HIOKI

2002

# 3441(-02)/3442(-03)/3446-01/3447-01 TEMPERATURE HiTESTERs

New

Environmental Test Equipment


3447

## 3447-01 for HACCP Temperature Recording/Management (New!)

- Compatible with Platinum temperature-measurement resistors (Pt 100) (-100˚C to 300˚C)
- Waterproof construction (IP67), 2-channel measurement
- Accommodates a temperature probe with hand switch
- Record temperature, time, and name of measurement object
- Record using either interval (28,800 data items) or manual (7,200 data items) recording modes

## 3446-01 For Temperature Recording/Management in Energy Conservation Applications (New !)

- 1-channel recording for use with Thermocouple (Type K) sensors (-100 C to 1000 C*)


3442

## 3442(-03) With Water-resistant Construction for Use in Damp Environments

- Use with Thermocouple (Type K) sensor with water-resistant construction (-100˚C to 1300˚C*)
- Max/min temperature recording

## 3441(-02) Basic Temperature HiTESTER

- Thermocouple (Type K) sensor (-100˚C to 1300˚C*)
- A choice of temperature sensors for different applications

* Measurable temperature range varies according to temperature sensor type.

ISO14001
JQA-E-90091

# Temperature Management of Food Preparation

## 3446-01, 3447-01 Record data and memos using either manual or interval recording mode.

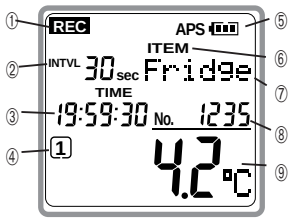
- 3447-01 has waterproof construction in both thermometer and sensor.
- 2-channel Class A temperature measurement using a platinum temperature-measurement resistor
- Single-channel recording with 3446-01 using type K thermocouple (-100˚C to 1000˚C).
- Both provide two recording modes, manual and interval, allowing recording at arbitrary times or at set intervals.
- Records product name and inspector name or pass/fail result along with temperature.
- Send data to a computer by RS-232C connection.
- Print recorded data*2 (using the optional 9670 printer)

*1 Maximum recording time in interval recording mode

When using only interval recording, the relationship between recording interval and maximum recording time are as shown below:
Note that the amount of continuous recording time available may be limited by remaining battery charge.

| Interval Recording | Recording Time | Interval Recording | Recording Time | Interval Recording | Recording Time | Interval Recording | Recording Time |
|---|---|---|---|---|---|---|---|
| 1 second | 8 hours | 15 seconds | 5 days | 1 minute | 20 days | 15 minutes | 300 days |
| 2 seconds | 16 hours | 20 seconds | 6 days, 16 hours | 2 minutes | 40 days | 20 minutes | 400 days |
| 5 seconds | 1 days, 6 hours | 30 seconds | 10 days | 5 minutes | 100 days | 30 minutes | 600 days |
| 10 seconds | 3 days, 8 hours | | | 10 minutes | 200 days | 60 minutes | 1200 days |

### Screen Display




① REC: recording
② INTVL: Interval recording mode, recording interval
③ Time display
④ Channel number being recorded (3447-01)
⑤ APS: auto power save function ON and battery charge remaining display
⑥ ITEM/ID: Product name/name of inspector
⑦ Memo, such as product name
⑧ Data number
⑨ Temperature display

## 3447-01 Measurement Specifications

| | | |
|---|---|---|
| Sensor type | : | Platinum temperature-measurement resistor Pt 100 (3 line type) |
| Measurement current | : | 0.5 mA |
| No. of inputs | : | 2 channel |
| Measurement range | : | -100.0 to 300.0˚C |
| Resolution | : | 0.1˚C |
| Measurement accuracy, thermometer | : | ±0.1% rdg. ±0.4˚C |
| Sampling rate | : | 1/second |
| Water resistance | : | IP67 (EN60529:1991) |

## 3446-01 Measurement Specifications

| | | |
|---|---|---|
| Sensor type | : | Type K thermocouple |
| No. of inputs | : | 1 channel |
| Measurement range | : | -100 to 1000˚C |
| Resolution | : | 0.1˚C (-100.0 to 300.0˚C), 1˚C (-100 to 1000˚C) |
| Measurement accuracy, thermometer | : | ±0.1% rdg. ±0.5˚C (with 0.1˚C resolution)<br>±0.2% rdg. ±1˚C (with 1˚C resolution) |
| Sampling rate | : | 1/second |

## 3446-01 / 3447-01 Common Specifications

Measurement Modes

Manual recording : Temperature recording by key operation
(Recording also possible via the key on the handle of the 9479 Temperature Probe. 3447-01 only)
Data recorded : Time, temperature, item, ID, comparator test result
Data items recorded : Max 7,200 (for the 3447-01: 4,800 with 2-ch recording)

Interval recording : Measurement values recorded at a set interval
Data recorded : Time, temperature, item, ID, comparator test result
Data items recorded : Max 28,800 (with the 3447, 14,400 with 2-ch recording)
Recording interval : OFF, 1, 2, 5, 10, 15, 20, or 30 seconds,
1, 2, 5, 10, 15, 20, 30, or 60 minutes
* Manual recording when set to OFF

Display

LCD display : Measured temperature, date, time, item, ID, etc.
Item display : 12 character (alphanumeric) item display, holds up to 300 entries
ID display : 12 character (alphanumeric), holds up to 100 entries
* Item and ID settings can be made from a computer using the 9674 PC software.

Functions

Comparator : Set for individual items (Hi, IN, Lo evaluation)
Result output : Result display, buzzer output

Clock : Real time control (year, month, day, hour, minute, second)
Data read-out : Measurement data, time, data number
Display hold : Holds measurement value.
Auto power save : Automatically switches the power off if no key is pressed for 10 minutes. Display automatically turned off during interval recording.
* Auto power save function can be disabled.
Data backup : Measurement data, Setting data
Communications interface : RS-232C (using dedicated cable)
Applicable ratings : Safety, EN61010-1:1993+A2;1995; Over-voltage category I, Pollution degree 2/EMC EN613260-1:1997+A1:1998
Operating temperature/humidity range : 0 to 40˚C, 80% RH or less (non-condensating)
Storage temperature/humidity range : -10 to 50˚C, 80% RH or less (non-condensating)
Power supply : 4 LR03 (AAA) alkaline dry cell batteries
Maximum rated power : 60 mVA
Continuous use time : 15 days (at 20˚C, with auto power save disabled)
1 month (at 20˚C, using auto power save, with a recording interval of 1 minute)
Dimensions/weight : Approx. 66 x 150 x 31.5 mm (2.6 x 5.9 x 1.25 in), approx. 240 g (8.47 ozs)
Accessories : Batteries, strap band

# and Storage, Support for Electronic Device Temperation Control

## Settings can be made from and data transferred to a connected computer

When a PC is connected to the 3446-01/3447-01, it can be used to make various settings (item, ID, comparator), or to store recorded data transferred from the Temperature HiTESTER. Computerization of temperature management can greatly increase work efficiency. The optional 9674 RS-232C Package is used for PC communications.

### 9674 RS-232C Package (Optional)

(Package contents: RS-232C cable, PC software on CD-ROM)

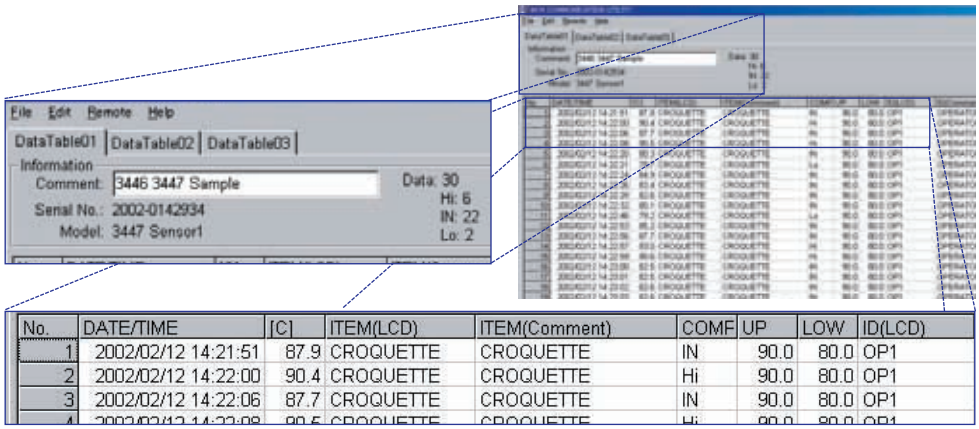
RS-232C cable (cable length: 2 m; Connector on PC side: Dsub-9 pin; Connector on thermometer side: Dedicated connector)

- PC software (Windows 95/98/Me/NT 4.0/2000/XP compatible)

  Functions: Item/ID setting, comparator setting, data list display, graph display, printing, file storage (in proprietary format or text format)

### *2 9670 Printer

When outputting recorded data to the optional 9670 Printer, use the RS-232C cable provided in the 9674 RS-232C Package and a commercially-available connector adapter (male Dsub-9 pin <-> male Dsub-25 pin).

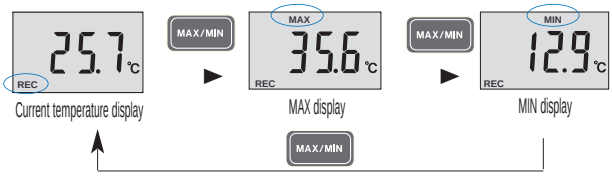



| No. | DATE/TIME | [C] | ITEM(LCD) | ITEM(Comment) | COMP | UP | LOW | ID(LCD) |
|---|---|---|---|---|---|---|---|---|
| 1 | 2002/02/12 14:21:51 | 87.9 | CROQUETTE | CROQUETTE | IN | 90.0 | 80.0 | OP1 |
| 2 | 2002/02/12 14:22:00 | 90.4 | CROQUETTE | CROQUETTE | Hi | 90.0 | 80.0 | OP1 |
| 3 | 2002/02/12 14:22:06 | 87.7 | CROQUETTE | CROQUETTE | IN | 90.0 | 80.0 | OP1 |

## 3441/3442 Extended Operation, Max/Min Temperature Recording, Water-resistant Construction (3442 only)

- The 3442 has a water-resistant construction for use in damp environments.
- Measurement in damp environments is possible by using the thermometer in combination with the 9472 or 9475 temperature probe.
- Choose from 9 different temperature sensors (optional), according to your application.
- Switching between °C/°F display (3441-02, 3442-03)

- Recording of maximum temperature (MAX) and minimum temperature (MIN)




The 3441 and 3442 support temperature management by recording maximum and minimum temperatures in memory after the REC START key is pressed. By pressing the MAX/MIN key, you can switch to display of the current maximum and minimum temperatures at any time, even during recording.

## 3441/3442 Specifications (accuracy at 23°C ±5°C, 80% RH or less)

| | | |
|---|---|---|
| Sensor | : | Type K thermocouple |
| Measurement range | : | -100°C to 1300°C (-148°F to 2372°F) |
| Resolution | : | 0.1°C (100 to 199. 9°C), 1°C (200 to 1300°C)/ 0.1°F (-148°F to 392°F), 1°F (393°F to 2372°F) |
| Measurement accuracy, thermometer | : | ±0.1% rdg. ±0.8°C (from -100 to 199.9°C)/ ±0.1% rdg. ±1.5°F (-148°F to 392°F)<br>±0.2% rdg. ±1°C (from 200 to 1300°C)/±0.2% rdg. ±1.8°F (393°F to 2372°F)<br>(Accuracy of temperature sensor is added.) |
| Temperature coefficient | : | 0.03°C/°C (from -100 to 199.9°C) / 0.054°F/°F (-148°F to 392°F)<br>0.05°C/°C (from 200 to 1300°C) / 0.09°F/°F (393°F to 2372°F) |
| Sampling rate | : | 2 / second |
| Display | : | LCD display |
| Reference contact compensation | : | Automatic |
| Functions | : | Max/Min temperature recording and display, display data hold, sensor discontinuity display (----), over-range display (O.F, - O.F), auto power save (operates after 30 minutes, can be disabled), low battery warning |

| | | |
|---|---|---|
| Operating environment | : | Indoors, at altitude up to 2000 m |
| Usable temperature/humidity range of main unit | : | 0 to 40°C (32°F to 104°F), 80% RH or less (non-condensating) |
| Storage temperature/humidity range of main unit | : | -10 to 50°C (14°F to 122°F), 80% RH or less (non-condensating) |
| Applicable ratings | : | Safety, EN61010-1:1993+A2:1995<br>Pollution index 2, over-voltage category I<br>EMC:EN55011, EN50082<br>Water-resistant construction: EN60529:1991 IP54 |
| Power supply | : | 4 R6P manganese dry cell batteries or 4 LR6 alkaline batteries (AAA) |
| Maximum rated power | : | 35 mVA |
| Continuous operating time | : | 200 hours or more (using manganese batteries) |
| Dimensions/weight | : | Approx. 74(W) x 155(H) x 24(D) mm (2.6 x 5.9 x 0.95 in), approx. 160g (5.6 oz) (not including batteries or sensor) |
| Accessories | : | Batteries, strap band |

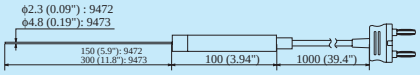
# Choose from a wide range of temperature sensors for various applications (optional)

1=mm (inch)

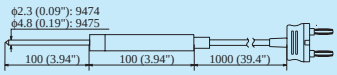
## TEMPERATURE PROBE for 3441 / 3442

:water--resistant structure

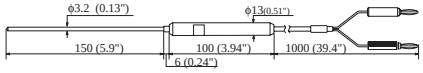
### 9472 / 9473 SHEATH TYPE



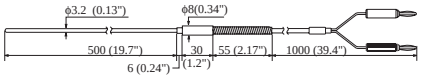

### 9474 / 9475 SHEATH TYPE



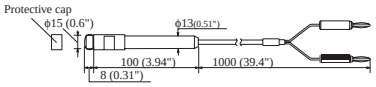

### 9180 / 9183 SHEATH TYPE



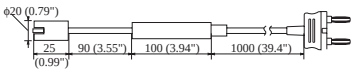

### 9182 SHEATH TYPE




### 9181 SURFACE TYPE

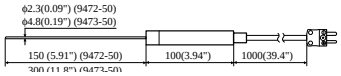



### 9476 SURFACE TYPE

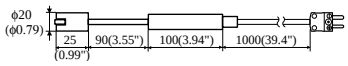



## TEMPERATURE PROBE for 3446-01

### 9472-50 / 9473-50 SHEATH TYPE



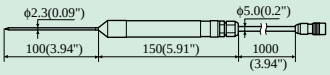

### 9476-50 SURFACE TYPE



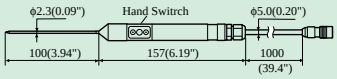

## TEMPERATURE PROBE for 3447-01

:waterproof structure

### 9478 SHEATH TYPE




### 9479 SHEATH TYPE with Hand Switch




## Related Products

### Management of temperature recordings

The 3412-50 produces a voltage output of 1 mV per degree Centigrade.Using the thermometer and recorder together allows recording of temperature variations.

* The CE marking does not pertain to the waterproof structure. Also, the recorder, 9036 AC adapter, 9094 output cord, and temperature probes are optional.

Range: –50˚C to 999˚C (–58 to 1830˚F), Sensor : Thermocouple K (CA), Unit accuracy: ±0.2% f.s.±1dgt. Analog output: 1mV / ˚C, Power supply: 6F22 battery

**3412-50 TEMPERATURE HiTESTER**

| | water-resistant structure | | | | | | | | | waterproof structure | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item | 9472 (-50) | 9473 (-50) | 9474 | 9475 | 9183 | 9180 | 9476 (-50) | 9181 | 9182 | 9478 | 9479 |
| Thermocouple material | K type (Chromel/Almel) | | | | | | | | | Pt 100(3-wires)*1 | |
| Tolerance | The greater of ±1.5˚C(2.7˚F) or ±0.4% of measured temperature | | | | | The greater of ±2.5˚C(4.5˚F) *2 | | | | ± 0.15˚C ±0.002 T*3 | |
| Response (90%)* | About 5 sec | About 10 sec | About 5 sec | About 10 sec | About 5 sec | | About 3 sec | | About 5 sec | About 5 sec | |
| Size of Sheath | ϕ2.3×150mm | ϕ4.8×300mm | ϕ2.3×100mm | ϕ4.8×100mm | ϕ3.2×150 mm | | ϕ20 mm | ϕ15 mm | ϕ3.2×500mm | ϕ2.3×100 mm | |
| Cable | General use (–20˚C to 90˚C,– 4˚F to 194˚F) 1 m | | | | | | | | (0˚C~150˚C) 2m | (– 40˚C~120˚C) 1m | |
| Grip heat resistance | 80˚C | | | | 150˚C | | 80˚C | 150˚C | 90˚C | 80˚C | |
| Max use temperature | –100~300˚C<br>–148~572˚F | 0~800˚C<br>32~1472˚F | –100~300˚C<br>–148~572˚F | –100~500˚C<br>–148~932˚F | –50~750˚C<br>–58~1382˚F | | –40~500˚C<br>–40~932˚F | –50~400˚C<br>–58~752˚F | –50~750˚C<br>–58~1382˚F | –100~300˚C<br>–148~572˚F | |

* Sheath type: Responsiveness in ice water at 0˚C (32˚F) and in boiling water at 100˚C(212˚F)
Surface type: Responsiveness on a metal surface at 0˚C (32˚F) and at 100˚C(212˚F)

*1 Platinum Temperature-measurement Resistor
*2 9180, 9182: The greater of ±2.5˚C(4.5˚F ) or ±0.75% of measured temperature
9476: (–0.03 ×T)˚C to + 2.5˚C at 100˚C<(T–Ts)
9181: (–0.035×T)˚C to + 2.5˚C at 100˚C<(T–Ts)
T: measured temperature, Ts: environmental temperature
*3 T: measured temperature

**3446-01** TEMPERATURE HiTESTER
**3447-01** TEMPERATURE HiTESTER

### Options for 3446-01, 3447-01

| | |
|---|---|
| 9674 | RS-232C PACKAGE (with PC Software) |
| 9386-01 | CARRYING CASE |
| 9472-50 | SHEATH TYPE TEMPERATURE PROBE |
| 9473-50 | SHEATH TYPE TEMPERATURE PROBE |
| 9476-50 | SURFACE TYPE TEMPERATURE PROBE |
| 9478 | SHEATH TYPE TEMPERATURE PROBE |
| 9479 | SHEATH TYPE TEMPERATURE PROBE |
| 9670 | PRINTER (with 1 roll of Recording Paper) |
| 9671 | AC ADAPTER for 9670 |
| 9237 | RECORDING PAPER (for 9670, 80mm × 25m, 4 rolls) |

**3441** TEMPERATURE HiTESTER ( ˚C only)
**3442-02** ( ˚C/ ˚F selectable)
**3442** TEMPERATURE HiTESTER( ˚C only)
**3442-03** ( ˚C/ ˚F selectable)

### Options for 3441(-02), 3442(-03)

| | |
|---|---|
| 9180 | SHEATH TYPE TEMPERATURE PROBE |
| 9181 | SURFACE TYPE TEMPERATURE PROBE |
| 9182 | SHEATH TYPE TEMPERATURE PROBE |
| 9183 | SHEATH TYPE TEMPERATURE PROBE |
| 9472 | SHEATH TYPE TEMPERATURE PROBE |
| 9473 | SHEATH TYPE TEMPERATURE PROBE |
| 9474 | SHEATH TYPE TEMPERATURE PROBE |
| 9475 | SHEATH TYPE TEMPERATURE PROBE |
| 9476 | SURFACE TYPE TEMPERATURE PROBE |
| 9386 | CARRYING CASE |