

DILIGENCE EV

Data Loggers



COMARK

Comark™
Kane - May™



Diligence EV

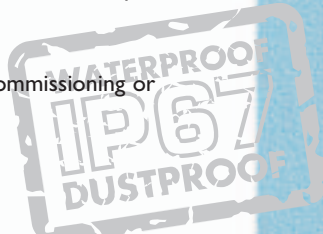
Logging in a New Century

Diligence EV temperature and humidity data loggers, supported by the specially designed Comark Evolution software, are the most advanced to be found in any market. The loggers are lightweight and small enough to be used almost anywhere and the range includes multi-sensor models, capable of simultaneously monitoring several temperature locations.

Once programmed, the loggers can be placed in the appropriate location or sent with consignments in transit, where they will acquire and store data for as long as necessary. The large, non-volatile, memory with wraparound capability and the extremely long battery life enable Diligence EV data loggers to handle logging assignments over extended periods of time and long distances. Stored data can be downloaded for analysis and used in vital decision making.

Diligence EV data loggers are very easy to operate, program and download and applications are almost limitless. Typical uses include the temperature and humidity monitoring of:

- Food, pharmaceutical products, medicines, chemicals and other sensitive materials, during distribution or storage in temperature controlled or ambient conditions
- Buildings such as offices, hotels, art galleries, museums and hospitals
- Scientific experiments especially incubators for the development of cultures
- Production processes
- Central heating and air conditioning during commissioning or maintenance



Diligence EV Data Loggers at a Glance

The six Diligence EV models cover almost every requirement and measure either temperature or humidity/temperature combined. Specifications include:-

- Tough, moulded cases, dust and waterproof to IP67 standards
- Large memory capacity of up to 16,000 readings
- Ability to log over multiple periods
- Windows™ based Evolution software, for fast, effective data download and analysis
- LED indication of active logging and temperature or humidity alarm conditions
- LCD displays on selected models, for instant checks on current readings and alarms
- Additional bleeper warning of temperature or humidity alarm conditions
- Single button control of all main functions
- Choice of single or multi-sensor temperature models
- Ability to scroll between readings from all sensors in use on LCD display
- Temperature system accuracy suitable for food industry applications
- Wide temperature measurement ranges: -40°C/-40°F to +70°C/+158°F for internal sensors and -40°C/-40°F to +150°C/+302°F for external sensors
- Lumberg connectors, for compatibility with Comark temperature probes, on models N2002 and N2012
- Long battery life



N2012 Multi-sensor temperature logger with LCD display (available without LCD, model N2002)



N2003 Humidity and temperature logger with LCD, (available without LCD, model N2002)



2 YEAR WARRANTY

The Diligence EV Data Logger Range

All instruments feature IP67 protection, up to 16,000 readings capacity plus wraparound, LED warning indicators for active logging and temperature alarms, and multi-function button.



N2001 Temperature Logger
Internal sensor and measurement range
-40°C/-40°F to +70°C/+158°F

N2011 Temperature Logger
As N2001 plus LCD display for temperature readings and alarm indication



N2002 Temperature Logger
Internal sensor and up to 4 external sensors via the Diligence EV Multi-Link.
Measurement ranges:
internal sensor
-40°C/-40°F to +70°C/+158°F
external sensors
-40°C/-40°F to +150°C/+302°F

N2012 Temperature Logger
As N2002 plus LCD display for temperature readings and alarm indication



N2003 Temperature and Humidity Logger
Internal temperature and external humidity sensors.
Measurement ranges:
temperature
-20°C/-4°F to +60°C/+140°F
humidity
0 to 97% RH non condensing

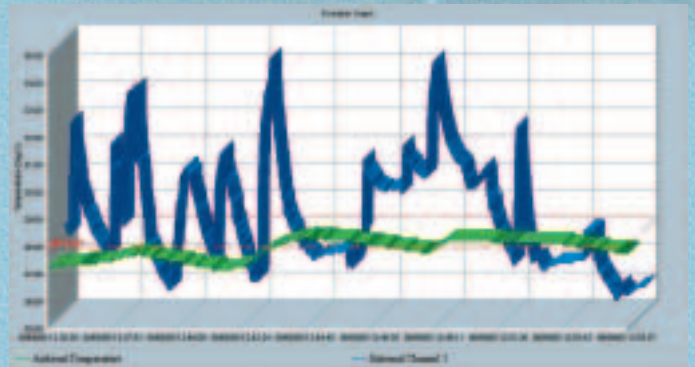
N2013 Temperature and Humidity Logger
As N2003 plus LCD display for temperature and humidity readings and alarm indication



Evolution Windows™ Software

The software used to program Diligence EV data loggers and to download and analyse data is based on the proven Evolution software platform and is compatible with Evolution data logging hand-held thermometers. Programming capabilities include:

- Setting times for logging start and stop
- Logging on selected days of the week to optimise use of available memory
- Selection of the logging interval to suit almost any logging task
- Extension of logging period with selectable memory wraparound. This enables new data to be saved over the oldest previously stored readings
- Adjustable high and low temperature and humidity alarm levels with active or disabled alarm bleeper
- Password protection of logging parameters and logged data
- Saving programmed logging configuration 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 the user's requirements
- Free form text column to allow descriptions of data to be added to data files
- "Quick" calculations of maximum, minimum and average temperatures and humidity levels plus the standard deviation 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



Typical Diligence EV graph.

Diligence EV Interface

The N2000INT interface connects Diligence EV data loggers to a PC for programming and downloading. Models N2002 and N2012 can be connected to the interface without the need to remove external probes.





N2011 Single sensor temperature logger with LCD display (available without LCD, model N2001)

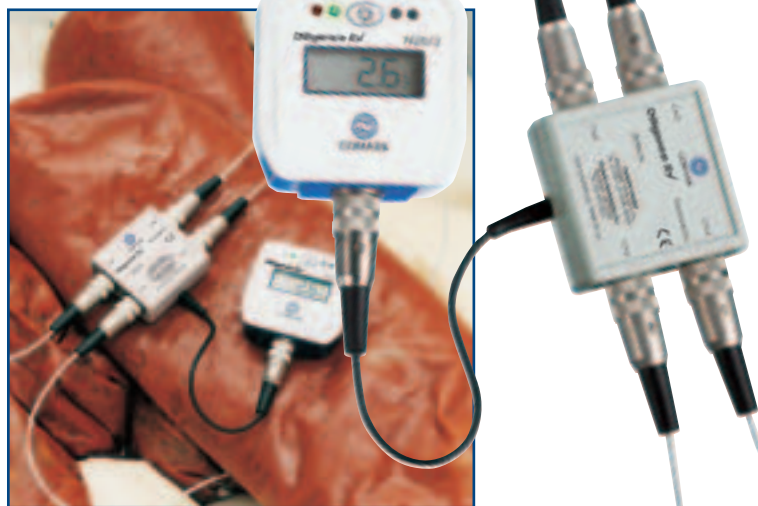
Multi-Sensor Capability

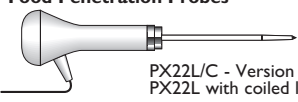

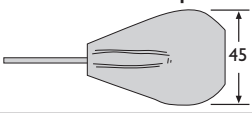
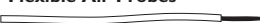

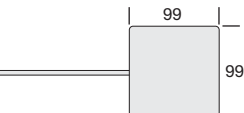
Diligence EV logger models N2002 and N2012 are even more cost effective because they can be used with any Comark thermistor probe fitted with a Lumberg connector. Up to 4 probes, plus the internal sensor, can be used at the same time, greatly increasing flexibility and applications.

For example, fridge and freezer temperatures can be monitored using air probes, stored consignments of products can be measured with between pack probes and the data logger can monitor its own environment from its internal sensor.

Diligence EV Multi-Link

The Diligence EV Multi-Link, order code N2000BOX, enables up to 4 probes to be used with models N2002 and N2012. The data logger will log readings from each sensor or probe in use.



	Sensor	Connector	Temp Range °C	Response Time (secs)†	Stem Length (mm)	Stem Dia (mm)	Lead Length (m)	Lead Material	Code
Food Penetration Probes  PX22L/C - Version of PX22L with coiled lead	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	1.0	PVC	PX22L/C
Penetration Probe 	PST	L	-40°C to +150°C	5.0	75	3.3	1.0	FEP	PX31L
Between Pack Temperature Probes 	PST	L	-40°C to +70°C	15.0	-	-	1.0	PEP	SX23L
	PST	L	-40°C to +70°C	15.0	-	-	3.0	PEP	SX24L
Flexible Air Probes 	PST	L	-40°C to +70°C	10	-	-	1.0	FEP	AX24L
	PST	L	-40°C to +70°C	10	-	-	3.0	FEP	AX25L
Damped Sensor Probe  - to slow down response times in applications where air temperatures change faster than the product temperatures, eg. food in fridges and freezers.	PST	L	-40°C to +70°C	30.0	-	8.0	2.0	FEP	DX28L
Food Simulant Probe  - for long term measurements of food in fridges and freezers.	PST	L	-40°C to +70°C	100	-	-	2.0	FEP	DX31L

All dimensions are in mm.

† The time constant is the time taken for the probe to reach 63% of the value of a temperature change. Multiply by 3 for the time taken to achieve 95% and by 5 for 99%.

Technical Specifications

Sensor Type	Thermistor
Measurement Range	
N2001, N2011	-40°C/-40°F to +70°C/+158°F
N2002, N2012	
Internal sensor	-40°C/-40°F to +70°C/+158°F
External Sensor	-40°C/-40°F to +150°C/+302°F
N2003, N2013	
Temperature	-20°C/-4°F to +60°C/+140°F
Humidity	0 to 97% RH non condensing
Scales	
Temperature	°C or °F
Humidity	RH or DP
Display Resolution	
Temperature	0.1°
Humidity	0.1% RH
System Accuracy	
Temperature	
-25°C/-13°F to +50°C/+122°F	±0.5°C/1°F
-40°C/-40°F to +80°C/+176°F	±1°C/2°F
-40°C/-40°F to +150°C/+302°F	±2°C/4°F (typical)
Humidity	
-20°C/-4°F to +60°C/+140°F	±3% RH
Memory 32K	
1 channel	16,000 samples
2 channels	8,000 samples
3 channels	5,300 samples
4 channels	4,000 samples
5 channels	3,200 samples
Communications	via infra-red interface
Download Time	3 minutes for 10,000 readings (typical)
Logging Frequency	Programmable between 1 second and 99 hours
Internal Sensor Response Time	T ₉₀ = 15 to 30 minutes in ambient air
Ambient Storage	-40°C/-40°F to +70°C/+158°F
Logging start	Programmable date and time or manual start from instrument multi-function button
Software	Windows™ based Evolution software requiring Windows 95, 98 or NT operating systems
Battery	1 x AA size 3.6V replaceable lithium battery, part number A17476
Battery Life	Up to 5 years
Case Material	ABS
Environmental Protection	IP67, EN60529, IEC529
LED Indication	Red = alarm, green = logger active
Dimensions	L 88mm/3.5" (including fixing lug) W 80mm/3.1" D 35mm/1.4"
Weight	
N 2001	95gms/3.5oz
N 2011	103gms/3.6oz
N 2002	111gms/3.9oz
N 2012	119gms/4.2oz
N 2003	109gms/3.9oz
N 2013	117gms/4.1oz

Diligence EV Data Logger Accessories

N2000BOX

Multi-link box with one Lumberg connector and 4 Lumberg input sockets, to connect up to 4 Comark probes to N2002 or N2012 data loggers.

N2000INT

Interface for programming and downloading Diligence EV data loggers.
N1SW
Evolution Windows™ software.

WARRANTY

All Comark instruments have a minimum one year warranty unless otherwise stated. The warranty period for temperature probes is for 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.

Comark Limited has an accredited UKAS calibration laboratory for temperature and humidity measurement. UKAS certificates can be provided for any Comark, Kane-May or other temperature measurement instrument.



CERTIFICATE No. FM12129
ISO 9001



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