COMARK

test and measuring equipment

product catalogue

# Comark - your first choice

**Comark is the leading name in electronic measurement instruments for almost every industry and application.**

The extensive ranges of instruments include hand held contact and infra red thermometers, pressure, humidity and pH meters, temperature and humidity data loggers, graphic display monitors, data management and monitoring systems, and a precision scanning thermometer. In addition there is a comprehensive range of temperature probes, calibration equipment and facilities for certification, calibration, service and repair.

Comark can supply everything needed for all manufacturing and processing, including the food and pharmaceutical sectors, and to support HACCP and other due diligence quality requirements. There are also instruments designed specifically for scientific and research work, heating, ventilating, air conditioning and refrigeration, building services and ATEX compliant models for intrinsically safe applications.

## CALIBRATION AND CERTIFICATION

Comark has two in-house calibration laboratories for maximum convenience. Certification can be carried out on new instruments or those returned for service or repair. The Comark UKAS (United Kingdom Accreditation Service) accredited calibration laboratory is one of the finest in the UK and can supply UKAS certificates of calibration for instruments and probes. UKAS has recognition agreements with many countries throughout the world, through organisations such as IAF (International Accreditation Forum), EA (European Co-operation on Accreditation) and ILAC (International Laboratory Accreditation Co-operation). Full details are available on the UKAS website, www.ukas.com.

The second laboratory supplies NPL traceable certificates of calibration.

For more information please contact the Comark Sales Office, your local Comark distributor or Comark Instruments Inc. in the USA. Please refer to the back cover for full address details.
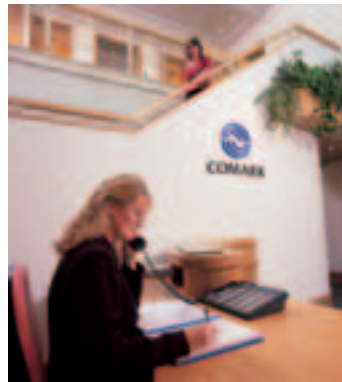
## WARRANTY

All Comark Instruments have a minimum one-year warranty unless otherwise stated. The warranty period for temperature probes is six months and all other probes and electrodes are unwarranted because the conditions of use are beyond our control.

The Comark warranty covers manufacturing defects and component failure and applies worldwide. The warranty does not affect your statutory rights.

In line with our policy of continuous development we reserve the right to alter any product specifications without notice.

All products marked * are designed by or designed and manufactured by Comark Limited to the highest quality standard in accordance with the company's certification under ISO 9001.

CERTIFICATE No. FM12129
ISO 9001

UKAS
CALIBRATION
0451

# INDEX

# Choosing the right instrument

COMARK

Comark has made it easy to select the right instrument. The chart below sets out instrument recommendations according to industry sectors.

The specification of each recommended instrument can then be used as a guide to specific applications.

| PRODUCT | Chemical | Defence | Engineering | Engineering Consultant | Estates and Facilities | Food Consultant | Food Manufacture/Processing | Food Retail | Food Service Sector/Catering | Health Service | HVAC | HVAC Consultant | Local Authority | Logistics | Manufacturing | Processing | Refrigeration | Scientific/Laboratory/Research | University | PAGE |
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# N5000 Series HACCP Auditor
## Data Management and Monitoring - Tomorrow's Solution Today

COMARK



**The Comark HACCP Auditor is a completely new and unique concept in hand held instrumentation for logging, monitoring and managing data.**

Specifically designed for use in HACCP, due diligence and health and safety systems, the instrument can be fully programmed, using the Auditor software, to suit the application, thus providing the flexibility and recording functions of palm held organisers.

Not only can vital data be collected on temperature or any event defined by the programmer, stored in the large memory and downloaded to a PC, whenever required, but the highly advanced Auditor software, with almost limitless programming capability, also enables the management and control of processes.

This is achieved through the logging of location/product/suppliers and other parameters, together with programmed corrective actions for out-of-limit temperatures and events. The free-form flowchart programming enables the user interface to be customised to match the abilities of whoever operates the instrument and does not require specialist IT skills. In selected tasks, timed and dated reminders for actions can also be automatically displayed.

The facility to define the required tasks from the software, from data collection to follow-up actions, with a complete log available on a PC or for printing out, makes the instrument ideal for use in HACCP, due diligence and other quality procedures.

## BENEFITS

HACCP Auditor benefits include:

- Provision of effective due diligence records
- Effective and efficient data capture relating to all aspects of HACCP land Health and Safety, not just temperature
- Easy and efficient data analysis with reduced costs of processing
- Faster responses to identified problems
- Minimisation of human error
- Elimination of paper records
- Easy programming with no need for IT specialists

The HACCP Auditor can be used in every aspect of manufacture and processing, especially in the food and pharmaceutical industries. Almost any type of task or check can be programmed into the instrument, such as checks and actions on damage, quantity, reference numbers and sell-by dates for incoming deliveries or the inspection of sub-assemblies and finished goods on production lines and in processing.

A typical example of recording and corrective actions would be the measurement of cooking temperatures. The required temperature for thoroughly cooked food would be programmed into the Auditor and temperature checks would produce the automatic display of instruction messages. These could include messages advising the user to stop cooking when the measured temperature reaches that required by the programming, or to continue cooking until the optimum temperature is reached.

# N5000 Series HACCP Auditor

## Data Management and Monitoring - Tomorrow's Solution Today

**COMARK**



① 

**2 YEAR WARRANTY**

② 

### ❶ *N5001 HACCP AUDITOR

The N5001 instrument has a large, full graphic display that can be easily accessed from the five-button keypad. The keypad is simple to use with three "hot" buttons whose functions are shown on the display. Users can scroll through option lists via the "up" and "down" arrow buttons and the keypad can be set for right or left hand use each time the instrument is used - ideal for multi-user applications.

The instrument has an 8-pin Lumberg socket for secure temperature probe attachment or for connection to a PC for programming or downloading data. Instrument facilities include:

- Temperature measurement ranges from –200°C to +400°C, type T thermocouple and –200°C to +700°C, type K thermocouple
- Memory, approximately 3000 readings
- Full security with authorised users and pin numbers built into programming
- Robust case made from food safe ABS and dust and waterproof to IP67 standards
- Exclusive range of type K and T thermocouple temperature probes
- Large, clear, backlit graphic display
- Low running costs with over 500 hours use from one set of batteries
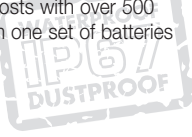
### ❷ AUDITOR SOFTWARE

The software enables full programming, data retrieval, viewing of data on screen, archiving of data and later retrieval from memory. Data is stored in a secure database of readings and can be filtered, sorted and printed. Databases can be exported to stand-alone spreadsheet or database packages in full or solely consisting of the exceptions – any reading outside the set limits for the event or measurement parameter. The software is supplied with a PC communications lead for use with the instrument. Facilities include:

- Entry and storage of temperature and non-temperature variables, e.g. number of units, yes/no responses or dates
- Automatic corrective actions if pre-defined criteria are not met
- Temperature profiling – ideal for cooling of hot foods and hot and cold food holding
- Fast data download
- Clear tabular data with optional exception reporting, sorting and filtering
- Data export capability
- Unique instrument simulation for validating the customer's programmed tasks and actions

### KITS AND ACCESSORIES

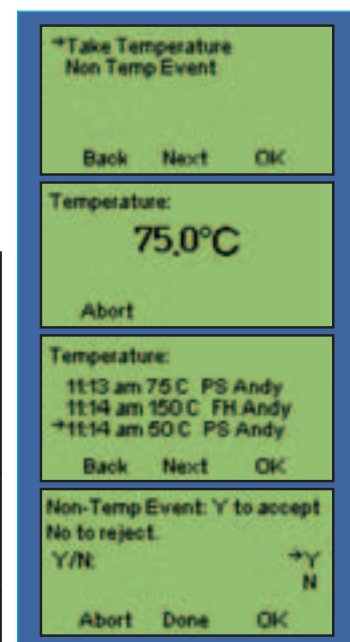For kit details please refer to the Comark price list.

**N5001KIT**

*CRS/4 Protective rubber boot.

*N5000S1 Auditor Software with communications lead.

A unique range of temperature probes is available for the N5001, with 8-pin Lumberg connectors. These are detailed on pages 24 to 27.



*The instrument can be programmed to suit the individual needs of the user. The images above show four typical displays.*

| Sensors | Type K or T thermocouple |
|---|---|
| Connector | Lumberg 8-pin |
| Measurement Range | |
|     Type K | –200°C to +700°C |
|     Type T | –200°C to +400°C |
| Display Resolution | 0.1°C |
| Instrument Accuracy | <±0.2% of reading, ±0.2°C full ambient range |
| **General** | |
| Display | Full graphic display LCD, 128 x 64 pixels |
| Operating Range | –20°C to +50°C |
| Memory | Approximately 3000 readings |
| Environmental Protection | IP67, BS 60529, IEC 529 |
| Case Material | Food safe ABS |
| Communications | RS232 via Lumberg 8-pin connector |
| Battery Type | 2 x 1.5V AA IEC LR6 Alkaline |
| Battery Life | Minimum of 500 hours (backlight not used) |

# Comark Foodcheck
## Food Safety Temperature Measurement for the Professional

**COMARK**





**Comark Foodcheck brings together selected thermometers that will appeal to everyone throughout the food industry, in production, processing, storage, distribution, retailing or catering.**

Major benefits include:
- Rechargeable batteries fitted to two variants of the N9092 and the long-life battery, lasting up to ten years, fitted to the N9091, with consequently lower operating costs
- Lumberg connectors on most models for improved prevention of food and liquid ingress and more secure probe connections

- Accuracy levels that meet the food safety hygiene regulations
- Advanced case designed for tough environments - dust and waterproof to IP67 standards, easy to clean, no dirt traps, soft-touch keypads and easy access to the battery compartment
- Free certificate of conformity

# Comark Foodcheck
## Food Safety Temperature Measurement for the Professional

**COMARK**

2 YEAR WARRANTY

### ❶ *N9092 IDEAL FOR HEAVY DUTY PROCESSING

- Selectable °C and °F scales
- Lumberg connector for secure probe connection
- Compatible with Thermistor and Type T thermocouple temperature probes for accuracy and speed of response
- Operates at temperatures as low as −25°C for accurate readings in sub–zero environments
- Selectable auto switch off to save battery power

WATERPROOF P67 DUSTPROOF

### ❷ *N9092R WITH RECHARGEABLE BATTERY

WATERPROOF P67 DUSTPROOF

- Thermistor sensor for higher accuracy
- Environmentally friendly, rechargeable battery
- Battery has up to a five-year service life for huge operating cost savings
- 200 hour battery life between recharges
- Sealed battery compartment
- Lumberg connector for overnight recharging
- Compatible with a wide range of temperature probes
- Selectable °C and °F scales
- Operates at temperatures as low as −25°C for accurate readings in sub–zero environments
- Selectable auto switch off to save battery power

❶

2 YEAR WARRANTY

- Available with battery charger unit supplied, order code – N9092R/KIT or as thermometer only – order code N9092R

### ❸ *N9092RT WITH RECHARGEABLE BATTERY

WATERPROOF P67 DUSTPROOF

The specification of the N9092RT is identical to that of the N9092R except for the sensor:

- Type T thermocouple sensor for speed of response
- Available with battery charger unit supplied, order code – N9092RT/KIT or as thermometer only – order code N9092RT

❷  ❸  ❹  ❺

### ❹ *N9091 WITH LONG-LIFE BATTERY

The N9091 Foodcheck thermometer is designed for heavy-duty use throughout the food-processing sector. It combines a long-life battery with the easy-clean, dust and waterproof case.

- New sealed, long-life battery lasts up to ten years
- Thermistor sensor for higher accuracy
- °C scale
- Lumberg connector for secure probe connection
- Compatible with wide choice of temperature probes
- Auto switch off to save battery power

### ❺ *N9009

WATERPROOF P67 DUSTPROOF

- Type T thermocouple sensor for speed of response
- Operates at temperatures as low as −25°C for accurate readings in sub–zero environments
- Sub-miniature connector
- Selectable °C and °F scales

### ❻ FOODCHECK KITS AND ACCESSORIES

For kit details please refer to the Comark price list.

- Ⓐ **N9092/EHO/KIT** Designed for Quality Assurance and Environmental Health applications.
- Ⓑ ***CRS/4** Protective rubber slip-on boot, with wrist strap.
- Ⓒ **MC29** Medium size carrying case.
- Ⓓ **LC98** Large size carrying case.

❻      Ⓑ      Ⓐ   Ⓒ   Ⓓ

| | N9092 | N9092R | N9092RT | N9091 | N9009 |
|---|---|---|---|---|---|
| Sensor Type | Thermistor/ Type T Thermocouple | Thermistor – | Type T Thermocouple – | Thermistor – | Type T Thermocouple – |
| Scales | °C/°F | °C/°F | °C/°F | °C | °C/°F |
| Measurement Range | | | | | |
|   Thermistor | -80°C to +150°C | -80°C to +150°C | – | −40°C to +110°C | – |
|   Type T Thermocouple | −200°C to +400°C | – | −200°C to +400°C | - | −200°C to +400°C |
| Resolution | 0.1° | 0.1° | 0.1° | 0.1° | 0.1° |
| System Accuracy, Thermistor at +23°C | | | | | |
|   0°C to +70°C | <±0.3°C | <±0.3°C | – | ±0.5°C | – |
|   −25°C to +110°C | <±0.5°C | <±0.5°C | – | – | – |
| System Accuracy, type T* Thermocouple at +23°C | | | | | |
|   0°C to +70°C | ±0.5°C | – | ±0.5°C | – | ±0.5°C |
| Environmental Protection to IP67, BS EN60529, IEC 529 | YES | YES | YES | YES | YES |
| Operating Temperature Range | −25°C to +50°C | −25°C to +50°C | −25°C to +50°C | 0°C to +40°C | −25°C to +50°C |
| Battery Type | 2 x IEC LR6, size AA | Rechargeable | Rechargeable | Lithium | 2 x IEC LR6, size AA |
| Battery Life | 200 hours | 5 years | 5 years | 10 years** | 200 hours |
| *Typical accuracy at +23°C with a Comark probe  ** Based on a usage of 4 hours a day over 7 days per week | | | | | |

# Food Thermometers

**The range offers a wide choice of instruments to suit all applications including waterproof, full size slimline, pocket and mini thermometers.**

Sensor types include thermistor for high accuracy and type T thermocouple with measurement range covering deep frozen foods to deep fat frying, both meeting the food hygiene regulations, plus type K thermocouple for the widest measurement range.

### ❶ *CF21 WITH LONG-LIFE BATTERY

CF21 is the latest version of the best selling professional catering thermometer. The long-life battery offers even greater value for money and lower operating costs throughout kitchens, contract catering and food retail outlets.

- New sealed, long-life battery lasts up to ten years
- Dust and waterproof case, designed to meet IP55 standards
- Fast response thermistor sensor for higher accuracy
- Lumberg connector for secure probe connection
- Compatible with wide choice of temperature probes
- Auto switch off to save battery power

### ❷ *KM22 HIGH ACCURACY AND WIDE MEASUREMENT RANGE

- High accuracy catering thermometer with extended temperature range to +400°C
- Compatible with Thermistor and Type T thermocouple temperature probes for accuracy and speed of response
- Operates at temperatures as low as −25°C for accurate readings in sub–zero environments
- Lumberg connector for secure probe connection
- Selectable auto switch off to save battery power

### ❸ *KM25

- Type T thermocouple sensor for fast response
- Dust and waterproof case, designed to meet IP55 standards
- Lumberg connector for secure probe connection
- Choice of scales, order KM25C/H for °C or KM25F for °F
- Hold function to freeze current reading on °C models

- Auto switch off to save battery power
- Up to 1000 hours battery life

### ❹ *KM26

Version of KM25 with sub-miniature connector. Order KM26C/H for °C or KM26F for °F.

### ❺ KM28B

- Type K thermocouple sensor
- Sub-miniature connector
- Supplied with CRS/5 protective rubber boot
- Auto switch off to save battery power

### ❻ KITS

For kit details please refer to the Comark price list.

A **CF21/PCKIT** Professional Caterer's Kit.

B **CF21/FKIT** Food Kit.

C **KM22/EHO/KIT** Designed for Quality Assurance and Environmental Health applications.

D **KM25C/H/KIT** Professional Caterer's Kit.

D **KM25F/KIT** Professional Caterer's Kit.

E **KM25C/H/P** Food Kit.

E **KM25F/P** Food Kit.

### ❼ ACCESSORIES

F **\*CRS/3** Protective rubber slip-on boot.

G **\*CRS/5** Protective rubber slip-on boot with probe rest.

H **MC29** Medium size carrying case.

I **SC25** Small carrying case.

J **PW175T** Tub of 175 bactericidal probe wipes.

K **PW70T** Tub of 70 bactericidal probe wipes.

L **\*TLOG1** A5 ring binder temperature logbook.

M **\*TLOG2** A6 HACCP logbook.

N **\*WB1** Wall bracket for thermometers.

P **\*WB2** Wall bracket for thermometers fitted with protective boots.

| | CF21 | KM22 | KM25/KM26 | KM28B |
|---|---|---|---|---|
| Sensor Type | Thermistor | Thermistor/Type T Thermocouple | Type T Thermocouple | Type K Thermocouple |
| Scales | °C | °C/°F | Choice of °C or °F | °C |
| **Measurement Range** | | | | |
|   Thermistor | −40°C to 110°C | −40°C to +110°C | – | – |
|   Type T Thermocouple | – | −200°C to +400°C | −50°C to +200°C | – |
|   Type K Thermocouple | – | – | – | −40°C to +500°C |
| Resolution | 0.1° | 0.1° | 0.1° | 0.1° to +190°C, 1° above |
| **System Accuracy, Thermistor at +23°C** | | | | |
|   0°C to +70°C | ±0.5°C | <±0.3°C | – | – |
|   −25°C to +110°C | – | <±0.5°C | – | – |
| **System Accuracy, Type T* Thermocouple at +23°C** | | | | |
|   0°C to 70°C | – | ±0.5°C | – | – |
|   −30°C to +110°C | – | – | ±0.5°C | – |
|   Full Range | – | – | ±3% of reading | – |
| **Accuracy Type K Thermocouple at +23°C** | | | | |
|   −30°C to +110°C | – | – | – | ±1.0°C |
|   Full Range | – | – | – | ±3% of reading |
| Operating Temperature Range | 0°C to +40°C | −25°C to +50°C | 0°C to +50°C | 0°C to +50°C |
| Battery Type | Lithium | 9V IEC 6LF22 alkaline | 9V IEC 6LF22 alkaline | 9V IEC 6LF22 alkaline |
| Battery Life | 10 years ** | 100 hours | 1000 hours | 300 hours |
| *Typical accuracy at +23°C with a Comark probe  ** Based on a usage of 4 hours a day over 7 days per week* | | | | |

# Food Thermometers

❶ **\*CATERCHECK 2**

Catercheck 2 provides the catering professional with the convenience of a permanently connected penetration probe for solid or semi-solid foods. The long-life battery offers even greater value for money and lower operating costs in a wide range of catering applications. Operation is easy with a single on/off button.

- New sealed, long-life battery lasts up to ten years
- Dust and waterproof slimline case, designed to meet IP55 standards
- Fast response thermistor sensor for higher accuracy
- Auto switch off to save battery power

❷ **\*POCKETHERM**

Pocketherm thermometers are safe and convenient with integral folding probes.

- Choice of thermistor sensor – order code P125 for °C, P125F for °F, or type T thermocouple sensor – order code P250 for °C, P250F for °F
- Large LCD for clearly displayed readings
- Fast response probe design
- Automatic switch on/off as the probe is opened or closed
- Auto switch off if probe left open to save battery power
- Instant LED visual indication of frozen, chilled and cooked temperature zones
- Yellow LED flashes when measured temperature is –18°C or below
- Green LED flashes when measured temperature is between 0°C and +5°C
- Red LED flashes when measured temperature is +70°C or above

❸ **KM290 SERIES**

KM290 Series HACCP pocket thermometers are available in five colour options, ideal for catering and other food uses where colour coding is required to prevent cross contamination. KM290 colours can be included in HACCP procedures.

- Choice of five colours for use with specific food types
- Prevents cross contamination of food
- Enables essential colour coding to be

built into HACCP procedures
- Thermometer supplied as a kit in a wallet, with 1 x food penetration probe, 1 x air probe, each colour coded to the instrument and 1 x TLOG2 HACCP logbook for temperature records.

Order Codes:
**KM291** - red
**KM292** - yellow
**KM293** - green
**KM294** - blue
**KM295** - orange

**KM290/HACCP**

Full HACCP kit. For kit details and replacement probes please refer to the Comark price list.

❹ **KM12 IDEAL FOR CHECKING DISHWASHER CYCLES.**

- Digital mini thermometer
- Completely submersible
- Maximum, minimum and current temperature readings
- Integral, heat-resistant, stainless steel probe

- Long battery life for low running costs
- Supplied with protective sleeve with pocket clip

❺ **PDT300C WATER-RESISTANT PEN STYLE, POCKET THERMOMETER**

- Cap doubles as a handle
- Membrane keypad
- Tapered probe tip for faster response

| | Catercheck 2 | P125 | P250 |
|---|---|---|---|
| Sensor Type | Thermistor | Thermistor | Type T Thermocouple |
| Scales | °C | °C | °C |
| Measurement Range | –40°C to +110°C | –40°C to +125°C | –50°C to +250°C |
| Resolution | 0.1° | 0.1° (displayed resolution) | 0.1° (displayed resolution) |
| System Accuracy, Thermistor at +23°C 0°C to +70°C | ±0.5°C | ±0.5°C | – |
| System Accuracy, type T Thermocouple 0°C to +40°C | – | – | ±0.3% ±0.75°C, below +125°C ±0.7% ±0.25°C, +125°C and above |
| Operating Temperature Range | 0°C to +40°C | –20°C to +50°C | –20°C to +50°C |
| Battery Type | Lithium | 9V IEC 6LF22 alkaline | 9V IEC 6LF22 alkaline |
| Battery Life | 10 years** | 600 hours minimum | 300 hours minimum |
| *\* Based on a usage of 4 hours a day over 7 days per week* | | | |

| | KM290 Series | KM12 | PDT300C |
|---|---|---|---|
| Sensor Type | Thermistor | Semiconductor | Thermistor |
| Scales | °C | °C and °F | °C and °F |
| Measurement Range | –30°C to +110°C | –10°C to +200°C | –50°C to +150°C |
| Resolution | 0.1° | 0.1° | Typically 0.1° |
| System Accuracy at +23°C 0°C to +70°C Full Range | – ±0.5°C ±1°C | ±1.0°C – – | Typically ±1.0°C – – |
| Operating Temperature Range | 0°C to +40°C | – | 0°C to +40°C |
| Battery Type | 1 x IEC LR6 size AA | LR44 1.5V button cell | LR44 1.5V button cell |
| Battery Life | 1 year average | 2 years average | – |

# Industrial Thermometers



**Comark industrial thermometers offer maximum versatility in all industrial applications plus those in heating, ventilating, air conditioning and refrigeration.**

The N9000 range instruments all share the same advanced case design – dust and waterproof to IP67 standards, easy to clean, soft-touch keypads and easy access to the battery compartment. The C9006IS is specially designed for intrinsically safe applications and is fully compliant with ATEX standards. All instruments feature the industry standard sub-miniature connector and N9000 instruments, C9006IS and C9007, have a two-year warranty.

**① *N9001**
- Six thermocouple compatibility for the widest range of applications
- Maximum and minimum temperature memory (not on N9008)
- Hold function to freeze the displayed reading
- Selectable auto switch off to save battery power

**② *N9008**
- Differential measurement version of N9001
- Measures two temperature inputs and calculates the difference between them

**③ *N9003**
- Type K thermocouple sensor thermometer
- Simple two-button operation

**④ KITS AND ACCESSORIES**

For kit details please refer to the Comark price list.

- **Ⓐ N9001/INKIT** Industrial Kit.
- **Ⓑ N9008/HVKIT** HVAC Kit.
- **Ⓒ LC98** Large size carrying case. (Shown above as part of N9001/INKIT).
- **Ⓓ *CRS/4** Protective rubber slip-on boot, with wrist strap.

| | N9001/N9008 | N9003 |
|---|---|---|
| Sensor Type (Thermocouple) | Type K, N, T, J, R, S | Type K |
| Scales | °C, °F, K | °C/°F |
| Measurement Range | To thermocouple limits# | |
| Resolution | 0.1° below +1000°C, 1° above (autoranging) | |
| Accuracy at 23ºC | <±0.1% of reading, ±0.2ºC | |
| Environmental Protection to IP67, BS EN60529, IEC 529 | YES | |
| Operating Temperature Range | −25ºC to +50ºC | |
| Battery Type | 2 x IEC LR6, size AA | |
| Battery Life | 200 hours | |
| #For Thermocouple limits see Page 27 (flap) | | |

# Industrial Thermometers

**COMARK**



① ② ③ ④ ⑤ ⑥

2 YEAR WARRANTY

A B C C D

## ① *C9006IS ATEX COMPLIANT FOR INTRINSICALLY SAFE APPLICATIONS

- Many applications in refineries, petrochemical plants and gas distribution
- Certified to ⟨Ex⟩ II 1 G EEx ia IIC T4 Baseefa 03 ATEX 0056
- Dust and waterproof to IP67 standards
- Maximum, minimum temperature memory and hold functions
- Selectable auto switch off

## ② *C9007

- Type K thermocouple thermometer
- Dust and waterproof to IP67 standards
- Simple two button operation

## ③ *KM450S

- Type K thermocouple thermometer

## ④ KM330

- Value for money, type K thermocouple thermometer
- Maximum temperature memory

- Hold function to freeze displayed reading
- Slip-on protective boot with desk stand

## ⑤ KM340

- Differential measurement version of KM330
- Ideal for HVAC applications, including flow and return measurements and radiator output checks
- Measures two temperature inputs and calculates the difference between them

## ⑥ KITS AND ACCESSORIES

For kit details please refer to the Comark price list.

**A** KM330KIT.

**B** KM340KIT.

**C** MC33 Medium size carrying case for KM33/KM340 thermometers.

**C** MC70 Medium size carrying case for KM450S thermometer.

**D** *CRS/1 Protective rubber slip-on boot for C9006IS and C9007 thermometers.

|  | C9006IS | C9007 | KM450S | KM330/KM340 |
|---|---|---|---|---|
| Sensor Type | Thermocouple types K, N, T, J, R, S | Thermocouple Type K | Thermocouple Type K | Thermocouple Type K |
| Scales | °C, °F, °A | °C | °C | °C/°F |
| Measurement Range | To thermocouple limits# | -40°C to +700°C | −50°C to +800°C | −50°C to +1300°C† |
| Resolution | 0.1° below +1000°, 1° above (autoranging) | 1°C | 0.1° below +200°, 1° above (autoranging) | 0.1°/1° selectable (KM330) 1° (KM340) |
| Accuracy at 23ºC | <±0.1% of reading ±0.2ºC |  | ±0.4% of reading, ±0.5°C ± 1 L.S.D. | – |
| −50°C to 0°C | – | – | – | +2, −1°C |
| −40ºC to +400ºC | – | <±0.5% ±1ºC | – | – |
| +400ºC to +700ºC | – | <±3°C | – | – |
| 0°C to +1100°C | – | – | – | ±(0.2% of reading +1°C) |
| Environmental Protection to IP67, BS EN60529, IEC 529 | YES | YES | – | – |
| Operating Temperature Range | −20°C to +40°C | 0° to +50°C | 0°C to +40°C | 0°C to +50°C |
| Battery Type | Duracell MN1604 only | 9V IEC 6LF22 alkaline | 9V IEC 6LF22 alkaline | 9V IEC 6LF22 alkaline |
| Battery Life | 80 hours | 600 hours | 140 hours | 200 hours |

#For Thermocouple limits see Page 27 (flap)    † reads to 1999ºF only

# *Evolution*
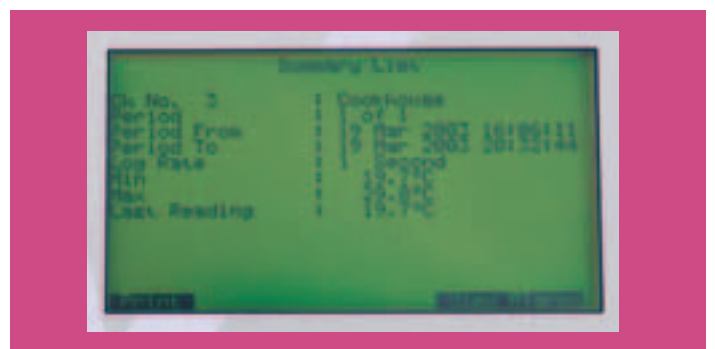# Diligence EVG Graphic Display Monitor

COMARK



**Diligence EVG is the latest concept in logging from Comark - data monitors with large graphical displays to provide continuous monitoring, with the convenience of instant data display whenever required. Comark Diligence EVG monitors are thus natural replacements for outdated chart recorders and other printer/recorders.**

Data can be stored on a PC, printed out in graphical, tabular or summary form or viewed on the display. Neat, compact and supplied with stand, wall fixings and carrying case, a Diligence EVG monitor can be located on a desk, or wherever needed, close by the operator.

Applications include the monitoring of industrial and food processes, stages of production and scientific experiments.

Comark Diligence EVG monitors use the proven Comark Evolution software package, shared with all existing Diligence EV loggers and Evolution logging handheld thermometers. This enables Diligence EVG monitors to be purchased for new monitoring systems or added to existing Evolution driven systems for maximum versatility.

# Evolution
# Diligence EVG Graphic Display Monitor

COMARK



2 YEAR WARRANTY

## *N3014

The first Diligence EVG instrument is the N3014 thermocouple monitor, offering:

- Large LCD for graphical or tabular display of data
- Selectable °C, °F or K scales
- Eight channel monitoring
- Compatibility with wide range of Comark thermocouple probes
- Measurement range from –200°C up to +1767°C
- Large memory capacity of 64000 readings
- Audible and visual alarm indication with alarm delay capability

- RS232 port for data communications, programming and serial printing
- Separate parallel port for printing
- Industry standard sub-miniature sensor connections
- Rechargeable battery or mains operation, with mains power adaptor/charger included

The N3014 can be programmed and interrogated directly from the keypad. Keypad initiated operations include:

- Start and stop recording by keypad or pre-set times
- Selection of wrap-around or "one-shot" memory

- Description of logging run and channel names
- Sensor configuration
- Alarm:
    enable
    audible alarm enable
    auto alarm reset
    alarm acknowledge
    alarm delay
- Password protection
- Clock set
- Tabular data presentations
- Alarm temperatures with time and duration for all or selected channels
- Maximum and minimum temperatures for the specified period

## ACCESSORIES

**\*N1SW** Evolution software. Please refer to page 17 for details.
**ADP46** Connecting cable – N3014 to a printer.
**\*ADP53** RS232 cable.
**ADP54/UK** Power supply/charger UK version.
**ADP54/EU** Power supply/charger EU version.
**ADP54/US** Power supply/charger US version.
**LC30** Large size carrying case.

| Sensor Type | Thermocouple types K, N, T, J, R, S, E, B |
|---|---|
| Measurement Range | |
| Type K | –200°C to +1372°C |
| Type T | –200°C to +400°C |
| Scales | °C, °F, K |
| Resolution | 0.1° |
| Instrument Accuracy, type K Thermocouple at +23°C | <±0.1% of reading, ±0.2°C |
| Channels | 8 |
| Recording Memory | 64000 readings |
| Communications | RS232 port for data download and programming via a PC or download to printer, parallel Centronics port for printer connection |
| Logging Frequency | Programmable between 10 seconds and 99 hours |
| Display | Monochrome LCD 240*128 lines for data display in graphical form |
| Ambient Operating Range | |
| Temperature | 0°C to +50°C |
| Humidity | 0 to 97% RH non-condensing |
| Logging Start/Stop | Programmable date and time or manual from instrument keypad |
| Power Requirements | |
| Battery | 4 x IEC LR6 Size AA Alkaline or Ni-mh rechargeable (supplied) |
| Mains | External DC input (supplied) |
| Case | High impact polystyrene |
| LED Indication | Green x 2  = DC power on and logging active, Yellow = Low battery, Red = Alarm |

# *Evolution*
# Diligence EV Data Loggers

**COMARK**

**The Comark Diligence EV range includes ten data loggers that can handle almost every requirement.**

Applications include the food industry, building services, scientific experiments, production processes, monitoring PLC and other control systems, heating, ventilating and air conditioning systems. All loggers feature:

- Tough moulded cases, dust and waterproof to IP67 standards
- Large memory capacity of up to 16000 readings
- Ability to log over multiple periods
- Windows™ based Evolution software, for fast, effective data download and analysis
- LED indication of active logging and alarm conditions, plus audible alarm warning
- LCD on selected models, for instant checks on readings and alarms
- Single button control of all main functions
- Choice of single or multi-sensor temperature models
- Ability to scroll display between readings from all sensors in use (N2012, N2013 and N2014 only)
- Long battery life, up to five years

**2 YEAR WARRANTY**

❶ **\*N2001/N2011**
- One channel, internal temperature sensor
- LCD on N2011

❷ **\*N2002/N2012**
- Five channels, one internal temperature sensor and up to four external thermistor sensors using the N2000BOX multi-link
- LCD on N2012
- Lumberg connector for direct probe connection or multi-link

❸ **\*N2003/N2013**
- Two channels, internal temperature and external humidity sensors
- LCD on N2013

❹ **\*N2004/N2014**
- Three channels, with up to three external type K or T thermocouple probes using the adaptor cables
- Additional ambient temperature measurement from PK31L or PT31L probes or the adaptor cables
- Can also measure from a single thermistor probe
- Lumberg connector for direct probe connection or multi-link
- Adaptors – N2000ADP/K, type K or N2000ADP/T, type T for up to three probes with sub-miniature connectors
- LCD on N2014

❺ **\*N2005/N2015**
Logger features:
- Measurement range 4 to 20mA
- Lumberg 6-pin socket for sensor connection via ADP50 connection lead

- Programmable selection of measurement parameters, temperature, humidity, pressure, flow, pH, current, voltage and user definable
- LCD on N2015

Evolution software features, specific to N2005/N2015:

- Selection of resolution between 0 and 4 decimals (on PC and printouts)
- Freeform text of up to eight characters for user definable measurement units
- Description of logging run and channel names
- Selection of over range and under range points
- Selection of scale high and low values equating to 20mA and 4mA

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## DILIGENCE EV KITS AND ACCESSORIES

A selection of logger kits is available. Please refer to the Comark price list.

**\*N1SW** Evolution software. Please refer to page 17 for details.

**\*N2000INT** PC interface for programming loggers and downloading data.

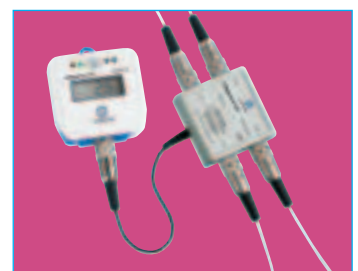**\*N2000BOX** Multi-link to connect external probes to N2002 or N2012.

*N2000INT*

**\*N2000ADP/K** Adaptor cable to connect up to three type K thermocouple probes to N2004 or N2014.

**\*N2000ADP/T** Adaptor cable to connect up to three type T thermocouple probes to N2004 or N2014.

**\*ADP50** Connection lead with Lumberg plug and 200mm wire with stripped and tinned ends, for N2005 or N2015.

*N2000BOX*

# *Evolution*
# Diligence EV Data Loggers



| | | |
|---|---|---|
| **Sensor Type** | | |
| N2001, N2011, N2002, N2012, N2003, N2013 | Thermistor | |
| N2004, N2014 | Type K or T thermocouple | |
| **Measurement Range** | | |
| N2001, N2011, N2002, N2012 internal sensor | −40°C to +70°C | |
| N2002, N2012 external sensor | −40°C to +150°C | |
| N2003, N2013 | | |
|   Temperature | −20°C to +60°C | |
|   Humidity | 0 to 97% RH non condensing | |
| N2004, N2014 | | |
|   Type K | −200°C to +1372°C | |
|   Type T | −200°C to +400°C | |
|   Thermistor | −40°C to +70°C | |
| N2005, N2015 | 4 to 20mA | |
| **Scales** | | |
|   Temperature | °C, °F | |
|   Humidity | RH or DP | |
| **Display Resolution** | | |
|   Temperature | 0.1° (N2014 only, 1° below −100° and above +1000°) | |
|   Humidity | 0.1% RH | |
|   N2015 only | 4 digits 1 decimal place (software allows 0 to 4 decimals in logged data*) | |
| **System Accuracy** | | |
|   Temperature N2001, N2011, N2002, N2012, N2003, N2013 | | |
|     −25°C to +50°C | ±0.5°C | |
|     −40°C to +80°C | ±1°C | |
|     +80°C to +150°C | ±2°C (typical) | |
|   Humidity N2003, N2013 | | |
|     −20°C to +60°C | ±3% RH | |
| **Instrument Accuracy at +20°C ambient** | | |
| N2004, N2014 | ±0.5°C ±0.3% of reading | |
| N2005, N2015 | ±0.3% of full scale | |
| **Memory 32K** | Samples | |
|   1 channel | 16000 | |
|   2 channels | 8000 | |
|   3 channels | 5300 | |
|   4 channels | 4000 | |
|   5 channels | 3200 | |
| **Logging Frequency** | Programmable between 1 second and 99 hours | |
| **Ambient Storage** | −40°C to +70°C | |
| **Battery Type** | 1 x AA size 3.6V replaceable lithium battery, part number A17476 | |
| **Battery Life** | Up to 5 years | |
| **Case Material** | ABS | |
| **Environmental Protection to IP67, EN 60529, IEC 529** | YES | |
| **LED indication** | Red = alarm, Green = logger active | |

*Software selection of decimals will affect recorded values, e.g. selection of 0 decimals = a value of ±32000 and a selection of 4 decimals = a value of ±3,2000*

# *Evolution*
# Logging Thermometers

**COMARK**

**Evolution logging thermometers combine the freedom of a fully portable hand held instrument with the versatility of a high specification data logger. There are two logging modes to maximise applications.**

**Walkabout logging mode** enables the temperatures of many different points, such as refrigerators, freezers, cooking surfaces, cooked, chilled and frozen food, and locations in factories, laboratories, storage facilities and heating systems to be logged.

- Up to 99 temperature locations
- Locations can be identified by description and code number using the software
- Readings identified by location code, date and time
- Maximum and minimum alarm temperatures can be set for each location, with audible warning
- Specific routes can be pre-programmed via the software

**Static logging mode** enables multiple readings from a single temperature point, ideal for monitoring processes, experiments and key production points. Logging can be programmed from the keypad or the software.

- Logging can be programmed from the software to start and stop at pre-set dates and times
- The logging interval can be set from 1 second to 99 hours
- Logging can continue when memory is full using the wraparound facility
- Operator, batch or company identification can be programmed for each logging run
- Logging can be restricted to specific days of the week using the software, to save memory
- Maximum and minimum alarm levels, with audible and displayed warnings
- Alarm indicators can be programmed to continue or to reset automatically when temperature readings return within the programmed levels
- Different alarm levels can be set on each channel (N1001 only)

Recorded data can be printed out or downloaded to a PC for later analysis and storage, making written records a thing of the past. Both instruments use the proven Windows™ based, Evolution software package and feature:

- IRDA direct programming or downloading with suitable computers and printers

① ②

2 YEAR WARRANTY

- Programming of logging tasks from the keypad or via the software
- Unrivalled data display from the triple-reading LCD
- Programmable high and low alarms
- Selectable auto switch off to save battery power

### ① *N1092 FOOD THERMOMETER

WATERPROOF IP67

Combines type T thermocouple and thermistor sensor compatibility for fast response and accuracy required by food hygiene regulations.

- Measurement range covers freezers to cooked food applications
- Lumberg connector for improved prevention of food and liquid ingress and more secure probe connections

### ② *N1001 INDUSTRIAL THERMOMETER

WATERPROOF IP67

- Eight thermocouple compatibility for maximum applications.
- Twin input channels for single or two channel differential temperature measurement
- Logging from either or both channels
- Industry standard sub-miniature probe connector

### KITS AND ACCESSORIES

For kit details please refer to the Comark price list.

**N1092KIT**

**N1001KIT**

***CRS/4** Protective rubber slip-on boot.

**LC98** Large size carrying case.
(CRS/4 and LC98 shown on page 10)
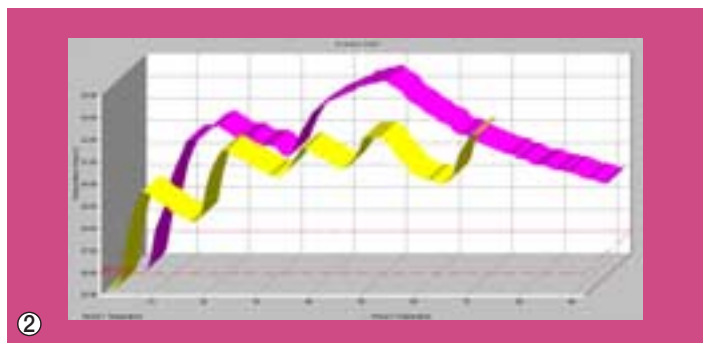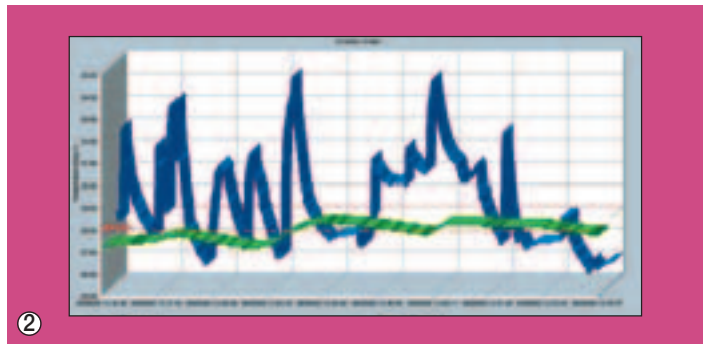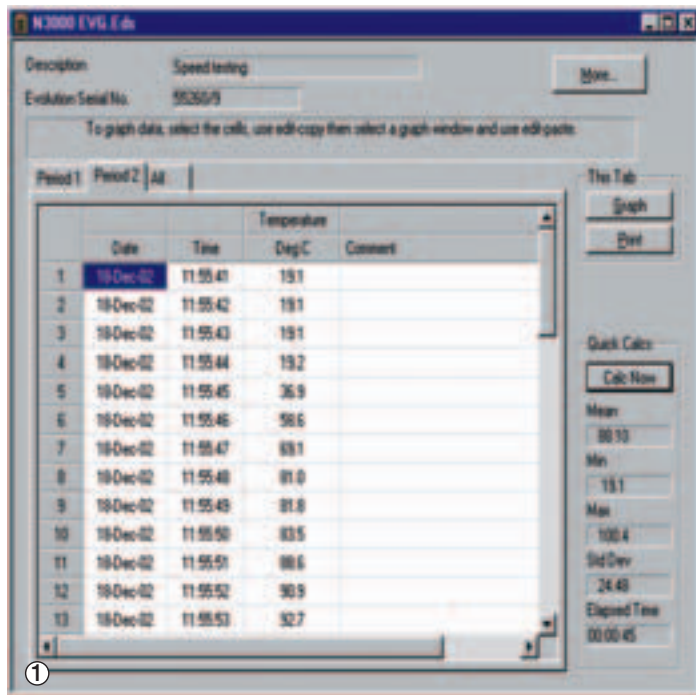
***N1SW** Evolution software.
Please refer to page 17 for details.

***CR1** Computer and printer interface for N1001 and N1092, used where an infra red port for direct data transfer is not available. Accepts instruments with or without the CRS/4 rubber boot fitted.

*CR1 Interface*

| | N1092 | N1001 |
|---|---|---|
| Sensor Type | Thermistor and type T thermocouple | Thermocouple types K, N, T, J, R, S, E, B |
| Scales | °C/°F | °C/°F/K |
| Measurement Range | | To thermocouple limits# |
|   Thermistor | −80°C to +150°C | − |
|   Type T Thermocouple | −200°C to +400°C | − |
| Resolution | 0.1° | 0.1° below +1000°C, 1° above (autoranging) |
| System accuracy at +23°C | | |
|   Thermistor | | |
|     0°C to +70°C | <±0.3°C | − |
|     −25°C to +110°C | <±0.5°C | − |
|   Type T* Thermocouple | | |
|     0°C to +70°C | ±0.5°C | ±0.5°C |
| Communications | Infra red interface | |
| Logging Memory | Up to 1569 samples | |
| Environmental Protection to IP67, BS EN60529, IEC 529 | YES | |
| Operating Temperature Range | −25°C to +50°C | |
| Battery Type | 2 x IEC LR6, size AA | |
| Battery Life | 300 hours | |

*\* Typical accuracy at +23°C with a Comark probe    #For thermocouple limits see Page 27 (flap)*

# *Evolution*
# Evolution Software

① 



② 



② 

**The Windows™ based Evolution software, order code N1SW, enables instruments to be programmed from a PC and stored data to be displayed or printed in tabular or graphical form.**

**The multilanguage software supplied on CDROM supports the N3014 Graphic Monitor, Diligence EV data loggers and Evolution logging thermometers.**

Programming capabilities include:

- Setting times for logging to start and stop
- Daily logging on selected days of the week to optimise the use of available memory
- Selection of the logging interval to suit almost any logging task
- Extension of logging periods through the memory wraparound facility, which enables new data to be saved over the oldest stored readings
- Adjustable high and low alarm levels
- Password protection of logging parameters and logged data
- Saving programmed logging configurations until needed
- Data presentation as spreadsheet style reports or graphs
- Extensive graphing options, including the ability to merge information from more than one data file onto one graph to show long-term trends and changes
- Merging information from more than one data file into a single file for analysis
- Sorting information, such as date, time and temperature to suit requirements
- Freeform text column to allow descriptions of data to be added to data files
- "Quick" calculations of mean, maximum, minimum, standard deviation and elapsed time for a whole data file
- Calculation of the duration of alarm conditions
- Alarm time delay, to prevent false alarms during normal operations such as fridge or freezer defrost cycles

① Display showing tabular data
② Displays showing graphical data

# C8600

Tempscan Modular Temperature and Humidity Measurement and Recording System

**COMARK**



① ② A B C D E

② **2 YEAR WARRANTY**
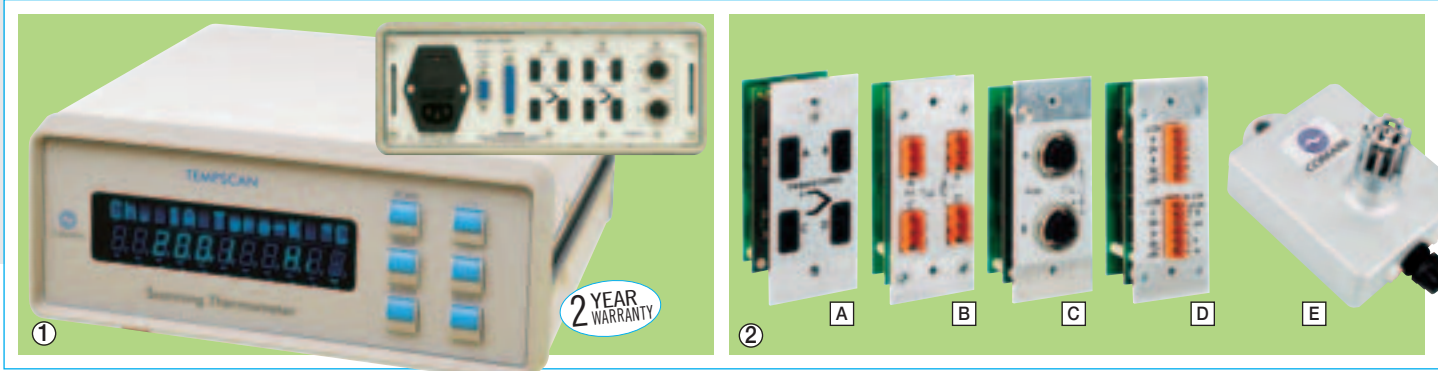
The **C8600 is ideal for many applications including the monitoring of production, processing, samples in incubators, air temperatures in buildings, cold stores, refrigerators, freezers and scientific research work.**

The modular design enables the C8600 to be configured with up to three of the four available measurement modules, in any combination. Humidity measurement can be added with the H86 transmitter.

① ***C8600** PRECISION SCANNING THERMOMETER**

- Widest range of applications from the four available modules
- Variable high/low alarms on each channel
- RS-232 output to serial printer or PC
- Large vacuum fluorescent display
- Can be operated from the keypad or a PC using the optional Windows™ software
- Choice of five languages for data display
- Tough aluminium case

② **MEASUREMENT MODULES**

A ***M8600/K** Accepts thermocouple probes, sensors and transducers.

B ***M8600/X** Accepts thermistor probes and sensors. Ideal for HACCP and due diligence requirements in the food industry.

C ***M8600/P** Accepts 4-wire sensors of 100Ω resistance at 0°C. Suitable for high accuracy applications in laboratories and quality systems.

D ***M8600/H** Two channels for use in pairs for RH and temperature measurement, or individually for current inputs of ±1mA. M8600/H can be used with up to two H86 transmitters.

E ***H86 RELATIVE HUMIDITY AND TEMPERATURE TRANSMITTER** Measures relative humidity and temperature of air and can be used with a C8600 fitted with M8600/H modules. The transmitter is dust and water-resistant to IP65 and has an industrial type, capacitive hygropolymer humidity sensor and a high accuracy platinum resistance temperature sensor. A voltage output version is available, order code H86V.

## ACCESSORIES

***AL1** Interface module for connection to autodiallers and external alarm systems.

***C8600S1** Windows™ Software.

**C4503** Serial printer complete with 3m connector cable fitted with 25-pin D to 25-pin D connectors.

| C8600 INSTRUMENT | |
|---|---|
| Operating Range | |
| Temperature | –5°C to +50°C |
| Humidity | 0 to 93% RH non condensing |
| Channel Reading Rate | 4 per second |
| Alarms | |
| Settability | 0.01°, 0.01Ω or 1µV |
| Outputs | Open collector isolated high and low outputs programmable for normal or inverse logic |
| Mains Supply | Universal, 85 to 265 volts ac, 47 to 63 Hz or dc equivalent |

| MODULES AND TRANSMITTER | | | | | |
|---|---|---|---|---|---|
| | M8600/K | M8600/X | M8600/P | M8600/H | H86 |
| Channels | 4 | 4 | 2 | 4 | – |
| **Measurement Ranges** | | | | | |
| Temperature | Thermocouple Types K, N, T, J, R, S, E, B To Thermocouple limits# | –80°C to +150°C (Thermistor) | –200°C to +850°C (Pt100) | –30°C to +80°C | –25°C to +75°C |
| Humidity | – | – | – | 0 to97% RH non condensing | 0 to97% RH non condensing |
| Dewpoint | – | – | – | –55°C to +88°C DP | – |
| User Scale | – | – | – | –1.2mA to +2.0mA | – |
| Output | – | – | – | – | 0 to 1mA or 0 to 1mV RH and temperature |
| **Resolution** | | | | | |
| Temperature | 1°, 0.1°, 0.01° full range | 1°, 0.1°, 0.01° full range (display) | 1°, 0.1°, 0.01° full range | 1, 0.1, 0.01 (also RH and DP) | – |
| Microvolt | 1µV | – | – | – | – |
| Ohms | – | – | 0.01 | – | – |
| User Scale | – | – | – | 7 positions for decimal point | – |
| Current | – | – | – | 100nA | – |
| Accuracy at 23°C | <±0.05% of reading, ±0.2°C (Type K) | <±0.05°C, –40°C to +110°C (System) | <±0.03% of reading, ±0.1°C | <±0.1% of reading ±1/2 LS Digit | – |
| Humidity | – | – | – | – | ±2% RH (10 to 90% RH) |
| Temperature | – | – | – | – | ±0.5°C full range |

#For thermocouple limits see Page 27 (flap)

# Infra-Red Thermometers

① ② ③ ④ ⑤ ⑥ ⑦

**Infra red thermometers measure surface temperatures and can be used throughout the food industry, in scientific experiments, building services, production and processing lines, energy conservation and anywhere that non-contact measurement is required.**

Infra red temperature measurement is fast, prevents wastage of the measured material, such as food, and enables checks on areas where access is difficult or dangerous including electrical and heating, ventilating and air conditioning installations.

### ① KM812, ② KM814, ③ KM814FS

These instruments are pocket sized and offer fast, convenient and safe measurements. The KM814FS has a range and accuracy ideally suited to food industry HACCP requirements.

- Backlit LCD
- Measurement range
  KM812/KM814, –18ºC to +260ºC
  KM814FS, –30ºC to +200ºC

- Distance to spot size ratio
  KM812/KM814, 6:1
  KM814FS, 4:1
- Hold function to freeze displayed reading
- Pre-set emissivity, 0.95 for most industrial uses on KM812 and KM814 and optimised for food applications at 0.97 on KM814FS
- Laser sighting to pinpoint target area on KM814 and KM814FS

### KM842‡, KM843‡, KM846‡, KM848‡

The KM840 series feature rugged cases with rubber overmouldings and are suitable for tough applications. All models have a tripod mounting facility and are supplied in hard carrying cases.

### ④ KM842

- Single point laser sighting to pinpoint target area
- Wide measurement range from –32ºC to +400ºC covers deep frozen materials to industrial processes
- Displays current and maximum temperatures

- Hold function freezes displayed reading
- Switchable backlit LCD
- Emissivity pre-set at 0.95
- Distance to spot size ratio 12:1

### ⑤ KM843

As KM842 plus:

- 8-point laser sighting ring to indicate measured spot size
- Extended measurement range from –32ºC to +545ºC

### ⑥ KM846

As KM843 plus:

- 12-point data logging capability
- Extended measurement range from –32ºC to +600ºC
- Distance to spot size ratio 30:1
- Connection for Pt1000 contact temperature probe
- Maximum, minimum, differential and average temperature functions and display recall
- Digitally adjustable emissivity from 0.1 to 1.0 for improved accuracy
- High and low temperature alarms with audible and visible indication

### ⑦ KM848

As KM846 plus:

- Extended measurement range from –32ºC to +760ºC
- Distance to spot size ratio 50:1

### ⑧ ACCESSORIES

**A** **17275** Protective pouch for KM812, KM814 and KM814FS.

**B** **PP22B** Pt1000 contact temperature probe for KM846 and KM848.

**C** **KM840PK** Soft pouch for KM842, KM843, KM846, KM848.

⑧

|  | KM812/KM814 | KM814FS | KM842 | KM843 | KM846 | KM848 |
|---|---|---|---|---|---|---|
| Scales, all instruments | °C, °F | °C, °F | °C, °F | °C, °F | °C, °F | °C, °F |
| Displayed Resolution | 0.2°C | 0.2°C | 0.2°C | 0.2°C | 0.1°C | 0.1°C |
| Accuracy at +23°C for targets at: | | | | | | |
| –18°C to –1°C | ±3°C | | | | | |
| –1°C to +260°C | ±2% of reading or ±2°C whichever is greater, | | | | | |
| below 0°C | | ±1°C +0.1% | | | | |
| 0°C to +65°C | | ±1°C | | | | |
| above +65°C | | ±1.5% of reading | | | | |
| –32°C to –26°C | | | | | ±3°C | |
| –26°C to –18°C | | | | | ±2.5°C | |
| –18°C to +23°C | | | | | ±2°C | |
| +23°C to full range | | | | ±1% of reading or ±1°C, whichever is greater | | |
| Operating Range (all models) | 0°C to +50°C | | | | | |
| Battery Type (all models) | 9V, IEC 6LF22 alkaline | | | | | |

‡*Infra red instrument specifications can vary in different countries. Please contact Comark or your distributor for details.*

# Temperature Calibration
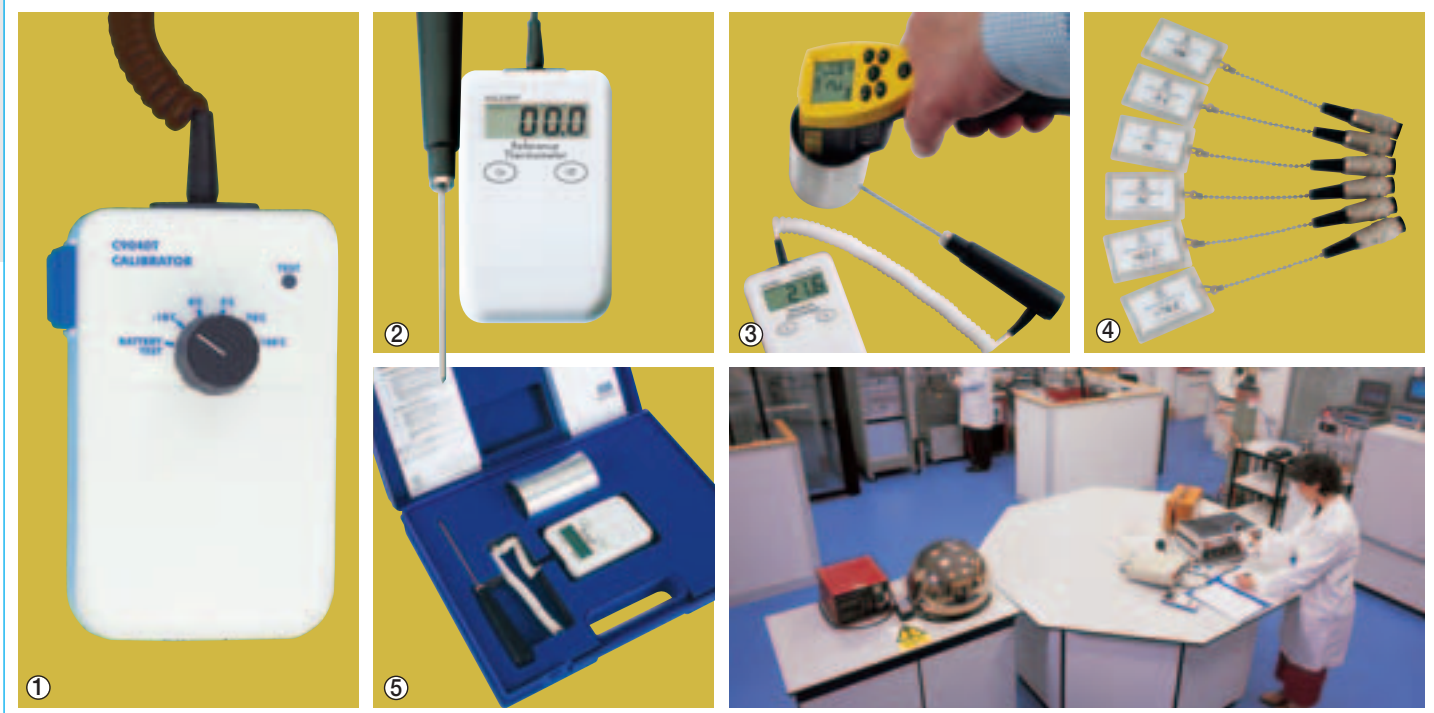










**Temperature measurement instrument performance is vital in almost every application, especially throughout the food industry. Performance can be affected by many factors including use and abuse and the age of the instrument.**

Regular, professional calibration checks are recommended, with certification as required, especially for companies with HACCP procedures and other quality systems. Calibration can be monitored in the meantime with Comark simulators, reference thermometers and validation equipment.

## ❶ *C9040 TEMPERATURE SIMULATOR

Available in thermocouple type K or T versions and used to check the calibration of thermometers at selected points.

- Supplied with UKAS Certificate of Calibration
- Selectable temperature simulation points
- Permanently connected coiled lead with connector
- Auto switch off
- Battery test facility

## ❷ *KM20REF

The KM20REF is a high accuracy reference thermometer for checking the calibration of all types of thermometer and probe combinations.

- Pt100 sensor and permanently attached probe for highest system accuracy
- Complete with 5 point UKAS Certificate of Calibration
- Auto switch off
- Supplied with hard carrying case
- Can be used with the KM820/VAL validator

## ❸ KM820/VAL VALIDATOR

- Checks the calibration of infra red and contact thermometers
- Precision machined from heavy gauge aluminium
- Also available in a calibration check kit with KM20REF reference thermometer and carrying case, order code KM820/VKIT, see picture ❺ above

## ❹ *THERMOMETER TEST CAPS

Six test caps are available, each calibrated to replicate a specific temperature point, relevant to the food industry, when attached to a thermometer. The temperature point can be compared with the reading on the thermometer to check instrument calibration. Testcaps are supplied with a UKAS certificate of calibration and can be used with any Comark thermistor thermometer fitted with a Lumberg type connector.

| Test Cap Order Code | Temperature Point |
|---|---|
| TX21L | −18°C |
| TX22L | −5°C |
| TX23L | 0°C |
| TX24L | +3°C |
| TX25L | +63°C |
| TX26L | +70°C |

| | C9040K | C9040TM | C9040TL | KM20REF |
|---|---|---|---|---|
| Sensor Type | Type K Thermocouple | Type T Thermocouple | Type T Thermocouple | Pt100 |
| Connector Type | Sub-miniature | Sub-miniature | Lumberg | – |
| Simulated Temperature Points | −20°C, 0°C, +50°C,+100°C, +500°C | −18°C, 0°C, +5°C, +70°C, +100°C | | – |
| UKAS Certificate of Calibration Points | −20°C, 0°C, +50°C,+100°C, +500°C | −18°C, 0°C, +5°C, +70°C, +100°C | | −18°C, 0°C, +5°C, +8°C, +20°C |
| Accuracy at +23°C | ±0.2°C | ±0.2°C | ±0.2°C | ±0.2°C (system) |
| Operating Temperature Range  Temperature  Humidity | −18°C to +28°C  10 to 90% RH non condensing | −18°C to +28°C  10 to 90% RH non condensing | −18°C to +28°C  10 to 90% RH non condensing | 0°C to + 40°C  – |
| Measurement Range | – | – | – | −100°C to +199.9°C |
| Scales | °C | °C | °C | °C |
| Resolution | – | – | – | 0.1° |
| Battery Type | 9V, IEC 6LF22 alkaline | 9V, IEC 6LF22 alkaline | 9V, IEC 6LF22 alkaline | 9V, IEC 6LF22 alkaline |
| Battery Life | 500 hours | 500 hours | 500 hours | 100 hours |

# Humidity and pH Meters

COMARK

**Humidity, temperature and pH are essential measurements throughout industry.**

Applications include heating, ventilating, air conditioning and refrigeration, food production and processing, building management from hotels and hospitals to art galleries and museums and water quality checks.

## N8004, N8006 HUMIDITY METERS

- IP67 protection against dust and water penetration
- Sealed, soft-touch keypads and easy access to the battery compartment
- Large data display for simultaneous readings of either relative humidity or calculated dewpoint temperature and ambient temperature
- Dewpoint calculation from measured temperature and humidity values, essential for controlled environments
- Optional slip-on boot for additional protection against knocks and severe handling
- Data hold of current, maximum and minimum readings
- Temperature display selectable in °C or °F
- Selectable auto switch off to save battery life
- Two-year warranty

### ❶ *N8004 WITH SEPARATE TEMPERATURE AND HUMIDITY SENSOR

The N8004 has a removable combined temperature and humidity sensor. The sensor has a flexible lead, enabling readings to be taken wherever needed.

- Capacitive humidity sensor provides fast response for quicker readings
- Thermistor sensor for accurate temperature readings
- Specially designed 8-pin Lumberg connector for the combined temperature and humidity sensor

### ❷ *N8006 WITH INTEGRAL TEMPERATURE AND HUMIDITY SENSOR

- The N8006 has an integral sensor for quick and convenient checks
- Capacitive humidity sensor provides fast response for quicker readings
- Thermistor sensor for accurate temperature readings

## ACCESSORIES

**MC80** Carrying case for N8004 or N8006.

**\*CRS/4** Protective rubber slip-on boot, with wrist strap.

**\*N81** Humidity and temperature sensor with 0.75m lead for N8004.

**SSF2** Stainless steel filter cover for N8006 and N81.

### ❸ *KM7000 AND
### ❹ *KM7002 pH METERS

KM7002 is a high accuracy pH meter and thermometer with a separate temperature probe. KM7000 is a pH only version of KM7002. Both models feature automatic temperature compensation and are supplied with a pH electrode, buffer tablets and a carrying case.

## ACCESSORIES

**KM1160** Combination pH electrode.

**KM1160/A** pH buffer tablets, 10 each at 4, 7 and 9.2pH.

**\*KPH** Flexible temperature probe for KM7002.

**MC70** Carrying case for pH meters.

| N8004/N8006 | |
|---|---|
| Sensors | |
|   Humidity | HC 1000 capacitive sensor |
|   Temperature | 10K thermistor sensor |
| Scales | RH, °C, °F, DP |
| Measurement Range | |
|   Humidity | 0 to 100%RH |
|   Temperature | −20°C to +60°C |
| Resolution | |
|   Humidity | 0.1%RH |
|   Temperature | 0.1° |
| Accuracy | |
|   0 to 90%RH | ±2%RH |
|   90 to 100%RH | ±3%RH |
|   Temperature | ±0.5°C |
| Environmental Protection | IP67, BS 60529, IEC 529 |
| Operating Temperature Range | −20°C to +60°C |
| Battery Type | 2 x type IEC LR6 Size AA |
| Battery Life (continuous) | |
|   N8004 | 250 hours |
|   N8006 | 300 hours |

| | KM7000 | KM7002 |
|---|---|---|
| Measurement Range | | |
|   pH | 0 to 14 | 0 to 14 |
|   Temperature | − | −30°C to +450°C |
| Accuracy | ±0.03 | ±0.02 |
| Operating Temperature Range | 0°C to +40°C | 0°C to +40°C |
| Battery Type | 9V IEC 6LF22 alkaline | 9V IEC 6LF22 alkaline |
| Battery Life | 250 hours | 250 hours |

# Pressure Meters

COMARK

**Comark pressure meters combine high accuracy with speed of response and offer the option of ATEX certified Intrinsically Safe models.**

The C9500 instruments have twin inputs for gauge or differential pressures and positive or negative (vacuum) pressure measurement.

Typical applications include boiler flue draft, air conditioning filters, laboratories and clean rooms, process pressures, service and maintenance and the calibration of other instruments.

The C9550 is designed for use with external pressure transducers and provides safe and accurate measurement from 0 to 4000 bar.

The KM50 and KM100 offer great value for money in applications such as checking gas supply pressures in domestic and commercial environments.

**\*C9500 INTERNAL SENSOR PRESSURE METERS**

- Dust and waterproof to IP67 standards
- Selectable pressure units
- Silicone protection option available for measurement of liquids, add /SIL to order code eg C9501/IS/SIL
- ATEX compliant Intrinsically Safe models available, certified to
  Ⓔ II 1 G EEx ia IIC T4 Baseefa 03 ATEX 0079
- Twin inputs for gauge or differential measurement
- Positive or negative (vacuum) measurement
- Semi-automatic zero adjustment
- Maximum and minimum pressure and hold function
- Averaged reading function
- Over-range indication
- Selectable auto switch off
- Can function as a calibrator when used with the TK2 pressure test kit
- Supplied with tubing and connectors, plus hard carrying case for Intrinsically Safe models

① 2 YEAR WARRANTY
② 2 YEAR WARRANTY
③ 2 YEAR WARRANTY
④ 2 YEAR WARRANTY

| SCALE | Standard Intrinsically Safe | C9551 ① C9501/IS | C9553 ② C9503/IS | C9555 ③ C9505/IS | C9557 ④ C9507/IS |
|---|---|---|---|---|---|
| **PSI** | Range Resolution | 0 to ±2 0.001 | 0 to ±5 0.001 | 0 to ±30 0.01 | 0 to ±100 0.1 |
| **mbar** | Range Resolution | 0 to ±140 0.1 | 0 to ±350 0.1 | 0 to ±2000 1 | 0 to ±6900 1 |
| **inH$_2$O** | Range Resolution | 0 to ±55 0.01 | 0 to ±140 0.1 | 0 to ±830 0.1 | 0 to ±2750 1 |
| **inHg** | Range Resolution | 0 to ±4 0.001 | 0 to ±9.999 0.001 | 0 to ±61 0.01 | 0 to ±200 0.1 |
| **mmHg** | Range Resolution | 0 to ±99.99 0.01 | 0 to ±260 0.1 | 0 to ±1500 1 | 0 to ±5200 1 |
| **torr** | Range Resolution | 0 to ±99.99 0.01 | 0 to ±260 0.1 | 0 to ±1500 1 | 0 to ±5200 1 |
| **Pa** | Range Resolution | 0 to ±9999 1 | - - | - - | - - |
| **KPa** | Range Resolution | - - | 0 to ±35 0.01 | 0 to ±200 0.1 | 0 to ±690 0.1 |
| **mmH$_2$O** | Range Resolution | 0 to ±1400 1 | 0 to ±3500 1 | - - | - - |
| **cmH$_2$O** | Range Resolution | - - | - - | 0 to ±2100 1 | 0 to ±7000 1 |
| **Kgcm$^{-2}$** | Range Resolution | - - | - - | 0 to ±2.1 0.001 | 0 to ±7.0 0.001 |
| Maximum Over/ Under Pressure | | 6 PSI/ 400mbar | 15 PSI/ 1000mbar | 90 PSI/ 6200mbar | 200PSI/ 13700mbar |
| Accuracy at +23°C | | ±0.2% of full scale | | | |
| Repeatability at +23°C | | ±0.1% of full scale | | | |
| Mean Temperature Coefficient of Reading | | Better than 0.1% per °C | | | |
| Operating Range Temperature Humidity | | 0°C to +40°C 10 to 90% RH non condensing | | | |
| Environmental Rating | | IP67, BS EN 60529, IEC 529 | | | |
| Protection Levels (IS Models only) | | Ⓔ II 1 G EEx ia IIC T4 Baseefa 03 ATEX 0079 (certification applicable at atmospheric pressure) | | | |
| Connections | | 1/8" BSP female | | | |
| Battery Type | | 6F22 MN1604, PP3 VT3 UCAR 9V | | | |
| Battery Life | | 90 hours | | | |

# Pressure Meters



❶ **\*C9550** EXTERNAL SENSOR PRESSURE METER

- Choice of gauge or absolute pressure measurement
- Hot swop function enables the instrument to communicate with the transducer and recognise and adjust to its range and scales
- Instrument can cover any transducer in the whole range from 0 to 4000 bar
- Choice of twelve scales for displayed pressure readings (subject to transducer range) with selected scale held in memory
- Transducers and installations are protected with warning display of over range pressures
- Maximum and minimum readings can be displayed, held in memory and reset to current reading
- Hold function to freeze the displayed reading plus previous maximum and minimum readings
- Averaged reading function
- Selectable auto switch off

❷ **C9550** PRESSURE TRANSDUCERS

Comark pressure transducers are available to customer order. Contact the Comark Sales Office or your local distributor for details.

- Comark pressure transducers feature Piezo resistive and thin film sensors, which are automatically specified according to the pressure full scale of the transducer
- All wetted parts are stainless steel and resistant to corrosive gases and liquids
- Non-process side is proof against ingress to IP65
- Measurement from 0 bar to a wide range of maximum pressures in steps of 1, 1.6, 2.5, 4 and 6 as expressed in bar and decimal multiples of these steps
- The complete range covers transducers measuring 0 to 0.1 bar, to transducers measuring 0 to 4000 bar

- Accuracy levels can be specified to suit process requirements; either 0.5% of full scale or 0.25% of full scale
- Measurement of either gauge pressure or absolute pressure
- Available with either internal or front flush diaphragm sensors

❸ **\*KM50, \*KM100** FOR COMMERCIAL AND DOMESTIC GAS SUPPLY PRESSURES

- Twin inputs on KM100 for gauge or differential measurement
- Can be specified to read in mbar, PSI or inH$_2$O
- Pressure range covers all gas supply requirements
- Backlit LCD
- Filter mode to stabilise readings
- Selectable auto switch off
- Over range capability of up to 300mbar or equivalent

## ACCESSORIES

**\*CRS/1** Protective slip-on rubber boot for C9500 and C9550 pressure meters.

**\*KMP15** Binder connector for in-line measurements with internal sensor models.

**\*TCP1** Tyre connector for use with internal sensor models.

**TK2** Pressure test kit with tubing, hand pump, scale conversion chart and carrying case.

**MC95** Medium size carrying case for C9500 and C9550 pressure meters.

**LC95** Large size carrying case for C9550 pressure meter, transducer, connecting lead and adaptor.

**\*ADP22** 1.5m interface lead for C9550 pressure meter.

| C9550 | |
|---|---|
| Calibrated Accuracy at +23°C | ±0.06% of full scale ±1 digit |
| Operating Range | −20°C to +50°C |
| Environmental Rating | IP67, BS EN 60529, IEC 529 |
| Battery Type | 9V IEC 6LF22 alkaline |
| Battery Life | 140 hours |
| Connections | 8 pin Lumberg socket KFV81, mating plug, Lumberg SV81 |

| KM50, KM100 mbar specifications shown here, for PSI and inH$_2$O please refer to website | |
|---|---|
| Measurement Range | |
| KM50 | 0 to 100 |
| KM100 | 0 to ±100 |
| Scales | mbar or PSI or inH$_2$O |
| Maximum Over Range Pressure | 300 |
| Resolution | 0.1 (0 to 70), 0.2 (70 to 100) |
| Accuracy at +23°C | ±0.5% (0 to 70), ±1% (70 to 100) |
| Operating Range | |
| Temperature | 0°C to +40°C |
| Humidity | 10 to 90% RH non condensing |
| Battery Type | 9V IEC 6LF22 alkaline |
| Battery Life | 300 hours |

# Temperature Probes

**Comark produces one of the largest available ranges of temperature probes, with a probe for almost every application. There is also a special probe design and build facility and Comark can either modify an existing probe or supply probes to customer designs. A selection of accessories, including extension leads, plugs, switch boxes, tempatches and thermocouple wire completes the probe range.**
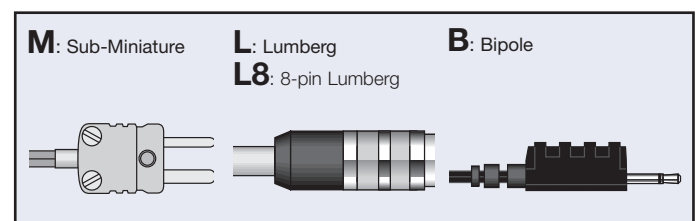
Comark can certify temperature probes, either alone, or, as recommended, with an instrument to record system accuracy. Certificates of calibration are supplied through the Comark in-house UKAS accredited temperature calibration laboratory and the in-house NPL traceable laboratory.

Comark Technical Services or your local distributor can offer advice on probes and certification and can provide detailed quotations.

## COMARK ORDER CODES

| Probe Category | Sensor Type | Connector Type |
|---|---|---|
| P: Penetration | K: Type K thermocouple | M: Sub-miniature |
| S: Surface | T: Type T thermocouple | L: Lumberg |
| A: Air | X: Thermistor (PST) | L8: Lumberg 8-pin, for N5001 HACCP Auditor |
| I: Immersion | P: PT100 | B: Bipole |

# P K 24 M

**Example**     Sequential code number

## CONNECTOR TYPES

**M**: Sub-Miniature    **L**: Lumberg          **B**: Bipole
                       **L8**: 8-pin Lumberg
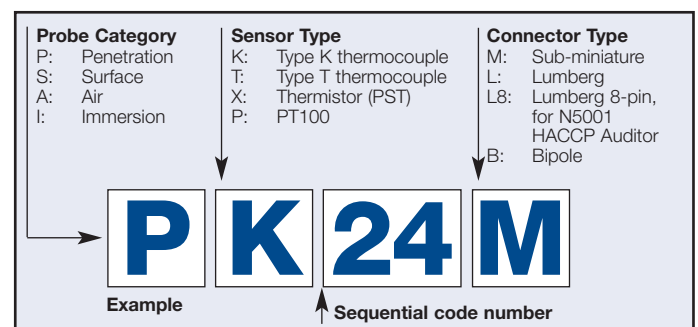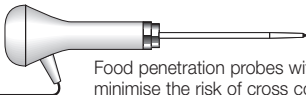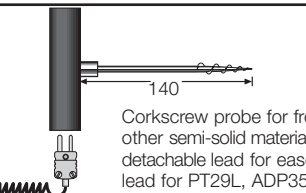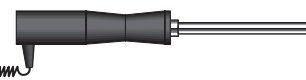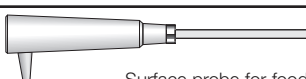
## PROBE LEADS

Comark probe leads are matched to the intended applications for the probe.The materials used are:

**PVC** – PVC coiled leads provide ease of use in ambient temperatures of up to +70°C.

**FEP and PTFE** – These materials are especially suited to food probes and can be used in sub-zero temperatures. Steel braided PTFE leads provide greater strength.
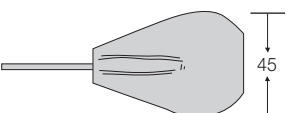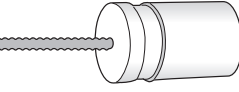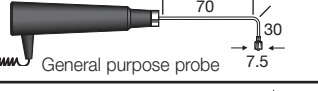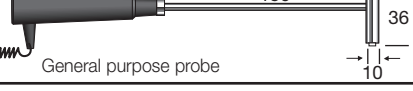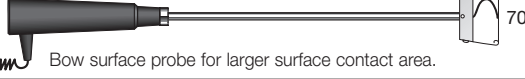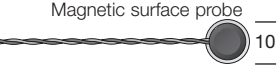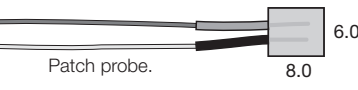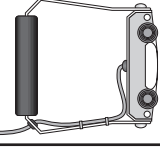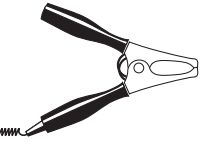
**Fibreglass (FG)** – fibreglass insulated leads are used for special application probes where the lead could be subjected to very high ambient temperatures of up to +400°C.

# Temperature Probes

COMARK

## Penetration Probes

| Sensor | Connector | Temp Range °C | Response Time (secs)† | Stem Length (mm) | Stem Dia (mm) | Lead Length (m) | Lead Material | Code |
|---|---|---|---|---|---|---|---|---|
| PST | L | −40°C to +150°C | 5.0 | 100 | 3.3 | 0.7 | FEP | *PX22L‡ |
| PST | L | −40°C to +150°C | 5.0 | 100 | 3.3 | 0.7 | FEP | *PX23L‡ |
| PST | L | −40°C to +150°C | 5.0 | 100 | 3.3 | 0.7 | FEP | *PX24L‡ |
| PST | L | −40°C to +150°C | 5.0 | 100 | 3.3 | 0.7 | FEP | *PX25L‡ |
| T | L | −100°C to +250°C | 2.0 | 100 | 3.3 | 0.7 | PTFE | *PT24L‡ |
| T | 8-PIN L | −100°C to +250°C | 2.0 | 100 | 3.3 | 1.0 | PVC | *PT24L8‡ |

Food penetration probes with coloured end caps to minimise the risk of cross contamination. PX22L White, PX23L Red, PX24L Green, PX25L Blue. PT24L - Type T sensor food probe with steel braided lead. PX22L, PX23L, PX24L, PX25L, PT24L available with 1.0m PVC coiled lead, add /C to order code eg PX22L/C. PT24L8 has a coiled lead.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PST | L | −40°C to +150°C | 0.5 | 100 | 1.6 | 0.7 | FEP | *PX16L‡ |
| T | L | −100°C to +250°C | 0.5 | 100 | 1.6 | 0.7 | PTFE | *PT23L‡ |
| T | 8-PIN L | −100°C to +250°C | 0.5 | 100 | 1.6 | 1.0 | PVC | *PT23L8‡ |

PX16L - Fast response thermistor food probe.
PT23L - Fast response Type T food probe with steel braided lead.
PT23L8 has a coiled lead.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| K | M | −50°C to +250°C | 2.0 | 100 | 3.3 | 2.5 | PTFE | *PK23M |
| T | L | −100°C to +250°C | 2.0 | 100 | 3.3 | 2.5 | PTFE | *PT26L‡ |

Oven meat probe for checking meat and food temperatures during cooking.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| T | L | −100°C to +250°C | 2.0 | 100 | 2.4 | - | - | *PT25L‡ |
| PST | L | −40°C to +150°C | 5.0 | 100 | 3.3 | - | - | *PX33L‡ |

Integral plug probe.

Penetration probes for use with Diligence EV data loggers.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PST | L | −40°C to +150°C | 2.0 | 75 | 3.3 | 1.0 | FEP | *PX31L‡ |
| T | L | −100°C to +250°C | 2.0 | 75 | 3.3 | 1.0 | FEP | *PT31L‡ |
| K | L | −100°C to +250°C | 2.0 | 75 | 3.3 | 1.0 | FEP | *PK31L‡ |
| T | L | −100°C to +250°C | 4.0 | 140 | 8.0 | 1.0 | PVC | PT29L‡ |
| T | M | −100°C to +250°C | 4.0 | 140 | 8.0 | 1.0 | PVC | PT29M |

140

Corkscrew probe for frozen foods and other semi-solid materials. Complete with detachable lead for ease of use, ADP34 lead for PT29L, ADP35 lead for PT29M.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PST | B | −40°C to +150°C | 5.0 | 80 | 3.3 | 0.4 | PVC | PX21B‡ |

Note: Coloured versions of this probe are available for KM290 HACCP thermometers - please refer to price list for details

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| K | M | −50°C to +250°C | 2.0 | 100 | 3.3 | 1.0 | PVC | *PK24M |
| K | 8-PIN L | −50°C to +250°C | 2.0 | 100 | 3.3 | 1.0 | PVC | *PK24L8‡ |
| K | M | −50°C to +250°C | 2.0 | 300 | 3.3 | 1.0 | PVC | *PK29M |
| K | M | −50°C to +250°C | 4.0 | 100 | 6.0 | 1.0 | PVC | *PK26M |
| K | M | −50°C to +250°C | 4.0 | 300 | 6.4/3.3 | 1.0 | PVC | *PK27M |
| T | L | −100°C to +250°C | 4.0 | 150 | 6.4/3.3 | 1.0 | FEP | *PT28L‡ |
| PST | L | −40°C to +150°C | 10.0 | 150 | 6.4/3.3 | 1.0 | FEP | *PX30L‡ |
| T | M | −100°C to +250°C | 2.0 | 100 | 3.3 | 1.0 | PVC | *PT22M |
| PT100 | L | −200°C to +250°C | 8.0 | 100 | 3.3 | 1.0 | PVC | *PP23L‡ |
| K | 8-PIN L | −50°C to +250°C | 2.0 | 100 | 2.5/1.6 | 1.0 | PVC | *PK19L8‡ |
| K | M | −50°C to +250°C | 1.5 | 100 | 2.5 | 1.0 | PVC | *PK31M |

Standard and heavy duty industrial probes.

6.4    3.3

PK31M - Binder probe for use with "Binder" test plugs for internal measurements in pipes and ducting.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| T | M | −100°C to +250°C | 0.5 | 50 | 1.6 | 1.0 | PVC | *PT21M |
| K | M | −50°C to +250°C | 0.5 | 50 | 1.6 | 1.0 | PVC | *PK21M |

Short Stem Probe for very fast response.

Heavy duty tarmac probe.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| K | M | −50°C to +250°C | 10.0 | 500 | 9.5/6.0 | 2.0 | PVC | *PK32M |

9.5    6.0

## Surface Probes

7.5

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| T | L | −100°C to +250°C | 0.2 | 100 | 7.5 | 0.7 | PTFE | *ST21L‡ |

Ribbon type surface probe with steel braided leads for food applications.

70

30
7.5

Ribbon type surface probe with steel braided leads for food applications.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| T | L | −100°C to +250°C | 0.2 | 70/30 | 7.5 | 0.7 | PTFE | *ST22L‡ |
| PST | L | −40°C to +150°C | 12.0 | 100 | 6.0 | 0.7 | FEP | *SX22L‡ |
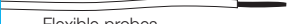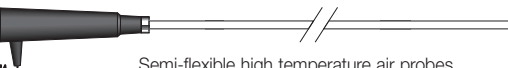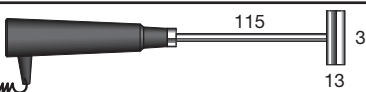
Surface probe for food applications.

†The time constant is the time taken for the probe to reach 63% of the value of the temperature change. Multiply x 3 for the time taken to achieve 95% and by 5 for 99%.
‡Not suitable for Intrinsically Safe applications.    Thermocouples:– Tolerances relate to BS EN60584–2 (1993), Class A.    All dimensions are in mm.

# Temperature Probes

## Surface Probes

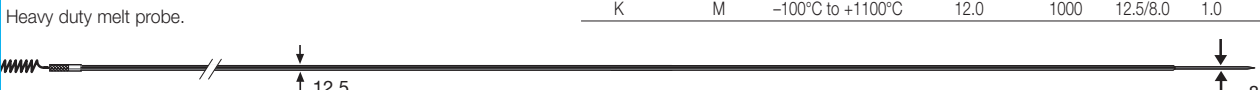| | | Sensor | Connector | Temp Range °C | Response Time (secs)† | Stem Length (mm) | Stem Dia (mm) | Lead Length (m) | Lead Material | Code |
|---|---|---|---|---|---|---|---|---|---|---|
| Heavy duty pallet probes. Flattened stem 8.0 x 2.0mm section (200) | | K | M | −50°C to +250°C | 4.0 | 250 | 8 x 2 | 1.0 | PVC | *SK38M |
| | | T | M | −100°C to +250°C | 4.0 | 250 | 8 x 2 | 1.0 | PVC | *ST38M |
| | | T | L | −100°C to +250°C | 4.0 | 250 | 8 x 2 | 1.0 | PVC | *ST38L⌐ |
| Between pack temperature probes. ST23L and ST24L with steel braided leads. (45) | | T | L | −40°C to +70°C | 5.0 | - | - | 1.0 | PTFE | *ST23L⌐ |
| | | PST | L | −40°C to +70°C | 15.0 | - | - | 1.0 | FEP | *SX23L⌐ |
| | | T | L | −40°C to +70°C | 5.0 | - | - | 3.0 | PTFE | *ST24L⌐ |
| | | PST | L | −40°C to +70°C | 15.0 | - | - | 3.0 | FEP | *SX24L⌐ |
| | | T | 8-PIN L | −40°C to +70°C | 5.0 | - | - | 1.0 | FEP | *ST23L8⌐ |
| Griddle probe | | K | M | to +260°C | - | - | - | 1.0 | - | *SK40M⌐ |
| | | K | 8-PIN L | to +260°C | - | - | - | 1.0 | - | *SK40L8⌐ |
| General purpose probe (7.5) | | K | M | −50°C to +250°C | 0.2 | 100 | 7.5 | 1.0 | PVC | *SK21M |
| General purpose probe (70 / 30 / 7.5) | | K | M | −50°C to +250°C | 0.2 | 70/30 | 7.5 | 1.0 | PVC | *SK22M |
| | | K | 8-PIN L | −50°C to +250°C | 0.2 | 70/30 | 7.5 | 1.0 | PVC | *SK22L8⌐ |
| General purpose probe (70 / 30 / 7.5) | | K | M | −50°C to +250°C | 0.2 | 70/30 | 7.5 | 1.0 | PVC | *SK23M |
| General purpose probe (10) | | K | M | −50°C to +650°C | 0.4 | 100 | 10.0 | 1.0 | PVC | *SK24M |
| General purpose probe (150 / 36 / 10) | | K | M | −50°C to +650°C | 0.4 | 150/36 | 10.0 | 1.0 | PVC | *SK25M |
| Bow surface probe for larger surface contact area. (70) | | K | M | −50°C to +500°C | 2.0 | 250 | 70 | 1.0 | PVC | *SK26M⌐ |
| Magnetic surface probe (10) | | K | M | −50°C to +150°C | 2.0 | – | – | 2.0 | PTFE | *SK27M⌐ |
| Patch probe. (6.0 / 8.0) | | K | M | −50°C to +250°C | 0.5 | – | – | 1.0 | PTFE | *SK32M |
| Self adhesive patch probes. (10.0) | | K | M | −50°C to +250°C | 0.5 | – | – | 1.0 | PTFE | *SK31M |
| | | T | M | −50°C to +250°C | 0.5 | – | – | 1.0 | PTFE | *ST21M |
| Roller probe for stationary or moving surfaces including cylinders and flat surfaces. Measures at up to 600m/min surface speed and from 125mm diameter curved to flat surfaces. | | K | M | −50°C to +250°C | 2.0 | 148 | – | 2.0 | PVC | *SK28M⌐ |
| Pipe probe for heating, ventilating and air conditioning applications with 500mm Velcro strap. | | K | M | −50°C to +100°C | 10.0 | – | – | 2.5 | PVC | *SK29M⌐ |
| Pipe clamp probe for use in heating, ventilating and air conditioning applications, for pipes 15 to 38mm diameter. | | K | M | −50°C to +100°C | 5.0 | – | – | 1.0 | PVC | *SK35M⌐ |

# Temperature Probes

COMARK

| | Sensor | Connector | Temp Range °C | Response Time (secs)† | Stem Length (mm) | Stem Dia (mm) | Lead Length (m) | Lead Material | Code |
|---|---|---|---|---|---|---|---|---|---|
| **Air Probes** | | | | | | | | | |
| Rigid air probe. | PST | L | –40°C to +70°C | 10.0 | 100 | 3.3 | 0.7 | FEP | *AX23L‡ |
| Flexible thermocouples. | K | M | –100°C to +250°C | 0.5 | - | - | 1.0 | PTFE | *AK28M |
| | T | M | –100°C to +250°C | 2.0 | - | - | 1.0 | PTFE | *AT26M |
| | T | M | –100°C to +400°C | 2.0 | – | – | 1.0 | FG | *AT27M |
| | K | M | –100°C to +250°C | 0.5 | – | – | 5.0 | PTFE | *AK29M |
| | K | M | –100°C to +250°C | 0.5 | – | – | 10.0 | PTFE | *AK31M |
| | K | M | –100°C to +250°C | 0.5 | – | – | 25.0 | PTFE | *AK32M |
| | K | M | –100°C to +400°C | 0.5 | – | – | 1.0 | FG | *AK33M |
| | T | L | –100°C to +250°C | 0.4 | - | - | 1.0 | PTFE | *AT26L |
| Fast response flexible probe with steel braided lead. | T | L | –100°C to +250°C | 2.0 | - | - | 1.0 | PTFE | *AT22L‡ |
| | T | 8-PIN L | –100°C to +250°C | 2.0 | - | - | 1.0 | FEP | *AT22L8‡ |
| Flexible probes.<br>Note: Coloured versions of the AX22B probe are available for KM290 HACCP thermometers - please refer to the price list for details. | PST | L | –40°C to +70°C | 10 | - | - | 1.0 | FEP | *AX24L‡ |
| | PST | L | –40°C to +70°C | 10 | - | - | 3.0 | FEP | *AX25L‡ |
| | PST | M | –40°C to +70°C | 10 | - | - | 5.0 | FEP | *AX28M‡ |
| | PST | M | –40°C to +70°C | 10 | - | - | 10.0 | FEP | *AX29M‡ |
| | PST | B | –40°C to +70°C | 10 | - | - | 1.0 | FEP | *AX22B‡ |
| Food simulant probes for long term measurements of food in fridges and freezers. Other lead lengths are available, please refer to the price list. | PST | M | –40°C to +70°C | 100 | - | - | 2.0 | FEP | *DX29M‡ |
| | PST | L | –40°C to +70°C | 100 | - | - | 2.0 | FEP | *DX31L‡ |
| Damped sensor probes to slow down response times in applications where air temperatures change faster than the product temperatures, eg. food in fridges and freezers. Other lead lengths are available, please refer to the price list. | PST | L | –40°C to +70°C | 30.0 | - | 8.0 | 2.0 | FEP | *DX28L‡ |
| | PST | M | –40°C to +70°C | 30.0 | - | 8.0 | 2.0 | FEP | *DX43M‡ |
| Integral plug probe. | T | L | –100°C to +250°C | 0.4 | 75 | 3.3 | - | - | *AT25L‡ |
| General purpose air probes. AT21M with steel braided lead. | K | M | –100°C to +850°C | 0.5 | 100 | 3.3 | 1.0 | PVC | *AK21M |
| | K | M | –100°C to +850°C | 0.5 | 300 | 3.3 | 1.0 | PVC | *AK22M |
| | K | M | –100°C to +250°C | 0.4 | 100 | 3.3 | 1.0 | PVC | *AK27M |
| | T | M | –50°C to +250°C | 0.4 | 100 | 3.3 | 1.0 | PTFE | *AT21M |
| | K | M | –100°C to +850°C | 1.0 | 300 | 6.0/3.0 | 1.0 | PVC | *AK23M |
| Semi-flexible high temperature air probes. | K | M | –100°C to +1100°C | 3.0 | 700 | 6.0 | 1.0 | PVC | *AK24M |
| | K | M | –100°C to +1100°C | 3.0 | 1000 | 6.0 | 1.0 | PVC | *AK25M |
| Shrouded air probe for use in air currents. | K | M | –30°C to +120°C | 0.5 | 115/30 | 13 | 1.0 | PVC | *AK26M |
| **Immersion Probes** | | | | | | | | | |
| Deep fat probe for food applications. | T | L | –200°C to +400°C | 1.0 | 500 | 3.0 | 0.7 | PTFE | *IT21L‡ |
| Weighted milk dip probe for dairy applications, also suitable for other liquid dip applications. | T | M | –40°C to +150°C | 2.0 | 90 | - | 2.0 | PTFE | *IT23M |
| | T | L | –40°C to +150°C | 2.0 | 90 | - | 2.0 | PTFE | *IT23L‡ |
| | PST | L | –40°C to +150°C | 5.0 | 90 | - | 2.0 | FEP | *IX23L‡ |
| Probes with type K and T thermocouple sensors also have mineral insulated, semi-flexible stems. | K | M | –100°C to +850°C | 0.4 | 100 | 1.5 | 1.0 | PVC | *IK21M |
| | K | M | –100°C to +850°C | 0.4 | 300 | 1.5 | 1.0 | PVC | *IK23M |
| | K | M | –100°C to +1100°C | 1.0 | 300 | 3.0 | 1.0 | PVC | *IK24M |
| | K | M | –100°C to +1100°C | 1.0 | 100 | 3.0 | 1.0 | PVC | *IK22M |
| | T | M | –200°C to +400°C | 1.0 | 300 | 3.0 | 1.0 | PVC | *IT22M |
| | T | M | –200°C to +400°C | 0.4 | 300 | 1.5 | 1.0 | P VC | *IT24M |
| | PT100 | L | –200°C to +500°C | 8.0 | 200 | 4.0 | 1.0 | PVC | *IP22L‡ |
| | PT100 | L | –200°C to +500°C | 15.0 | 300 | 6.0 | 1.0 | PVC | *IP23L‡ |
| Heavy duty melt probe. | K | M | –100°C to +1100°C | 12.0 | 1000 | 12.5/8.0 | 1.0 | PVC | IK25M‡ |
| Weighted sinker probe for deep tanks and containers. | K | M | –100°C to +150°C | 2.0 | 120 | – | 20.0 | PTFE | *IK26M |

†The time constant is the time taken for the probe to reach 63% of the value of the temperature change. Multiply x 3 for the time taken to achieve 95% and by 5 for 99%.
‡Not suitable for Intrinsically Safe applications.     Thermocouples:– Tolerances relate to BS EN60584–2 (1993), Class A.     All dimensions are in mm.

| °C | °F |
|---|---|
| 1820 | 3308 |
| 1767 | 3213 |
| 1372 | 2502 |
| 1300 | 2372 |
| 1200 | 2192 |
| 1100 | 2012 |
| 1000 | 1832 |
| 850 | 1562 |
| 800 | 1472 |
| 760 | 1400 |
| 700 | 1292 |
| 650 | 1202 |
| 600 | 1112 |
| 545 | 1013 |
| 500 | 932 |
| 450 | 842 |
| 400 | 752 |
| 260 | 500 |
| 250 | 482 |
| 200 | 392 |
| 190 | 374 |
| 150 | 302 |
| 140 | 284 |
| 125 | 257 |
| 120 | 248 |
| 110 | 230 |
| 100 | 212 |
| 90 | 194 |
| 88 | 190 |
| 85 | 185 |
| 80 | 176 |
| 75 | 167 |
| 70 | 158 |
| 65 | 149 |
| 63 | 145 |
| 60 | 140 |
| 50 | 122 |
| 40 | 104 |
| 28 | 82 |
| 23 | 73 |
| 20 | 68 |
| 8 | 46 |
| 5 | 41 |
| 3 | 37 |
| 2 | 36 |
| 1 | 34 |
| 0 | 32 |
| −1 | 30 |
| −5 | 23 |
| −10 | 14 |
| −18 | 0 |
| −20 | −4 |
| −25 | −13 |
| −30 | −22 |
| −32 | −26 |
| −40 | −40 |
| −50 | −58 |
| −55 | −67 |
| −80 | −112 |
| −100 | −148 |
| −200 | −328 |

## CONVERSION FORMULA

°C to °F = x 1.8 + 32
°F to °C = −32 ÷ 1.8

# GLOSSARY OF TERMS

**ATEX:** Atmosphére Explosif. Refers to the current standards for Intrinsically Safe equipment.

**Baseefa:** Refers to Baseefa 2001 Ltd, the notified body for Comark ATEX compliance.

**Differential Measurement:** Ability of an instrument to measure temperature, pressure etc. simultaneously from two different points and to calculate the difference between them.

**Distance to Spot Size Ratio:** The measure of the increase in the target area diameter detected by an infra red thermometer, over the distance from instrument to target surface.

**Emissivity:** The natural level of infra red radiation from the surface of any material. Emissivity is measured on a scale from 0.1 to 1.0, where 1.0 represents the radiation from a black body.

**HACCP:** Hazard Analysis and Critical Control Point. The quality system used throughout the food industry to ensure safe food.

**HVAC:** Heating, Ventillating and Air Conditioning.

**IP Rating:** Set of standards for dust and waterproof protection. Many Comark instruments are rated at IP67.

**IRDA:** Direct infra red communication between an instrument and a PC or laptop for data downloading.

**Lumberg and 8-pin Lumberg:** Connector with locking screw, used to provide strong, secure probe-to-instrument connections with better prevention of liquid ingress.

**NPL:** The National Physical Laboratory.

**Operating Range:** Temperature and Humidity limits within which an instrument will function correctly.

**Pt100:** Platinum resistance thermometer. High accuracy temperature sensor using electrical resistance and rated at 100 ohms.

**"Quick" Calculations:** Pre-programmed calculations available in software, such as average or standard deviation.

**Resolution:** Indicates the smallest difference in measurements that can be detected and displayed by the instrument, e.g. 0.1° indicates that the instrument can detect differences of one tenth of a degree. In some cases there can be a difference between the detected measurement change and the displayed change.

**Sub–miniature:** Two-pin industry standard connector.

**System Accuracy:** Temperature accuracy level for the instrument and probe combined. Instrument accuracy excludes the probe.

**Thermistor:** Type of temperature sensor offering accuracy suitable for food applications.

**Thermocouple:** Type of temperature sensor using bi–metal electrical properties. Eight types of bi-metal combinations are available: – K, N, T, J, R, S, E and B – with different measurement ranges and characteristics to suit different applications.

**UKAS:** The United Kingdom Accreditation Service.

**Walkabout Logging:** Ability to program a hand held data logger with a selected route of required temperature points, identified by location, so that the user can follow the route and store readings in location order.

**Wraparound:** Ability to program a data logger to continue logging when its memory is full, by logging new readings over the oldest readings already in the memory.

## THERMOCOUPLE LIMITS

| Type | Temperature Range | Type | Temperature Range |
|---|---|---|---|
| K | −200°C to +1372°C | R, S | −50°C to +1767°C |
| N | −200°C to +1300°C | E | −200°C to +1000°C |
| T | −200°C to +400°C | B | 0°C to +1820°C |
| J | −200°C to +1200°C | | |