ECOLOG TN2,TN3-P,TN4,TN4-L,TP2,TP4-L,TH1,TH2

for firmware version TN2:7.00, TNx:7.12, TPx:5.01, THx:8.12 or higher; Power Safe

1. Product Overview

1.1 Display

Large LCD display for measured values and status

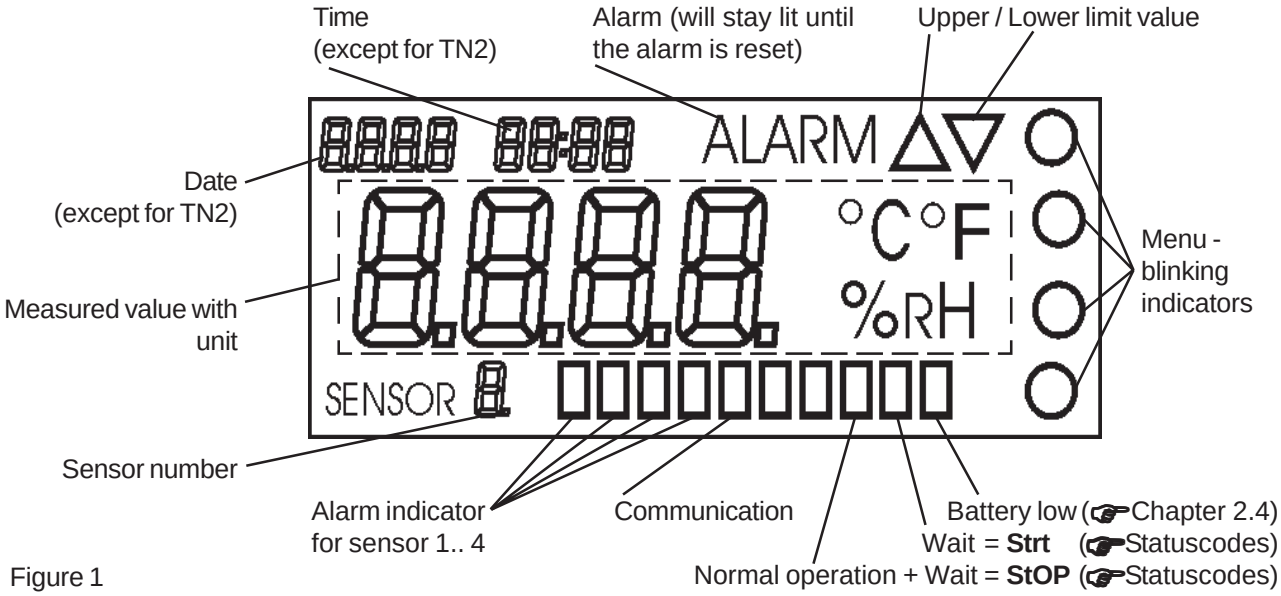


Figure 1

1.2 Key Pad

4 keys for datalogger operation (except for TN2 & TN3-P)

Figure 2

1.3 Battery

3.6 Volt lithium battery with extended temperature range.
For more information about the operating range of the battery and the battery lifetime see chapter 2, Application and Safety Regulations.

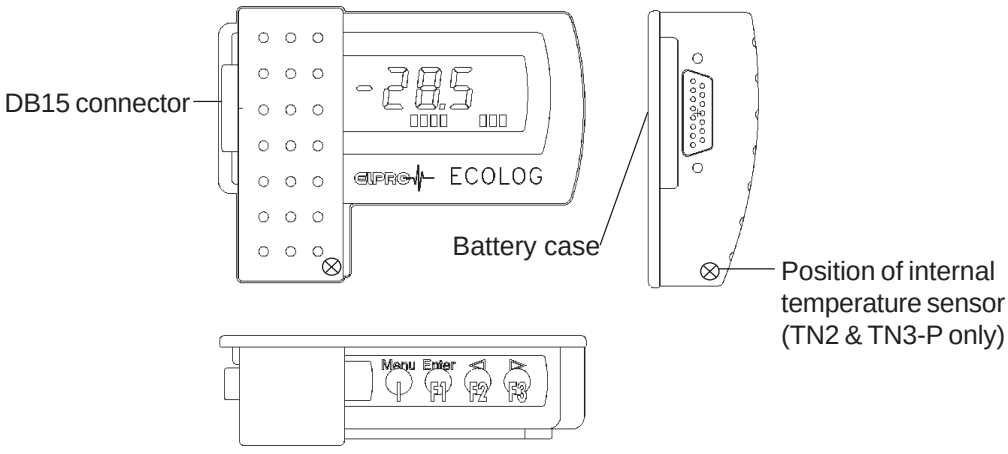


Figure 3

2. Applications and Safety Regulations

2.1 Operating Temperatures

- The loggers can be used in the temperature range between -35° and +55°C. However, it becomes increasingly difficult to read the display when the temperature falls below -20°C.
- Lithium battery passivation, due to long-term use at temperatures above 40°C, can result in temporary read problems (self-discharge protection). This can be rectified by repeated evaluation.
- Long-term use at low temperatures down to -40°C does not present any problems, but may reduce the quality of the display.
- We can not guarantee that the logger will always function properly if it is implemented at temperatures below -40°C. Experience has shown that the battery freezes at approx. -50°C, that it is no longer possible to perform measurements and that the timer tracking function can be temporarily interrupted. To make further operation possible, the logger must be reprogrammed when room temperature is reestablished.
- Temperatures exceeding 55°C can result in permanent discoloration of the display.
- Temperatures exceeding 70°C can result in deformation of the housing.

2.2 Exceptional Environmental Conditions

Pay attention to the following when loggers are used under exceptional environmental conditions:

- UV rays diminish the stability of the housing
- IR radiation (warmth) and superheated steam can result in deformation of the housing
- A vent hole into the battery cover (Ø 2mm) should be drilled at negative pressures of <0.4 bar abs.
- There is a risk that the battery may explode if the logger is used in conjunction with microwaves

2.3 Precautionary Measures for Handling Units with Lithium Batteries

- Do not short-circuit batteries or throw into fire: Danger of explosions
- Do not subject the batteries to mechanical stress and do not dismantle them. The leaking battery fluid is highly corrosive and lithium can generate severe heat when it comes into contact with moisture or it can ignite fire.
- Do not heat up battery-driven units to temperatures exceeding 100°C: Danger of explosions
- Avoid violent knocks and blows
- Follow the manufacturer's specifications for battery storage

2.4 Serviceable Life

	Recommended	max.	Conditions
TNx	18 month	21 month	1 minute log interval
	21 month	24 month	1 minute log interval; powersave on
THx	10 month	12 month	1 minute log interval; serviceable life reduced with 2nd sensor
	13 month	18 month	1 minute log interval; powersave on; serviceable life reduced with 2nd sensor
TPx	10 month	14 month	1 minute log interval; higher resolution
	15 month	18 month	1 minute log interval; high resolution; powersave on

At temperatures above 45°C the self-discharge of the battery increases, serviceable life will be reduced by approximately 1/3

Battery low — This indicator (see page 13) is going to be switched on at the time the battery life ends. Please change the battery according to the procedure described in chapter 2.8 at your next possibility.

2.5 Power-save Mode

The **ECOLOG** logger have a power-save mode, which switches off the display. As a result, measurements are only made during the defined log interval. A rotating element located in the display for measured values indicates that the datalogger is still functioning correctly during the recording process.
The elproLOG Software - Extended Setup - Display mode / Powersave is responsible for switching this mode on and off.
The measured value display at dataloggers which have a key pad can be switched on temporarily for testing purposes.

2.6 Alarm Processing

In power-save mode, alarm processing is executed either at 1 minute cycles if the recording interval exceeds 1 minute or at the recording interval for shorter intervals. If the logger is in stop-mode, then the alarm contact want be opperated anymore.

2.7 Display at ECOLOG TP2 & TP4-L

The measured value display is updated at 4 second cycles, always with the low resolution of measured values. Only measured values logged during the recording interval can also be logged with function: „High Resolution“. The reason for this is the higher current consumption resulting from function: „High Resolution“.

2.8 Maintenance

To ensure proper functioning of the logger the following steps should be part of a periodical maintenance plan:

- Calibration check, for detailed information see also data sheet ECOLOG D-EZ-2001E
- Readout of the data logger and saving the file; Check of the alarm function if used
- Battery replacement
  (Part No 2820, set of 2, storage time 5 years; Lithium 3.6V, 1900mAh, AM3/LR6/AA)

An energy consumption count monitors the life-span of the logger battery. For this reason, only the specific battery recommended by the manufacturer should be used in the logger. Do not remove the battery from the logger during non-working periods. The use of other batteries or the removal of battery will produce incorrect status information at the battery indicator.
You must reset the battery change time (elproLOG Software - Extended Setup - Programming of battery changetime...) after you have replaced the battery, otherwise the energy counter will not function correctly!

2.9 Technical Alterations

In the interest of our customers, we reserve the right to perform alterations resulting from subsequent technical developments without any particular notice. For this reason, diagrams, descriptions and the information concerning the scope of delivery are not binding.

- This product must be certified with CE
- The manufacturer guarantees that this product complies with the relevant recommendations EN 61000-6-2 : 2001 and EN61000-6-4 : 2001

- This product has to be disposed according to WEEE (Waste electrical and electronic equipment, 2002/96/EC)!

3. Settings in elproLOG

3.1 Datalogger Setup 

Window „Datalogger Setup“ is used to define the used measuring channels.
Refer to Chapter 5.8.1 in the elproLOG manual for detailed information about the following:

- Log Mode
- Log Start
- Log interval
- Module Tag
- Close, Reprogram, Print Status
- PIN

3.2 Extended Setup# 

Low point calibration... **High point calibration...** **Direct calibration by downloading values...**	Those 3 functions are used for logger adjustment
Set date of calibration check	To enter the current data as calibration data into the logger status
Define alarm parameters...	See chapter 4
Reset alarm	With this function an alarm message may be resetted
Set date and time...	To adjust the internal clock
Display mode / Powersave...	See chapter 2.5
Terminal mode parameters...	Terminal mode (except TN2) can be used for communication between an **ECOLOG** and various terminal programs such as HyperTerminal. Further applications include integration of the logger in a LabView environment and data transmission to a PLC (Programmable Logic Control). Please request our documentation (D-HC6001Bx) if you require further information.
Set language...	Language selection for printouts
Set printer...	Printer selection and size definition of the short log report
Set temperature unit...	Display temperature unit selection. You have to choose between °C and °F.
Set mean value measurement parameter...	To suppress line frequency interferences
Setup printout header texts	Customer information that is printed on top of the printout.
Programming of battery change time...	To restart the logger after the battery has been replaced (see chapter 2).

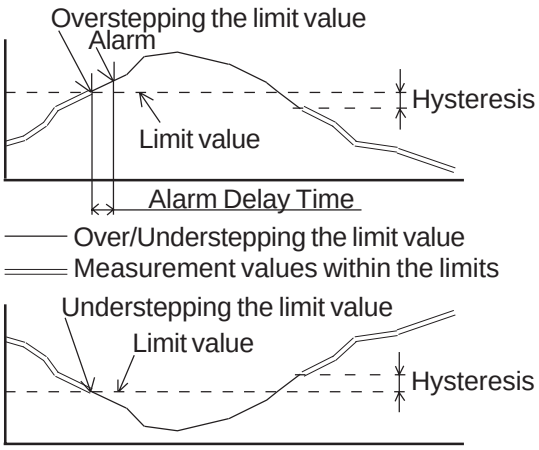
Not all of these functions are available on all **ECOLOG** models!

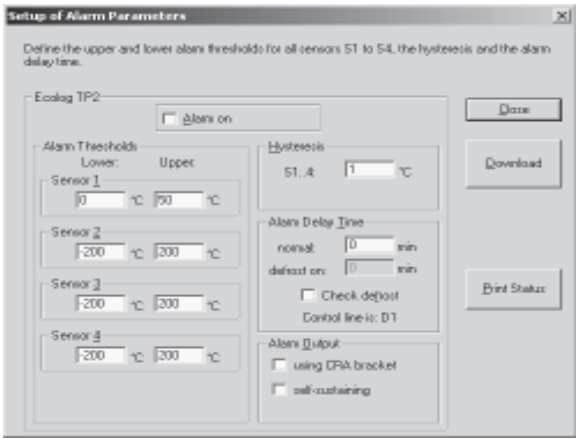
4. Definition of Alarm Parameters

The dataloggers **ECOLOG** have an alarm indication feature and an alarm contact. The alarm parameters are defined in the „Setup of Alarm Parameters“ window.

- Alarmindication
  The alarm indication is independent of the sensor number, but all sensors that may cause an alarm have to be selected in the measurement function. The alarm indication has to be reset manually. It is possible to reset the alarm indication by the PC software, the keyboard or the alarm reset connector.
- Alarm contact
  In case of an alarm indication, the alarm contact is closed. The alarm contact is independent of the sensor number, but all sensors that may cause an alarm have to be selected in the measurement function.

- Hysteresis is used for controlling external processes (P-Controller) only.
Set to 0 for alarm function with time delay
- Example: a) Alarmfunction with time delay: Hysteresis = 0°C
b) Controlfunction for P-Controller: Hysteresis = 1°C





Alarm on By activating this check box, the alarm function is switched on, **see also chapter 2.6**.

Alarm Thresholds Data entry field for lower and uper limit values.

Hysteresis The switching hysteresis is used to avoid uncontrolled on/off switching of the contact. To move the contact, the measurement value has to differ from the limit value by the value defined in this field.

Alarm Delay Time

- normal
To close the alarm contact, the duration of a measurement value, outside the limit values, has to be longer than the delay time defined in the "normal" data entry field.

- defrost on
If the "check defrost" function is selected and the defrost contact D1 is closed, then the duration of a measurement value, outside the limit values, has to be longer than the delay time defined in the "defrost on" data entry field.

Alarm Output

- no selection
This mode is used for all applications where the alarm contact is used to control any external devices like a flash light or a telephon dailling unit.
The contact will be closed **as long as a limit value is exeded**.

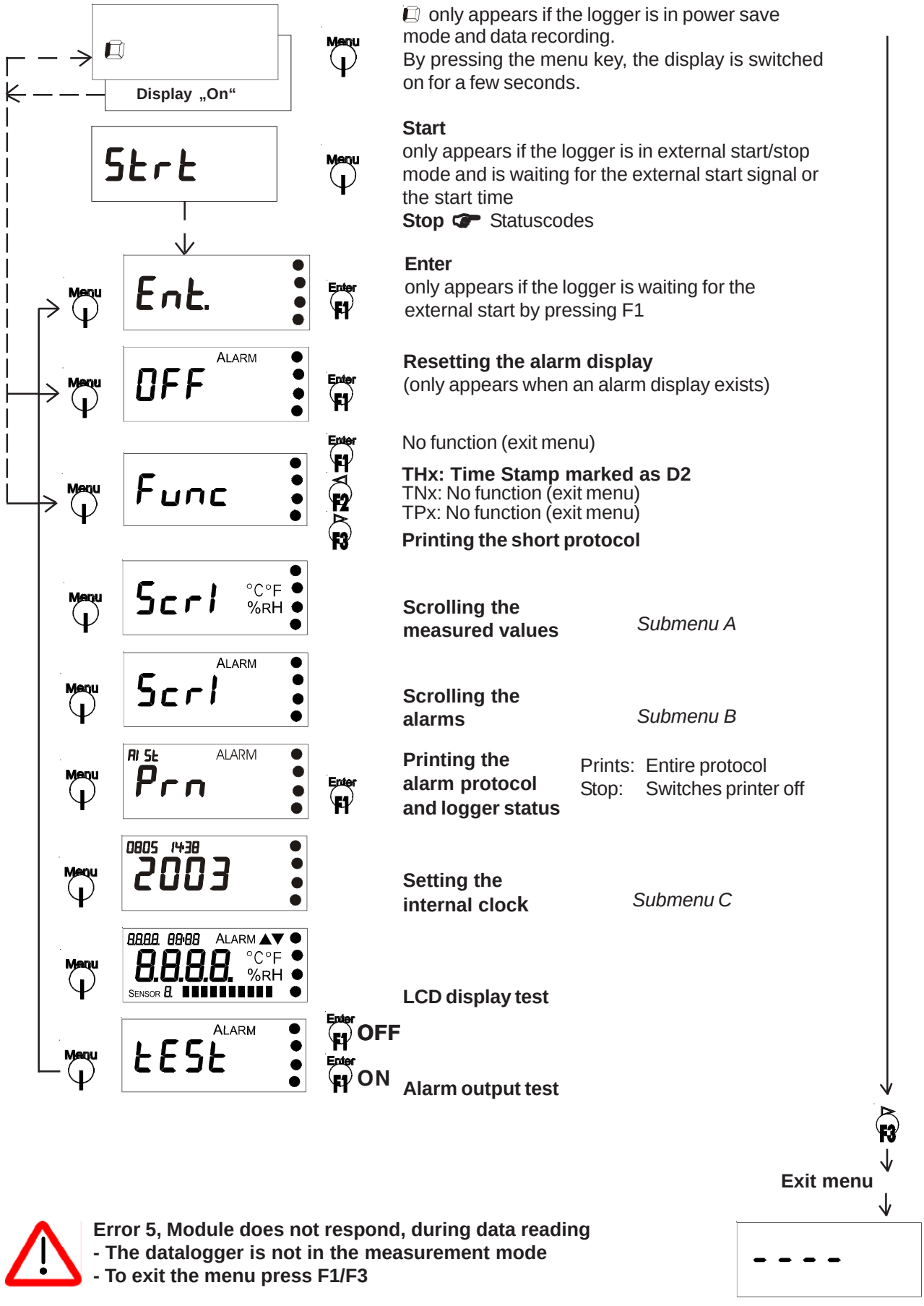
- using CRA bracket
This mode is used in combination with a 280x-CRA bracket **only**.

- self-sustaining
This mode is used for all applications where the alarm contact is used to control any external devices like a flash light or a telephon dailling unit.
The contact will be closed till the alarm is **reseted by the user**.

Close / Download / Print Status
These buttons are used to program the logger, to printout the current status of the logger and to close the „Setup of Alarm Parameters“ window.

5. Operation

5.1 Main Menu



only appears if the logger is in power save mode and data recording.
By pressing the menu key, the display is switched on for a few seconds.

Start
only appears if the logger is in external start/stop mode and is waiting for the external start signal or the start time
Stop ☛ Statuscodes

Enter
only appears if the logger is waiting for the external start by pressing F1

Resetting the alarm display
(only appears when an alarm display exists)

No function (exit menu)

THx: Time Stamp marked as D2
TNx: No function (exit menu)
TPx: No function (exit menu)

Printing the short protocol

Scrolling the measured values *Submenu A*

Scrolling the alarms *Submenu B*

Printing the alarm protocol and logger status
Prints: Entire protocol
Stop: Switches printer off

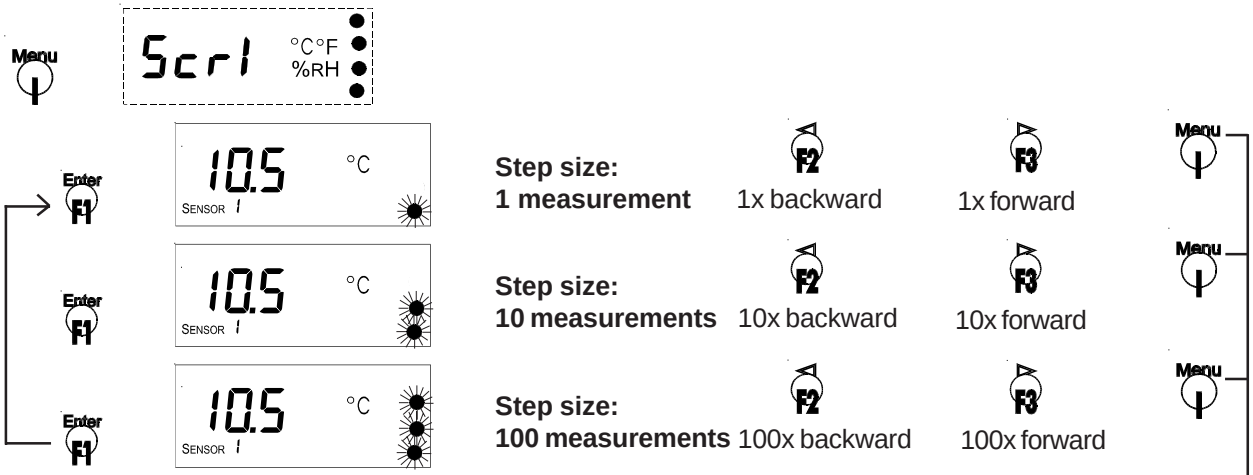
Setting the internal clock *Submenu C*

LCD display test

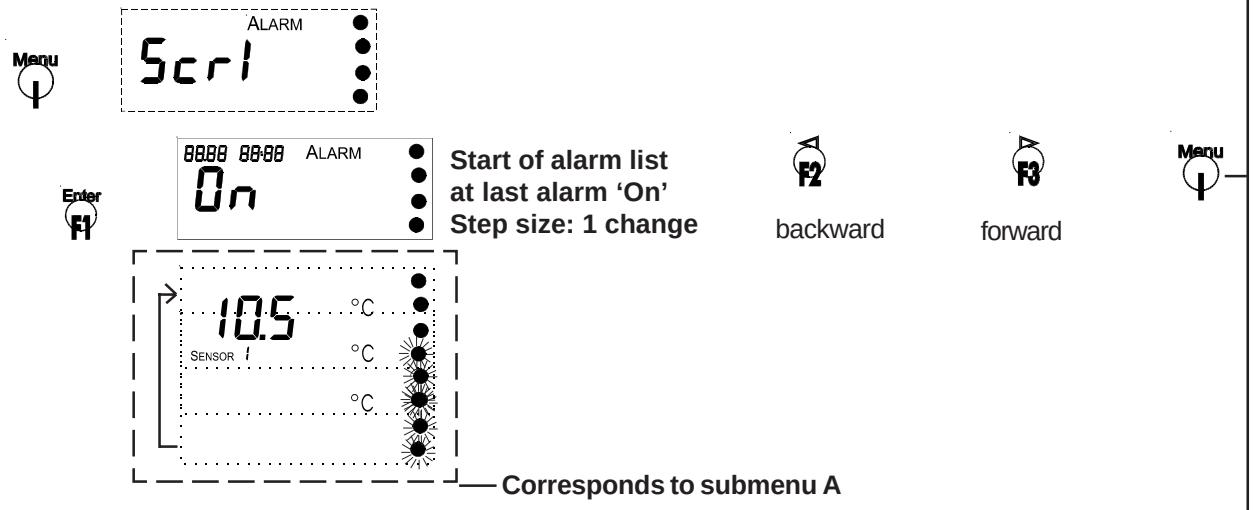
Alarm output test

Error 5, Module does not respond, during data reading
- The datalogger is not in the measurement mode
- To exit the menu press F1/F3

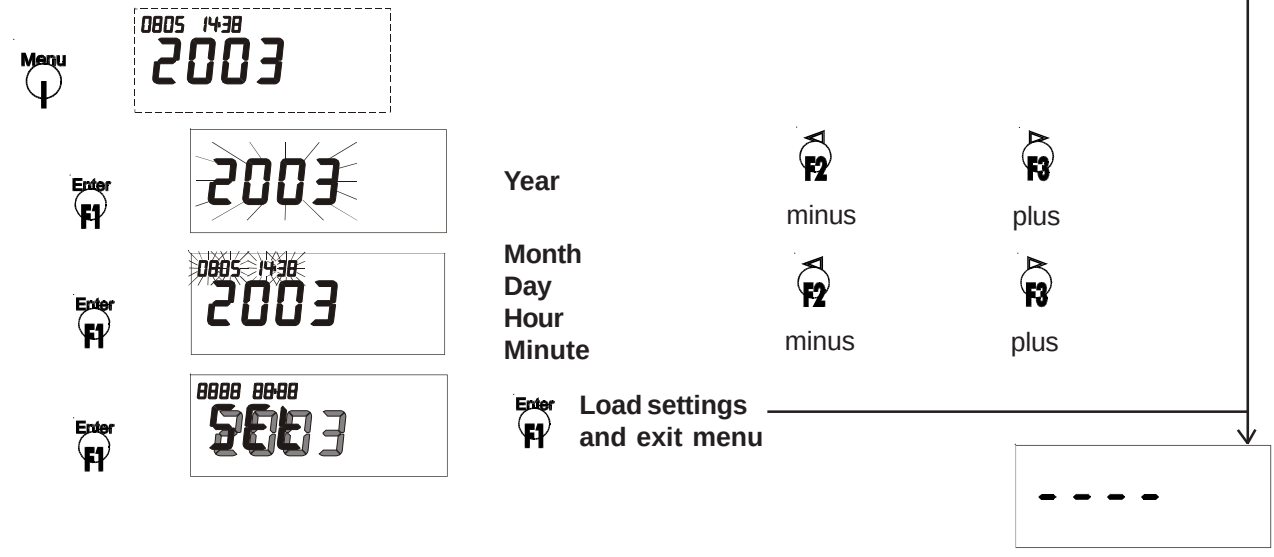
5.2 Submenu A: Menu for Displaying and Printing Measurement Data



5.3 Submenu B: Menu for Displaying Alarm Messages



5.4 Submenu C: Menu for Setting Internal Clock and Calendar



6. Print- and Special- Functions

6.1 Alarm- and Status- Information

All dataloggers (except TN2) are printing a combined alarm and status protocol.

```
                Ecolog TH1
      ELPRO-BUCHS AG, CH-9471 Buchs
Customer Information: Transport ABC
Logger ID:  51050
Version:    3.01.B06Wi
Interval1:  1' / S1,3:T[°C] S2,4:rH[%]


Druckzeit:  04.12.1998 14:13

Alarm: ON
Alarm level:     L    /     H
   S1:        -10.0 /  +25.0
   S2:         +0.0 / +100.0


Alarm ON:  04.12.1998 13:12  OFF: 04.12.1998 13:16
Alarm ON:  04.12.1998 13:06  OFF: 04.12.1998 13:09
Alarm ON:  04.12.1998 12:57  OFF: 04.12.1998 13:00
```

6.2 Function F2 - Time Stamp

All dataloggers of the THx-Family will mark the actual measurement value with a time stamp, as input D2, by pressing F2.
Also this time stamp is visible under PC data evaluation as D2 (graphics and table mode).

```
ECOLOG THx
Customer Information: Transport ABC
S/N 51050 / S1,3:T[°C] S2,4:rH[%] / 1'
              S1:  S2:
04.12.98 11:43 +23.9 +31.3
04.12.98 11:42 +23.9 +32.6
04.12.98 11:41 +23.9 +31.4
04.12.98 11:40 +24.0 +31.1b
```

6.3 Function F3 - Short Protocol

All dataloggers except TN2 are able to printout measurement values in a short protocol (up to 250 values).
TN3-P: Printing starts by power up of the printer. At the time of data printing, MarkPos (b or B) marking in the measurement value table.

```
ECOLOG TNx
Customer Information: Transport ABC
S/N 50436  /  T[°C]  /  30"
              S1:
07.12.98 10:23 +21.8
07.12.98 10:22 +22.5
07.12.98 10:22 +35.6*
07.12.98 10:21 +35.5*
07.12.98 10:21 +35.3*
07.12.98 10:20 +34.9*
```

6.4 Legend of Markings at the Line End

*	=	Alarm			
a	=	Input D1	A	=	Alarm and Input D1
b	=	Input D2	B	=	Alarm and Input D2
c	=	Input D1 + D2	C	=	Alarm and Input D1 + D2

7. Mounting Instructions

7.1 Fixation Elements

As accessories ELPRO provides several protective housing made of shock proof plastic material with IP66, Part No. 2350-xx and 5 different brackets for simple fixation of dataloggers.

Simple fixation bracket
Part No. 2804-A

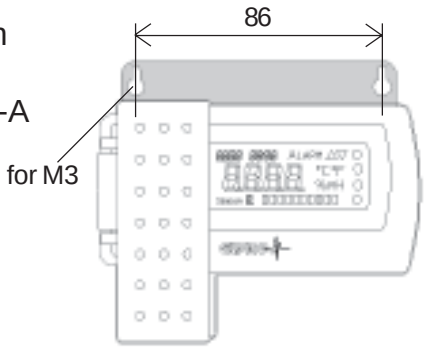
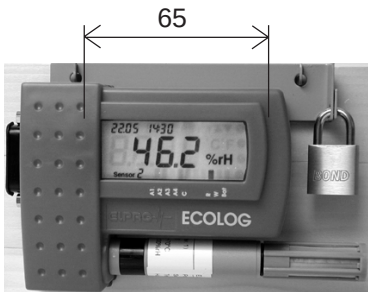


Figure 4

Fixation bracket lockable by padlock
Part No. 2804-E



The padlock is not part of the delivery!

Figure 5

Mounting bracket with DB15 socket fixation
Part No. 2804-B

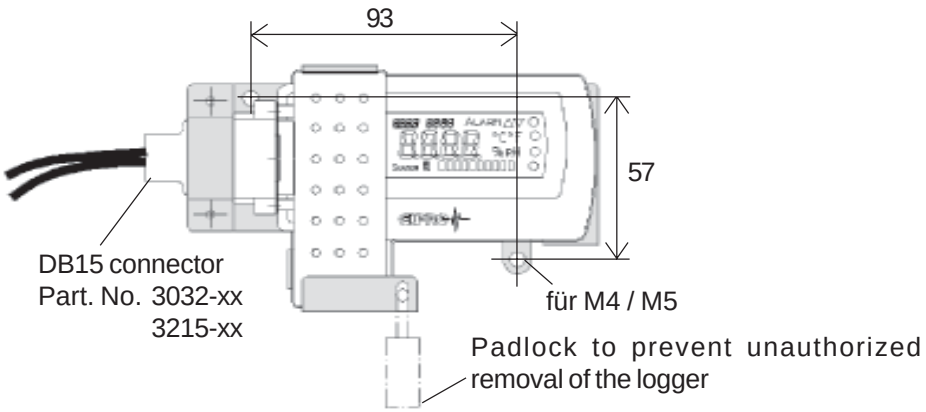


Figure 6

Mounting bracket with screw terminals and cover for TNx:
Part No. 2804-C or
Part No. 2804-CR
for TPx:
Part No. 2801-CR

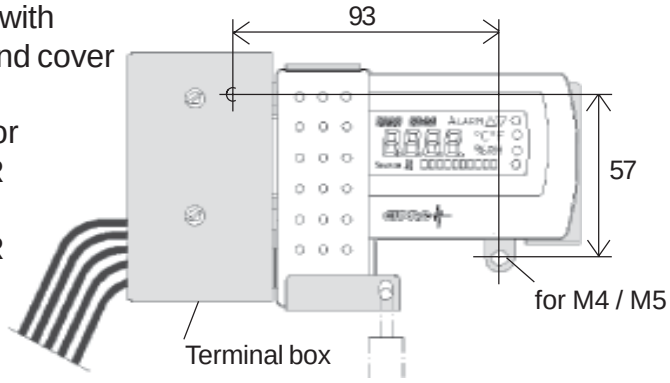


Figure 7

Mounting bracket with screw terminals and cover for THx:
Part No. 2805-CR

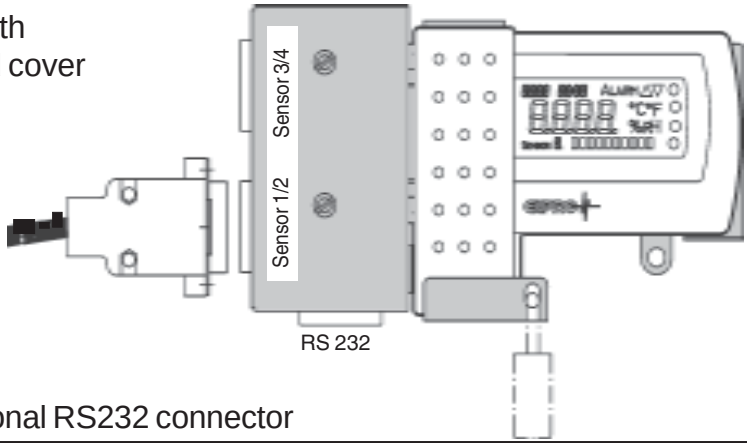


Figure 8

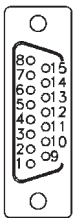
xxxx-CR with additional RS232 connector

7.2 Pin Assignment and Connection Diagram

Wire the DB15 connector for the **ECOLOG** as shown below:

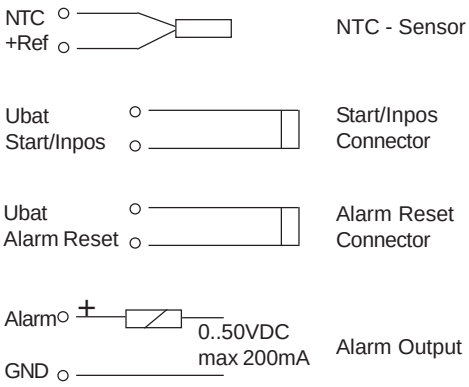
TN2
TN3-P

DB15 connector



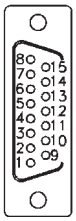
8	GND	15	RXD
7	TXD	14	Busy
6	NTC2	13	Res.
5	+Ref	12	Start / Inpos (D1)
4	Res.	11	Ubat.
3	NTC3	10	Alarm Reset (D2)
2	+Ref.	9	Alarm
1	NTC1		

Connection diagram



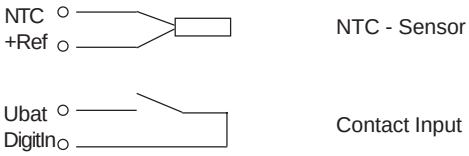
TN4
TN4-L

DB15 connector



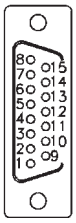
8	GND	15	RXD
7	TXD	14	Busy
6	NTC2	13	Res.
5	+Ref	12	DigitIn1 (D1)
4	NTC4	11	Ubat.
3	NTC3	10	DigitIn2 (D2)
2	+Ref.	9	Alarm
1	NTC1		

Connection diagram



TP4-L
TP2 (only 2 sensors)

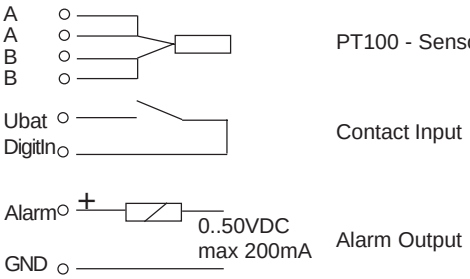
DB15 connector



8	GND	15	RXD
7	TXD	14	Busy
6	Ubat	13	A2
5	A1	12	A2
4	A1	11	B2
3	B1	10	DigitIn (D1)
2	B1	9	Alarm
1	B2		

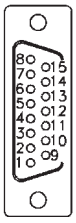
LEMO Connector (soldering side)

Connection diagram



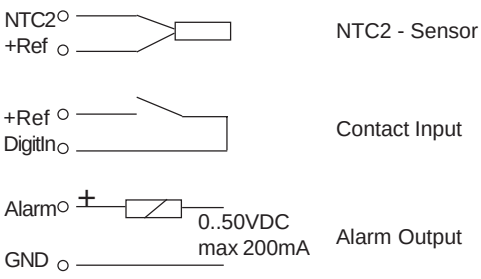
TH1
TH2

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 (D1)
2	D2	9	Alarm
1	C1,2		

Connection diagram



8. Status- and Error-Codes

8.1 Logger Display

CAL	Calibration active
Strt	The logger is waiting for the recording start, according to the settings in the datalogger setup menu.
StOP	Stop is reached if the logger is in the Start/Stop mode and the memory is full. Logging has been stopped. For a new logging period, the logger has to be reprogrammed. This is the delivery status of the PT100 loggers TP2 and TP4-L.
Ld.	The calibration parameters of the rH/T sensor are automatically uploaded when the sensor is connected to the logger.
Prn	Data are printed
b.F.	Battery voltage is too low
CAL.E.	Error during calibration
C.F.	Datalogger is faulty
Err	Error during printing
HHHH	Logger keypad is defective
L.C.	Datalogger is faulty
Ld.F.	Error during upload of rH/T sensor parameters
n.c.	No sensor is connected
S.C.	Sensor has a short circuit
O.F.	Over flow of measurement value
U.F.	Under flow of measurement value

8.2 Logger Status in elproLOG

RAM IMG-BMP destroyed

This error message is visible in the logger status information, line: Module time. The reason for such an error message might be, a battery replacement where the battery change time has not been set. (see also chapter 2.7 Maintenance).

9. Hints

TH1 & TH2	Please do not calibrate with 2 connected rH/T sensors For sensor exchange, the corresponding humidity channel (Channel 2 or 4) has to show n.c. on the display at least twice before the new sensor is connected to the logger! Please take care about the sensor position before connecting it. There is no force on the sensor needed to plug it on. See also the printing on the casing of the logger (TH1 only)
TN2 & TN3-P	Every time a data exchange with elproLOG software happens the function of the display will be tested.
Digital Inputs	In some of the documents the digital inputs are labelled with DigitIn. The same digital inputs are labelled in the elproLOG software with D only.
Software	**ECOLOG** data loggers require an evaluation software of version 3.20 or higher.
CD-ROM	For more product information please see elproLOG CD-ROM.
EEx	All **ECOLOG** data loggers are available with EEx Zone 1 approval. II 2 G EEx ib IIB T4 **For applications in hazardous areas the ELPRO documentation D-EZ-7003Ba has to be taken into consideration!**

10. Measurement- Operating-Ranges and Accuracy

Temperature Measurement

TNx and THx	Range	Resolution	Accuracy
(Logger with sensor typical;	-50°C.. -26°C	0.1°C	± 0.4°C
logger at room temperature)	-25°C.. -1°C	0.1°C	± 0.3°C
	0°C.. 69°C	0.1°C	± 0.3°C
	70°C.. 99°C	0.1°C	± 0.5°C
	100°C.. 140°C	0.1°C	± 1.0°C

TPx	Range	Resolution	Linearity
(Logger only;	-200°C.. -101°C	0.2°C	± 0.3°C
at room temperature)	-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

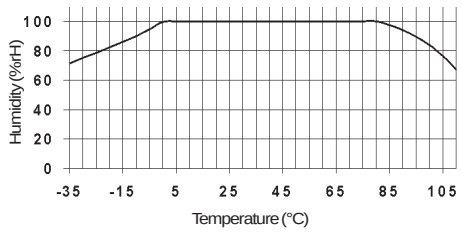
Relative Air Humidity Measurement

THx	Range	Resolution	Accuracy
	0%.. 100%rH	0.2%rH	At room temperature, 23°C: ± 1.5%rH Hysteresis 10-90-10%rH: <1%rH

Operating Ranges

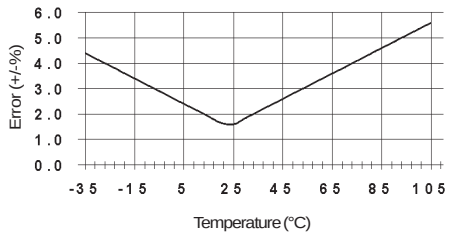
Datalogger ECOLOG	-35°C.. 55°C, display readable down to -20°C 0%.. 100%rH, with condensation	
rH/T Sensor; Internal	3087 and 3087-A	-35°C.. +55°C 0%.. 100%rH, with condensation
rH/T Sensor; External	3087 and 3087-A	-35°C.. 70°C 0%.. 100%rH, with condensation
	3087-B	-35°C.. 100°C (permanent operation) -35°C.. 110°C (temperature peeks) 0%.. 100%rH, with condensation

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

Document Revision History

Autor	Date	Version	Description
A.Gubler	15/12/2004	--	First edition; power safe mode
A.Gubler	11/02/2005	a	Alarm on TN2
A.Gubler	07/06/2005	b	Small changes
A.Gubler	21/11/2005	c	Small changes / typing error
A.Gubler	20/02/2006	d	WEEE / 2.4 / display test TN2 & TN3-P

Head Office:
ELPRO-BUCHS AG
Langäulistrasse 62
CH-9471 Buchs / SGS
Switzerland
email: swiss@elpro.com

ELPRO-BUCHS SA
Route de Grandvaux 26
CH-1096 Cully
Suisse
email: swiss@elpro.com

ELPRO MESSTECHNIK GmbH
Baumwasenstrasse 20/1
D-73614 Schorndorf
Deutschland
email: brd@elpro.com

ELPRO Services Inc.
P.O. Box 727
210 Mill Creek Road
Marietta, Ohio 45750
U.S.A
email: usa@elpro.com

www.elpro.com

Your Distributor: