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Pt100 SIMULATOR HD2047

HD 2047 is a handheld instrument designed to test and calibrate instruments with Pt100 input (100Ω a 0°C) and voltage/current outputs, such as active or passive temperature transmitter, recorders, testers and data loggers, etc.

HD 2047 simulates up to 24 fixed values, following the Pt100 scale from -100°C up to +500°C, with a 2, 3 or 4 -wire connections. The set points selection is made through a rotary switch placed on the front part of the instrument. Whatever operating mode is chosen, Pt100 output is always active.

HD 2047 can measure with high accuracy voltage/current outputs of any transmitter connected to the instrument input: -20V...+20V continuous voltage range and 0...22mA continuous current range.

The instrument can also calibrate and test the working process of a passive transmitter and simulates the Pt100 temperature input, providing power supply to the transmitter and measuring the current inside it with no external power supply required.

TECHNICAL DATA (@ 20°C)

GENERAL	
Power supply	4 batteries 1.5V, AA size (the input for the 9Vdc external supplier is provided only upon request)
Operating time using 1.5V batteries with capacity of 2250mAh	160 h (in "V READ" and "mA READ" operating mode)
	30 h @ loop current = 12mA (in "2 WIRE" operating mode)
Low batteries signal	The battery sign lights up with a battery voltage of about 3.6V
Oerating temperature	-5...50 ºC
Operating reletive humidity	0...90 % RH (not condensing)
Weight / Dimensions	580 gr (without batteries) / 23 x 70 x 230 mm
CONTINUOUS VOLTAGE MEASURE	
Measure range	-1,999V...1,999 V; 1mV resolution -19,99 V...19,99 V; 10 mV resolution
Accuracy	± 1 mV range -1,999V...1,999 V ± 10 mV range -19,99 V...19,99 V
Imput resistance	1 MΩ
Maximum voltage applied to terminals	48 Vcc
CONTINUOUS CURRENT MEASURE	
Measure range	0,00 ...99,9 mA; 10 mA resolution 0,0...22,0 mA; 100 µA resolution
Accuracy	±(0,01mA+0,05% of range); range 0,00...19,99 mA ±0,1 mA; range 0,0 ...22,0 mA
Shunt resistance	20 Ω
Overload protection	Current limit 25 mA
PASSIVE TRANSMITTERS: POWER SUPPLY/ MEASURE	
Measure range	0,00 ...99,9 mA; 10 µA resolution 0,0...22,0 mA; 100 µA resolution
Accuracy	±(0,01mA+0,05% of range); range 0,00...19,99 mA ±0,1 mA; range 0,0 ...22,0 mA
Shunt resistance	20 Ω
Overload protection	Current limit 25 mA
Maximum load @20mA	700 Ω
Applied voltage	14 Vcc
SIMULATING A Pt 100	
Type of RTD	Pt 100 (100 Ω a a 0 ºC, α =0,003850, EN60751, IEC 751, BS1904
Temperature values	24 fixed values from -100 up to +500°C
Accuracy	± 0,05% of simulated value
Room temperature effect	± 5ppm/ºC
Maximum power loss	12 mW
Maximum load current	20 mA

The instrument is provided with three different keys:
ON/OFF turns the instrument on and off. Upon power on, HD 2047 sets automatically to voltage measuring mode.
MODE selects cyclically the operating mode; by pressing the key consecutively, you select in the following order:
      1. voltage measurement;
      2. current measurement;
      3. current measurement with 4...20mA loop power supply.
RANGE during the measuring process (voltage/current), this mode Allows the full scale selection and the best resolution for the measuring in progress: -1.999...+1.999, -19.99...+19.99 and -199.9...+199.9.
L'HD 2047 is internally protected against any kind of connecting error made by the operator: it is highly recommended anyway not to exceed voltage/current limits shown in technical data.
A battery sign on the display lights up to indicate that batteries are low and must be replaced.

Operating modes
1) How to measure input continuous voltage
The instrument measures positive and negative continuous voltages up to 20V
maximum amplitude.
Operating mode (see fig.1):
• select "input voltage" operating mode by pressing MODE key. The red led
corresponding to "READ V" lights up;
• connect the wires to the sockets, as shown in fig.1;
• select the correct range depending on the voltage, by pressing RANGE key.
An OverRange measurement is indicated by a 1 sign, lighted on the display
left part: in this case you just press RANGE key to pass to the following measuring range.
Warning: a) For safety reasons, never apply any voltage superior to 48Vdc to the sockets.
    b) The instrument only measures continuous voltage.

2) How to measure input continuous current
The instrument measures positive and negative current up to 22mA maximum amplitude.
Operating mode (see fig.2):
• select "input current" operating mode by pressing MODE key. The red led corresponding to "READ mA" lights up;
• connect the wires to the sockets, as shown in fig. 2, without changing the correct polarity: to be measured, the current must be delivered through the positive (+) socket;
• select the correct range depending on the current, by pressing RANGE key.
An OverRange measurement is indicated by a 1 sign, lighted on the display left part: in this case you just press RANGE key to pass to the following measuring range.
Warning: a) The instrument measures continuous current up to a 22mA maximum amplitude.
    b) The instrument only measures continuous current.
    c) The instrument is provided with an internal protection circuit to limit the current within 25mA.

3) How to calibrate and test passive transmitters
The instrument can power a 4...20mA loop, measure the current and simulate 24 fixed values of a Pt100 at the input of a temperature transmitter, with no external power supply required.
Operating mode (see fig.3):
• select "2 WIRE" operating mode by pressing MODE key. The corresponding red led lights up;
• connect the 4...20mA loop wires to the left sockets, as shown in fig. 3, without changing the correct polarity; the current supplied by HD 2047 is delivered through the positive (+) socket;
• select the correct range depending on the current you need to measure. An Over-Range measurement is indicated by a 1 sign, lighted on the display
left part: in this case you just press RANGE key to pass to the following measuring range
• select the temperature value by turning the rotary switch.

Warning: a) The delivered current has a maximum amplitude of 25mA.
    b) A 14Vdc voltage is supplied to the current loop.
    c) In case of 2 or 3-wire connections, do not make jumpers on unused sockets; it is highly recommended to leave them free.

4) 4) How to simulate a Pt100 sensor
The instrument can simulate 24 temperature fixed values of a Pt100 sensor (100Ω at 0°C, coefficient α=0.003850) with 2, 3 or 4-wire connections. The selection is made through a rotary switch placed on the front part of the instrument.
Operating mode:
• make the connection as shown in fig. 3, 4 o 5, depending on the number of wires;
• select the temperature value by turning the rotary switch.
Warning: a) In case of 2 or 3- is highly recommended to leave them free.
    b) MODE and RANGE keys have no effects on the resistance selection.
    c) The internal protection circuit reduces to approximately 1.2V the drop on resistances: this means the measuring current has a maximum amplitude of 20mA.
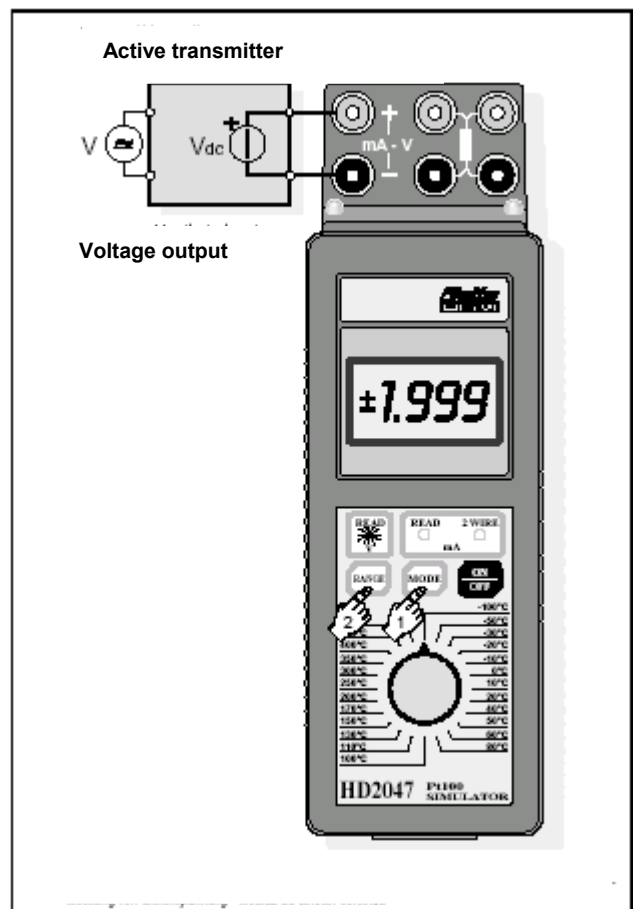

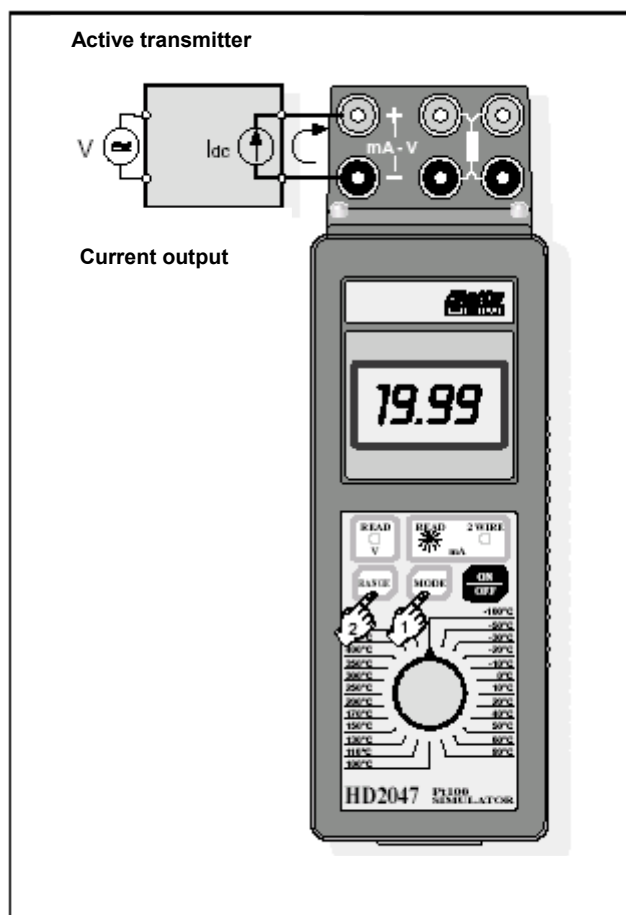Fig. 1 . Continous voltage measurement

Active transmitter

Current output

Fig. 2 . Continous current measurement

Passive transmitter

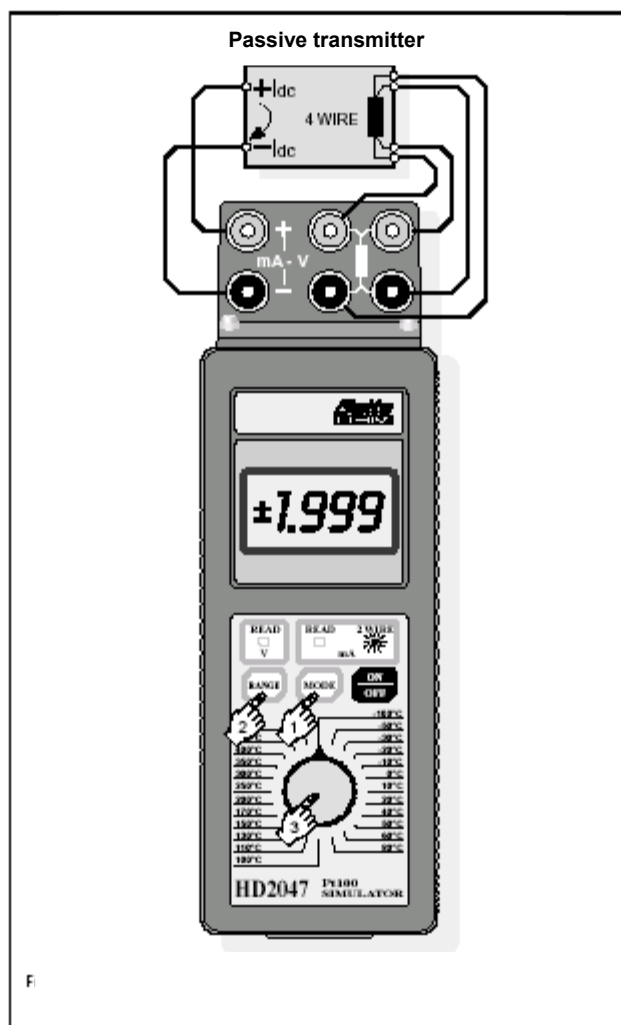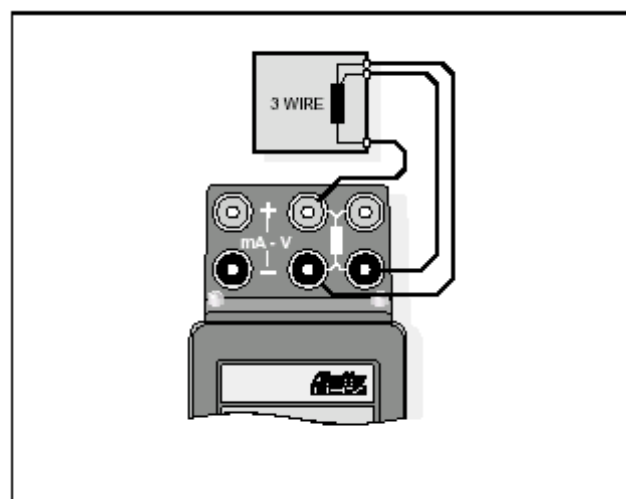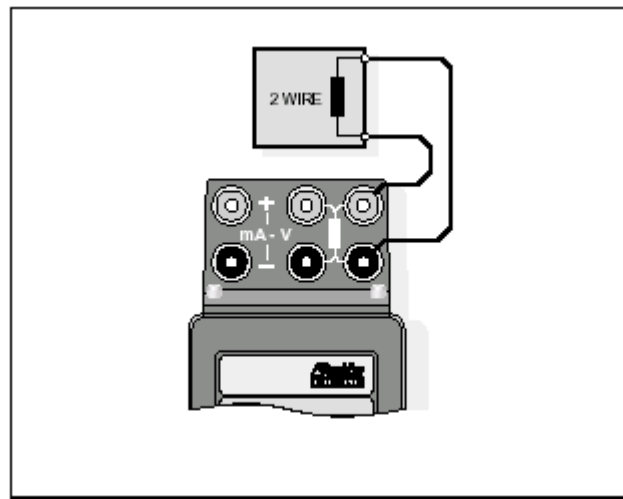Fig, 3 . Verification of a passive transmitter with Pt100 imput

Fig. 4   Pt100 3 wire simulator

Fig. 5 .   4   Pt100 2 wire simulator