

Model T490 Advanced Temperature Validator

THE MODEL T490 DELIVERS

- *Temperature transmitter validation*
- *True 4-wire RTD measurement*
- *Thermocouple and RTD simulation*
- *Cold junction compensation*
- *Interfaces with Asset Management Solutions™ (AMS) Calibration Assistant*
SNAP-ON™ Application



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Model T490

THE ALL-PURPOSE VALIDATOR

The Model T490 Precision Validator can do much more than temperature transmitter validations. It provides true 4-wire RTD measurements, and it can simulate thermocouples, RTDs, and 2-wire transmitters. The Model 490 provides accurate cold junction compensation testing, and it can provide output (mA) in ramp and step functions for current loop testing. It has a fully programmable signal converter function.

USER-BASED DESIGN

The Model T490 is designed with the user in mind and is simple to use. Its compact size, adjustable strap, carrying case, and its 24 V power-sourcing capability, make it convenient to use in remote testing areas. Its fully rotating control panel provides an optimal viewing angle no matter what the test conditions. Its electrical terminals are accessible from both sides, providing maximum control and ease of use. It has a unique keystroking feature that lets the user store and recall up to ten keypad sequences. With all of these high performance features, the Model T490 is truly an all-purpose temperature validator.

FEATURES

- Simultaneous Input and Output Display
- 2-Wire Transmitter Validation
- Transmitter Simulation
 - 2-Wire Transmitter Simulation
 - True 4-Wire RTD and Ohms Measurement and Simulation
- Cold Junction μ Volts Compensation
- Switch Testing Capability
- Frequency Counts Measurement and Pulse Transmission
- Output and Reading of Volts and Millivolts
- Output Ramp Mode
- Step Mode
- Scaled Readings
- Programmable Signal Converter
- Help Key
- Keystroking
- Battery or Line Voltage Operation
- Computer Interface Standard Option

The Model T490 is supported by AMS™ Calibration Assistant SNAP-ON™ application (page Communication-23) to automate the collection, storage, and retrieval of device calibration data. The Model T490 recalls the downloaded calibration schemes by Tag and then steps the technician through the precision calibration eliminating notes and errors.

SPECIAL FUNCTIONS

Steps

10 programmable, 10%, 20%, 25% division stepping by keypad entry or adjustable by timer.

Ramp

Programmable travel time for up/down and dwell.

Scaling

Allows five digits and a sign on all electrical ranges.

Temperature Transmitter Validation

Converts and/or displays both the input and output readings in temperature units for easier comparison.

Temperature Transmitter Simulation

The mA output is translated and appears in temperature units.

Signal Converter

Any input into any output, fully isolated.

FIGURE 1. Rosemount offers several precision pressure and temperature validators. For more information, contact your Rosemount representative.



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Specifications

TABLE 1. Model T490 Temperature Specifications⁽¹⁾

Temperature Function	Range	Resolution	1 Year Accuracy (Abs. \pm 1 Isd ⁽²⁾)	Remarks
Measure Pt 1000 (385)	–328 to 752 °F (–200 to 400 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	IEC 751
Simulation Pt 1000 (385)	–328 to 752 °F (–200 to 400 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	IEC 751
Measure Pt 500 (385)	–328 to 1562 °F (–200 to 850 °C)	0.2 °F (0.1 °C)	0.4 °F (0.2 °C)	IEC 751
Simulation Pt 500 (385)	–328 to 1562 °F (–200 to 850 °C)	0.2 °F (0.1 °C)	0.4 °F (0.2 °C)	IEC 751
Measure Pt 200 (385)	–328 to 1562 °F (–200 to 850 °C)	0.2 °F (0.1 °C)	0.7 °F (0.4 °C)	IEC 751
Simulation Pt 200(385)	–328 to 1562 °F (–200 to 850 °C)	0.2 °F (0.1 °C)	0.9 °F (0.5 °C)	IEC 751
Measure Pt 100 (385)	–328 to 1562 °F (–200 to 850 °C)	0.06 °F (0.03 °C)	0.36 °F (0.20 °C)	IEC 751
Simulation Pt 100 (385)	–328 to 1562 °F (–200 to 850 °C)	0.06 °F (0.03 °C)	0.45 °F (0.25 °C)	IEC 751
Measure Pt 50 (385)	–328 to 1562 °F (–200 to 850 °C)	0.11 °F (0.06 °C)	0.6 °F (0.3 °C)	IEC 751
Simulation Pt 50 (385)	–328 to 1562 °F (–200 to 850 °C)	0.11 °F (0.06 °C)	0.7 °F (0.4 °C)	IEC 751
Measure D – 100 (392)	–328 to 1193 °F (–200 to 645 °C)	0.06 °F (0.03 °C)	0.36 °F (0.20 °C)	JIS C1604 1989
Simulation D – 100 (392)	–328 to 1193 °F (–200 to 645 °C)	0.06 °F (0.03 °C)	0.45 °F (0.25 °C)	JIS C1604 1989
Measure Ni 100	–76 to 482 °F (–60 to 250 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	DIN 43760
Simulation Ni 100	–76 to 482 °F (–60 to 250 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	DIN 43760
Measure Ni 120	–112 to 500 °F (–80 to 260 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	Minco 7
Simulation Ni 120	–112 to 500 °F (–80 to 260 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	Minco 7
Measure Cu 10	–328 to 500 °F (–200 to 260 °C)	0.6 °F (0.3 °C)	3.3 °F (1.7 °C)	Minco 16 – 9
Simulation Cu 10	–328 to 500 °F (–200 to 260 °C)	0.6 °F (0.3 °C)	4.2 °F (2.2 °C)	Minco 16 – 9
Measure / Simulation TC – J	–346 to 2192 °F (–210 to 1200 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	IEC 584
Measure / Simulation TC – L	–328 to 1652 °F (–200 to 900 °C)	0.2 °F (0.1 °C)	0.2 °F (0.1 °C)	DIN 43710
Measure / Simulation TC – K	–328 to 2498 °F (–200 to 1370 °C) –454 to –328 °F (–270 to –200 °C)	0.2 °F (0.1 °C) 0.4 °F (0.2 °C)	0.2 °F (0.1 °C) 0.6 °F (0.3 °C)	IEC 584 IEC 584
Measure / Simulation TC – T	–103 to 752 °F (–75 to 400 °C) –292 to –103 °F (–180 to –75 °C) –454 to –292 °F (–270 to –180 °C)	0.2 °F (0.1 °C) 0.2 °F (0.1 °C) 0.2 °F (0.1 °C)	0.2 °F (0.1 °C) 0.4 °F (0.2 °C) 0.9 °F (0.5 °C)	IEC 584 IEC 584 IEC 584
Measure / Simulation TC – U	–184 to 1112 °F (–100 to 600 °C) –328 to –184 °F (–200 to –100 °C)	0.2 °F (0.1 °C) 0.2 °F (0.1 °C)	0.2 °F (0.1 °C) 0.4 °F (0.2 °C)	DIN 43710 DIN 43710
Measure / Simulation TC – B	2192 to 3308 °F (1200 to 1820 °C) 932 to 2192 °F (500 to 1200 °C) 482 to 932 °F (250 to 500 °C) 122 to 482 °F (50 to 250 °C)	0.2 °F (0.1 °C) 0.4 °F (0.2 °C) 0.6 °F (0.3 °C) 1.0 °F (0.5 °C)	0.7 °F (0.4 °C) 1.3 °F (0.7 °C) 2.7 °F (1.5 °C) 3.6 °F (2.0 °C)	IEC 584 IEC 584 IEC 584 IEC 584
Measure / Simulation TC – R	572 to 3216 °F (300 to 1769 °C) –58 to 572 °F (–50 to 300 °C)	0.2 °F (0.1 °C) 0.4 °F (0.2 °C)	0.9 °F (0.5 °C) 1.8 °F (1.0 °C)	IEC 584 IEC 584
Measure / Simulation TC – S	752 to 3216 °F (400 to 1769 °C) 212 to 752 °F (100 to 400 °C) –58 to 212 °F (–50 to 100 °C)	0.2 °F (0.1 °C) 0.4 °F (0.2 °C) 0.4 °F (0.2 °C)	0.9 °F (0.5 °C) 1.5 °F (0.8 °C) 1.8 °F (1.0 °C)	IEC 584 IEC 584 IEC 584
Measure / Simulation TC – E	–238 to 1832 °F (–150 to 1000 °C) –454 to –238 °F (–270 to –150 °C)	0.2 °F (0.1 °C) 0.2 °F (0.1 °C)	0.2 °F (0.1 °C) 0.6 °F (0.3 °C)	IEC 584 IEC 584
Measure / Simulation TC –N	–4 to 2372 °F (–20 to 1300 °C) –328 to –4 °F (–200 to –20 °C) –454 to –328 °F (–270 to –200 °C)	0.2 °F (0.1 °C) 0.2 °F (0.1 °C) 0.4 °F (0.2 °C)	0.2 °F (0.1 °C) 0.7 °F (0.4 °C) 1.8 °F (1.0 °C)	IEC 584 IEC 584 IEC 584
Measure / Simulation TC –C	32 to 2732 °F (0 to 1500 °C) 2732 to 3632 °F (1500 to 2000 °C) 3632 to 4208 °F (2000 to 2320 °C)	0.2 °F (0.1 °C) 0.2 °F (0.1 °C) 0.4 °F (0.2 °C)	0.4 °F (0.2 °C) 0.7 °F (0.3 °C) 1.1 °F (0.6 °C)	
Measure / Simulation TC – D	32 to 3092 °F (0 to 1700 °C) 3092 to 3992 °F (1700 to 2200 °C) 3992 to 4523 °F (2200 to 2495 °C)	0.2 °F (0.1 °C) 0.2 °F (0.1 °C) 0.4 °F (0.2 °C)	0.4 °F (0.2 °C) 0.7 °F (0.4 °C) 2.0 °F (1.1 °C)	

(1) Thermocouple accuracies do not include cold junction compensation errors

(2) Isd = Least significant digit

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ELECTRICAL SPECIFICATIONS

TABLE 2. Model T490 Electrical Specifications

Electrical Function	Range	Resolution	1 year Accuracy		Remarks
Measure Millivolts	± 0 – 100 mV	0.001	0.004% Rdg. + 0.004% f.s.	±1 lsd ⁽¹⁾	R – input > 20 MV
auto-ranging	±100 to 600 mV	0.01	0.010% Rdg. + 0.005% f.s.	±1 lsd	R – input > 20 MV
Output millivolts	–10 to 100 mV	0.001	0.004% Rdg. + 0.004% f.s.	±1 lsd	R – output >0.2 V
Measure Volts	± 0 to 6 V	0.0001	0.008% Rdg. + 0.005% f.s.	±1 lsd	R – input > 1 MV
auto-ranging	± 6 to 60 V	0.001	0.009% Rdg. + 0.006% f.s.	±1 lsd	R – input > 1 MV
Output Volts	0 to 12 V	0.0001	0.004% Rdg. + 0.003% f.s.	±1 lsd	R – output < 0.2 V
Measure milliampere	± 0 to 52 mA	0.001	0.005% Rdg. + 0.010% f.s.	±1 lsd	R – input, 2, 5 V fused
Output milliampere	0 to 24 mA	0.001	0.025% f.s.	±1 lsd	R – max. 900 V
Simulate 2-, 3-, and 4-Wire Xmtrs	4 to 24 mA	0.001	0.025% f.s.	±1 lsd	R – max. 900 V
Measure Ohms	0 to 400 V	0.01	.0015% f.s. ±1 lsd	±1 lsd	at 0.9 mA excitation
autoranging	400 to 2000 V	0.1	0.025% f.s. ±1 lsd	±1 lsd	at 0.9 mA excitation
Simulate Ohms	0 to 400 V	0.01	0.020% f.s. ±1 lsd	±1 lsd	at 1 mA excitation
Simulate Ohms	0 to 2000 V	0.1	0.025% f.s. ±1 lsd	±1 lsd	at 1 mA excitation
Measure Frequency	0 to 655 Hz	0.01	0.006% Rdg ±1 lsd	±1 lsd	R – input > 300 kV
autoranging	655 to 1310 Hz	0.1	0.1 Hz		R – input > 300 kV
autoranging	1310 – 10.000 Hz	1	1 Hz		R – input > 300 kV
Totalizing Counter	0 to 10 ⁸ - 1	1 count	Infinite		R – input > 300 kV
Counts/minute	0 to 6 x 10 ⁵	1 c/min	1 c/min		R – input > 300 kV
Counts/hour	0 to 10 ⁷ - 1	1 c/h	1 c/h		R – input > 300 kV
Pulse output preset	0 to 10 ⁸ - 1	1 count	Infinite		0 – 24 V / 34 mA max.
Pulse output	0 to 100 Hz	0.01	0.01Hz		0 – 24 V / 34 mA max.
Pulse output	0 to 6000 p/min	1 p/min	1 p/min		0 – 24 V / 34 mA max.
Pulse output	0 to 10.000 Hz	1 Hz	1 Hz		0 – 24 V / 34 mA max.
Pulse output	0 to 99.9999 p/hr	1p/hour	1p/hour		0 – 24 V / 34 mA max.

(1) lsd = least significant digit

General Specifications

Reference

22 °C ±1 (71.6 °F ±1.8), RH 45% ±5

Calibration

Traceable to National Standards

Accuracy Environment

For 17 to 27 °C (62.6 to 80.6 °F)

Outside these limits 0.0005% / °C is typical on mV

Cold Junction Error

±0.4 °C (0.8 °F) maximum in transient; ±0.2 °C (0.4 °F) maximum when steady

Long Term Drift After 1 Year

0.005% / year or 1000 operating hours

Cold Junction Modes

Automatic, Manual, Remote Sensor

Temperature Scale

Selectable IPTS68 or ITS90

Warm up time

2 minutes for rated accuracies

Recalibration

From keypad (no inside trimmers) Recommended for each year

Operating Temperature

-10 to 50 °C (14 to 122 °F)

Storage Temperature

-20 to 70 °C (-4 to 158 °F)

Relative Humidity

0 – 90% noncondensing

Input/output Isolation

500 V dc continuous

Electrical protection

50 V, 30 seconds maximum. Ohms out to ground; 5 V maximum

Output Mismatch

Displays “check loop”

Product Data Sheet

00813-0100-4780, Rev CA
Catalog 2002 – 2003

Model T490

Overrange

Displays ">>>>>"

Underrange

Displays "<<<<<"

Readings

Text in English. Temperature noted as °C or °F

Batteries (LR14 or C)

Six 1.5 V alkaline batteries or 1.2 V NiCd rechargeable batteries

Battery Life

Alkaline: 22 hours at 20 °C (68 °F).

NiCd: 14 hours at 20 °C (68 °F)

Battery Life with 20 mA Output

Alkaline: 12 hours at 20 °C (68 °F).

NiCd: 7 hours at 20 °C (68 °F)

Low Battery Warning

Flashes a battery symbol

Line Power

With optional 115 or 230 V ac adapter, green LED indicator

Recharge NiCds

With optional 115 or 230 V ac adapter, amber LED indicator

User Terminals

Gold plated, standard 4mm (0.16 in.) plugs

T/C Comp. Wire Terminals

Screw fixable, 2mm (0.08 in.) diameter max

Protection

IP 53

Housing

Textured high-impact ABS plastic

Control Panel

Rotatable, 5 clicks of 30°

Size

265 mm 3160 mm 3 56/80 mm without case

(10.6 in. 3 6.4 in. 3 2.2/3.2 in.)

Carrying Case

Black Cordura

Weight

5.5 lbs (2.2 kg) with batteries

Keystroking

Storage capability for 10 operation sequences

Contact Change Detection

Reading freezes on open or close

Date and Time

Recorded when the PCMCIA card is used

PCMCIA Station

SRAM PCMCIA card type 1 or 2

Detection Level Frequency In

Adjustable. 10 mV to 5.0 V

Pulse Output Level

Adjustable. 0 – 24 V, 0.1 V resolution, 2% accuracy

Pulse Output Form

Symmetrical square, zero based –70 mV

Pulse Output Speed

Adjustable in Hz or Baud rate

Remote Sensor Input

Mini DIN. Suitable for Pt 100 (385 curve) full range, 3- or 4-wire

LCD Display

Full graphic, with contrast control and backlight timer

Ohms Simulation

0.18 to 3.5mA excitation current, either polarity

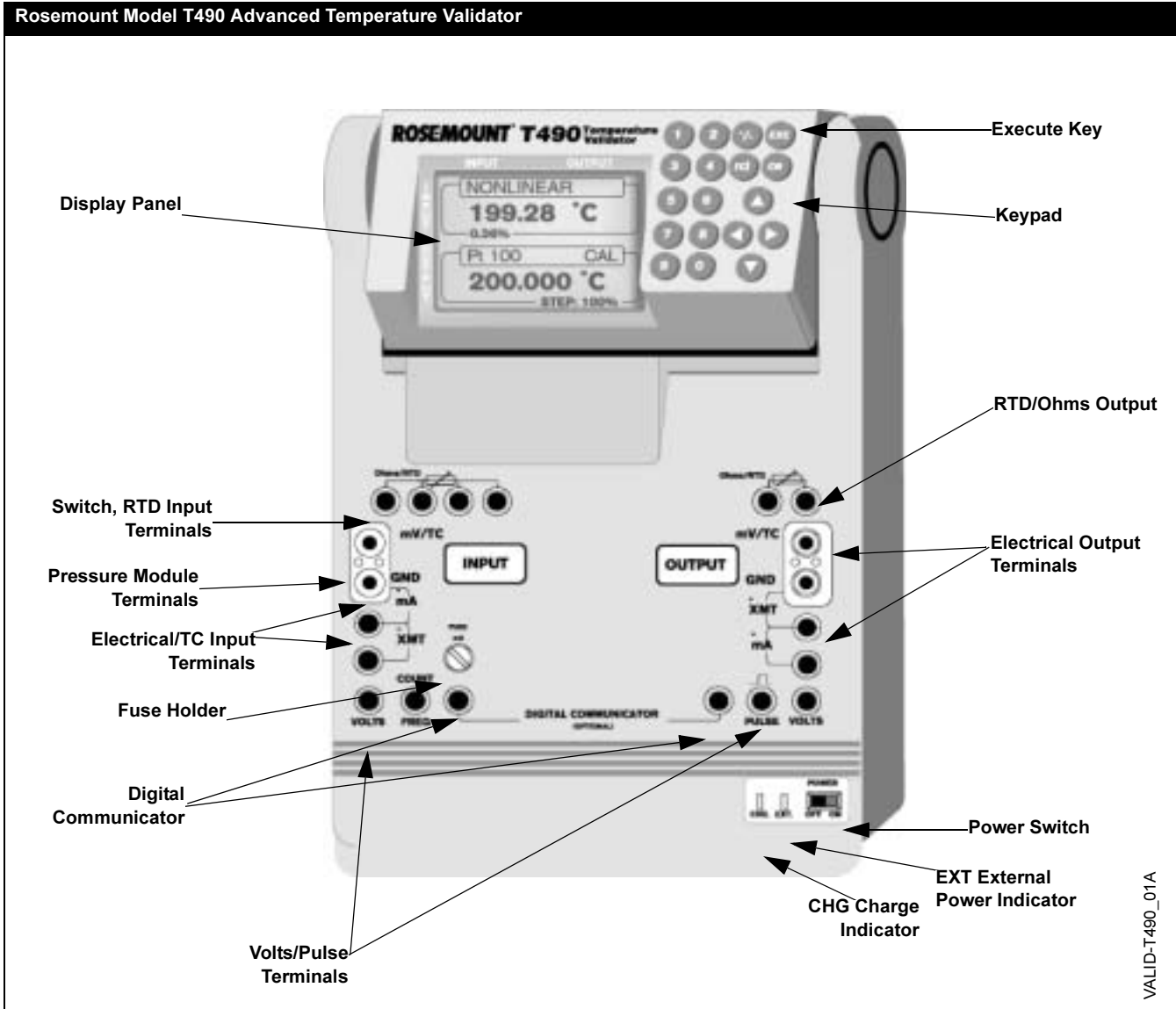
Ohms Input Terminals

2-, 3-, or 4-wire automatic mode select. True 4-wire system

Digital Communicator Board

Slot supplied as standard for electronic board

Dimensional Drawings



Ordering Information

Model	Product Description
T490	Advanced Temperature Validator
Code	Options
V1	Line Voltage Adapter/Charger 110 V ac
V2	Line Voltage Adapter/Charger 220 V ac
H1	Hart Communications Board
T1	Remote Air Temperature Probe
DM	PCMCIA Documenting Memory Card

Validator Accessories

Item Description	Part Number
Line Voltage Adapter/Charger 100 V ac	00490-0014-0001
Line Voltage Adapter/Charger 220 V ac	00490-0014-0002
Remote Air Temperature Probe	00490-0019-0001
PCMCIA Documenting Memory Card	00490-0026-0001
Lead Set	00490-0015-0001
Carrying Case	00490-0016-0001
HART Communications Kit	00490-0028-0001

Standard Configuration

The Model T490 is shipped with these accessories:

- Lead set including 6 test leads
- Carrying case
- Six C cell alkaline batteries
- Certificate of calibration

Custom Configurations

Option Code V1: 110 V ac Adapter/Charger
 For use with power outlets in the United States

Option Code V2: 220 V ac Adapter/Charger
 For use with European power outlets

**Option Code H1:
 HART® Communications Board**
 If this option is ordered, the Model T490 is shipped with a Digital HART Communications Board. This feature allows the Model T490 to communicate with Rosemount Transmitter Models 1151, 3051, 3044, 3244, 3244, and 644.

Option Code T1: Remote Air Temperature Probe
 This option is a hand held remote pt 100 (385) probe with a 1/5 DIN sensor. Useful for many general applications and particularly useful for validation recordings and remote cold junctions. The remote probe has a three foot cable for maximum testing convenience.

Option Code DM: Documenting Memory Card and Cable
 For data recording, uploading, and downloading to a PC based maintenance system such as AMS.

Product Data Sheet

00813-0100-4780, Rev CA

Catalog 2002 – 2003

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