

high precision thermometer

PHP 602



Main applications include:

- Temperature measurements using RTDs
- Absolute or differential measurements over two channels.
- Calibration of temperature sensors.
- Differential thermal analysis.
- Checking the temperature stability of furnaces or baths.
- Monitoring (alarm) and temperature recording.

Resolution 0.0001 °C

Accuracy 0.009 °C

RTDs

Dual inputs

RS 232 and IEEE 488 interfaces

functions

The PHP 602 is a high accuracy, dual input thermometer suitable for use with RTDs.
If a large number of probes already exists in the data base, the user can at anytime,

create new linearisation tables and the metrological parameters (correction versus standards, serial numbers, names, calibration dates ...) are stored in the memory.

Thanks to these functionalities, PHP 602 is perfectly designed for accurate probes calibration using comparison method and studies of temperature phenomena.

Resistance measurement (1)

All ranges	Stability 24 hours	Accuracy 90 days (2)	Accuracy 1 year (2)
25 to 3 200	0.0005%Cal	0.0030% + 0.0005%	0.0045% + 0.0005%

(1) 4 wire configuration, all currents. For the 3 wire configuration, add 1m .

(2) Accuracy is expressed in \pm (% reading + % range) at $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

Temperature measurement

Direct reading in °C, °F or K.

- From 1 to 4 calibration points may be entered for all types of sensors.
- Digital filter.
- Programming using either the RS 232 link (standard) or the IEEE 488 link (option).
- Storage of up to 5000 measurements together with date.
- Measurements triggered by internal or external event.
- 2 alarm outputs relays.
- Choice of 6 measurement current from 0.125 to 4 mA.

Three current waves: direct, pulse and alternate, together with I/V2 function to define self-heating measurement.

3 or 4 wire configuration.

Measurement of all types of sensors as described below:

- Standardized sensors according to IEC Publication 751/1995,
= 3851, Pt 100, 200, 500 and 1000.
JISC 1604/1989, $\alpha = 3916$, JPt 100.
EIT 90, = 3926, Pt 100.
- DIN 43760, = 618, Ni 100.
- MIL-T 24388C, = 672, Ni 120.

MINCO 16/9, = 427, Cu 10.

- Callendar and Van Dusen equations defined by coefficients (Ro, A, B, C) or by 4 couples of points (resistance/temperature).

- EIT 90 equations defined by R at 0.01°C and the deviation function coefficients or by resistance values at fixed points.

- Polynomial equations defined per point (25 points max.).

Standard sensors	Measurement range	Range	Resolution	Stability 24 hours	Accuracy 90 days (1)	Accuracy 1 year (1)
Pt 100 at 0°C = 3851	- 210 to + 45°C	100	0.0001°C	0.002°C	0.003% + 0.009°C	0.004% + 0.013°C
	- 210 to + 365°C	200	0.0002°C	0.004°C	0.003% + 0.010°C	0.004% + 0.014°C
	- 210 to + 1 100°C	400	0.0005°C	0.010°C	0.003% + 0.012°C	0.004% + 0.016°C
JPt 100 at 0°C = 3916	- 200 to + 44°C	100	0.0001°C	0.002°C	0.003% + 0.009°C	0.004% + 0.013°C
	- 200 to + 358°C	200	0.0002°C	0.004°C	0.003% + 0.010°C	0.004% + 0.014°C
	- 200 to + 510°C	400	0.0005°C	0.010°C	0.003% + 0.012°C	0.004% + 0.016°C
Pt 100 at 0°C = 3926	- 210 to + 45°C	100	0.0001°C	0.002°C	0.003% + 0.009°C	0.004% + 0.013°C
	- 210 to + 357°C	200	0.0002°C	0.004°C	0.003% + 0.010°C	0.004% + 0.014°C
	- 210 to + 850°C	400	0.0005°C	0.010°C	0.003% + 0.012°C	0.004% + 0.016°C
Pt 200 at 0°C = 3851	- 210 to + 45°C	200	0.0001°C	0.002°C	0.003% + 0.009°C	0.004% + 0.013°C
	- 210 to + 365°C	400	0.0002°C	0.004°C	0.003% + 0.010°C	0.004% + 0.014°C
	- 210 to + 1 100°C	800	0.0005°C	0.010°C	0.003% + 0.012°C	0.004% + 0.016°C
Pt 500 at 0°C = 3851	- 210 to + 233°C	800	0.0001°C	0.002°C	0.003% + 0.009°C	0.004% + 0.013°C
	- 210 to + 800°C	1 600	0.0005°C	0.004°C	0.003% + 0.010°C	0.004% + 0.014°C
	- 210 to + 1 200°C	3 200	0.001°C	0.010°C	0.003% + 0.012°C	0.004% + 0.016°C
Pt 1000 at 0°C = 3851	- 210 to + 230°C	1 600	0.0002°C	0.002°C	0.003% + 0.009°C	0.004% + 0.013°C
	- 210 to + 800°C	3 200	0.0005°C	0.004°C	0.003% + 0.010°C	0.004% + 0.014°C
Ni 100 at 0°C = 618	- 60 to + 30°C	100	0.0001°C	0.002°C	0.007°C	0.010°C
	- 60 to + 180°C	200	0.0001°C	0.002°C	0.009°C	0.014°C
Ni 120 at 0°C = 672	- 40 to + 136°C	200	0.0001°C	0.002°C	0.008°C	0.008°C
	- 40 to + 205°C	400	0.0002°C	0.004°C	0.010°C	0.010°C
Cu 10 at 25°C = 427	- 200 to + 260°C	25	0.0002°C	0.004°C	0.003% + 0.010°C	0.0045% + 0.013°C

(1) Accuracy is given in \pm (% reading + n°C) or \pm (n°C) at 23°C \pm 1°C.

general specifications

LCD graphic display with backlighting.
Three languages available for the menus
and on-line help (English, French and
German).

Connection using 4-mm plugs and LEMO
sockets.

Mains supply and optional battery pack.

Presentation

ABS bench-type unit with tilt bail/handle.
Dimensions: 225 x 88 x 310 mm.
Weight: 2 to 3 kg depending on options.

calibration software and accessories

The LCL30 software (see separate leaflet)
enables the user to define automatic cali-
bration procedures.
It provides control of generated or simulat-
ed temperatures and will measure the dif-
ference between the standard thermome-
ter and the sensor being calibrated

This software allows:
- to print and save calibration reports for
all the sensors.
- the user to document and recall the histo-
ry of calibrated sensors with a PC.

• Standard sensor AN 5847 and "work-
ing" standard sensor AN 5848 are
offered with various connections: plug,

DIN socket or LEMO socket.

- LEMO-DIN adapter for connection to the
probe equipped with DIN socket
(PEM 40316).
- T 1200 sensor, standard thermocouple
connectable by using plugs.
- Cable, 2-meter length (ACL 4603) with
LEMO socket at one end and RTD free
sensor connection at the other end.

ordering instructions

High accuracy thermometer PHP 602-1
High accuracy thermometer + battery pack + charger PHP 602-2
High accuracy thermometer with IEEE 488.2 interface PHP 602-3
High accuracy thermometer with battery pack, charger
and IEEE 488.2 interface PHP 602-4

Pt 100 reference sensor with plugs
LEMO Pt 100 reference sensor
LEMO Pt 100 reference sensor
LEMO-DIN adapter
Automatic calibration software

AN 5848-2000
AN 5848-3000
AN 5848-3001
PEM 40316
LCL 30

Accessories

Carrying case AN 6901
Right-angle brackets for panel mounting AN 5883
Rack mounting kit AN 5884
RS 232 cable, 9-pin male/9-pin female AN 5875
IEEE 488 cable, 2-meter AN 5836
LEMO socket to be wired ER 48379
Cable, 2-meter, LEMO/free ACL 4603
Pt 25 reference sensor AN 5681
Pt 100 standard sensor with plugs AN 5847-2000
LEMO Pt 100 standard sensor AN 5847-3000

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Specifications are subject to modification without prior notice