

# OPERATION MANUAL

## Temperature measurement system TLOG20 connections RS232, RS485, USB

### Description



0567 0003 (RS485-Interface)  
The variants with other inter-  
faces look slightly different

### Technical Data

Temperature measurement	
Number of channels	configurable, 1 to 20
Measurement range	-55...+125 °C
Typical accuracy	conform with the used sensor
for sensor DS18B20:	±0,5 °C (-10...+55 °C) ±2 °C (-55...-10 °C, +85...+125 °C)
for sensor DS18S20:	±0,5 °C (0...+70 °C) (see curve on page 2)
Module	
Dimensions modul	L785 x W40 x D21 mm
Operating temperature Micro controller circuit	-10...+55 °C
Operating voltage DC	9 V-24 V DC (mains plug)
Operating current	approx. 40 mA
Interface	4800 Baud, 8 Data bits, No parity, One Stop bit
CE-Conformance	2014/30/EU
EMV-noise emission:	EN 61000-6-3:2011
EMV-noise withstanding:	EN 61000-6-2:2007
Accessories	See ordering numbers on page 5
Article number	
0567 0002	RS232
0567 0003	RS485
0567 0004	USB 1.1, 2.0 and 3.0 compatible

### Characteristic features

- Up to 20 temperature measurement points  
measuring range -55...+125 °C
- Use of temperature probe DALLAS-Sensors type 18B20, 18S20
- Three wire, parallel connection of sensors
- More than 60 meter lead length
- 0.06 °C resolution
- Automatic configuration
- Inclusive simple Windows™ software

### Areas of application

- Monitoring of cold storage or stock rooms,  
in food industry
- Quality assurance
- Temperature measurement in buildings,  
air conditioning, heating control, solar plants
- Dallas connection adapter for customer specific software on Windows or  
Linux platform

### Windows Software

- Display of current temperature values
- Tabular representation of measured values
- Storing of data on hard disk
- Graphics Software as accessories

### Operation

The product offers an efficient measurement and indication system for a maximum of 20 temperature channels. DALLAS sensors of type 1820, 18B20 are used as temperature sensors and these are connected in parallel with a three wire lead. By using suitable cables, it is possible to achieve larger lead lengths up to a few hundred meters.

The integrating member between PC and sensor network is a micro controller module which is inserted at the serial COM-Port and makes the DALLAS-Touch-Bus ready through a six pole RJ12 plug connector. Suitable connection cable or measurement sensor can be easily made or can be readily procured from us.

The micro controller controls the dallas touch bus, manages the serial numbers and picks up the temperatures of all connected sensors in a cyclic manner. The currently measured values are sent as ASCII string to the connected PC. The display and graphical representation of measured values (option) appears on the PC. An easy to use Windows software for display of measured values and data representation is included in the scope of supply.

More such modules can be operated with a PC, provided more free COM-ports are available at our disposal. If the program RECORDER is used, only one module per PC can be read.

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### WINDOWS-Software RECORDER

With the help of this program the measured values can be received through the interfaces and recorded on the PC. The recorded data is compatible with any desired spread sheet program, with which it is possible to further process the measured values for statistical evaluation and interpretation.

Download: <https://download.bb-sensors.com/index.php/login>

Login: bb-shop, Passwort: BBshop#2017

Installation: The program should be first installed under Windows 98, Windows NT, Windows 2000, Windows XP, Windows Vista or Windows 7 system. Run the program "setup.exe" either by selecting "Run" from the START menu or through the windows explorer. Then follow the instructions of the installation program. The setup program creates a new program group "HYGROSENS INSTRUMENTS" in the folder "programs". After successful installation, the software can be accessed and executed through the START menu.

First time operation: Connect the temperature logger to a free serial port on the PC. If the software runs for the first time in the menu option "settings", select device type as "20Ch. Thermometer Templog 4800Bd" and also the serial interface used (for example, COM1) under "interface". The remaining settings (Data rate, Parity, Start and Stop bit) are automatically selected and need not be changed. In case the connection hangs, refer to data communication in the terminal window. Then select "OK" the current settings will be stored.

Please note that still micro controller adapter has to be configured as per the connected sensors, before displaying the measurement values.

Data communication: The maximum allowable distance (between PC and interface converters) depends on the model of the interface adapter.

USB-Interface: For USB-Interface the max. allowable length is restricted: As per standard, only 5 m are allowed. Due to high frequently signals, this value should not be exceeded with the use of passive connection cables. Only special USB cables may be used. For further routes, special repeater-cables are available, which extend the allowable radius by 15 m in each case. Max. 5 such repeaters can be cascaded. (No extend of delivery)

RS232-version: As per standard, the allowable cable length is 15 m. In actual practice much longer routes, for example up to several 100 m, can also be realised with low baud rates.

RS485-version: For very large distances between PC and sensor connection adapter, the RS485-version can be used. With this the connection length up to 1200 m can be realised. On the PC side a RS485-interface adapter is required.

If you are not able to make any data communication between PC and the measuring device or the measuring adapter, then first please check the power supply and also cable connection to the PC.

Data recording: First activate all the measurement channels for recording by checking the channels. In 'Text 1', 'Text 2' and 'Text 3', you can enter a description as header of the data file. The selected separator appears between the individual data elements. Enter the recording interval in seconds in the

Field "Every". The data is recorded in the file which is entered as path in the 'Settings' button. The recording begins by pushing the 'Start' button.

EXCEL™: If you want to use EXCEL for evaluation, then operate the control button EXCEL before start of recording, so that suitable decimal separation characters and field separators are inserted. The created file is compatible with CSV-Format. In order to display the measured data, you can use graphic tools, for example, the diagramassistant in EXCEL™. However, other software can also be used to evaluate the measured data.

### Connection of Sensors

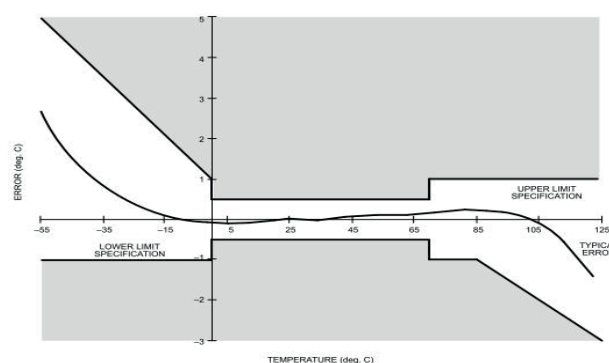
The Dallas temperature sensors of type 1820 has an internal coding (serial-number) and can be operated along with several other sensors on a three wire bus. The sensors are calibrated by the manufacturer.

For short connection lengths, there are no special requirements in respect of the connecting cable to be used. It is also recommended to connect a ceramic capacitor of 100 nF from pin +5 V to pin GND at each sensor.

The lead length with unshielded cables can go up to 60 m. To increase the approach length, an additional Pullup-resistor of 1.5k to 10 k-Ω (from Pin "DALLAS" to pin "+5 V") can be added. With this, it is possible to increase the cable length up to 150 m or more, but with slightly lower accuracy of measurement due to the increased temperature rise of the sensors.

#### TYPICAL PERFORMANCE CURVE

DS1820 DIGITAL THERMOMETER AND THERMOSTAT  
TEMPERATURE READING ERROR



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### Plug connector layout

Power supply: The articles 0567 0022 and 0567 0003 get their power supply via socket-plug. The inner core of the 3.5 mm socket-plug carries positive operating voltage of approximately 9 to 24 V DC. The outer conductor is minus. The power supply for article 0567 0004 is given via USB-port.

Sensor- plug connector: The Western plug connector 6P6 (RJ12) on the logger side is as shown below (view of the cable i.e. the contact surfaces of the plug):

- 1 GND
- 2 GND
- 3 Data
- 4 Data
- 5 +5V
- 6 +5V



### Automatic sensor search

The system should be configured once before first time operation. For this, first all sensors are connected and operating voltage is applied.

- After pressing the 'Configuration' key on the board shortly for three times (in each case, approximately pressing for 1,5 seconds and then pausing for one second), the program goes into Autosearch mode. The LED consecutively blinks three times in a cyclic manner for short duration.
- If now the 'Configuration' key is operated for at least 5 seconds, the sensors connected on the bus are searched and the new configuration is stored in the controller's memory. The process can as often be repeated as desired. After the sensors are searched and identified, the current temperature values appear on the screen.
- To exit from the Auto search mode, the operating voltage must be switched off for a short while. The configuration remains stored.
- During execution of Autosearch-Function, the stored calibration values are also deleted (see below).

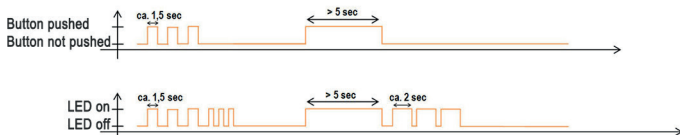
### Format of Data transfer

The interface works at a data rate of 4800 Bd, 8 databits, no parity and one stop bit. The transfer of useful data takes place in lines. All characters are ASCII coded. All information is sent continuously without separation characters. In a line, only information of one channel is transferred. At the end of the line, the last two ASCII characters are sent for the check sum (8 bit CRC) of the current line. Each line closes with the character 'Carriage return' '<CR>'. Several lines form a data-block. A data-block can have the following contents, for example:

```
@<CR>
I011010E0223C000000B1<CR>
V0108DA7D<CR>
I02101050013C00000021<CR>
V0208C276<CR>
I031010B0093C00000017<CR>
V0308CCF9<CR>
$<CR>
```

The data block has following structure:

- A synchronization pattern for the beginning of a Data block. For synchronization, the sequence '@<CR>' is used.
- The configuration data ('Identifier') of a channel. The data line begins with the character 'I', followed by the logical channel number, and then followed by configuration data and the Sensor serial number. The line is closed with the check sum and the character '<CR>'.  
Example: I011010E0223C000000B1<CR>
- The measurements of a channel. The data line begins with the character 'V', followed by the logical channel number, followed by useful data. Only numerical measurement values and the check sum (CRC), at the end of the line, are transferred. All other information like number format, number of characters, physical unit, etc. are contained in the configuration data (sensor coding).  
Example: V0108DA7D<CR>
- The configuration data and measurement values follow the same scheme for all other channels.
- The continuation character '\$<CR>' is sent at the end of a data-block



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### Structure of Config Dataline

The configuration data line contains all information of the sensor working on the corresponding channel. The line has following structure:

- Character '1' at the beginning of the line.
- 8 bits (two ASCII characters) physical sensor coding. Based on sensor coding, the number format, scale, physical unit and allowable range of values are specified. The sensor coding is 01 for the described device.
- 8 bits (two ASCII characters) Hardware coding (type of the measurement sensor). The Dallas sensors have the code number 10 for 1820 and 28 (HEX) for 18B20.
- 48 bits (twelve ASCII characters) serial number of the sensor: Here, the serial number of Dallas-sensor is mentioned.
- 8 bits (two ASCII characters) CRC (check sum)
- '<CR>' as line termination

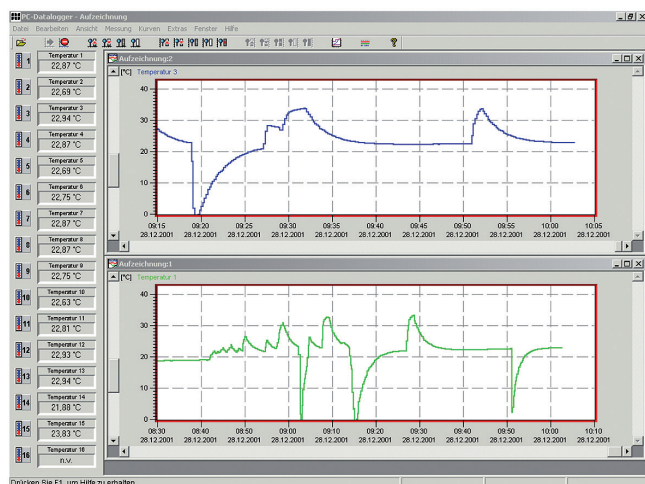
### Structure of Measured value Datalines

The measurement value data line contains the current measurements of the sensor operating on the corresponding channel. All information are represented in binary and is transferred ASCII coded format without separation characters. For the sensor marking 01, the line has following structure:

- Character 'V' at the beginning of the line
- 8 bits (two ASCII character) logical channel number
- 2 Bytes (4 ASCII characters) measurement data with 0.01°C resolution. The hexadecimal value is to be converted into a decimal number and to be divided by 100. With this, the temperature value is obtained in °C with two decimals.
- 8 bits (two ASCII characters) check sum (CRC)
- '<CR>' as line termination

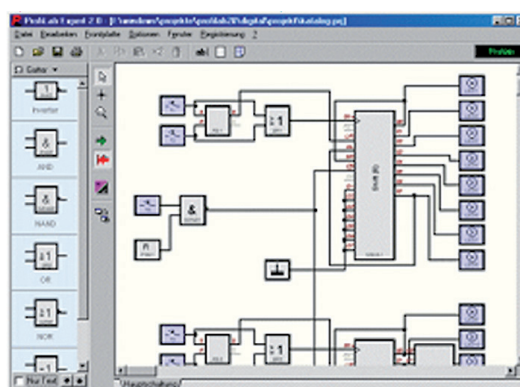
### Accessories (Optional)

#### Software "PCLOG"



The software screen are in English and German language. Temperature values can displayed in °F or °C. Besides data storing on hard disk, the software offers as most important feature the graphical representation of all measured and recorded channels in the form of a temperature Vs time chart (online scriber function). By means of Drag & Click, the window section can be enlarged and the time or temperature axis can be scaled as desired. Besides the graphic view, the representation is also possible in the form of a table. Cut & paste is used for capturing measured data series into a spreadsheet program (for example EXCELTM). All tables and graphic representations can be printed out in colors. In addition, simple monitoring and controlling functions are also integrated in the software. Limits can be set for each channel. An acoustic signal (Wave file) is given when the values are exceeded. Control of up to eight external devices is possible by a relay card, to be attached at the parallel port or USB connector.

### Software Profilab



With this software, professional measurement and control projects can be realized in a simple, graphics based development platform. You can simply draw the wiring diagram of the measurement circuit and do the project design. Without any knowledge of programming, the measurement values of up to 16 temperature sensors can be easily used in the measurement circuit. Arithmetic and logical components take care of linking and processing of the measurements. Modules like impulse generators, timers and relay cards etc. provide extensive possibilities for control and regulation. Various instruments, scribes and tables serve as the storage and representation of measured values and you can monitor the measurement system with display and control elements. The system is operated through a self designed front panel, on which you can arrange switches, potentiometers, displays, LED's, instruments etc. The software also enables compilation of the project into an EXE-file, which can run without Profilab.

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### Ordering numbers

Article	Article no.
PC-measurement with RS232 interface	0567 0002
PC-measurement with RS485 interface	0567 0003
PC-measurement with USB interface	0567 0004

Accessories	Ordering No.
Switching AC/DC adaptor, 12 V, 670 mA (not needed for 0567 0004)	NG-12V-670MA
Screw type temperature probe M10, cable 2 m	0555 0251
Temperature probe DS18S20 with PUR cable and RJ12 plug, 2 m	DS1820-PUR-2M
Temperature probe DS18S20 with PUR cable and RJ12 plug, 5 m	DS1820-PUR-5M
Temperature probe DS18S20 with PVC- cable and RJ11-plug, 2 m	DS1820-LC-2M
Temperature probe DS18S20 with PVC- cable and RJ11-plug, 5 m	DS1820-LC-5M
Distribution box 10- port with housing	VERT-GEH
Software Profilab expert	0534 1800

### Attention

Please avoid extreme mechanical and inappropriate exposure.

The device/product is not suitable for potential explosive areas and medical-technical applications.

For further information, please visit our homepage:  
[www.bb-sensors.com](http://www.bb-sensors.com)

