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 ± (% reading + % range) at 23°C ± 1°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, α = 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 - 210 to + 365°C - 210 to 1 100°C	100 200 400	0.0001°C 0.0002°C 0.0005°C	0.002°C 0.004°C 0.010°C	0.003% + 0.009°C 0.003% + 0.010°C 0.003% + 0.012°C	0.004% + 0.013°C 0.004% + 0.014°C 0.004% + 0.016°C
JPt 100 at 0°C = 3916	- 200 to + 44°C - 200 to + 358°C - 200 to + 510°C	100 200 400	0.0001°C 0.0002°C 0.0005°C	0.002°C 0.004°C 0.010°C	0.003% + 0.009°C 0.003% + 0.010°C 0.003% + 0.012°C	0.004% + 0.013°C 0.004% + 0.014°C 0.004% + 0.016°C
Pt 100 at 0°C = 3926	- 210 to + 45°C - 210 to + 357°C - 210 to + 850°C	100 200 400	0.0001°C 0.0002°C 0.0005°C	0.002°C 0.004°C 0.010°C	0.003% + 0.009°C 0.003% + 0.010°C 0.003% + 0.012°C	0.004% + 0.013°C 0.004% + 0.014°C 0.004% + 0.016°C
Pt 200 at 0°C = 3851	- 210 to + 45°C - 210 to + 365°C - 210 to 1 100°C	200 400 800	0.0001°C 0.0002°C 0.0005°C	0.002°C 0.004°C 0.010°C	0.003% + 0.009°C 0.003% + 0.010°C 0.003% + 0.012°C	0.004% + 0.013°C 0.004% + 0.014°C 0.004% + 0.016°C
Pt 500 at 0°C = 3851	- 210 to + 233°C - 210 to + 800°C - 210 to 1 200°C	800 1 600 3 200	0.0001°C 0.0005°C 0.001°C	0.002°C 0.004°C 0.010°C	0.003% + 0.009°C 0.003% + 0.010°C 0.003% + 0.012°C	0.004% + 0.013°C 0.004% + 0.014°C 0.004% + 0.016°C
Pt 1000 at 0°C = 3851	- 210 to + 230°C - 210 to + 800°C	1 600 3 200	0.0002°C 0.0005°C	0.002°C 0.004°C	0.003% + 0.009°C 0.003% + 0.010°C	0.004% + 0.013°C 0.004% + 0.014°C
Ni 100 at 0°C = 618	- 60 to + 30°C - 60 to + 180°C	100 200	0.0001°C 0.0001°C	0.002°C 0.002°C	0.007°C 0.009°C	0.010°C 0.014°C
Ni 120 at 0°C = 672	- 40 to + 136°C - 40 to + 205°C	200 400	0.0001°C 0.0002°C	0.002°C 0.004°C	0.008°C 0.010°C	0.008°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 ± (% reading + n°C) or ± (n°C) at 23°C ± 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 calibration procedures.
It provides control of generated or simulated temperatures and will measure the difference between the standard thermometer 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 history of calibrated sensors with a PC.

• Standard sensor AN 5847 and "working" 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 — AN 5848-2000
LEMO Pt 100 reference sensor — AN 5848-3000
LEMO Pt 100 reference sensor — AN 5848-3001
LEMO-DIN adapter — PEM 40316
Automatic calibration software — 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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