

CALIBRATION

THERMYS 150

High precision handheld Thermometer / Calibrator



**Simultaneous IN and OUT
2 measurement channels
Designed for onsite use
Easy-connect system
Data acquisition
21 CFR part11 compliant**

The THERMYS 150 is a very high precision hand-held thermometer / calibrator. Easy to use the THERMYS 150 integrates all the necessary process functions, making it the perfect device for maintenance, quality control and sensor calibration purposes.

Robust and practical, (protective housing, easy-connect system, high contrast backlit display), the THERMYS 150 can do the work of several different devices in just one unit :

- Simulation and emission of temperatures
- Measurement of temperatures

The **Bluetooth interface** and the quick access to all function as well as online help for connection make the THERMYS 150 an especially efficient and powerful tool onsite.



CALIBRATION

THERMYS 150: introduction

THERMYS 150 is a hand-held calibrator, capable of measuring and generating simultaneously on 2 isolated channels. The wide backlit screen can adapt to all lighting conditions.

Protected by the housing with a polycarbonate keypad to protect it from dirt, the raised keys allows the THERMYS 150 to be used when wearing protective gloves

Capable of measuring and generating thermocouples and resistive probes.

The device can also drive dry block and temperature baths for temperature sensor calibration by comparison.



Supplied as standard with a strap and a stand for desktop use, a battery charger and a set of 6 measurement leads with crocodile clips.

Main characteristics:

Display: Backlit display with contrast settings

USB connection

Nominal operating conditions: 0 to 50°C, 10 to 80% relative humidity

Maximum operating conditions: -10 to 55°C, 10 to 80% relative humidity

Protection: IP 54

Rechargeable NiMH batteries Dimensions:

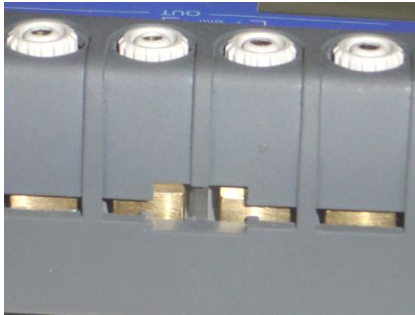
210X110X50 mm (8.3x4.3x2.0 in.)

Weight: 200g (7Oz)



CALIBRATION

"Easy-connect®" system



This unique system allows the connection of

- Wires with diameters up to 3 mm or 10 AWG
- Compensated thermocouple connectors

By simply pushing the top of the terminal, inserting the connector and releasing.

The wires are tightly gripped between two brass plates which provide good thermal stability and consequently an excellent cold junction compensation for thermocouples.

This system also allows 4 mm banana plugs and security connectors to be connected on the front panel.

Functions:

The THERMYS 150 is capable of simultaneously measuring and generating temperatures with the following types of sensors:

- **Thermocouples**
- **Resistive probes: platinum, nickel and copper**
- **Thermistors**

The THERMYS 150 allows the scaling of process signals and corrections to temperature probes.

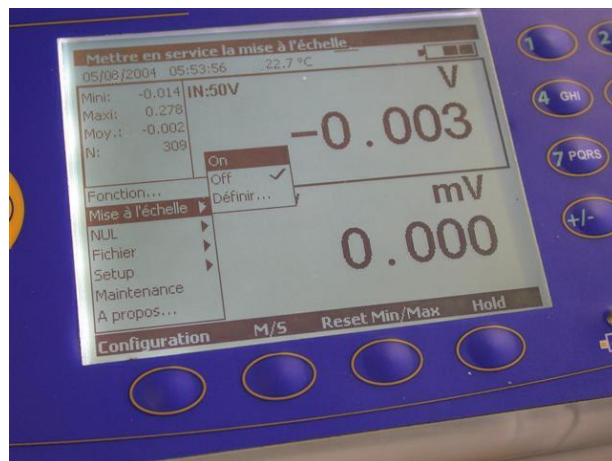
The unit also stores the data which can be transferred with the calibration coefficients to a PC (via a USB connection) for analysis.

Calibration:

- Calibration of sensor and measurement chains. (sensor+thermometer) :
 - The calibration coefficients (correction) are accounted during the measurements. The THERMYS 150 can issue a calibration report from a pre-defined procedure
- Calibration of temperature of measuring instruments (indicators, thermometers, data-loggers,...):
 - Calibration by comparison (2 probes and temperature generator driven) or by using a signal generator. Two methods are available : manual or automatic with in both cases the calibration setpoints entered by the user.
 - Drives dry-block and baths...

Display screen:

The dual display of the THERMYS 150 continuously displays the measured value, the emitted value, the gauge and the selected functions. The date, time and the external temperature are also indicated. The minimum, maximum and average of the measured values are available to the user at all times.



CALIBRATION

Functions and performances: @23°C ±5°C

Uncertainty is in % of displayed value (display of THERMYS 150) + a fixed value

RTD: Measure and Emission

Sensor	Input range	Resolution	Accuracy / 1 year (Measurement)	Output range	Resolution	Accuracy / 1 year (emission)
Pt 50 ($\alpha = 3851$)	-220°C + 850°C	0.01°C	0.006% R + 0.04°C	-220°C + 850°C	0.01°C	0.006% R + 0.04°C
Pt 100 ($\alpha=3851$)	-220°C + 850°C	0.01°C	0.006% R + 0.03°C	-220°C + 850°C	0.01°C	0.006% R + 0.035°C
Pt 100 ($\alpha=3916$)	-200°C + 510°C	0.01°C	0.006% R + 0.03°C	-200°C + 510°C	0.01°C	0.006% R + 0.035°C
Pt 100 ($\alpha=3926$)	-210°C + 850°C	0.01°C	0.006% R + 0.03°C	-210°C + 850°C	0.01°C	0.006% R + 0.035°C
Pt 200 ($\alpha=3851$)	-220°C + 850°C	0.01°C	0.006% R + 0.04°C	-220°C + 850°C	0.01°C	0.006% R + 0.04°C
Pt 500 ($\alpha=3851$)	-220°C + 850°C	0.01°C	0.006% R + 0.03°C	-220°C + 850°C	0.01°C	0.006% R + 0.04°C
Pt1000($\alpha=3851$)	-220°C + 850°C	0.01°C	0.006% R + 0.03°C	-220°C + 850°C	0.01°C	0.006% R + 0.035°C
Ni100 ($\alpha = 618$)	-60°C + 180°C	0.01°C	0.006%R + 0.05°C	-60°C + 180°C	0.01°C	0.006%R + 0.04°C
Ni 120 ($\alpha = 672$)	-40°C + 205°C	0.01°C	0.006%R + 0.05°C	-40°C + 205°C	0.01°C	0.006%R + 0.04°C
Ni1000 ($\alpha= 618$)	-60°C + 180°C	0.01°C	0.006%R + 0.05°C	-60°C + 180°C	0.01°C	0.006%R + 0.04°C
Cu 10 ($\alpha = 427$)	-50°C + 150°C	0,10°C	0.006% R + 0.18°C	-50°C + 150°C	0.01°C	0.006% R + 0.1°C
Cu 50 ($\alpha = 428$)	-50°C + 150°C	0.01°C	0.006% R + 0.05°C	-50°C + 150°C	0.01°C	0.006% R + 0.05°C

Resistive probe measurements in 2,3, or 4 wires : automatic recognition of the number of connected wires with indication on screen.

- The above accuracies are given for 4 wire mounted probes.
- RTD simulation accuracies are given for 1mA current (Pt50,100,Ni100, 120, Cu10,50) ou 0,1mA (Pt200, 500, 1000, Ni1000)
- Errors specific to the temperature sensor and to implementation conditions must be taken into account.
- Acceptable current: 0.01 mA to 1mA;
- Stabilisation time : < 1 ms for simulation (simulation on rapid transmitters)
- Temperature coefficient : < 10 % of accuracy/°C.
- Display in °C or Ohms

Thermocouples: Measurement and Emission

Sensor	Input range	Resolution	Accuracy / 1 year (Measurement)	Output range	Resolution	Accuracy / 1 year (Emission)
K	-250 to -200°C -200 to -120°C -120 to +1 372°C	0.2°C 0.05°C 0.05°C	0.50°C 0.15°C 0.0050 % R + 0.08°C	-250 to -50°C -50 to +120°C +120 to +1020°C +1020 to +1370°C	0.2°C 0.1°C 0.05°C 0.05°C	0.15% R 0.06°C 0.005% R + 0.05°C 0.007% R + 0.05°C
T	-250 to -200°C -200 to -100°C -100 to +80°C +80 to +400°C	0.2°C 0.05°C 0.05°C 0.05°C	0.50°C 0.05% R + 0.06°C 0.015% R + 0.07°C 0.06°C	-250 to -100°C -100 to +0°C +0 to +400°C	0.2°C 0.05°C 0.05°C	0.1% R + 0.05°C 0.02% R + 0.06°C 0.055°C
J	-210 to -120°C -120 to +60°C +60 to +1 200°C	0.05°C 0.05°C 0.05°C	0.15°C 0.005% R + 0.07°C 0.0025 % R + 0.06°C	-210 to +0°C +0 to +50°C +60 to +1 200°C	0.05°C 0.05°C 0.05°C	0.03% R + 0.08°C 0.05% R + 0.07°C 0.005 % R + 0.04°C
R	-50 to +0°C +0 to +150°C +150 to +1 768°C	0,5°C 0.2°C 0.1°C	+0.60°C +0.60°C +0.3°C	-50 to +0°C +0 to +350°C +350 to +1 768°C	0.5°C 0.2°C 0.1°C	0.35% R + 0.4°C +0,4°C +0.25°C
S	-50 to +150°C +150 to +1450°C +1450 to +1 768°C	0,5°C 0.2°C 0.1°C	0,80°C 0.30°C 0.35°C	-50 to +0°C +0 to +350°C +350 to +1 768°C	0.5°C 0.2°C 0.1°C	0.25% R + 0.4°C 0.30°C 0.25°C
B	+400 to +900°C +900 to +1 820°C	0.2°C 0.1°C	0.005 % R + 0,4°C 0.005 % R + 0.2°C	+400 to +900°C +900 to +1 820°C	0.2°C 0.1°C	0.005 % R + 0,4°C 0.005 % R + 0.2°C
U	-200 to -100°C -100 to +660°	0.05°C 0.05°C	+0.13°C +0.09°C	-200 to +400°C +400 to +600°C	0.05°C 0.05°C	+0.09°C +0.11°C
N	-240 to -190°C -190 to -110°C -110 to +0°C +0 to 400°C +400 to +1 300°C	0.2°C 0.1°C 0.05°C 0.05°C 0.05°C	0,25% R 0.1% R 0.04% R + 0.06°C 0.08°C 0.005% R + 0.06°C	-240 to -200°C -200 to +10°C +10 to +250°C +250 to +1300°	0.2°C 0.1°C 0.05°C 0.05°C	0.15 % R +0,10°C +0.08°C 0.008 % R + 0.05°C

Thermocouples: PlatineL, Mo, NiMo/NiCo, G, D, L, C : for specifications, refer to the instruction manual (available on request).

Accuracy is guaranteed for reference junction at 0°C.

If using internal RJ (except couple B) an additional uncertainty of 0.2°C will need to be taken into account.

CJC localisation can be selected by keypad programming, except for thermocouple type B :

- External at 0°C, internal (temperature compensation of the terminals of the instrument) or by programming the temperatures.
- Temperature coefficient: < 10 % of accuracy /°C. Display in °C, °F and K.



CALIBRATION

Thermistors: Measurement and Emission

With the 50Kohm range and the Steinhart –Hart equation, thermistors can be implemented into the THERMYS 150. The Steinhart-hart equation states : $\frac{1}{T} = A + B(\ln(R)) + C(\ln(R))^3$: where A, B, C are calculated according to the temperature : 0°C, 25°C & 70°C

Other functions

File Menu:

The user can save up to 10 full configurations of the instruments and recall them at all times. These configurations include all programming carried out on the unit such as the gauges.

Contrast adjustment:

The contrast of the screen can be adjusted as required.

Battery life:

The THERMYS 150 has a battery life of 8 hours in worst case operating conditions.

Scaling:

This function allows the correction of sensors after calibration.

Relative measurement

- Programming of a reference value different from that of the instrument (NUL function)
- Subtraction of a constant value by measuring or programming it from a measured value (TARE function).

Calculation of statistics:

Continuous display of the average, minimum, maximum values of the measured signal as well as the number of measurements.

Transmitter tests:

Transmitters can be checked using user defined procedures..

Up to 20 procedures can be stored along with associated test results.

Deviation curves displayed

The THERMYS150 is delivered as standard with a set 6 test leads, a battery charger, an instruction manual.

Ordering instructions:

Thermometer/ Calibrator	THERMYS 150	Cable for temperature generator	ACL600
Transport case	ACL 6050		

Simulation Menu:

The simulation value is set by entering the values on the keypad or modifying a specific digit with the cursor.

Generation of ramps:

The start, end and length of the time for the simulation for simple and cyclic ramps as well as the number of ramps in the case of cyclic ramps for all can be programmed.

Simulation of steps:

2 modes are proposed:

- Program mode: Starting value, number of steps and length of time need to be set.
- Manual mode: There are approximately a hundred preset values.

Synthesizer:

The THERMYS 150 allows the manual input of 100 values to regenerate a curve.

Switch test:

The THERMYS 150 can control electronic thermostat and pressostat trigger levels as a function of temperature.

Memory

The THERMYS 150 can record up to 10000 values in one or several rounds of acquisition either automatically or upon user request. Data can be displayed onscreen in the form of a list of a curve.

Compatibility with 21 CFR part 11 standard:
passwords, login, audit trail



CALIBRATION

DATACAL Calibration Management SOFTWARE

Easy to use & comprehensive software

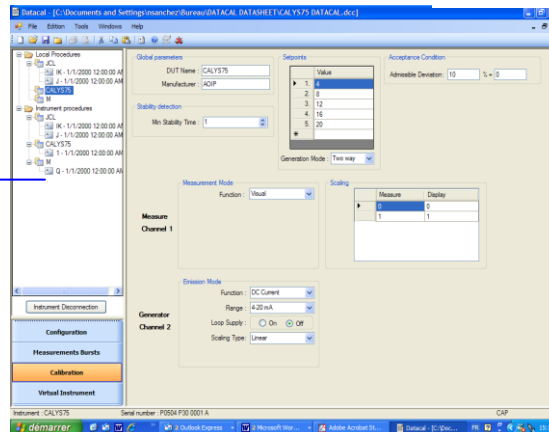
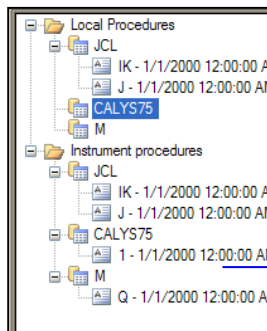
4 Main Functions

Configuration of the instruments

Data management

Calibration

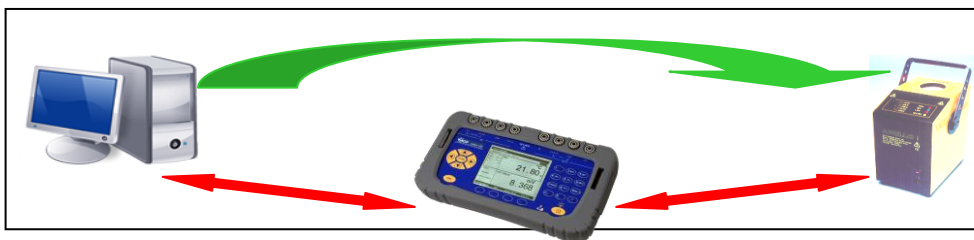
Virtual instrument



Datalcal and Thermys 150 for temperature calibration by comparison

Using the "two measurement channels" of the Thermys 150, and its capacity to drive dry block and calibration baths, Datalcal can monitor the processes while the data is being processed by the Thermys 150.

- Create a calibration procedure by comparison with Datalcal.
- Upload the procedure onto the Thermys150
- Start the procedure
- Download the results into Datalcal once the procedure has terminated.
- Save the data and print the report.



AOIP
BP 182
91133 Ris Orangis CEDEX
FRANCE
+33 169 028 900
www.aoip.com



SOFIMAE laboratory on our premises of Ris-Orangis
*Ranges available on www.cofrac.fr