPERATION

A. Counting	5
B. Reset	5

SECTION 4. SERVICE

A. Repair	5
B. Shipment	5

SECTION 5. CLAIMS AND WARRANTY

A. Damage Claims	6
B. Warranty and Conditions	6

INSTALLATION, OPERATION & SERVICE INSTRUCTIONS SERIES 7998 MINI-LX TOTALIZER



SECTION 1. INTRODUCTION

A. GENERAL. This manual contains instructions for installation, operation and service procedures for the Series 7998 Mini-LX Totalizer. The counter is designed and manufactured by Veeder-Root Company, 125 Powder Forest Drive, P.O. Box 2003, Simsbury, CT 06070-2003, (203) 651-2700.

When a vertical bar | appears adjacent to text or illustrations, information has been added or changed at the last issue date.

Consult Veeder-Root on any unusual application, installation, or possible modification of this basic design.

B. DESCRIPTION.

The Series 7998 Mini-LX Totalizer is a compact electronic counter which employs CMOS Large Scale Integrated circuitry (LSI), has a Liquid Crystal Display (LCD), and a self-contained power source.

Standard case dimensions that fit 25 x 50 mm openings provide the ability to use the 7998 in direct replacement of many popular electromechanical counters. Both receptacle mounting and panel mounting versions are available in six or eight digits.

Two count input variations are offered: AC/DC input (models have black label) which accepts any voltage impulse — 6 volts to 250 volts (CSA models, 115 V) AC or DC, and switch input (models have blue label) which counts relay or switch contact actuations and requires no voltage whatsoever.

Six digit models feature front panel pushbutton reset and remote contact reset capability. Eight digit models provide remote reset only.

C. STANDARD SPECIFICATIONS.

Number of Decades: 6 and 8 figure models standard.

Display: 5.1 mm (0.2"), liquid crystal.

Count Input Characteristics: Refer to Standard Models for count input type of specific models.

AC/DC Input Models (black label):

Maximum Count Speed: AC: 3000 cpm (50 Hz). DC: 3600 cpm (60 Hz).

Impulse Voltage: 6 to 250 volts AC (RMS) or DC.

Note: For C.S.A. certified versions only - impulse voltage: 6 to 115 volts AC (RMS) or DC voltage.

Minimum Impulse On-Time: AC: 10 milliseconds, DC: 7 milliseconds.

Minimum Impulse Off-Time: AC: 10 milliseconds, DC: 9 milliseconds.

Maximum Impulse On-Time or Off-Time: Unlimited.

Input Current: 2.5 milliamps, maximum, drawn from external circuit.

Switch Input Models (blue label):

Maximum Count Speed: 3000 cpm (50 Hz).

Contact Burden: 3 VDC, 500 microamperes.

Minimum Contact Open-or-Closed Dwell Time: 0.008 second (8 milliseconds).

Panel Reset (not available for 8 decade models): To zero by means of pushbutton switch.

Remote Reset: Via rear connection, by isolated switch contact only. Requires 50 milliseconds minimum closure.

Power Source: External power not required.

Connections: Via rear 0.062" diameter pins. See outline drawing. Count input per pin positions 1 and 2 (may be relocated to positions 5 and 6 for compatibility to existing socket requirement). Remote reset input per pin positions 3 and 4. Plug-in mount models may be used with P/N 616353-001 Accessory Receptacle. Panel mount models supplied with slide-on contact terminals.

Operating Temperature: 0° to +50°C (+32° to +122°F).

Storage Temperature: -20° to +60°C (-4° to +140°F).

Mounting: Plug-in models (see Accessory Receptacle) and panel-mount models available. See standard models and outline dimensions.

Materials: Case: Modified Polyphenylene. Crystal: Polycarbonate.

Net Weight: 56.7 g (2.0 oz).

Predicted Service Life: Unlike electromechanical counters, the Mini-LX Totalizer is not subject to degradation due to mechanical wear. With proper installation and environment, the 7998 will retain its original accuracy over a long service life. The internal power source is rated at 10 years typical life. Actual service life will vary somewhat, primarily dependent on environmental conditions.

D. ACCESSORIES.

Receptacle: P/N 616353-001. Allows plug-in mounting of suitable models. See outline drawing.

E. STANDARD MODELS.

Description: Per Standard Specifications above.

Decades	Mounting	Input	Reset	CSA Certified	Form Number	Stock Status
6	Plug-in	AC/DC	Panel/Remote	No	799806-211	N-stock
6	Plug-in	Switch	Panel/Remote	No	799806-221	N-stock
6	Panel	AC/DC	Panel/Remote	No	799806-212	Stock
6	Panel	Switch	Panel/Remote	No	799806-222	Stock
6	Plug-in	AC/DC	Remote	No	799806-311	N-stock
6	Plug-in	Switch	Remote	No	799806-321	N-stock
6	Panel	AC/DC	Remote	No	799806-312	N-stock
6	Panel	Switch	Remote	No	799806-322	N-stock
8	Plug-in	AC/DC	Remote	No	799808-311	N-stock
8	Plug-in	Switch	Remote	No	799808-321	N-stock
8	Panel	AC/DC	Remote	No	799808-312	Stock
8	Panel	Switch	Remote	No	799808-322	Stock
6	Plug-in	AC/DC	Panel/Remote	Yes	799876-201	N-stock
6	Panel	AC/DC	Panel/Remote	Yes	799876-202	N-stock
6	Plug-in	AC/DC	Remote	Yes	799876-301	N-stock
6	Panel	AC/DC	Remote	Yes	799876-302	N-stock
8	Plug-in	AC/DC	Remote	Yes	799878-301	N-stock
8	Panel	AC/DC	Remote	Yes	799878-302	N-stock

SECTION 2. INSTALLATION.

WARNING: IN INSTALLATION AND USE OF THIS PRODUCT, COMPLY WITH THE NATIONAL ELECTRICAL CODE; FEDERAL, STATE AND LOCAL CODES; AND ANY OTHER APPLICABLE SAFETY CODES. IN ADDITION, TURN OFF POWER AND TAKE OTHER NECESSARY PRECAUTIONS DURING INSTALLATION, SERVICE AND REPAIR TO PREVENT PERSONAL INJURY, PROPERTY LOSS AND EQUIPMENT DAMAGE.



INSTALLATION, OPERATION & SERVICE INSTRUCTIONS SERIES 7998 MINI-LX TOTALIZER

A. GENERAL. The counter may be installed in almost any nonexplosive environment free from severe vibration, extreme temperatures, excessive humidity and/or airborne contamination.

B. PANEL MOUNT INSTALLATION. Cut opening in panel per Figure 1.

1. Remove spring clamp from the rear of the counter housing.
2. Carefully insert the counter in the panel cutout, install spring clamp over top of counter, and swing forward and clip into place against panel.

C. PLUG-IN MOUNT INSTRUCTIONS. For Mini-LX Totalizers not using remote reset feature:

1. As shipped, the 7998 AC/DC input models can be plugged into the sockets, replacing existing electromechanical counters without modifications:
 - a. Hecon: GO, FO Series.
 - b. Hobatronics: ZR6 Series.
 - c. Redington: 300 Series.
 - d. Hengstler: F Series.
2. By removing pins 1 and 2 and installing the shorter pins provided in positions 5 and 6 (see Paragraph D), the 7998 AC/DC input models can be plugged into sockets replacing existing IVO electromechanical counters.

CAUTION: 7998 SWITCH INPUT MODELS MUST BE USED WITH VEEDER-ROOT 616353-001 RECEPTACLES ONLY. NON-VEEDER-ROOT RECEPTACLES USED IN AN EXISTING APPLICATION WILL HAVE APPLIED VOLTAGES WHICH WILL CAUSE PERMANENT DAMAGE TO THE COUNTER. SWITCH INPUT MODELS ARE SHIPPED WITH REMOTE RESET PINS INSTALLED, AND THESE PINS WILL NOT FIT IN NON-VEEDER-ROOT RECEPTACLES.

3. Series 7998 switch input models used with Veeder-Root receptacles can be plugged in directly. Receptacle sockets may be mounted singly or grouped (see instructions shipped with receptacle). If the remote reset is not to be used, do not make any connection to pins 3 and 4.

WARNING: IF INSTALLATION IS TO BE IN A VOLATILE, COMBUSTIBLE OR EXPLOSIVE ATMOSPHERE, THIS PRODUCT MUST BE HOUSED IN AN APPROPRIATE ENCLOSURE AS REQUIRED FOR USE IN SUCH ATMOSPHERE BY NATIONAL ELECTRICAL CODE AND ANY LOCAL APPLICABLE STANDARDS.

D. MOVING PINS. It may be necessary to relocate the input terminals in order to make the counter compatible with IVO receptacles. It may also be necessary or desirable to install the remote reset pins if they are not already in place (for use in Veeder-Root receptacles only). Proceed as follows:

CAUTION: THE BATTERY IS ALWAYS CONNECTED TO THE 7998, SO WHEN THE COVER IS REMOVED, LIVE CIRCUITRY IS EXPOSED. DO NOT PERMIT ANY METALLIC OR CONDUCTIVE MATERIAL TO COME IN CONTACT WITH THE INTERIOR OF THE COUNTER OR DAMAGE TO THE CIRCUITS MAY OCCUR.

1. Hold counter so label is on top.
2. Remove screw holding case top to body.
3. Carefully remove case top.

4. Lift back plate up slightly and remove.

5. To move count input pins to accommodate IVO socket:

- a. Hold the rear circuit board to prevent damage and remove pins from positions 1 and 2. A slight rocking motion while pulling is best.
- b. Discard these pins.
- c. Shorter pins have been supplied with the counter. Install these shorter pins in positions 5 and 6. Support the rear circuit board with fingers and use a slight rocking motion while pressing the pins into position. Do not use the pins removed from positions 1 and 2 or improper mounting may result.

6. If remote reset pins are to be installed in plug-in mount models, support the rear circuit board with fingers and use a slight rocking motion while pressing the long pins supplied with the counter into positions 3 and 4. Wire per Figure 8.

7. Install back plate (numbered side out and number up) over pins. Lift slightly to seat locking tabs.

8. Carefully align and install cover and secure with screw.

E. GENERAL WIRING PRACTICES. The Series 7998 utilizes state-of-the-art CMOS/LSI circuitry which characteristically has high immunity to the effects of electrical interference. Proper electrical wiring practice will further reduce the probability of electrical interference; therefore, the following precautions should be observed.

CAUTION: DO NOT ATTEMPT TO SOLDER CONNECTIONS DIRECTLY TO THE PINS ON THE REAR OF THE COUNTER. USE THE P/N 616353-001 ACCESSORY RECEPTACLE OR PUSH-ON WIRE-CRIMP TERMINALS SUPPLIED WITH PANEL MOUNT MODELS.

1. Do not run input count signal lines in the same conduit as power or control lines from relays, motor starters, etc.
2. Use shielded lines for counter input and remote reset (if used). Connect the shield to earth (ground). Shield must not be used to carry signal. Do not connect to counter.
3. Mount the counter as far as possible away from motor starters, SCR circuits, large relays, etc.
4. Tin all stranded wire before making connections.

F. WIRING AC/DC INPUT MODELS (black label). AC/DC input models will accept count impulses of from 6 to 250 volts (C.S.A. versions 6 to 115 volts) AC or DC. See Standard Specifications for minimum on and off times. See Figures 2 and 3 for input wiring. Reset wiring should be extended no further than ten feet from the counter. If reset signal is generated at greater distances, use an isolated relay contact within ten feet of counter to generate reset. During a reset cycle, the counter will not accept input counts. Connect per Figure 8.

Most Veeder-Root sensors, as well as those of other manufacturers, will interface with AC/DC input models. See Figures 2 through 7 for connecting diagrams of most commonly used types.

INSTALLATION, OPERATION & SERVICE INSTRUCTIONS SERIES 7998 MINI-LX TOTALIZER



G. WIRING SWITCH INPUT MODELS (blue label). See Figure 7 for count input wiring. Reset wiring should be extended no further than ten feet from the counter. If reset signal is generated at greater distances, use an isolated relay contact within ten feet of counter to generate reset. During a reset cycle, the counter will not accept input counts. Connect per Figure 8.

CAUTION: DO NOT APPLY ANY VOLTAGE TO ANY PINS ON SWITCH INPUT MODELS. USE ISOLATED CONTACT CLOSURES ONLY OR PERMANENT DAMAGE TO THE COUNTER WILL RESULT.

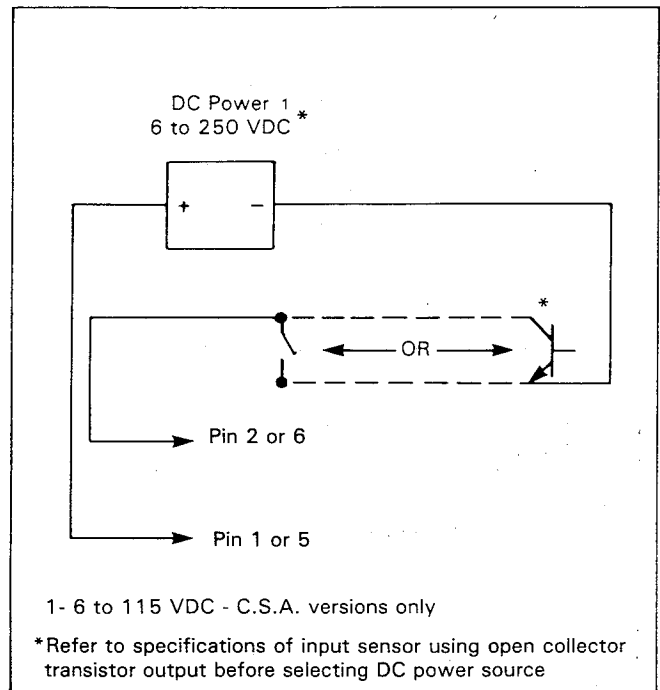


Figure 2. Connecting AC/DC Models (black label) when Count Source is DC. A Switch Contact or Open Collector NPN Transistor Sensor may be used.

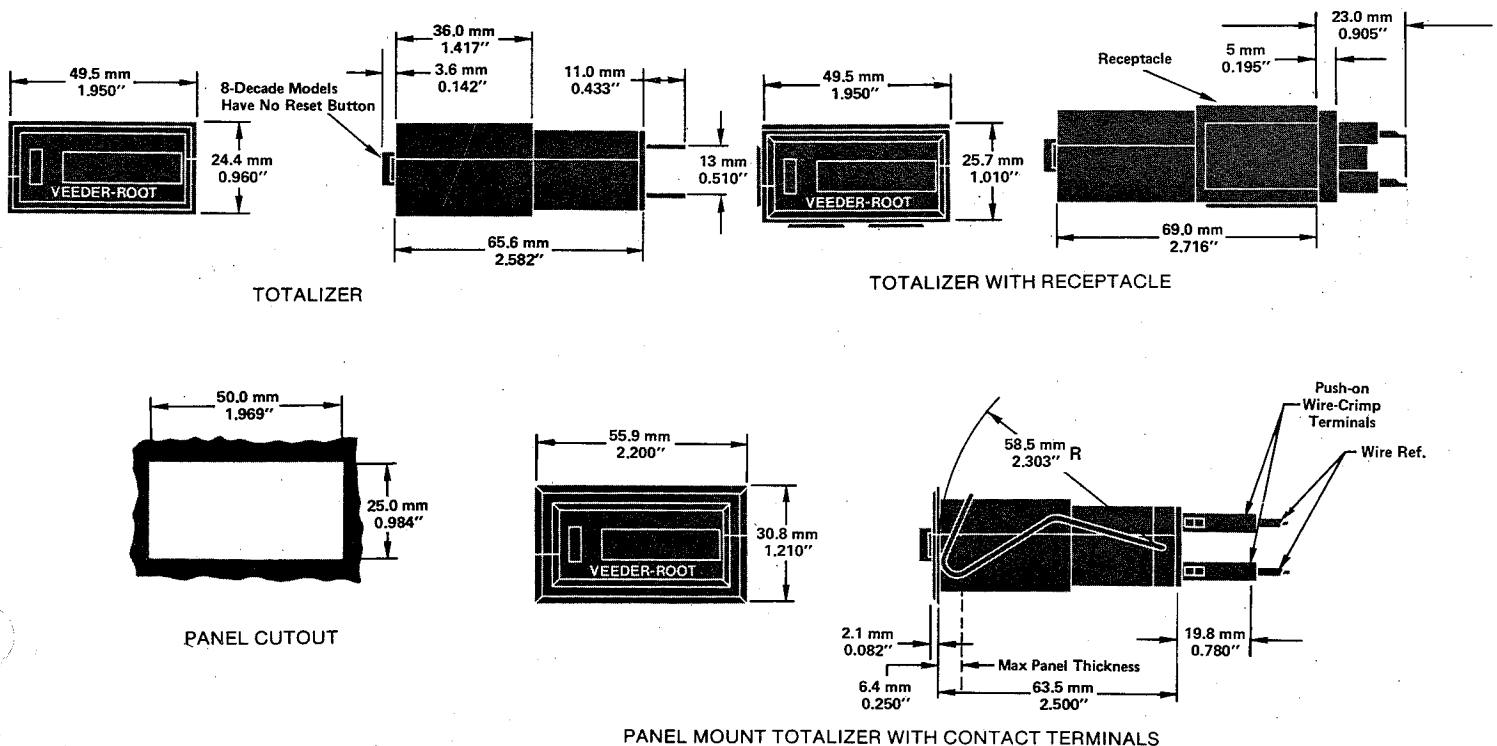


Figure 1. Mounting Dimensions.

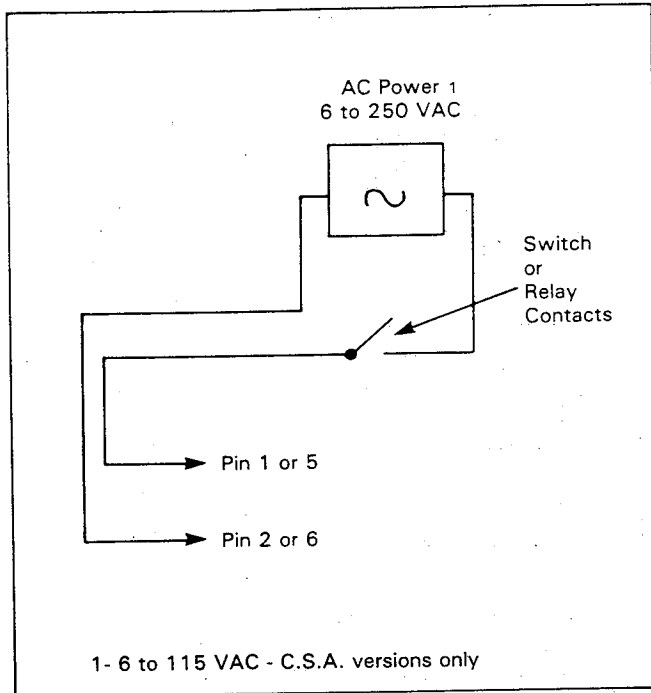


Figure 3. Connecting AC/DC Models (black label) when Count Source is AC.

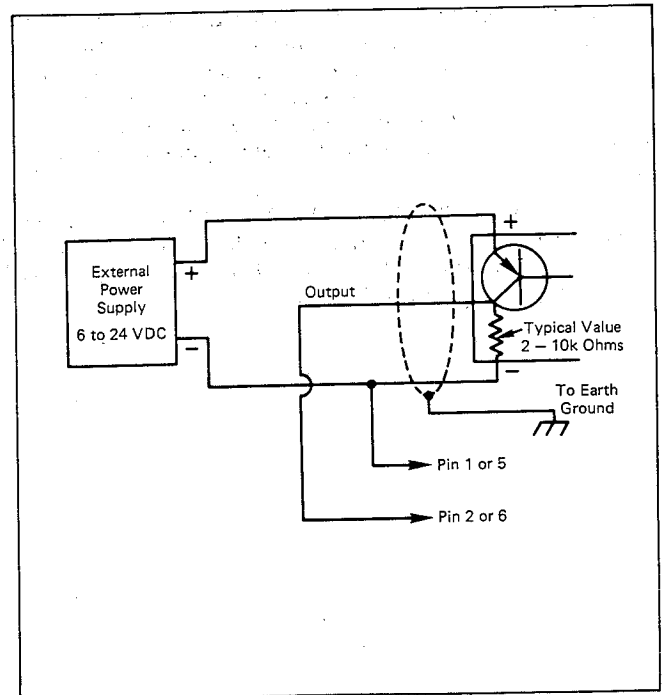


Figure 5. Connecting AC/DC Model (black label) to a Typical Sensor with a Current Sourcing PNP Internal Pull-Down Transistor Output.

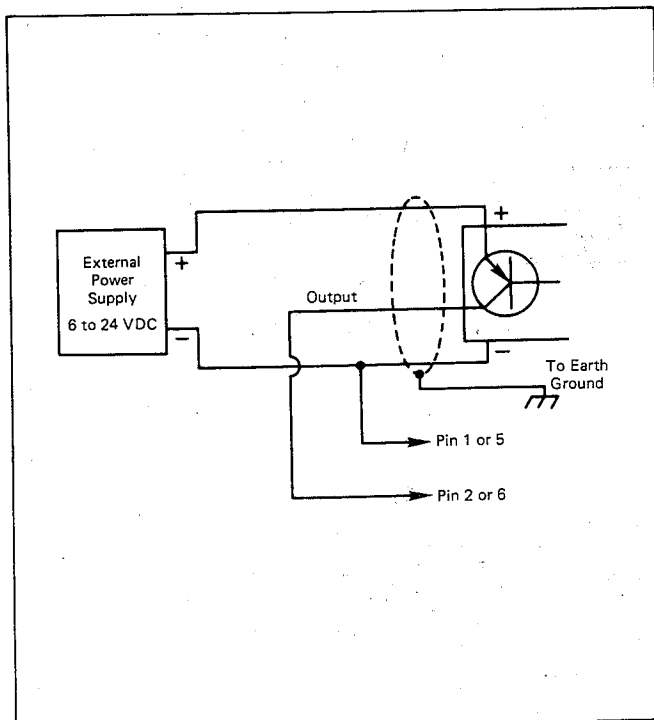


Figure 4. Connecting AC/DC Model (black label) to a Typical Sensor with a Current Sourcing PNP Transistor Output.

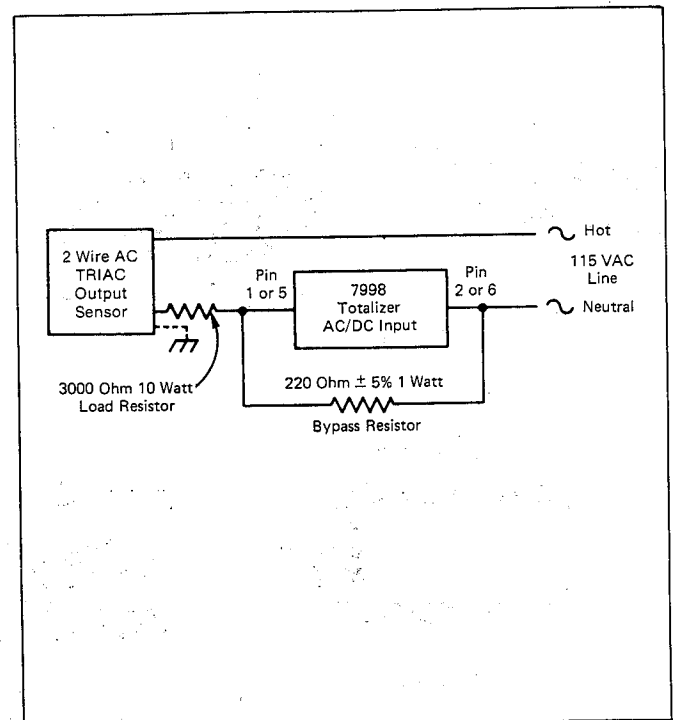


Figure 6. Connecting AC/DC Models (black label) to a TRIAC output 115 VAC, Two Wire-Sensor. Resistors shown are required to compensate for Typical Leakage Currents present in Sensor.

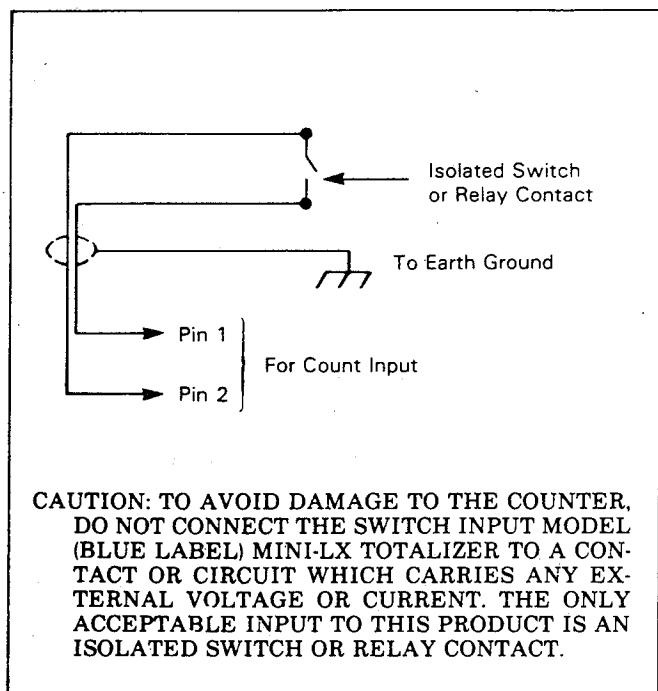


Figure 7. Connecting Switch Input (blue label) to Isolated Switch or Relay Contact only.

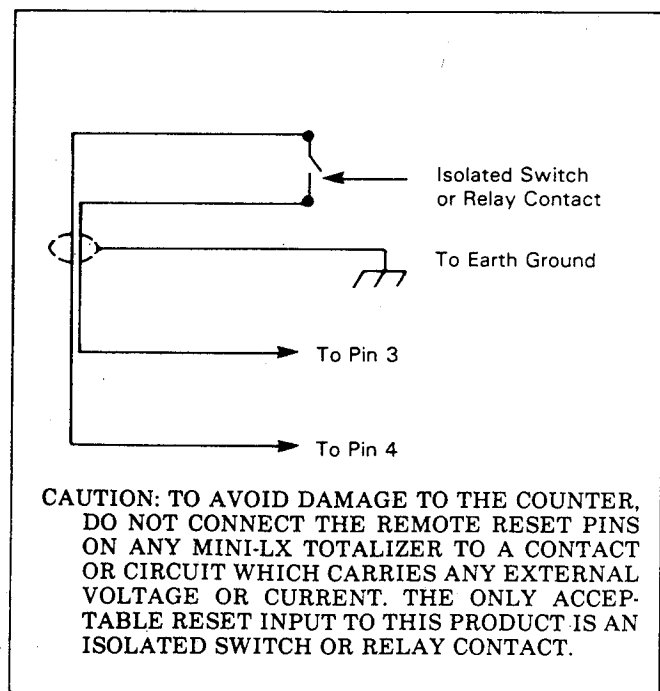


Figure 8. Connecting Remote Reset (All Models) to Isolated Switch or Relay Contact only.

SECTION 3. OPERATION.

A. COUNTING. The 7998 Mini-LX Totalizer registers one count each time the count input is activated. Count switches (or relay contacts) which exhibit unusually high degrees of contact bounce may cause erroneous totals or limit the speed of the counter. Should this occur, replace the switch or relay with one having better bounce characteristics.

In normal operation when the counter is reset to zero, zeros appear on the display.

B. RESET. To reset the counter, press the reset button located on the left-hand side of the counter. For counters wired for remote reset, activate the remote isolated contacts to reset the counter. Counters without the reset button may be reset remotely (Figure 8).

SECTION 4. SERVICE.

WARNING: DO NOT ATTEMPT TO REPLACE OR DISPOSE OF THE LITHIUM BATTERY USED TO POWER THE 7998. IF REPLACEMENT IS REQUIRED, RETURN THE 7998 PER PARAGRAPH A. IMPROPER DISPOSAL OF THE LITHIUM BATTERY COULD RESULT IN PERSONAL INJURY, PROPERTY LOSS OR EQUIPMENT DAMAGE.

A. REPAIR. NO attempt to repair the counter should be made by users or their agents. The compact design of the counter, made possible by the use of integrated circuits and other solid state devices, makes special knowledge and unique test equipment essential if serious damage to the electronic circuits is to be avoided. We therefore recommend that the counter be returned to a Veeder-Root authorized electronic service center or the factory for repair or adjustment. See Paragraph B for instructions.

B. SHIPMENT. If the counter must be returned to a Veeder-Root authorized electronic service center or factory for repair, perform the following steps:

1. Explain, in writing, the nature of the problem as accurately as possible. List the persons to be contacted in the event communication is required.
2. Place the letter along with the counter and its packing material in its box.
3. Place in an overwrap box. Address to the nearest authorized Electronic Service Center or:

Service Department
 VEEDER-ROOT LTD.
 Kilspindie Road
 Dundee DD2 3QJ
 SCOTLAND
 Tel: 44-382-833033
 Telex: 76146
 Fax: 44-382-832382

Service Department
 VEEDER-ROOT
 COMPANY
 125 Powder Forest Drive
 Simsbury, CT 06070-2003
 Tel: (203) 651-2700
 Telex: 99219
 Fax: (203) 651-2750

Service Department
 VEEDER-ROOT
 (Australia) PTY LTD.
 82 Herald Street
 Cheltenham, Victoria 3192
 AUSTRALIA
 Tel: 61 (3) 584-3800
 Fax: 61 (3) 583-8450

Service Department
 VEEDER-ROOT
 OF CANADA LTD.
 26 Fieldway Road
 Etobicoke, Ontario M8Z 3L2
 CANADA
 Tel: (416) 239-3094
 Fax: (416) 239-2653

4. All shipments must be prepaid.



INSTALLATION, OPERATION & SERVICE INSTRUCTIONS SERIES 7998 MINI-LX TOTALIZER

SECTION 5. CLAIMS AND WARRANTY

A. DAMAGE CLAIMS

1. Thoroughly examine the enclosure as soon as it is received. If damaged, write on the face of the freight bill a complete and detailed description of the damage. Have the carrier's agent sign the description.

Note: Insist that the carrier's agent verify the inspection and sign the description.

2. Immediately notify the delivering carrier of damage or loss. This notification may be given either in person or by telephone. Written confirmation must be mailed within 48 hours. Railroads and motor carriers are understandably reluctant to make adjustments for damaged merchandise unless inspected and reported promptly.

3. Risk of loss of, or damage to merchandise remains with the Buyer. It is the Buyer's responsibility to file a claim with the carrier involved.

4. Immediately advise your Veeder-Root representative, distributor, or the factory so that we may assist you.

B. WARRANTY AND CONDITIONS

1. **WARRANTY.** We warrant that this product shall be free from defects in material and workmanship for a period of one year from the date of shipment thereof or the product's total rated life, whichever first occurs. Within the warranty period we shall repair or replace such products which are returned to us with shipping charges prepaid and which are determined by us to be defective. This warranty will not apply to any product which has been subjected to misuse, negligence, or accident; or misapplied; or used in violation of product manuals, instructions, or warnings; or modified or repaired by unauthorized persons; or improperly installed.

2. **INSPECTION.** You shall inspect the product promptly after receipt and shall notify us at our Simsbury office, in writing, of any claims, including claims of breach of warranty, within thirty days after you discover or should have

discovered the facts upon which the claim is based. Your failure to give written notice of a claim within the time period shall be deemed to be a waiver of such claim.

3. **LIMITATION OF REMEDY AND WARRANTY.** The provisions of Paragraph 1 are our sole obligation and exclude all other remedies or warranties, express or implied, including warranties of MERCHANTABILITY and FITNESS FOR A PARTICULAR PURPOSE, whether or not purposes or specifications are described herein. We further disclaim any responsibility whatsoever to you or to any other person for injury to person or damage to or loss of any property or value caused by any product which has been subjected to misuse, negligence, or accident; or misapplied; or used in violation of product manuals, instructions, or warnings; or modified or repaired by unauthorized persons; or improperly installed.

4. **LIMITATION OF DAMAGES.** Under no circumstances shall we be liable for any incidental, consequential or special damages, losses or expenses arising from this contract or its performance or in connection with the use of, or inability to use, our product for any purpose whatsoever.

5. **LIMITATION OF ACTIONS.** No action regardless of form arising out of this contract may be commenced more than one year after the cause of action has accrued, except an action for nonpayment.

6. **COLLATERAL PROMISES.** There are no representations, warranties, or conditions express or implied, statutory or otherwise except those herein contained, and no agreements or waivers collateral hereto shall be binding on either party unless in writing and signed by you and accepted by us at our Simsbury office.

7. **INTERPRETATION.** Rights and liabilities arising out of any contract with us shall be determined under the Uniform Commercial Code as enacted in Connecticut.

Warranty revised January 1, 1990

VEEDER-ROOT 
Digital Products

2100 W. Broad St., P.O. Box 368, Elizabethtown, NC 28337

TEL: (847) 662-2666 FAX: (847) 662-6633

AUSTRALIA: Cheltenham, Victoria • BRAZIL: Sao Paulo • CANADA: Etobicoke/Montreal/Vancouver
FRANCE: Rungis • SCOTLAND: Dundee • WEST GERMANY: Neuhausen/Filder