

T-PRINT G0221

**Dual channel temperature data logger with display
and built-in printer**

Instruction manual

Instruction manual for use of temperature data logger G0221

Basic data logger features

Instrument is designed for temperature measurement and record from up to two external temperature probes, connected by means of connectors. Measured temperature from both channels is displayed on dual line illuminated LCD display and are recorded in adjustable time interval to internal, non-volatile memory. Recorded values will not be lost even in disconnection instrument from power). If memory is fulfilled oldest recorded values are overwritten with new values. Setting and control of data logger is performed from keyboard data logger or by means of computer. In both cases setting can be protected by password.

Data logger is equipped alarm function. I.e. each 5 seconds (independently on adjusted logging interval) temperature is measured from both external probes, measured value from each channel is compared with two adjustable limits for each channel. Limit exceeding is indicated on the LCD display, by the red LED and acoustically. Alarm evaluation is possible to enable or disable for each channel. Audible indication can be also enabled or disabled.

Measured values recorded in data logger memory can be printed out on built-in printer or transferred means of USB communication cable to personal computer for evaluation. Data logger can be connected to computer permanently – data record will not be interrupted.

Instrument conforms EN 12830 requirements: conditions for class 1 accuracy and is suitable for temperature record during storing (S) and transport (T) of food in climate environment code A, B. If instrument is used during transport, it must be installed in cabin of the vehicle.

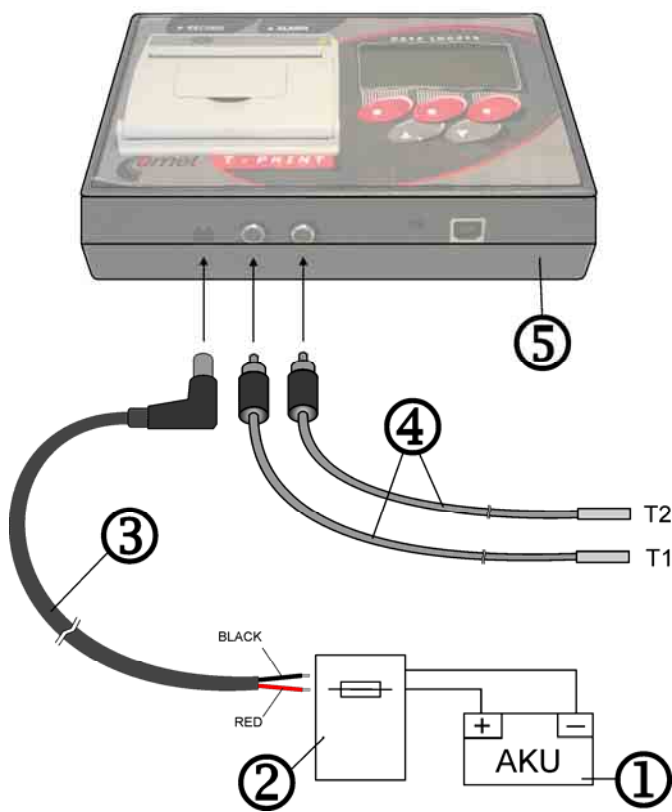
Fixed installation of data logger

Data logger is delivered with installed battery for internal clock. For instrument operation external power source is necessary - ac/dc adapter (optional accessory) or e.g. accumulator. If not using ac/dc adapter use included power cable for power connection. In case of supplying from vehicle on-board power supply connect cable behind the fuse protecting accumulator, not directly to accumulator! Free end of power cable connect e.g. to fuse box of the vehicle and pull it through to data logger. Respect the correct polarity – black lead of the cable must be connected to negative source pole and red lead to positive source pole. Data logger does not work if poles are incorrectly connected, but will not be damaged. In case of operation in vehicle it is necessary to mount data logger with included self adhesive Dual Lock or by means of optional metal holders LP007, for installation instructions - see page 17. Stick Dual Lock to clean degreased smooth surface. Pull through carefully temperature probe cable without insulation damage to measured point and connect it by means of the CINCH connector to instrument input T1. If needed connect the similar way also second temperature probe to input T2. Locate temperature probes to places with good air circulation. Avoid places influenced by local heat sources (illuminating lamps etc.).

Connect power cable connector to data logger socket marked "+9 to +32V DC". If using ac/dc adapter (optional accessory), plug it in the mains after connection to data logger. After connection to power LCD display lights up and green LED RECORD starts to blink. It is recommended to protect connected power cable in the vehicle against unprompted fall out by means of the cable clip.

Warning: Nor during mounting of temperature probe cable and during the operation insulation of probe cable must not be damaged! In case of short circuit of the temperature probe lead with vehicle frame data logger can be damaged! If cable of temperature probe is damaged do not connect it to data logger. Cable must be repaired or replaced.

Data logger connection to source and temperature probes



Legend:

- 1 – external power source (accumulator)
- 2 – fuse box of the vehicle
- 3 – power cable (included)
- BLACK – black lead (minus pole)
- RED – red lead (plus pole)
- 4 – temperature probe
- 5 – data logger T-PRINT

Data logger configuration before first operation

Before first operation it is necessary to set instrument from instrument keyboard or by means of personal computer with installed user software. User program is available to download free from www.cometsystem.cz. For data logger connection to the computer included USB cable A-B is necessary. If data logger setting is performed from the computer, data logger is powered via USB interface from computer and no other power source is needed. This could be an advantage when data logger is connected to the computer out of its fixed installation.

Before measurement it is necessary:

- select language of data logger menu (only before first use)
- check, optionally set real time in data logger
- select unit of temperature measurement (°C, °F)
- select suitable logging interval
- select logging mode (actual value, average value or average value+min+max)
- check for each channel, optionally set by means of computer type of connected temperature probe (Pt1000 or Ni1000). Switching over probe types is not enable from data logger keyboard
- disable channels not to be recorded (e.g. without connected probe)
- if using alarms, set for each channel lower and upper limits and enable alarm
- set for each channel delay of alarm
- enable or disable audible alarm indication
- if suitable, enter text description of each channel and location of data logger

- if suitable, enter desired content of print-out header
- if necessary avoid unauthorized setting of data logger by entering password (PIN code)

Data logger is not equipped with power switch. After connection to power short initialization is performed and then data logger immediately continuously measures and records.

Interval between two subsequent measurements is specified by the user. The interval can be adjusted from 1 to 60 minutes. Memorizing of the first value is synchronized with the internal real time clock, so the record is performed at sharp multiples of minutes, hours and days. E.g. after starting the record with the 15 minute interval the first value is not stored immediately, but after the internal clock gets the status of a quarter, a half or a whole hour.

Warning: Connect external probe only to the switched OFF data logger. In opposite case incorrect measurement can be recorded to the memory during connecting the probe.

During setting of record parameters (from instrument keyboard or from the computer) record is stopped till the setting mode is left. If data logger stays in setting mode 5 minutes and no key is pressed and no command from the computer is received, data logger automatically ends up setting mode and record continues.

If data logger is powered only via USB interface from the computer, print-out on built-in printer is disabled, because supplied energy is not sufficient for print.

Using of data logger

Data logger controls

Instrument is controlled by the user by means of built-in five button keyboard and graphic display. Important information on data logger state is also indicated by green and red LEDs and enable user to watch data logger from longer distance and at the dark. Blinking green LED RECORD indicates record in progress, blinking red LED ALARM indicates active alarm, i.e. one or both temperatures are outside of adjusted limits.

Built-in printer is equipped with paper shift button and dual-colored LED, which is OFF in usual operation. During print-out or printer initialization LED blinks green, if printer is out of paper, LED blinks red.

Data logger is equipped with illumination of display and keyboard for the operation in worse light conditions. Illumination is activated by pressing any keyboard button and it is automatically switched off after about 30 seconds after the last pressing of the keyboard.

Function of keyboard upper row buttons is defined by actual description of each button on the lower LCD line display. Function of lower buttons is fixed. Lower buttons serve always for movement in menu or for change of edited item (upwards, downwards).

Basic display readings

In basic operation LCD displays actually measured value from both channels, date and time of data logger internal clock. If logging mode of average values (ϕ) or logging mode of min-max-average (ϕ MinMax) are selected, also symbols indicating these modes record. Hyphens (---) on display indicate values outside of instrument measuring range or values sensed with disconnected (optionally damaged) temperature probe.

By pressing buttons \triangle or ∇ it is possible to view actually measured values from each channel including user description of the channel.

By pressing button MENU data logger goes to mode of viewing items of main menu. By button PRINT it is possible to start the print-out of recorded values on built-in printer. The middle button AUDIO is active only if alarm is activated and enables to mute temporarily audible alarm indication. In this case audible indication is activated again if new alarm appears.

Running alarm state is indicated on display by inverse reading ALARM together with information which channel activated the alarm.

Print-out of recorded values

Print-out of recorded values on built-in printer can be started in basic LCD display by button PRINT. Offer to print table or graphs appears. Select required option by means of \triangle or ∇ button. After confirmation of *Table* option by button PRINT print-out is started. In case of *Graph* selection it is necessary to select required temperature channel to be printed out.

Recorded values are printed out always backward - from newest values towards oldest. If not required (and not adjusted) print-out of older values, print-out starts with last value recorded in memory.

Notice: If memory is totally full and print-out of oldest recorded values is requested, the delay from button pressing to print start can be up to 13 seconds. It is caused by searching through a large quantity of recorded data.

1) Print-out of table

Each recorded value (or pair of values for two recorded channels) is printed in table on separate line together with storing date and time and temperature unit ($^{\circ}\text{C}$ or $^{\circ}\text{F}$). If recorded value is outside of adjusted limits for proper channel, it is printed in table inversely. Adjusted delay of alarm is ignored in this case. If selected logging mode of average values or logging mode of min-max-average, only average temperature value for interval are printed. Such line is indicated in table by symbol ϕ . Time value in line in such case indicates end of the interval average value was calculated for.

Hyphens (---) in print-out indicate values outside instrument measuring range or value sensed with disconnected (optionally damaged) temperature probe. If some channel is disabled for record by the user, dots (.....) are printed-out instead of values of proper channel. Interruption of record caused by configuration of data logger from keyboard or from computer is indicated in print-out line with beginning time of record interruption and by reading *Interrupted-Keyb* or *Interrupted-PC*.

20.04.2008	1.k	2.k
ϕ 3:00:00	-15.7	-5.2 $^{\circ}\text{C}$
ϕ 3:30:00	-16.1	-5.1 $^{\circ}\text{C}$
ϕ 4:00:00	-16.0	-5.5 $^{\circ}\text{C}$
ϕ 4:30:00	-15.6	-5.4 $^{\circ}\text{C}$
ϕ 5:00:00	-5.2 $^{\circ}\text{C}$
5:27:15	Interrupted-PC	
6:00:00	-14.2	--- $^{\circ}\text{C}$
6:30:00	-14.8	-5.3 $^{\circ}\text{C}$
7:00:00	-15.1	-4.2 $^{\circ}\text{C}$
7:30:00	-15.7	-5.6 $^{\circ}\text{C}$

← values recorded in data logger memory

← symbol ϕ indicates record of average values

← dots indicate disabled temperature channel

← record interruption (logger configuration from computer)

← hyphens indicate value outside of the range (or no probe)

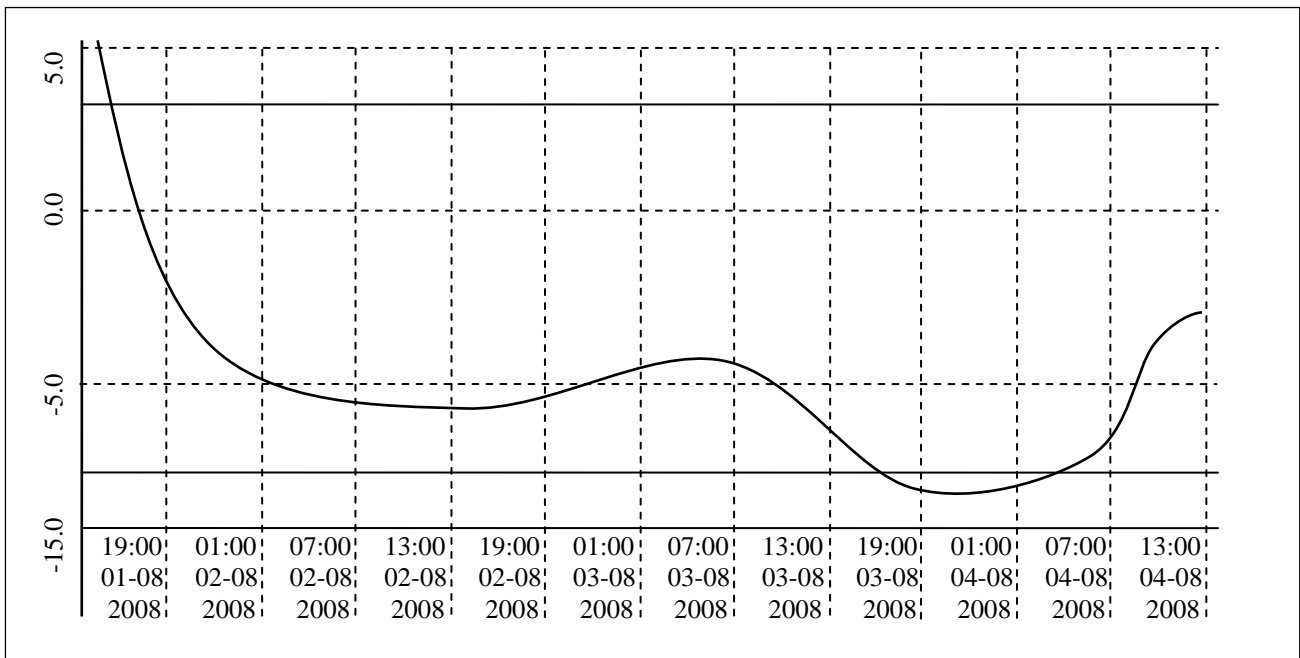
← record of actual values (without symbol ϕ)

↑ prints towards older values

← actual time (print start)

2) Print-out of graph

Graph can be useful for graphic presentation of longer time sections of temperature with simple evaluation of exceeded alarm limits. Graph is printed lengthwise, always channel by channel. Y axis scale must be preset suitably in accordance with expected temperature values at monitored room. The scale is set for each channel individually.



Time values are on the X axis. One segment always represents six recorded values. Figure shows an example of record with 60 minute interval. Vertical dashed line is one time segment and refers to nearer (i.e. left) time value. If recorded values are outside of the selected Y axis scale of the graph, curve not be printed at this area. Alarm limits of the currently printed channel are presented by two continuous lines without any description – alarm limit values are printed-out at the end of the header. If the curve exceeds the alarm line, recorded values are outside of the set limits. If alarm limits are set outside of the graph range, alarm lines are not be visible.

3) Print-out of table of graph in progress can be stopped

- manually (button CANCEL)
- automatically, if preset length of time period is printed-out already
- automatically, if preset time for print end was exceeded (in menu item Prints values to)
- automatically, if all recorded values are printed-out already

If both time values for automatic end of print are enabled at the same time (length of time period of print-out and time of print end) print-out will be ended after at least one of both conditions is fulfilled.

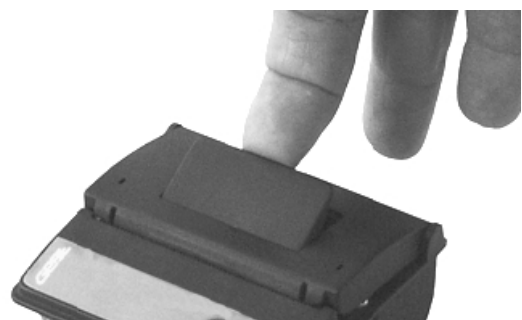
At the end of print-out always record header is printed. Header enables to identify record accordingly to data logger serial number, its description, its location (must be entered before in data logger) and date of print. Tear off printed-out paper over tear edge of the printer.

Warning: if back-up battery of internal clock is low and at the same time instrument was not continuously powered from external source, time reading will not be valid, which is indicated by inverse print of time value.

Paper replacement in built-in printer

Last meter of paper in the roll is marked by colored strip indicating paper will be finished soon.

If paper is finished during print-out, LED on printer shortly blinks in red and LCD reports *Load paper!* Insert new paper in accordance with described procedure below. After installation of the new roll of paper press shortly shift button on printer (<) and print-out will continue.



After inserting new paper pull gently lever on the lid and release printer lid. Pressure roll for paper transport is released from driving gear of printer drive and lid can be opened easily.

Unwind several centimeters of paper from new role and insert it to paper container, thermo-sensitive layer outside. Unwound paper end must stick out from container.

Press strongly printer lid to snap audibly to container lock. Now it is possible to tear off printed-out paper over tear edge of the printer and the lid stays closed. Printer is ready to operation.



Configuration of data logger from built-in keyboard

Main menu

From main menu are directly available functions of print setting, information on record parameters setting, setting of LCD illumination level and menu language selection. For setting of all other parameters it is necessary to enter 4-digit PIN code. Manufacture PIN code is 5555, user can change it anytime.

Move between menu items by means of buttons \triangle or ∇ . Go back to basic display button by means of button Escape.

Items of main menu:

- 1.0 Print Period
- 2.0 Day End Time
- 3.0 Print From Date
- 4.0 Day Start Time
- 5.0 Info On Setting
- 6.0 ParameterSetting
- 7.0 Illuminat. Level
- 8.0 Language Select.

1.0 Print Period

Defines time period of recorded values to be printed. Set time period in whole hours at range from 1 to 255 h, which represents 10.6 days of printed record in maximum. Function it is possible to disable by button DISABL or enable again by button TIME. Use buttons \triangle , ∇ or \triangleright for setting itself. If function is disabled, print of recorded values will not be limited by this function. If function is enabled at the same time with function Day End Time, print time period can be limited by time adjusted in item Day End Time.

2.0 Day End Time

Defines time of print end in whole hours at range from 0 to 23 h. This function enables to print records only from one day, i.e. in actual day or (in print of history) in day of required print (item Print From Date). Function it is possible to disable by button DISABL or enable again by button TIME. Use buttons \triangle , ∇ or \triangleright for setting itself. If function is disabled, print of recorded values will not be limited by this function. If function is enabled at the same time with function Print Period, print time period can be limited by time adjusted in item Print Period.

Illustration of concurrence of function Print Period and Day End Time

Example 1 – setting of time in Day End Time is irrelevant

3:00:00 -15.7 -5.2°C	← values recorded in data logger memory
3:30:00 -15.7 -5.2°C	
4:00:00 -15.7 -5.2°C	← day end time (adjusted to 4:00:00)
4:30:00 -15.7 -5.2°C	
5:00:00 -15.7 -5.2°C	← Print Period is indicated in bold (adjusted to 6 hours)
5:30:00 -15.7 -5.2°C	
6:00:00 -15.7 -5.2°C	
6:30:00 -15.7 -5.2°C	
7:00:00 -15.7 -5.2°C	
7:30:00 -15.7 -5.2°C	
8:00:00 -15.7 -5.2°C	
8:30:00 -15.7 -5.2°C	
9:00:00 -15.7 -5.2°C	
9:30:00 -15.7 -5.2°C	← values to be printed are indicated by frame
10:00:00 -15.7 -5.2°C	
10:30:00 -15.7 -5.2°C	↑ prints towards older values
11:00:00 -15.7 -5.2°C	← actual time (print start)

Example 2 – setting of Print Period is irrelevant

3:00:00 -15.7 -5.2°C	← values recorded in data logger memory
3:30:00 -15.7 -5.2°C	
4:00:00 -15.7 -5.2°C	
4:30:00 -15.7 -5.2°C	
5:00:00 -15.7 -5.2°C	← Print Period is indicated in bold (adjusted to 6 hours)
5:30:00 -15.7 -5.2°C	
6:00:00 -15.7 -5.2°C	
6:30:00 -15.7 -5.2°C	
7:00:00 -15.7 -5.2°C	
7:30:00 -15.7 -5.2°C	
8:00:00 -15.7 -5.2°C	← prints values to (adjusted on 8:00:00)
8:30:00 -15.7 -5.2°C	
9:00:00 -15.7 -5.2°C	
9:30:00 -15.7 -5.2°C	← values to be printed are indicated by frame
10:00:00 -15.7 -5.2°C	
10:30:00 -15.7 -5.2°C	↑ prints towards older values
11:00:00 -15.7 -5.2°C	← actual time (print start)

3.0 Print From Date

Defines day required values will be printed out. Function is available for print of older values stored in memory. Function it is possible to disable by button Today (i.e. it prints always from actual date and time) or enable again by button DATE (enables to select required date of print). Use buttons \triangle , ∇ or \triangleright for setting itself. Function it is possible to use in parallel with functions Print

Period and Day End Time, which define end of print. Function Print from Date is directly related to function Day Start Time, which precisely defines start time of print in selected day.

4.0 Day Start Time

Defines time, from which (towards older recorded values) print will be started. This function is usable only for print of older values in memory and is enabled or disabled together with function Print From Date. Disabled function is indicated by reading Today (i.e. prints always from actual date and time). Use buttons \triangle , ∇ or \triangleright for setting itself. Function Day Start Time is directly related to function Print From Date, which Defines date of print start for selected time.

5.0 Info On Setting

This function enables to view all data logger settings protected by PIN code. Move between setting items by buttons \triangle , ∇ . Button NEXT enables quick move between General setting selections, Setting of channel 1 and Setting of channel 2.

6.0 ParameterSetting

Access to this menu item is protected by PIN code. If PIN is entered correctly, record stops till the end of setting mode. If data logger stays in setting mode 5 minutes and no key is pressed and no command from the computer is received, data logger automatically ends up setting mode and record continues.

7.0 Illuminat. Level

This function enables to change illumination intensity of LCD display from 0 to 100% with 10% step. Level 0% means illumination permanently disabled, 100% is maximum level of illumination. Use buttons \triangle , ∇ or \triangleright for setting itself, selected level confirm by button STORE. Illumination is activated by pressing any keyboard button and is switched off automatically after 30 seconds.

8.0 Language Select.

This function enables to select one from the maximum 15 languages of instrument menu. E.g. following languages can be selected: English, German, French, Italian, Polish, Dutch, Spanish, Portuguese, Romanian, Czech. Select language by buttons \triangle or ∇ , confirm selected language by button STORE.

Menu 6.0 ParameterSetting

6.1 General Setting

Menu Item General Setting concerns entire data logger (both temperature channels). Setting is indicated in upper part of the display by symbol of a mounting spanner.

6.1.1 Logging interval

Defines interval, for storing of values from both temperature channels to internal memory. Memorizing of the first value is synchronized with the internal real time clock, so the record is performed at sharp multiples of minutes, hours and days. E.g. after starting the record with the 15 minute interval the first value is not stored immediately, but after the internal clock gets the status of a quarter, a half or a whole hour. First interval after switching on the data logger (or after parameter setting) is always shorter. Set logging interval by pressing button CHANGE and by selection from preset values by means of buttons \triangle or ∇ . Store selected interval by button STORE.

6.1.2 Alarm Audio

This menu item enables to disable/enable audible alarm indication. If audible indication is enabled, in active alarm state every 10 seconds warning signal sounds. Sound is possible to switch OFF temporarily by button AUDIO (if new alarm is activated signal sounds again). If audible indication is disabled, warning signal does not sound.

6.1.3 Logger Location

Enables to enter description of data logger location with 16 characters. Description will be visible on each print-out from built-in printer. Edit text after pressing button CHANGE. Edited character is indicated from above and below by arrows and change is enabled in alphabetical order by buttons Δ , ∇ . Optionally it is possible to swap between capital letters and lower case letter or symbols by means of button 1-A-a. Space character is first character of symbols and follows after last character of lower case letters (z). Digits are part of symbols. Shift to another edited character in text string by button \triangleright . Standard offering STORE (to store edited text) or CANCEL (to end editing without storing) are available after pressing button NEXT.

6.1.4 Header Text

Can contain e.g. your company name and it is printed-out always at the first line of the header of the print-out of measured values. Edit text after pressing button CHANGE. Editing is identical as in item Logger Location (see above).

6.1.5 Set Date

If there is a need to change the date in data logger internal clock, enter editing mode by button CHANGE. Edited digit is indicated from above and below by arrows and it is possible to change it by buttons Δ or ∇ . Instrument does not allow to set values outside of interval 01 to 31 for day and 01 to 12 for month. Shift to another edited digit by button \triangleright . Only two last digits in range 00 to 99 are editable in year indication. Use button STORE to store edited date to data logger internal clock or button CANCEL to end editing without storing.

6.1.6 Set Time

If there is a need to change the time in data logger internal clock, enter editing mode by button CHANGE. Edited digit is indicated from above and below by arrows and it is possible to change it by buttons Δ or ∇ . Instrument does not allow to set values outside of interval 00 to 23 for hour and 00 to 59 for minute. Shift to another edited digit by button \triangleright . Use button STORE to store edited time to data logger internal clock (seconds will be zeroed) or button CANCEL to end editing without storing.

6.1.7 Temperature Unit

This menu item enables after pressing button CHANGE to select between two temperature units: °C or °F. Data logger works with selected temperature unit in measurement (value on display), record to data logger memory and in alarming (adjusted limits). Change the used temperature unit by buttons Δ or ∇ . Use button STORE to store selected unit to data logger or button CANCEL to end unit selection without storing.

6.1.8 Logging mode

Enables to select by means of buttons Δ or ∇ one of three available logging modes:

- actual, when actually measured value is recorded at the moment of logging interval
- average, when average value of temperature measured during adjusted logging interval is recorded. Temperature is measured in fixed interval 5 s.
- min-max-average, when average value of temperature measured during adjusted logging interval (same as above) accompanied by minimum and maximum temperature in logging

interval. Recorded min. and max. values are available after data download to computer. Print-out on built-in printer is not enabled.

Use button STORE to store selected logging mode to data logger or button CANCEL to end logging mode selection without storing.

6.1.9 PIN Change

This menu item enables user to change anytime four-digit PIN code. Edited digit is indicated from above and below by arrows and it is possible to change it by buttons \triangle or ∇ . Other digits are hidden (replaced by symbol asterisk). Shift to another edited digit by button \triangleright . Use button STORE to store PIN to data logger or button CANCEL to end PIN change without storing.

Remember new PIN well, there is no universal code to unblock the instrument!

6.2 (6.3) Setting of channel 1 or channel 2

Following parameters concern each channel and can be adjusted separately for each channel. Adjusted menu items are identical for both temperature channels. Setting of proper channel is indicated at the LCD upper part by symbol of mounting spanner with digit indicating adjusted channel.

6.2(3).1 Chan.Description

Enables to enter description of location of temperature probe for proper channel with 16 characters. Description will be visible on each print-out from built-in printer. Edit text after pressing button CHANGE. Edited character is indicated from above and below by arrows and change is enabled in alphabetical order by buttons \triangle , ∇ . Optionally it is possible to swap between capital letters and lower case letter or symbols by means of button 1-A-a. Space character is first character of symbols and follows after last character of lower case letters (z). Digits are part of symbols. Shift to another edited character in text string by button \triangleright . Standard offering STORE (to store edited text) or CANCEL (to end editing without storing) are available after pressing button NEXT.

6.2(3).2 Upper AlarmLimit

Enables after pressing button CHANGE to set upper temperature limit of proper channel. After exceeding the limit alarm delay is counted. If specified delay time value is exceeded, alarm is activated (visually, optionally acoustically). Value of alarm limit is adjustable at the range -130 to +500. Temperature unit of alarm limit depends on setting of temperature unit in general setting. After change of temperature unit adjusted values of alarm limits remain without change!

Edited digit of alarm limit is indicated from above and below by arrows and it is possible to change it by buttons \triangle or ∇ . Shift to another edited digit by button \triangleright . Use button STORE to store alarm limit to data logger or button CANCEL to end alarm limit adjustment without storing.

6.2(3).3 Lower AlarmLimit

Adjustment of lower alarm limit is analogical with above setting of upper alarm limit.

6.2(3).4 Alarm Delay

Enables to set after pressing button CHANGE at the range of 0 to 60 minutes. Delay is counted from the moment when measured temperature of proper channel exceeds adjusted alarm limit. If temperature during delay counting returns to adjusted limits, delay is counted after new exceeding of alarm limits again from the beginning. After elapsing of adjusted delay visual, optionally audible alarms are activated.

Edited digit of alarm delay is indicated from above and below by arrows and it is possible to change it by buttons \triangle or ∇ . Shift to another edited digit by button \triangleright . Use button STORE to store alarm delay to data logger or button CANCEL to end alarm delay adjustment without storing.

6.2(3).5 Alarm ON/OFF

Enables to disable the evaluation of alarms by setting this item to „disabled“. Alarms of this channel then will not be evaluated and adjusted values of alarm limits and alarm delay are irrelevant. Change the state of alarm evaluation after pressing button CHANGE. Select value „enabled“ or disabled“ by means of buttons Δ or ∇ . Use button STORE to store alarm evaluation to data logger or button CANCEL to end alarm evaluation adjustment without storing.

6.2(3).6 Channel Record

Enables to disable proper channel for record (e.g. if temperature probe is permanently disconnected). Capacity of data logger memory is then available for another channel. At least one temperature channel must be enabled for record. It is not allowed to disable both channels at the same time! Change the state of channel logging after pressing button CHANGE. Select value „enabled“ or disabled“ by means of buttons Δ or ∇ . Use button STORE to store channel logging to data logger or button CANCEL to end channel logging adjustment without storing.

6.2(3).7 Graph Y axis min

It is useful for graph print to preset graph Y axis scale in accordance with expected temperature values at monitored room. Set minimum of the Y axis scale of the proper channel after pressing of the CHANGE button. Value is adjustable from the range -130 to +500, temperature unit is defined by set temperature unit in general setting. After temperature unit change the set value of the Y axis scale remains the same !

Edited digit of scale value is marked by arrows from below and above and can be changed by Δ or ∇ buttons. Shift to next edited digit by button \triangleright . Press button STORE to save new Y axis scale value to recorder. Press button CANCEL to leave without saving changes.

6.2(3).8 Graph Y axis max

Here it is possible to preset maximum of the Y axis scale of the proper channel in analogical way as described above.

Structure of menu

1.0	Print Period	xx Hour / Disable	(1-255hours i.e. 10.6 days), controlled by buttons TIME and DISABL	
2.0	Day End Time	xx:00 Hour / Disable	(0-23hours), controlled by buttons TIME and DISABL	
3.0	Print From Date	xx.xx.20xx / Today	(1.1.2000-31.12.2099) controlled by buttons DATE and TODAY	
4.0	Day Start Time	xx:00 Hour / From Now	(0-23hours) activated analogically with previous selection	
5.0	Info On Setting	Submenu...	(only viewing of adjusted parameters)	
6.0	ParameterSetting	Submenu...	(protected by PIN, stops the record, after completion of setting resets the instrument)	
7.0	Illuminat. Level	0-100%		
8.0	Language Select.	Several selections		
5.1	General Setting	5.1.1	Logging Interval, Alarm Audio	
		5.1.2	MemoryOccupation, Logging Mode	
		5.1.3	Temperature Unit, Logger Type	
		5.1.4	Logger Location, Header Text	
		5.1.5	Ser.Num., FW vers., Menu Vers., PC Driver State	
5.2	Setting Of Channel 1	5.2.1	Upper AlarmLimit + Lower AlarmLimit	
		5.2.2	Alarm Delay, Alarm ON/OFF	
		5.2.3	Sensor Type, Channel Logging	
5.3	Setting Of Channel 2	5.3.1	Upper AlarmLimit + Lower AlarmLimit	
		5.3.2	Alarm Delay, Alarm ON/OFF	
		5.3.3	Sensor Type, Channel Logging	
6.1	General Setting	6.1.1	Logging Interval	1,2,3,4,5,10,15,20,30,60 min
		6.1.2	Alarm Audio	Enable / Disabled
		6.1.3	Logger Location	16characters max (vehicle number, driver...)
		6.1.4	Header Text	16characters max (e.g. company name)
		6.1.5	Set Date	25.09.2008

		6.1.6	Set Time	15:11 Hour
		6.1.7	Temperature Unit	°C / °F
		6.1.8	Logging Mode	Actual Values / Average/Interval / Min-Max-Average
		6.1.9	PIN Change	
6.2	Ch1 Setting	6.2.1	Chan.Description	16characters max
		6.2.2	Upper AlarmLimit	xxx.x °C/F (adjustable -130 to 500)
		6.2.3	Lower AlarmLimit	xxx.x °C/F (adjustable -130 to 500)
		6.2.4	Alarm Delay	0-60 min
		6.2.5	Alarm ON/OFF	Enable / Disable
		6.2.6	Channel Logging	Enable / Disable
		6.2.7	Graph Y axis min	xxx.x°C/F (adjustable -130 to +500)
		6.2.8	Graph Y axis max	xxx.x°C/F (adjustable -130 to +500)
6.3	Ch2 Setting	6.3.1	Chan.Description	16characters max
		6.3.2	Upper AlarmLimit	xxx.x °C/F (adjustable -130 to 500)
		6.3.3	Lower AlarmLimit	xxx.x °C/F (adjustable -130 to 500)
		6.3.4	Alarm Delay	0-60 min
		6.3.5	Alarm ON/OFF	Enable / Disable
		6.3.6	Channel Logging	Enable / Disable
		6.3.7	Graph Y axis min	xxx.x°C/F (adjustable -130 to +500)
		6.3.8	Graph Y axis max	xxx.x°C/F (adjustable -130 to +500)

Installation program for personal computer

Installation program is common for both versions of user program, i.e. basic (freeware) and optional (paid). Installed user program during first run asks installation code - if code is entered, program runs as optional version. If installation code is not entered, program se runs in basic version. Installation code can be entered anytime later.

Installation program is available for free at the Internet address www.cometsystem.cz or can be ordered on the CD as the optional accessory.

- installation from the Internet:
visit www.cometsystem.cz and click to link *Programs*. Download *Program for dataloggers Comet* to your computer. If you are going to run program on a PC with older operating system (Windows98 or ME), download also item *USB adapter – driver* (optionally also with file with installation description). After running downloaded file *logger.exe* follow the Installator instructions.
- installation from installation CD:
Insert installation CD to CD-ROM drive and wait for automatic Installator run. If Installator is not run automatically (depends on setting of operating system), find in file browser file *CDSetup.exe* in main directory of the installation CD and click to run. Follow Installator instructions. Select *Program for dataloggers* from the menu.

In both cases tick during installation offered selection *Install driver for USB adapter* (valid only for Windows2000 and newer operating systems. Older operating systems require driver installation after first data logger connection to the PC). Driver installation procedure and troubleshooting of optional problems is described for each operating systems in *USBxxxx.pdf* file on the installation CD and also at the website.

Data logger is connected to USB interface of the computer, but user SW communicates with data logger by means of the virtual serial port. Check, if adjusted COM port number in driver properties „USB Serial Port“ is at the range COM1 to COM8, program does not support higher port numbers. If needed correct the setting: open driver features „USB Serial Port“ by pressing right mouse button on this driver in Device manager and by selection of item *Properties*. Select card „Port Settings“ and press button „Advanced...“ on the card and select free port at the range 1 to 8.

Reading of recorded data

For recorded data download from data logger to the computer connect instrument to the computer by means of the communication cable and run user program.

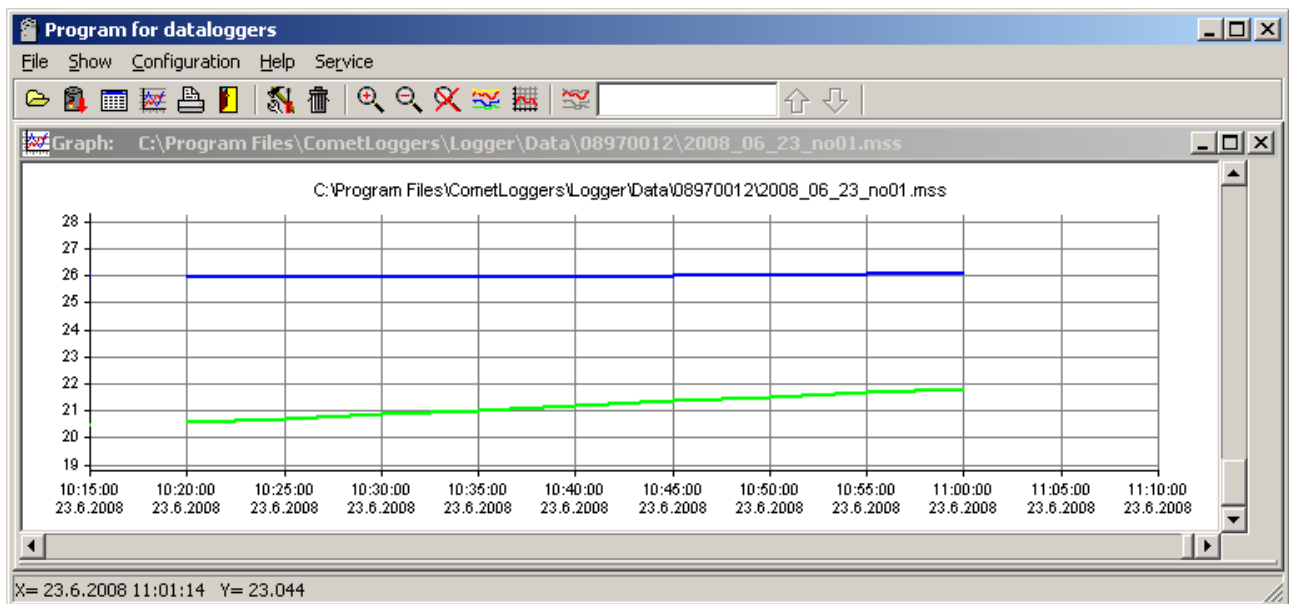
Select menu item *File / From data logger*, confirm offered file name and click to *Store*. It is also possible here to enter suitable description of file with recorded data and select, if memory of data logger after data transfer will be erased or recorded data remains in memory. Data transfer to the computer follows. After finishing table of recorded values appears.

Analogous way enables to open archived recorded data file in the computer anytime. Use menu item *File / From disk* and select required file.

Hyphens instead of measured values in the table indicate values outside of the measuring data logger range, optionally not connected temperature probe. If min-max-average record is not selected, columns Min and Max for both channels in the table are empty (min and max values are not recorded).

INDEX	Date	Time	Frozen section [°C]	Chilled section [°C]	Frozen section MIN [°C]	Frozen section MAX [°C]	Chilled section MIN [°C]	Chilled section MAX [°C]
5583	23.6.2008	10:10:00	26,0	26,0				
5584	23.6.2008	10:15:00	26,0	20,5				
5585	23.6.2008	10:20:00	26,0	20,6	26,0	26,0	20,5	20,6
5586	23.6.2008	10:25:00	26,0	20,7	26,0	26,0	20,6	20,8
5587	23.6.2008	10:30:00	26,0	20,9	26,0	26,0	20,8	21,0
5588	23.6.2008	10:35:00	26,0	21,0	26,0	26,0	21,0	21,1
5589	23.6.2008	10:40:00	26,0	21,2	26,0	26,0	21,1	21,3
5590	23.6.2008	10:45:00	26,0	21,4	26,0	26,0	21,3	21,4
5591	23.6.2008	10:50:00	26,0	21,5	26,0	26,0	21,4	21,6

Often the graphic presentation of recorded data can be more suitable. Graphs are accessible after data download from the instrument or computer hard disk by selection of menu *View / Graph*.



Erasing of recorded data

Recorded data in data logger can be erased by means of the computer by selection *Configuration / Erasing of data logger memory* or by confirmation the offer during data transfer.

Data logging works in cyclic mode. That is why it is not necessary to erase the data - if memory is filled older recorded values are overwritten by newer values.

Upgrade of data logger internal firmware

If manufacturer releases newer firmware version (FW), user can upload FW from computer to data logger by means of USB interface. For setting of FW upload mode it is necessary:

- to switch over data logger manually by means of menu to ParameterSetting, to enter and confirm PIN code
- at the same time press and hold pressed button \triangle , ∇ and middle button
- while holding pressed three buttons, press button END
- data logger display switches off and green LED RECORD switches on permanently (now it is possible to release buttons)
- to connect data logger to the PC and by means of user SW upload new FW. During upload do not disconnect data logger power nor press any button
- leave FW upload mode by pressing right upper button below LCD (green LED switches off, data logger initialization runs and data logger switches to basic display, green LED starts to blink)

Replacement of back-up battery

If back-up battery of internal clock is low and at the same time instrument was not continuously powered from external source, time reading is not valid. This is indicated by inverse print-out of time value. Used battery is button battery 3 V, type CR2032 - located in holder under instrument bottom cover.

Replacement procedure:

- disconnect data logger from power and from temperature probes
- lever up four rubber covers from under instrument
- by means of a suitable screwdriver unscrew screws from the back of the case and remove the instrument cover
- remove old battery from the holder by means of a suitable flat screwdriver
- insert new battery with **correct polarity** (+ pole of the battery must be visible from above)
- put back the instrument cover and screw the screws. Put back also four rubber corner covers
- set internal clock of data logger (from data logger keyboard or from the computer)

Liquidate discharged battery ecologically !

Recorder mounting by means of the optional LP007 metal holders

This way of installation is recommended in cases, when included self adhesive Dual Lock is not suitable to use, e.g. for cohesionless, brashy surface etc. The LP007 package contains pair of metal holders and four pieces of self-drilling screws.

First fix both metal holders to the back of recorder by delivered four self-drilling screws. Holders are horizontally fixed to the recorder rear cover at the upper and lower side. The position is defined by four holes for screws already prepared at the rear cover.

Then it is possible to mount recorder by means of at least four suitable screws of 3 mm diameter to desired place.

Technical parameters of the instrument:

Measuring range of the RTD Pt1000/3850ppm input: -90 to +260 °C

Measuring range of the RTD Ni1000/6180ppm input: -50 to +250 °C

Resolution: 0.1 °C/°F (for °F is in interval -130 to -100 °F resolution 1 °F)

Accuracy of temperature inputs (without probes - valid both for inputs Pt1000 and Ni1000): ±0.2 °C in full range

Accuracy of the instrument with connected temperature probe is defined by the above input accuracy and accuracy of the used probe.

Temperature unit: °C or °F

Maximum length of the probe cable: 10 m

Type of connectable probe: with RTD sensor Pt1000/3850 ppm or Ni1000/6180 ppm, equipped with connector CINCH

Recommended probe: PT1000TGL40/C (probe with protection IP67, range -30 to +80 °C)

Response time (for probe PT1000TGL40/C): $t_{90} < 150$ with (temperature step 20 °C, air flow approximately 1 m/s)

Interval of measurement, alarm evaluation, MIN/MAX memory update and refresh of measured values on the display: 5 s

Logging interval of measured values to memory: 1 min to 60 min (10 selections)

Memory capacity: 102 400 records each channel (both channels enabled)
172 032 records, if only one channel is enabled

Specified number of records is maximum possible and can be achieved only, if record from memory erasing was not interrupted by new setting and if logging mode of actual or average values is selected. In logging mode average+min+max values number of records is approximately 3 times lower.

Communication with computer: USB port or (optionally) RS232

Real time clock: adjustable from the computer, integrated calendar including leap years

Accuracy of internal clock: < 200 ppm (i.e. 0.02 %, 17.28 s in 24 h)

Consumption without display illumination: not printing 50mW, during print 8W

Power connector: co-axial 5.5 x 2.1 mm

Power cable (included): wires 2 x 0.75 mm², 5 m length

Protection: IP20

Operating conditions:

Power: external source 9 to 32 V dc and back-up battery of internal clock 3V CR2032

Operating temperature range of data logger: -30 to +65 °C (at temperature below -20 °C display must not be readable)

Operating temperature range of built-in printer: -20 to +50 °C

Operating humidity range of the instrument: 5 to 85 %RH (without condensation)

External characteristics in accordance with EN33-2000-3: normal with the specifications

NM: AE1, AN1, AR1, BE1

Working position: horizontally or vertically

Mounting of instrument: by self adhesive Dual Lock, stick to clean, ungreased and smooth surface

Not allowed manipulation: it is not allowed to stick instrument by self adhesive Dual Lock to cohesionless surface

Limit conditions:

Power: external source -36 to +36 V dc

Limit temperature range of instrument: -30 to +70 °C

Limit humidity range of instrument: 5 to 85 %RH (without condensation)

Storing conditions: temperature -40 to +85 °C, humidity 0 to 85 %RH (without condensation)

Dimensions (without connectors): 175 x 124 x 51 mm

Weight including battery (without probes): approximately 370 g

Material of the case: ABS

Paper for printer: width 58 mm, length 10 m, i.e. approximately 3400 printed lines

Instrument passed through tests of electromagnetic compatibility (EMC):

Device conforms in accordance with EN 61326-1 these norms:

radiation: EN 55011 Class B

immunity: EN 61000-4-2 (levels 4/8 kV, Class A)

EN 61000-4-3 (intensity of electric field 3 V/m, Class A)

EN 61000-4-4 (levels 1/0.5 kV, Class A)

EN 61000-4-6 (intensity of electric field 3 V/m, Class A)

Technical support and service of the instrument

Technical support and service is ensured by the distributor of this instrument.