ECOLOG Data Sheets

Status September 2009

Price list on demand
Subject to alterations

ECOLOG TN2 **Part No. 2420**
ECOLOG TN2 for EX-Zone 1 **Part No. 2420-EX**
- For 2 NTC sensors; external: -50°C..140°C / internal: -35°C..55°C, Alarm output
- External Start / Alarm Reset / InPos detection (with special connector)
- Alarm output

ECOLOG TN3-P **Part No. 2420-P**
ECOLOG TN3-P for EX-Zone 1 **Part No. 2420-PEX**
- For 3 NTC sensors; external: -50°C..140°C / internal: -35°C..55°C
- Alarm output
- External Start / Alarm Reset / InPos detection (with special connector)
- Automatic printout for data

ECOLOG TN4 **Part No. 2421**
ECOLOG TN4 for EX-Zone 1 **Part No. 2421-EX**
- For 4 NTC sensors -50°C..140°C
- Alarm output; 2 digital inputs
- 4 button keypad; External Start, Alarm Reset, Measurement and Alarm Scroll
- Direct connection to printer for alarm protocol and status

ECOLOG TN4-L **Part No. 2422**
ECOLOG TN4-L for EX-Zone 1 **Part No. 2422-EX**
- For 4 NTC sensors-50°C..140°C with LEMO connector
- Alarm output; 2 digital inputs
- 4 button keypad; External Start, Alarm Reset, Measurement and Alarm Scroll
- Direct connection to printer for alarm protocol and status

ECOLOG TH1 with standard Sensor **Part No. 2423**
ECOLOG TH1 for EX-Zone 1 with standard sensor **Part No. 2423-EX**
ECOLOG TH1-M with whit casing and standard sensor **Part No. 2423-M**
- Connection for 1 integrated -35°C ..55°C; 0 ..100%rH or up to 2 external humidity and temperature sensors -35°C ..55/110°C; 0..100%rH or a second temperature sensor -50°C ..140°C
- Calibrated, interchangeable humidity and temperature sensors (Part No. 3087; 3087-A; 3087-B)
- Alarm output; 1 digital input
- 4 button keypad; External Start, Alarm Reset, Measurement and Alarm Scroll
- Direct connection to printer for alarm protocol and status

ECOLOG TH2 **Part No. 2426**
ECOLOG TH2 for EX-Zone 1 **Part No. 2426-EX**
- For 2 external, calibrated and interchangeable humidity and temperature sensors -35°C ..70°C; -35°C..55/110°C; 0%..100%rH (Part No. 3087; 3087-A; 3087-B)
- Alarm output; 1 digital input
- 4 button keypad, External Start, Alarm Reset, Measurement and Alarm Scroll
- Direct connection to printer for data and alarm printout

ECOLOG TP2 **Part No. 2425-2T**
ECOLOG TP2 for EX-Zone 1 **Part No. 2425-2TEX**
ECOLOG TP4-L **Part No. 2425**
ECOLOG TP4-L for EX-Zone 1 **Part No. 2425-EX**
- TP2: For 2 PT100 sensors -200°C..550°C - 4 wire system with DB15 connector
  TP4-L: For 4 PT100 sensors -200°C..550°C - 4 wire system with LEMO connector
- Alarm output; 1 digital input
- 4 button keypad; External Start, Alarm Reset, Measurement and Alarm Scroll
- Direct connection to printer for alarm protocol and status

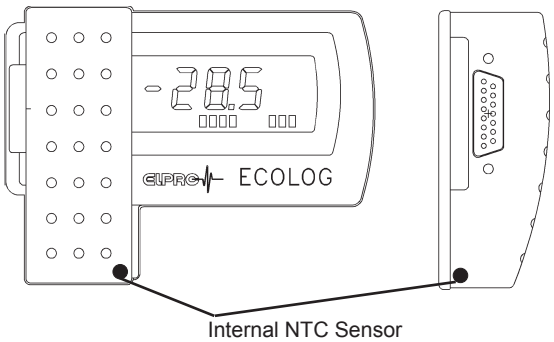
ECOLOG TN2
ECOLOG TN3-P
Datalogger System for 1-3 Temperatures

Part No. 2420
Part No. 2420-EX
Part No. 2420-P
Part No. 2420-PEX

Technical Data

General:	TN2: 2 channel datalogger with display and alarm functions
	TN3-P: 3 channel datalogger with display and alarm functions
Case:	Thermoplastic ABS, IP54 with internal sensor and cover on DB15, suitable for foodstuff applications, 110x85x35mm
Display:	Large LCD display, visible down to -20°C, with alarm indication
Memory:	64'000 data points
	Loop memory or start - stop mode with external start option
Interval:	Programmable, 1 second to 3 hours,
Log Period:	Days, months, years
Alarm:	External on DB15, and alarm display on LCD screen (programmable)
Operating:	-35°C..55°C, display readable down to -20°C
Measuring:	1 built-in NTC sensor -35°C..55°C and/or up to 2/3 external NTC sensors -50°C..140°C
Battery:	1x Lithium 3.6V, user-replaceable, life-span approx. 2 years
	Low-battery warning
Evaluation:	PC software elproLOG ANALYZE for all communication, reprogramming, display, statistics and printout (fast data transmission RS232 with 38 400 Baud)
Features:	Start extern and InPos with DB15 start socket, display alarm reset with DB15 reset socket
	TN2: No print function
	TN3-P: Direct printout of short protocol (serial printer RS232 w. 9600 Baud)

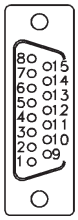
DB15 connector for sensors, RS232 and Alarm



Internal NTC Sensor

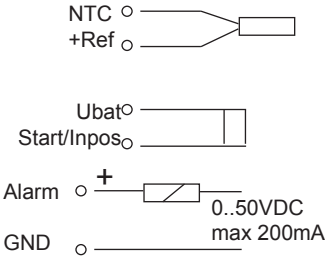
Accessories:	**Part No.**
Evaluation software elproLOG ANALYZE	2338-CDV
Data cable PC	2318
Simple fixation bracket	2804-A
Mounting bracket for DB15	2804-B
Bracket with terminals	2804-C..
Seiko DPU414 protocol printer	2319
Data cable for Seiko DPU414	2309-F
EcoPrint (Set: TN3-P + Printer)	2560-A
DB15 socket for sensor etc.	3032
DB15 with screw terminals	3034
DB15 socket Start / Inpos	3032-IS
DB15 socket Alarm reset	3032-EA

DB15 Connector

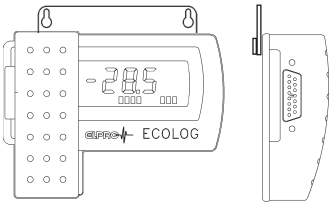


8	GND	15	RxD
7	TxD	14	Busy
6	NTC2	13	Res.
5	+Ref	12	Start/Inpos
4	Res.	11	Ubat.
3	Res. / NTC3	10	Alarm Reset
2	+Ref.	9	Alarm
1	NTC1		

Wiring Diagramme



Simple Fixation Bracket 2804-A



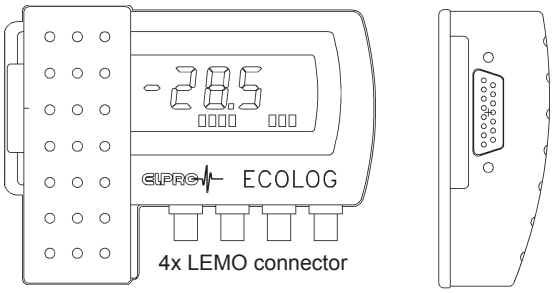
ECOLOG TN4
ECOLOG TN4-L
Datalogger System for 1-4 NTC Sensors

Part No. 2421
Part No. 2421-EX
Part No. 2422
Part No. 2422-EX

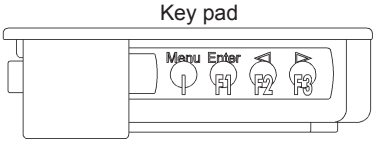
Technical Data

General:	4 channel datalogger with display and alarm functions
Case:	Thermoplastic ABS, IP52 with ext. sensor, suitable for foodstuff applications, 110x85x35mm
Display:	Large LCD display, visible down to -20°C, with alarm indication
Key pad:	4-keys: reset alarm, step by step data or alarm display, printout data / alarm
Memory:	64'000 data points Loop memory or start - stop mode with external start by using the key pad
Interval:	Programmable, 1 second to 3 hours,
Log Period:	Days, months, years
Alarm:	External on DB15, and alarm display on LCD screen (programmable)
Operating:	-35°C..55°C, display readable down to -20°C
Measuring:	4 x NTC sensors -50°C..140°C
Sensor connection:	TN4: DB15 connector TN4-L: 4 LEMO connectors 2 pin or on DB15 connector
Battery:	1x Lithium 3.6V, user-replaceable, life-span approx. 2 years Low-battery warning
Evaluation:	PC software elproLOG ANALYZE for all communication, reprogramming, display, statistics and printout (fast data transmission RS232 with 38 400 Baud)

DB15 connector for sensors, RS232, alarm

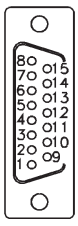


Key pad



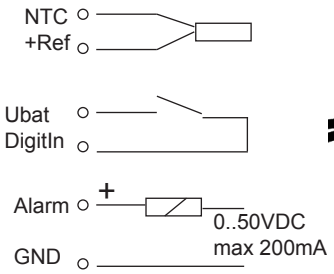
Accessories:	Part No.
Evaluation software elproLOG ANALYZE	2338-CDV
Data cable PC	2318
Simple fixation bracket	2804-A
Mounting bracket for DB15	2804-B
Bracket with terminals	2804-C..
Seiko DPU414 protocol printer	2319
Data cable for Seiko DPU414	2309-F
DB15 socket for sensor etc.	3032
DB15 with screw terminals	3034
DB15 socket with built-in NTC	3032-A

DB15 Connector

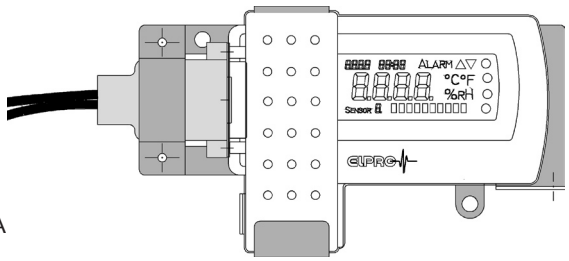


8	GND	15	RxD
7	TxD	14	Busy
6	NTC2	13	Res.
5	+Ref	12	DigitIn1
4	NTC4	11	Ubat.
3	NTC3	10	DigitIn2
2	+Ref.	9	Alarm
1	NTC1		

Wiring Diagramme



Bracket 2804-B with Alarm Cable

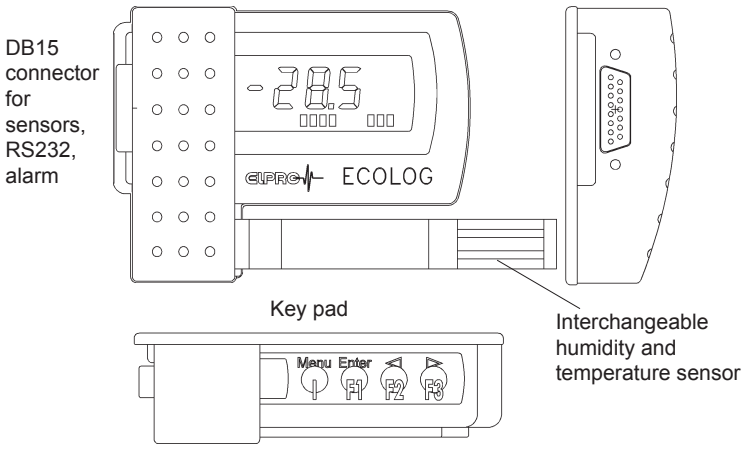


ECOLOG TH1 Datalogger System for Temperature and Humidity

Part No. 2423
Part No. 2423-EX

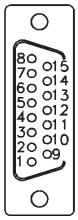
Technical Data

General:	4 channel (2 x Humidity and 2 x Temperature) datalogger with display and alarm functions
Case:	Thermoplastic ABS, IP50, suitable for foodstuff applications, 110x85x35mm
Display:	Large LCD display, visible down to -20°C, with alarm indication
Key pad:	4-key: reset alarm, step by step data or alarm display, printout data / alarm
Memory:	64'000 data points Loop memory or start - stop mode with external start by using the key pad
Interval:	Programmable, 1 second to 3 hours,
Log Period:	Days, months, years
Alarm:	External on DB15, and alarm display on LCD screen (programmable)
Operating:	-35°C..55°C, display readable down to -20°C; 0%..100%rH, with condensation
Reaction Constant:	Temperature: 110s; Humidity: 110s Logger with sensor, standard dust filter, air speed: 1m/s
Measuring:	- 3087 or 3087-A: Integrated or up to 2 external temperature and humidity sensors: T: -35°C..70°C, H: 0%..100%rH - 3087-B: 1 or 2 external temperature and humidity sensors: T: -35°C..110°C, H: 0%..100%rH - Up to 2 external NTC temperature sensors: T: -50°C..140°C
Battery:	1x Lithium 3.6V, user-replaceable, life-span approx. 1.5 years Low-battery warning
Evaluation:	PC software elproLOG ANALYZE for all communication, reprogramming display, statistics and printout (fast data transmission RS232 with 38 400 Baud)
Printer:	Direct printout of alarm protocol and status (serial printer RS232 with 9600 Baud)



Accessories:	Part No.
Evaluation software elproLOG ANALYZE	2338-CDV
Data cable PC	2318
Simple fixation bracket	2804-A
Mounting bracket for 3215-Sx	2804-B
Bracket with 3 x DB15 sockets	2805-CR
Seiko DPU414 protocol printer	2319
Data cable for Seiko DPU414	2309-F
DB15 socket for alarm etc.	3032
DB15 with screw terminals	3034
Humidity-temperature sensor	3087
Humidity-temperature sensor (replacement)	3087-A
Humidity-temperature sensor (high temp.)	3087-B
Humidity calibration set	2812-B
Extension cable 1, 2, 5, 10m	3215-Sxx
Connection lead for two rH/T sensors 2, 5m	3215-Dxx
Adapter sensor 1/2 to 3/4	3215-DX
Adapter for 2 temperature sensors	3215-VN

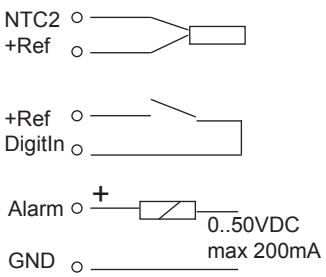
DB15 Connector on ECOLOG



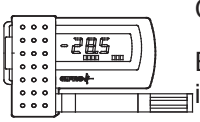
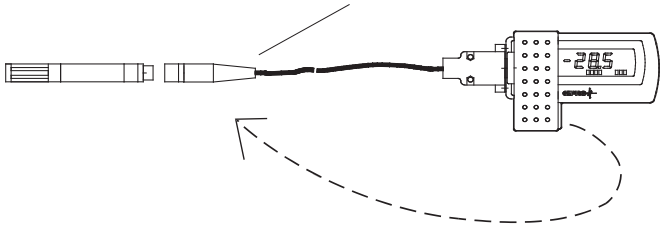
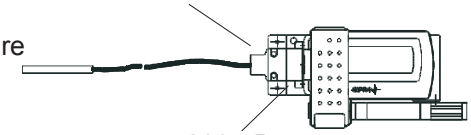
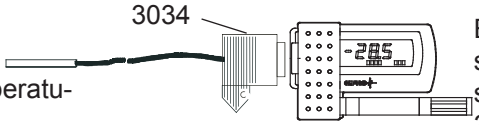
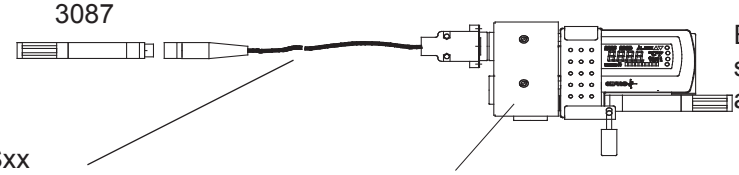
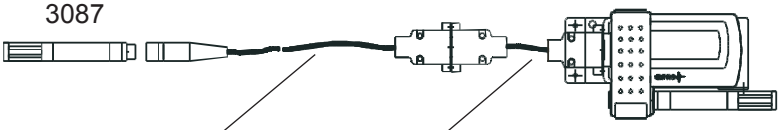
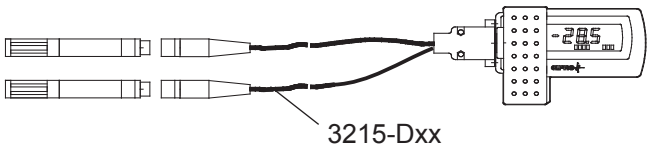
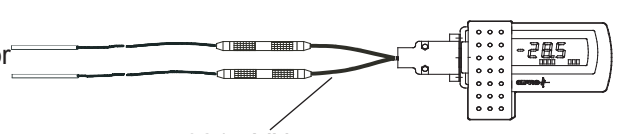
8	GND	15	RxD
7	TxD	14	Busy
6	+Ref	13	*)
5	*)	12	NTC2
4	*)	11	*)
3	*)	10	DigitIn
2	*)	9	Alarm
1	*)		

*) For a second rH/T sensor use bracket type 2805-CR

Wiring Diagramme



Sensor Configuration
ECOLOG TH1

	Configuration	Function
	ECOLOG TH1 with 1 internal rH/T sensor	Internal: Humidity and temperature
3215-S1 	ECOLOG TH1 Calibration	External: Humidity and temperature
3215-B any NTC temperature sensor  2804-B	ECOLOG TH1 with a second temperature sensor and bracket 2804-B	Internal: Humidity and temperature External: Temperature
3034  any NTC temperature sensor	ECOLOG TH1 with a second temperature sensor and connector 3034	Internal: Humidity and temperature External: Temperature
3087  3215-Sxx xx = 1; 2; 5; 10; 15; 20m 2805-CR	ECOLOG TH1 with a second rH/T sensor and bracket 2805-CR	Internal: Humidity and temperature External: Humidity and temperature
3087  3215-Sxx xx = 1; 2; 5; 10; 15; 20m 3215-DX	ECOLOG TH1 with a second rH/T sensor and adapter 3215-DX	Internal: Humidity and temperature External: Humidity and temperature
3087  3215-Dxx xx = 2m; 5m	ECOLOG TH1 with two rH/T sensors and connection lead 3215-Dxx	External: Two times humidity and temperature
any NTC temperature sensor with LEMO plug  3215-VN	ECOLOG TH1 with two temperature sensor and adapter 3215-VN	External: Two times temperature

Important Note:
Max. added cable length for rH/T sensor 1 and 2 is 20m
(e.g. 1x3215-S20 or 2x3215-S10)

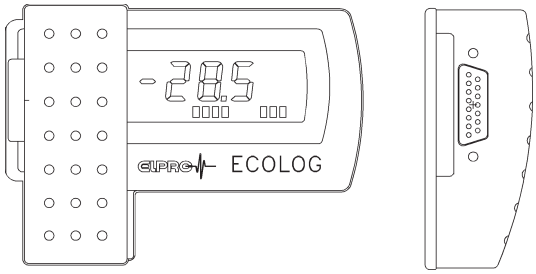
ECOLOG TH2 Datalogger System for Temperature and Humidity

Part No. 2426
Part No. 2426-EX

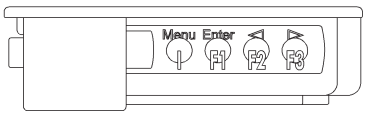
Technical Data

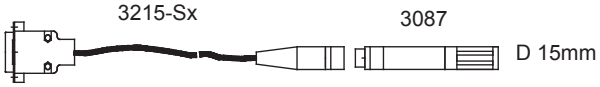
General:	4 channel (2 x Humidity and 2 x Temperature) datalogger with display and alarm functions
Case:	Thermoplastic ABS, IP52 with ext. sensor, suitable for foodstuff applications, 110x85x35mm
Display:	Large LCD display, visible down to -20°C, with alarm indication
Key pad:	4-key: reset alarm, step by step data or alarm display, printout data / alarm
Memory:	64'000 data points Loop memory or start - stop mode with external start by using the key pad
Interval:	Programmable, 1 second to 3 hours,
Log Period:	Days, months, years
Alarm:	External on DB15, and alarm display on LCD screen (programmable)
Operating:	-35°C..55°C, display readable down to -20°C 0%..100%rH, with condensation
Measuring:	- 3087 or 3087-A: 1 or 2 external temperature and humidity sensors: T: -35°C..70°C , H: 0%..100%rH - 3087-B: 1 or 2 external temperature and humidity sensors: T: -35°C..110°C, H: 0%..100%rH - Up to 2 external NTC temperature sensors: T: -50°C..140°C
Battery:	1x Lithium 3.6V, user-replaceable, life-span approx. 1.5 years Low-battery warning
Evaluation:	PC software elproLOG ANALYZE for all communication, reprogramming, display, statistics and printout (fast data transmission RS232 with 38 400 Baud)
Printer:	Direct printout of alarm protocol and status (serial printer RS232 with 9600 Baud)

DB15 connector for sensors, RS232, alarm



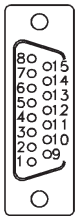
Key pad





Accessories:	**Part No.**
Evaluation software elproLOG ANALYZE	2338-CDV
Data cable PC	2318
Simple fixation bracket	2804-A
Mounting bracket for 3215-Sx	2804-B
Bracket with 3 x DB15 sockets	2805-CR
Seiko DPU414 protocol printer	2319
Data cable for Seiko DPU414	2309-F
DB15 socket for alarm etc.	3032
DB15 with screw terminals	3034
Humidity-temperature sensor	3087
Humidity-temperature sensor (replacement)	3087-A
Humidity-temperature sensor (high temp.)	3087-B
Humidity calibration set	2812-B
Extension cable 1, 2, 5, 10m	3215-Sxx
Connection lead for two rH/T sensors 2, 5m	3215-Dxx
Adapter sensor 1/2 to 3/4	3215-DX
Adapter for 2 temperature sensors	3215-VN
NTC temperature sensors	Page 5

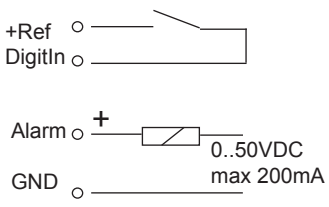
DB15 Connector



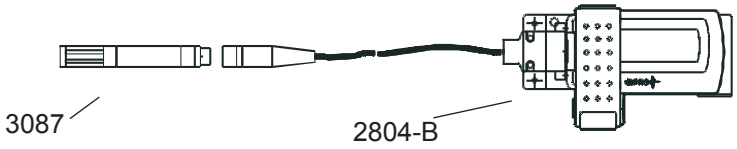
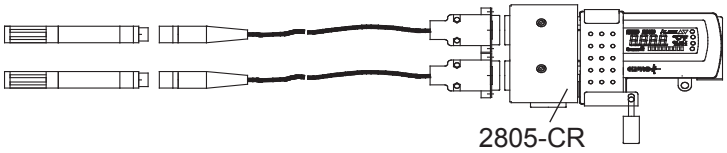
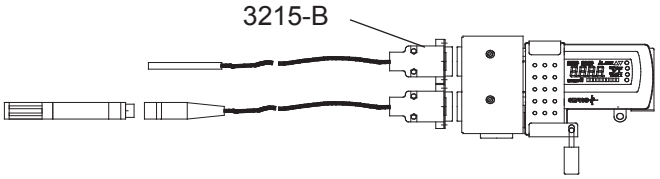
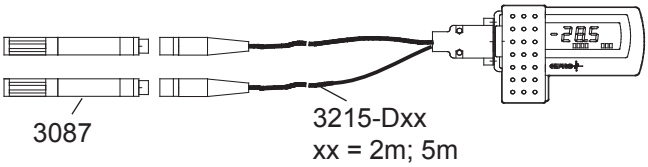
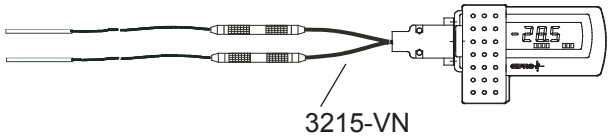
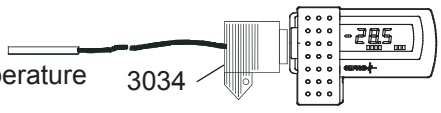
8	GND	15	RXD
7	TXD	14	Busy
6	+Ref.	13	NTC1
5	A1	12	NTC2
4	A2	11	D1
3	B1,2	10	DigitIn
2	D2	9	Alarm
1	C1,2		

For a second rH/T sensor, alarm etc. the use of bracket 2805-CR is recommended

Wiring Diagramme

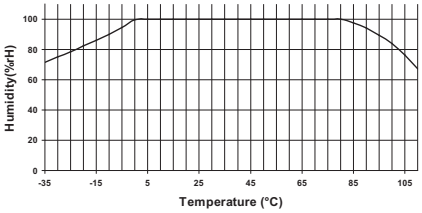


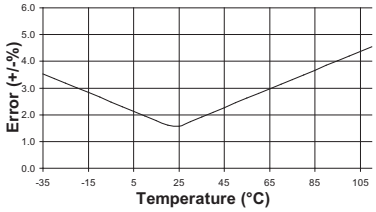
Sensor Configuration
ECOLOG TH2
rH/T Sensor 3087-B

	Configuration	Function
	ECOLOG TH2 as portable rH/T data logger	External: Humidity and temperature
	ECOLOG TH2 with 1 rH/T sensor and bracket 2804-B	External: Humidity and temperature
	ECOLOG TH2 with two rH/T sensors and bracket 2805-CR	External: Two times humidity and temperature
	ECOLOG TH2 with a rH/T sensor, second temperature sensor and bracket 2805-CR	External: Humidity and temperature and second temperature
	ECOLOG TH2 with two rH/T sensors and connection lead 3215-Dxx	External: Two times humidity and temperature
any NTC temperature sensor with LEMO plug 	ECOLOG TH2 with two temperature sensor and adapter 3215-VN	External: Two times temperature
any NTC temperature sensor 	ECOLOG TH2 with temperature sensor and connector 3034	External: Temperature

Important Note:
Max. added cable length for rH/T sensor
1 and 2 is 20m (e.g. 1x3215-S20 or 2x3215-S10)

Save Operation Area of rH/T sensor 3087-B; Sensor with extended temperatur range up to 100°C





Save operation area of the rH/T sensor 3087-B for extended temperature application corresponds to the plot shown.
110°C for temperature peeks, permanent operation 100°C only.

Attention
Temperature range for the sensor cable 3215-Sxx is -35°C ..80°C
The cable should not be moved at such high temperatures!

— Sensor 3087-B temperature dependence off the measurement error at the time of shipment.
For sensor 3087 and 3087-A reduced temperature range:
-35°C..70°C only

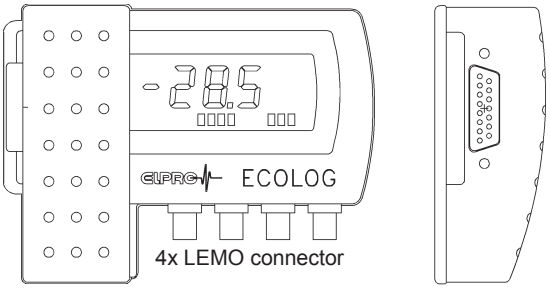
ECOLOG TP2
ECOLOG TP4-L
Datalogger System for 1-4 PT100 Sensors

Part No. 2425-2T
Part No. 2425-2TEX
Part No. 2425
Part No. 2425-EX

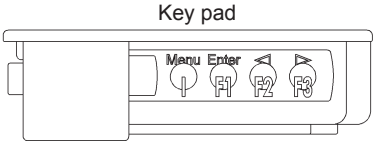
Technical Data

General:	TP2: 2 channel datalogger with display and alarm functions TP4-L: 4 channel datalogger with display and alarm functions
Case:	Thermoplastic ABS, IP52 with ext. sensor, suitable for foodstuff applications, 110x85x35mm
Display:	Large LCD display, visible down to -20°C, with alarm indication
Key pad:	4-key: reset alarm, step by step data or alarm display, printout data / alarm
Memory:	64'000 data points Loop memory or start - stop mode with external start by using the key pad
Interval:	Programmable, 1 second to 3 hours
Resolution:	High and low resolution selectable. Attention: Display in low resolution mode always!
Log Period:	Days, months, years
Alarm:	External on DB15, and alarm display on LCD screen (programmable)
Operating:	-35°C..55°C, display readable down to -20°C
Measuring:	2/4 x PT100 sensors -200°C..550°C, 4 wire system
Sensor connection:	TP2: DB15 connector TP4-L: 4 LEMO connectors 4 Pin or sensor 1 & 2 on DB15 connector
Battery:	1x Lithium 3.6V, user-replaceable, life-span up to 1.5 year, depending on measurement interval and resolution. Low-battery warning
Evaluation:	PC software elproLOG ANALYZE for all communication, reprogramming, display, statistics and printout (fast data transmission RS232 with 38 400 Baud)
Printer:	Direct printout of alarm protocol and status (serial printer RS232 with 9600 Baud)

DB15 connector for sensors, RS232, alarm

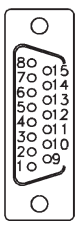


Key pad



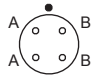
Accessories:	**Part No.**
Evaluation software elproLOG ANALYZE	2338-CDV
Data cable PC	2318
Simple fixation bracket	2804-A
Mounting bracket for DB15	2804-B
Bracket with terminals	2801-CR
Seiko DPU414 protocol printer	2319
Data cable for Seiko DPU414	2309-F
DB15 socket for alarm etc.	3032
DB15 with screw terminals	3034

DB15 Connector



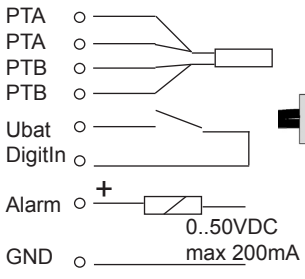
8	GND	15	RxD
7	TxD	14	Busy
6	Ubat	13	A2
5	A1	12	A2
4	A1	11	B2
3	B1	10	DigitIn
2	B1	9	Alarm
1	B2		

LEMO Connector

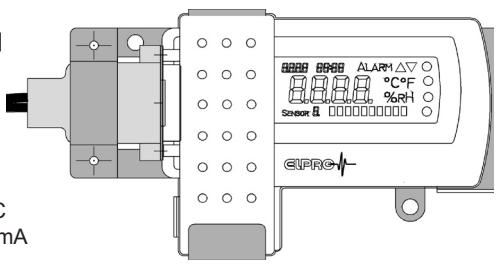


Plug soldering side seen

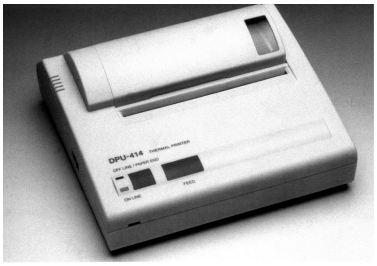
Wiring Diagramme



Bracket 2804-B with Alarm Cable



Accessories
Intrinsically Safe
ECOLOG Dataloggers



Seiko DPU414 printer — Part No. 2319
- For 220V and battery operation, 110mm thermopaper
- Printer cable — Part No. 2309-F
- Printer paper (3 rolls) — Part No. 2311

EcoPrint — Part No. 2560-A
- Multivolt for operation in transporters; 10 - 30VDC
- Set made of: printer, TN3-P, one sensor 3094-L10 and protective housing
- Printer paper (5 rolls) — Part No. 2315-PA

USB - RS232 Adapter — Part No. 2317-USB
- To connect any ECOLOG data loggers to a PC by using the USB port of the PC.

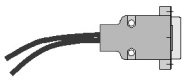
Replacement battery for ECOLOG data loggers — Part No. 2820
Set of 2 batteries, minimum storage time is 5 years

Intrinsically Safe Logger; Part No. xxxx-EX

SEE 00 ATEX 3115
II 2 G
Ex ib IIB T4
CE 1258
Anschlussdaten des eigensicheren Steckers:
Securité intrinséque interface:
Con. data of the intrinsically safe interface:
Manual EZ-7003B

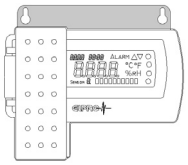
II 2 G	I I	Equipment group II intended for use in all potentially explosive atmospheres apart from mines
	2	Category 2, suitable for use in zone 1 (occasional explosion hazard) as well as in zone 2 (rare explosion hazard)
	G	Atmosphere with explosion hazard arising from gases and vapors but not from dust
Ex ib IIB T4	Ex	Explosion protection type according to European directives: EN60079-0:2006 and types of protection against ignition
	ib	Type of protection for intrinsic safety against ignition: category ib with 1 failure according to EN60079-11:2007, EN1127-1:2007
	IIB	Use in all potentially explosive atmospheres apart from mines: group II sub-clause B
	T4	Temperature class T4: max. surface temperature 135°C with a safety margin of 5 Kelvin for permanently hot surfaces T4 applies for compound materials with an ignition temperature of t > 135°C, essentially ethyl ether and ethanal, which are used for industrial production of synthetics and solvents.

Mounting Fixtures
ECOLOG Dataloggers



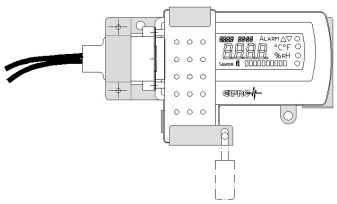
DB15 connector **Part No. 3032**
Sensor with customized mounting **Part No. 3032-B**
2-3 cables can be attached
Metal housing with connector head - solder hook terminated for sensor, alarm output, etc.

DB15 connector with sensor **Part No. 3032-A**
For ECOLOG TN4 as internal sensor, analog 3032
Operating: -35°C..55°C

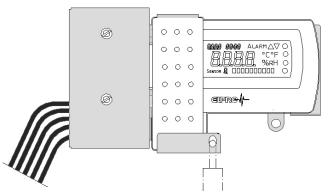


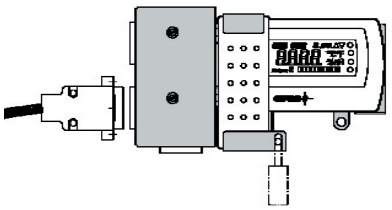
Simple fixation bracket **Part No. 2804-A**
Ideal for ECOLOG TN2 and TH1
Support plate made of stainless steel
With 2 PT screws for attachment to logger

Fixation bracket with padlock **Part No. 2804-E**
Ideal for ECOLOG TN2 and TH1
Support plate made of stainless steel
The logger can be protected and secured with a padlock (not part of delivery)



Fixation bracket ECOLOG for DB15 **Part No. 2804-B**
Ideal for ECOLOG TN2, TN4 and TH2
Made of stainless steel for wall-mounting
With mounting bracket to attach DB15 connector
With 2-3 cables, without DB15 connector
The logger can be protected and secured with a padlock (not part of delivery)





Fixation bracket ECOLOG with terminals **Part No. 280x-C..**
Ideal for customer applications
Made of stainless steel for wall-mounting
For simple attachment of all sensor cables, digital inputs and alarm cables to the connecting terminals
The logger can be protected and secured with a padlock (not part of delivery)

Logger Type	Bracket Type
TNx:	2804-C
	2804-CR (with additional RS232 connector)
THx:	2805-CR
TPx:	2801-CR (with additional RS232 connector)

Protective Housing ECOLOG **Part No. 2350-xx**
As accessories ELPRO provides a protective housing made of shock proof plastic material with IP66, and 3 differenterent brackets for simple fixation of dataloggers.
For more information see specific data sheets.

Accuracy; Traceability Temperature; Time Norms passed

Temperature Measurement TPx

(Datalogger only, at room temperature)

Operating Range	Resolution	Linearity (k=1)
-200°C.. -101°C	0.2°C	± 0.3°C
-100°C.. 399°C	0.1°C	± 0.2°C
400°C.. 499°C	0.1°C	± 0.3°C
500°C.. 550°C	0.2°C	± 0.5°C

Temperature Measurement TNx and THx

(Datalogger with sensor typical; logger at room temperature)

Operating Range	Resolution	Accuracy (U95; k=2)
-50.0°C.. -25.0°C	0.1°C	± 0.4°C
-24.9°C.. 0.0°C	0.1°C	± 0.3°C
0.1°C.. 70.0°C	0.1°C	± 0.2°C
70.1°C.. 100.0°C	0.1°C	± 0.4°C
100.1°C.. 140.0°C	0.1°C	± 0.7°C

Check / Verification of Temperature Measurement

1) New devices:
- All dataloggers are factory-checked using precision resistors and subsequently receive a calibration certificate.
- NTC resistor sensors (thermal resistor) are interchangeable in terms of accuracy - see the adjacent table.
- PT100 sensors are interchangeable with respect to their class of accuracy.

2) Periodical recalibration:
Datalogger: every 1 - 2 years - with calibration resistor by end user or by ELPRO service center.
Sensor: every 2 years or when deviations occur - in calibration bath by end user or by ELPRO service center.

Traceability

ELPRO uses calibrated measuring units for factory calibration. The ELPRO certificate can be used for GLP applications. The following calibrated normals are implemented for the calibration procedure:

Voltage / current calibration source	GENERAL-RESISTANCE DAS-57AL
Resistance reference	CROPICO type RBB5
Precision resistance bridge	HART 1502A
Calibration bath -20°C... 150°C	ASL LR100 & TAMSON TV2000 & HART 6102

Time

The accuracy of the logger internal clock is: +/- 20 minutes/year at 25°C
If the ambient temperature is changed, the following deviations are possible:
Between -20°C and +55°C up to +/- 1 hour/year

Norms

EN12830	Temperature recording instrument for transport, storage and distribution of foodstuffs
EN13485	Thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream
GZ1480	Exceptional approval for calibration GZ1480/2000 from 10. 4. 2000, BEV Austria
Ex...	Approval for intrinsically safe area 1; EN60079-0:2006, EN60079-11:2007 and EN1127-1:2007
FDA	Software validation for GLP application
CE	The loggers are conform to EN61000-6-2:2006 and EN61000-6-4:2006

广州虹科电子科技有限公司 广州市五山华南理工大学国家科技园 2 号楼 504-505 室（510640）
电话： 020-3874 3030; 3874 3032 e-mail: sales@hkaco.com 网站：www.hkaco.com

Accuracy; Traceability Humidity

Relative Air Humidity ECOLOG THx

Operating range	Resolution	Accuracy of measurement	
0% rH .. 100%rH	0.2%rH	At ambient temperature, 23°C:	± 1.5%rH
		Hysteresis 10-90-10%rH:	<1%rH
		Temperature coefficient:	see page 9

Check / Verificaton of the Relative Humidity Measurement

a) New devices:
All dataloggers are factory-calibrated with SCS* calibration solutions and subsequently receive a calibration certificate. The adjustment points are 0%rH and 80%rH (95%rH for high levels of humidity). The humidity sensors are calibrated and interchangeable. The calibration values are read in by the logger.

b) Periodical recalibration:
With SCS calibration solutions and calibration device by the end user or by ELPRO service center.
Alternatively there is the possibility to get a calibrated sensor as an interchangeable part from ELPRO.
Interval: every 12 months in clean operating environment; in environment with high humidity, dust, smoke etc, every 6 months or in case of doubt.

*SCS = SWISS CALIBRATION SERVICE

Interchangeability of rH/T Sensors

a) Humidity Sensor used in rH/T Sensors
All humidity sensors are factory-calibrated with SCS calibration solutions and subsequently receive a calibration certificate. The adjustment points are 0%rH and 80%rH. (95%rH for high levels of humidity)
The ECOLOG rH/T sensors are interchangeable in their pre-calibrated state. The calibration data are read in by the logger.

b) Temperature Sensor used in rH/T Sensors
For the temperature sensor used in the rH/T sensor are the same conditions valid as for the NTC sensors used. Based on the strong relation between temperature and measurement value, in most of our cases a check at 0°C ice-water is sufficient.

c) Data Logger
For the production of our data loggers we use high quality components only. The functionality of all loggers is checked by the use of high precision resistors for the temperature measurement and with a simulated signal for the humidity measurement. According to these checks all data loggers receive a calibration certificate.

Check / Verification of rH/T Sensors

a) Temperature measurement
According to the information about temperature measurement, see page 15.

b) Humidity measurement
With SCS calibration solutions and calibration device by the end user or by ELPRO service center.
Interval: In clean operating environment every 12 month, in environments with high humidity, dust, smoke etc. every 6 month or in case of doubt.

Required for humidity calibration and adjustment:	**Part No.**
Extension cable for ECOLOG THx for calibration:	3215-S01
Calibraton unit for humidity logger:	2902
Calibration ampullae (set of 5)	2901-Hx, x= 0%, 35%, 50%, 80%, 95%

Traceability

ELPRO uses SCS calibrated humidity standards for calibration. The ELPRO certificate can be used for GLP applications.

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电话： 020-3874 3030; 3874 3032 e-mail: sales@hkaco.com 网站：www.hkaco.com

ECOLOG TNx , THx and TPx Temperature - Calibration or Adjustment

ECOLOG TNx and THx: Modules for measuring temperature with precise NTC sensors
Dataloggers belonging to the TNx and THx series are supplied with very precise temperature sensors. Consequently, it is possible to dispense with adjustment procedures. However we recommend that you perform an operational check on the module and its temperature sensors approx. every 12 - 14 months. If you detect a deviation from the permissible range, there is a defect at the sensor, cable or connector. The cause of this defect must be eliminated.

ECOLOG TPx: Modules for measuring temperature with PT100 sensors
Dataloggers belonging to the TPx series are factory-adjusted with precision resistors to the theoretical PT100 characteristic. The implemented 4-line measuring technique automatically compensates the measuring cable influence. In exceptional cases, it is possible to readjust PT100 sensor deviation, i.e. when very exact measurements must be made in one special operating point. However, an readjusted module must be marked as follows: Only to be used with sensor XYZ. We recommend that you perform an operational check on the module and its temperature sensors approx. every 12 - 14 months.

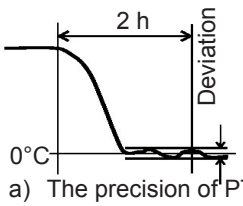
Methods for Temperatur Calibration
a) 0°C ice-water
Calibration of modules with their sensors which uses the triple point of ice-water (0°C) as reference temperature. You can expect an accuracy of approx. 0°C ±0.1°C.
b) Calibration bath
When a calibration bath is used (-20°C..200°C), pay attention to the fact that the reference sensor should be fastened to the comparison sensor. This will ensure the temperature at the individual sensors is identical, i.e. that there is no temperature difference. All the sensors should be immersed to the same depth in the bath and the implemented reference bath should be stable. Also make sure that the sensors do reach the reference temperature. The measured values can be improved by repeated measuring and averaging.

NOTE
Sensor interchangeability can no longer be guaranteed if this method is used. A possible offset at the used sensor will be taken into account of during the calibration procedure. For this reason, only use the above method in exceptional cases.

c) Dry calibrator
You should only calibrate sensors in the dry calibrator when the diameter of the aperture in the test block corresponds exactly with the diameter of the sensor and when the sensor can be inserted deep into the test block (min. 100 mm or deeper, depending on the sensor).

Ice water calibration procedure

1. Prepare the ice water in an insulated container, e.g. a camping cool-box:
   Fill the cool-box with 10 liters of ice cubes. Use ice from an ice machine (-1°C), not from a freezer (-20°C). Fill up the cool-box with cold water to the filling height of the ice. Stir the contents of the cool-box thoroughly to mix ice and cold water.
2. Program a short recording interval (1 min).
3. a) Wrap up the logger with internal sensor in watertight packaging material, i.e. pack it in a latex glove.
   b) Plug in external temperature sensors at the module.
   c) Use the extension cable to connect the rH/T sensors for THx modules to the module and wrap up the sensor in watertight packaging material, e.g. in a latex glove.
4. Submerge the module / sensor completely in the ice water and wait 2 h. If you are testing combined rH/T sensors, part (min. 0.5m) of the cable must be submerged along with the sensor in the ice water otherwise the required measuring accuracy will not be attained.
5. **Calibration**: compare setpoint and actual value



Evaluate the module data and make a record of the measured deviation values in your calibraiton logbook.

   a) The precision of PT100 sensors will depend on your quality class (A or B). Measured value deviation should not exceed the following:
      PT100 A : -100°C..100°C ±0.35°C
      PT100 B : -100°C..100°C ±0.8°C
   b) Deviation for the NTC should not exceed the following:
      NTC : -20°C..50°C ±0.2°C
      If deviation is greater, conditions during measurement were not stable enough or the module / sensor has a defect (cable, connector, etc.).
6. **Adjustment**: Only readjust the module (TPx) when the level of deviation is too high and when the module or the sensor does not have a defect (cable, connector, etc.).
   Connect the test plug or the decade resistor to the module. Adjust the decade resistor in accordance with a PT100 standards table.
   In menu item “Extended Setup”, select single-point adjustment for the relevant adjustment point and the sensor. Enter the temperature for the adjustment procedure and confirm your entries by activation the OK button.
   Logger adjustment requires two temperature points. To guarantee high-quality adjustment, both of these adjustment points should be outside the logger’s normal operativerange. Use the status printout to check the success of the adjustment.

NOTE
Prior to further operation, reprogram the original temperature and time ranges.

ECOLOG THx Humidity - Calibration or Adjustment

Modules for measuring relative air humidity

At delivery, each of our humidity dataloggers is fitted with a precisely calibrated humidity sensor. We recommend that humidity sensors used in normal working environments are calibrated every 6 - 12 months. If necessary, they should also be readjusted. In particularly contaminated environments, it is necessary to clean the rH sensor very carefully using water or a solution with max. 40% alcohol.

Calibration procedure

a) Return the sensor to ELPRO-BUCHS AG.
b) Replace the sensor with a calibrated sensor.
c) Calibration at customer-site performed by the ELPRO-BUCHS AG calibration service (Switzerland only).
d) Calibration in accordance with the following instructions.

WARNING

- do not clean the sensor with pure benzene or acetone
- do not pack the sensor in plastic bags
- do not touch the sensor with your hands

Method

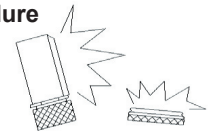
Use our SCS-certified humidity calibration solutions for operating points with relative humidity values of 0%, 5%, 10%, 20%, 35%, 50%, 65%, 80% and 95%.

Verification is more important than adjustment! The calibration solutions and the calibration device can be used to simulate a variety of humidity levels at the sensor. Single-point adjustment of the upper adjustment point with the 80% calibration solution is suitable for the majority of applications.

The following material and equipment are required:
- a calibration device (Part No. 2902)
- calibration solution of 0% .. 95% (Part No. 2901-Hxx)
- extension cable 1m (Part No. 3215-S01)
- calibration case or thermally isolated box

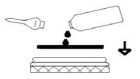
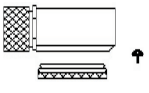
or calibration set for 0% and 80% (Part No. 2812-B)
and elproLOG ANALYZE evaluation software

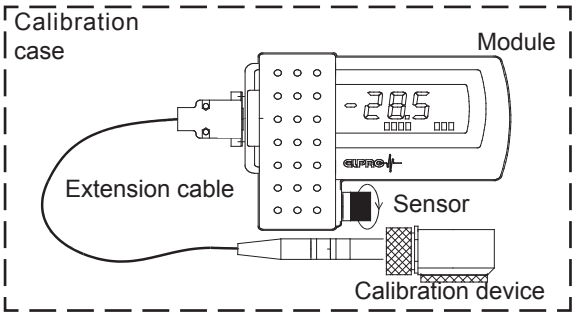
Procedure

1.  Clean the calibration device thoroughly and dry it in an air flow

IMPORTANT

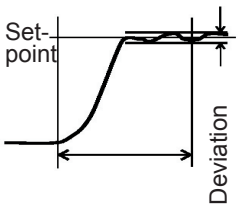
The calibration device must be absolutely clean and dry before it is used. Wash the disassembled device and dry it thoroughly in an air flow.

2. Program a short recording interval (1 min) and make a status printout (Status A).
3. Turn the black ring, in the direction of the arrow, to its limit stop position and pull the sensor out of the coupling. Wait until the display shows “n.c. %rH” and then use the extension cable to connect the sensor to the module.
4.  Insert the supplied fabric disc (except at 0%) in the device base plate. Break to open the ampoule containing the calibration solution and distribute its contents onto the fabric
5.  Slide the calibration device (screwed-on base plate facing downwards) onto the sensor and tighten the sealing ring.
6. Place the logger for 3 h in an insulated container or in the calibration case.



The temperature in the calibrtion case should be at approx. 20 °C (ambient temperature).

7. **Calibration**: compare setpoint and actual value. Unplug the extension cable, leave the sensor with calibration case and evaluate the module data. The module must be adjusted if the measured values are outside the max. permissible deviation range.



8. **Adjustment**: Only readjust the module data when the level of deviation is too high.
In menu item “Extended Setup”, select single-point adjustment for the relevant adjustment point with the implemented calibration solution and the sensor and reduce the wait time to 15 min. Return the module to the sensor in the calibration case and plug the extension cable back into the module.
When the above wait time has elapsed, disconnect the module and sensor from the extension cable and make another status printout (Status B). This status printout indicates whether the adjustment procedure has been carried out successfully. If the adjustment has not been a success, you can use menu item “Direct Calibration..” to reenter the initial adjustment data contained in the original status printout (Status A) or to repeat the adjustment procedure.

IMPORTANT

For the adjustment of a sensor, connected one sensor to the logger only!

9. 9. When “n.c. %rH” appears in the display, plug in the sensor at the module and secure it by turning the ring in the opposite direction to the arrow until it reaches its limit stop position. The logger is operable again when “Ld. %rH” appears on the display.

NOTE

- Prior to further operation, reprogram the original temperature and time ranges.
- Measurement is stable after 10 seconds.

Evaluation Software elproLOG ANALYZE

PC Requirements

Hardware	PC with pentium/500
Software	Windows NT4, 2000, XP or VISTA

Items required for evaluation

		Part No
Software	Full version standard	2338-CDV
	Update standard	2338-CDU
	Basic licence QLS	2335-BL
	Follow licence QLS	2335-FL
Data cable	Used to interconnect the logger to the pc serial port	2318

Screen Shots

ON/OFF Statistics with additional Information

Alarm levels may be implemented in Histogram

Draw marking lines and store configurations

Automatic scaling and block time zoom

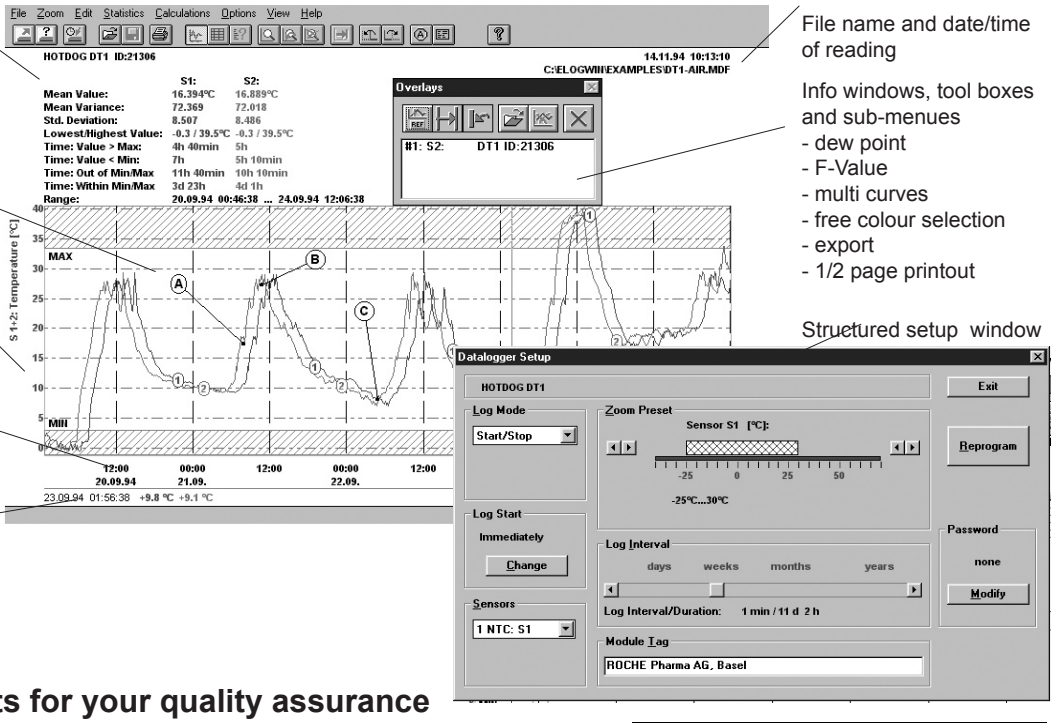
Autoscale for time and date

Info line with data at cursor

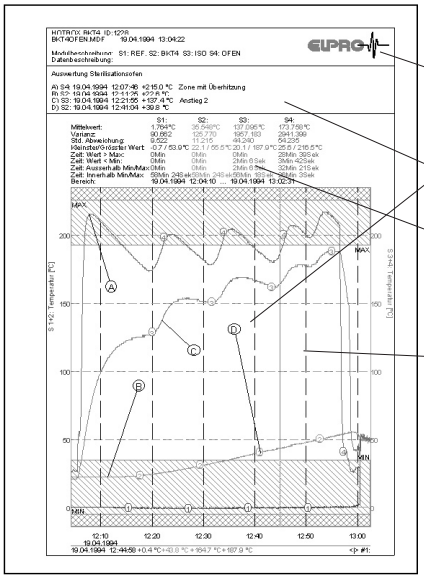
File name and date/time of reading

Info windows, tool boxes and sub-menues
- dew point
- F-Value
- multi curves
- free colour selection
- export
- 1/2 page printout

Structured setup window



As easy as 123, perfect documents for your quality assurance



LOGO of customer on all printout

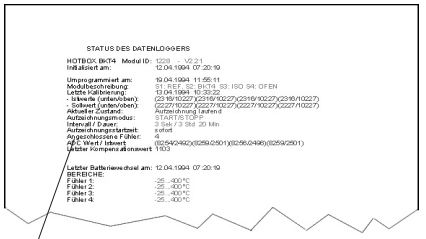
6 line- text editor, automatic time/date/ values stamp with the use of Mark Lines

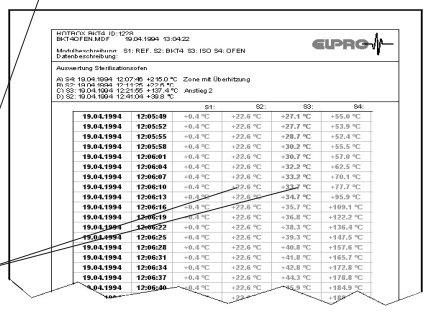
Statistics with timeperiod 'value outside of Min/Max'

clear graphic printout

Status printout with all relevant information about logger settings

Tabel printout with change of colour when outside Min/Max level





These documents comply to: EN12830, EN13485, FDA Reg. 21CFR Part 11, 58, 820

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