Data Logger Systems
FOR THERMAL PROCESS VALIDATION

MEDICAL | PHARMACEUTICAL | FOOD
Data Logger Systems

Flexible data logger systems for the thermal process validation

ebro provides flexible measuring and documentation systems for the validation of various thermal processes. The reliable systems include easy to managing wireless radio or mini-data logger EBI 10 and EBI 11 series, which are placed directly in the process, as well as a software to process validation. We also offer you a system for wired online measurement with up to 12 thermocouples with the EBI 40. An online measurement is also possible with the radio logger of EBI 10 series.

Our data loggers offer a wide variety to validate processes in the medical field, the pharmaceutical industry and the food industry.

- Washer-disinfectors
- Washer-disinfectors for endoscopes
- Bed pan washers
- Steam sterilizers
- Gas sterilizers
  - Ethylene oxide
  - Formaldehyde
  - H2O2
- Blood banks
- Medicine refrigerators
- Laboratories
- Freezers
- Stability chambers
- Cold storage
- Validation of store houses
- Incubators
- Retorts
- Pasteurization
- Spiral-cooker / cooler
- Transport facilities
- Refrigerators
- Smoke chambers
- Ovens
- Full water autoclaves
Temperature Data Logger EBI 10-T

The EBI 10 temperature data logger is in various models available. Whether with one sensor, with two sensors or with four sensors. Different technologies of the probes opens a wide field of applications. The loggers are fitted with flexible metal probes or highly flexible cable sensors.

Characteristics:

- Pt 1000 technology for high accuracy and long term stability
- Up to four temperature sensors per logger
- Wide temperature range -85 °C ... +400 °C
- Accuracy ± 0.1 K
- Sampling rate 250 ms
- Probe length up to 1200 mm
- Response time $t_{90} <2$ sec
- Sensor diameter <2 mm
- Online measurement possible
- Battery replaceable
- Calibration by user
- Conform DIN EN ISO 17665 and DIN EN ISO 15883

Temperature / Pressure Data Logger EBI 10-TP

The EBI 10 temperature / pressure data logger is in various models available. The pressure connection is a “LUERLOCK” plug. The additional temperature recording can be with one sensor, two sensors or with three sensors.

A different technology in the design of the temperature sensor and pressure sensor opens a wide field of application and temperature range.

The pressure sensor is temperature compensated.

Characteristics:

- Piezo-resistive pressure sensor with temperature compensation
- Pressure sensor „LUERLOCK“, as M10 hose connector or as ambient pressure sensor
- Pt 1000 technology for high accuracy and long term stability
- Up to three temperature sensors per logger
- Wide temperature range 0 °C ... +150 °
- Pressure range 1 ... 4000 mbar
- Accuracy ± 0.1 K / ± 10mbar
- Sampling rate 250 ms
- Probe length up to 1200 mm
- Response time $t_{90} <2$ sec
- Sensor diameter <2 mm
- Online measurement possible
- Battery replaceable
- Calibration by user
- Conform DIN EN ISO 17665 and DIN EN ISO 15883
Precision Pressure Logger EBI 10-TP X9X for Gas Sterilizations Processes

The EBI 10-TP X9X pressure / temperature logger is developed for a precise measurement of pressure and temperature in low pressure sterilization processes. The data logger is specially designed for accurate measurement from 0.1 mbar.

Characteristics:
- Continuous pressure monitoring in H₂O₂ (plasma), formaldehyde and ethylene oxide sterilization processes
- Range 0.1 ... 1050 mbar
- Accuracy ±0.25 mbar
- High accurate pressure and temperature measurement in low-pressure processes
- Different configurations available

Temperature / Humidity Data Logger EBI 10-TH100

EBI 10-TH100 temperature / humidity logger is designed for accurate measurement of moisture in different environments. The humidity and the temperature sensor are arranged under the removable stainless steel-sinter-cap.

The sensor element is replaceable by user and replacement sensors are delivered calibrated.

Characteristics:
- Capacitive polymer sensor for precise measurement of humidity
- Humidity sensor resistant to aggressive environment
- Pt 1000 Technology for high accuracy and long term stability
- Wide humidity range 0 ... 100 % rH
- Wide temperature range -40 °C ... +85 °C
- Accuracy ±0.1 K / ±2 % rH
- Sampling rate 1 sec
- Online measurement possible
- Battery replaceable
- Exchangeable sensor, factory calibrated
- Calibration by user

Bowie-Dick-Test Logger EBI 16

The EBI 16 determines reliably and reproducibly the physical parameters for steam sterilization. This innovative electronic testing system creates a high precision, computer based measurement analysis, for a safe sterilization control.

Characteristics:
- Reliable: clear, reproducible measurement results
- Accurate: high-resolution graphical cycle display
- Secure: digital data recording and storage
- Easy: to use and evaluate

Applications:
- Vacuum test
- Steam penetration as alternative electronic Bowie-Dick test
- Conform to towel pack DIN EN 285 and DIN EN ISO 11140-4
Temperature Data Logger and Temperature / Pressure Data Logger EBI 11-T and EBI 11-TP

The EBI 11 mini-temperature data logger and the EBI 11 temperature / pressure logger are designed for tight spaces. Whether with a temperature probe or as a temperature / pressure logger, through the various versions of the sensor opens up a wide field of application as well as temperature and pressure range.

The temperature logger is equipped with rigid or flexible metal probe.

The pressure logger has an internal temperature sensor.

**Characteristics:**
- Diameter only 16.5 mm
- Pt 1000 Technology for high accuracy and long term stability
- Wide temperature range -30 °C … +150 °C
- Wide pressure range 1 … 10000 mbar
- Pressure connection “LUERLOCK”, as M5 hose connector or as ambient pressure sensor
- Accuracy ±0.1 K / ±15 mbar
- Sampling rate 1 sec
- Probe length up to 500 mm
- Sensor diameter <2 mm
- Battery replaceable
- Calibration by user
- Conform DIN EN ISO 17665 and DIN EN ISO 15883

**Interface EBI-IF**

The ebro data logger system and the software Winlog.validation is designed for an intuitive and easy use. This include the interface. It can be connected to the PC with a free USB port. The software recognizes automatically the connected interface.

Up to seven Interface are usable with the Winlog.validation.

**Characteristics:**
- EBI IF 100, one EBI 10 and one EBI 11
- EBI IF 150, one EBI 10 or one EBI 16
- EBI IF 200, up to four EBI 10
- EBI IF 300, up to four EBI 11
- Power supply from USB Port
- Status displayed by Multicolor LED
Multi-channel Temperature Data Logger EBI 40

The EBI 40 multi-channel temperature data logger is a wired system. To bring up to 12 thermocouples in your process maybe a feed through it is required. Process monitoring is very easy thanks to the large color display. Also, the EBI 40 may with a sampling rate of 100 ms records extremely fast changes in temperature and display directly.

There are various sensors such as the thermocouples TPN 601 or TPN 611 (SMP-Anschlüsse).

Characteristics:

- Large TFT Display
- No Interface required, USB communication
- Thermocouple Type K and Type T
- Wide temperature range -200 °C … +1200 °C
- Accuracy ±0.5 K
- Sampling rate 100 ms
- Battery monitoring
- Battery replaceable
- USB supply
- Calibration by user
- Conform DIN EN ISO 17665 and DIN EN 285

Technical Data

EBI 10-T

Measurands:

| Temperature | 1-4 temperature channels |

Measurement range:

| Series EBI 10-T probe length ≥100 mm | -85 to +400 °C |
| Series EBI 10-T cable probe (PTFE) | -20 to +150 °C |
| Series EBI 10-T other | -85 to +150 °C |
| Series EBI 10-T Type 101 | -85 to +85 °C |

Accuracy:

Temperature: ±0.5 °C (-85 to -40 °C)  
±0.2 °C (-40 to 0 °C)  
±0.1 °C (0 to +140 °C)  
±0.2 °C (+140 to +250 °C)  
±0.5 °C (+250 to +400 °C)

Resolution:

Temperature: 0.01 °C

Data memory: 100,000 measurement values

Sampling rate: 250 ms to 24 h

Measurement mode: • Endless measurement immediately  
• Measure immediately until end of memory  
• Start / stop measurement

Sensor: Pt 1000

Interface: Wireless 2.4 GHz / IEEE 802.15.4

Operating temperature:

Log mod: -85 to +150 °C

Radio mod: -30 to +150 °C

Storage: -40 to +125 °C

Protection class: IP68/NEMA 6P

Battery: Lithium cell 3,6 V replaceable

Battery lifetime: up to 2 Years

Dimension: (D x H) 46 x 24 mm

Housing material: Stainless steel (V4A), PEEK

Weight: approx. 45 g

Calibration: factory calibration, ISO or DAkkS certificate on request
### Technical Data

**EBI 10-TP**

**Measurands:**
- Pressure 1 pressure channel
- Temperature 1-3 temperature channels

**Measurement range:**
- **Pressure:** 1 to 4000 mbar (0.1 to 400 kPa)
- **Temperature:** 0 to +150 °C

**Accuracy:**
- **Pressure:** ±10 mbar (50 to 150 mbar)
  ±10 mbar (2050 to 2250 mbar)
  ±10 mbar (3000 to 3250 mbar)
  ±15 mbar (for the remaining range)
- **Temperature:** ±0.1 °C (0 to +140 °C)
  ±0.2 °C (+140 to +150 °C)

**Resolution:**
- **Pressure:** 1 mbar (100 Pa)
- **Temperature:** 0.01 °C

**Data Memory:** 100,000 measurement values

**Sampling rate:** 250 ms to 24 h

**Measurement mode:**
- • Endless measurement immediately
- • Measure immediately until end of memory
- • Start / stop measurement

**Sensor:** Pt 1000, piezoresistive pressure sensor

**Interface:** Wireless 2.4 GHz / IEEE 802.15.4

**Operating temperature:**
- Log mod 0 to +150 °C
- Radio mod 0 to +150 °C
- Storage 0 to +125 °C

**Protection class:** IP68/NEMA 6P

**Battery:** Lithium cell 3.6 V replaceable

**Battery lifetime:** up to 2 Years

**Dimension:** (D x H) 46 x 24 mm

**Housing material:** Stainless steel (V4A), PEEK

**Weight:** approx. 45 g

**Calibration:**
- Factory calibration
- ISO or DAkkS certificate on request

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**EBI 10-TPX9X**

**Measurands:**
- Pressure 1 pressure channel
- Temperature 1-3 temperature channels

**Measurement range:**
- **Pressure:** 0.1 to 1050 mbar (10 Pa to 105 kPa)
- **Temperature:** 0 °C … +85 °C

**Accuracy:**
- **Pressure:**
  ±0.25 mbar (0.1 to 50 mbar)
  ±5 % of measured value (50 to 100 mbar)
  1 % FS (100 to 1050 mbar)
- **Temperature:** ±0.1 °C (0 °C to +85 °C)

**Resolution:**
- **Pressure:** 0.1 mbar (10 Pa)
- **Temperature:** 0.01 °C

**Data Memory:** 100,000 measurement values

**Sampling rate:** 250 ms to 24 h

**Measurement mode:**
- • Endless measurement immediately
- • Measure immediately until end of memory
- • Start / stop measurement

**Sensor:** Pt 1000, piezoresistive pressure sensor

**Interface:** Wireless 2.4 GHz / IEEE 802.15.4

**Operating temperature:** 0 to + 85 °C

**Protection class:** IP68/NEMA 6P

**Battery:** Lithium cell 3.6 V replaceable

**Battery lifetime:** up to 2 Years

**Dimension:** (D x H) 46 x 24 mm

**Housing material:** Stainless steel (V4A), PEEK

**Weight:** approx. 45 g

**Calibration:**
- Factory calibration
- ISO or DAkkS certificate on request

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**EBI 10-TH**

**Measurands:**
- Humidity 1 humidity channel
- Temperature 1 temperature channel

**Measurement range:**
- **Humidity:** 0 to 100 %
- **Temperature:** 0 to +85 °C

**Accuracy:**
- **Humidity:** ±2 %rH (10 – 90 % at 25 °C)
- **Temperature:** ±0.1 °C

**Resolution:**
- **Humidity:** 0.1 %rH
- **Temperature:** 0.01 °C

**Data Memory:** 100,000 measurement values

**Sampling rate:** 1 sec to 24 h

**Measurement mode:**
- • Endless measurement immediately
- • Measure immediately until end of memory
- • Start / stop measurement

**Sensor:** Pt 1000, capacitive humidity sensor

**Interface:** Wireless 2.4 GHz / IEEE 802.15.4

**Operating temperature:**
- Log mod 40 to +85 °C
- Radio mod 30 to +85 °C
- Storage 40 to +85 °C

**Protection class:** IP52

**Battery:** Lithium cell 3.6 V replaceable

**Battery lifetime:** up to 2 Years

**Dimension:** (D x H) 46 x 24 mm

**Housing material:** Stainless steel (V4A), PEEK

**Weight:** approx. 45 g

**Calibration:**
- Factory calibration
- ISO or DAkkS certificate on request
## Technical Data

### EBI 11-T

**Measurands:**
- Temperature: 1 temperature channel

**Measurement range:**
- Temperature: -30 to +150°C

**Accuracy:**
- Temperature: ±0.1 °C

**Resolution:**
- Temperature: 0.01 °C

**Data memory:** 15,000 measurement values

**Sampling rate:** 1 sec to 24 h

**Measurement mode**
- Endless measurement immediately
- Measure immediately until end of memory
- Start / stop measurement

**Sensor:** Pt 1000

**Operating temperature:** -30 to +150°C

**Storage:** 0 to +60°C

**Protection class:** IP68/NEMA 6P

**Battery:** 2 x Lithium high temperature 3 V replaceable

**Battery lifetime:** 20 days at a sampling rate of 1 sec and 120°C ambient temperature

**Dimension (D x H):** 16,5 x 22 mm (without probe)

**Housing material:** Stainless steel (V4A), PEEK

**Weight:** approx. 30 g

**Calibration:** Factory calibration

### EBI 11-TP

**Measurands:**
- Pressure: 1 pressure channel
- Temperature: 1 temperature channel

**Measurement range:**
- Pressure: 0 to 4000 mbar (0 to 400 kPa)
- Temperature: 0 to +150°C

**Accuracy:**
- Pressure: ±20 mbar (±2 kPa)
- Temperature: ±0.1 °C

**Resolution:**
- Pressure: 1 mbar (100 Pa)
- Temperature: 0.01 °C

**Data memory:** 15,000 measurement values

**Sampling rate:** 1 sec to 24 h

**Measurement mode**
- Endless measurement immediately
- Measure immediately until end of memory
- Start / stop measurement

**Sensor:** Pt 1000, piezoresistive pressure sensor

**Operating temperature:** 0 to +150°C

**Storage:** 0 to +60°C

**Protection class:** IP68/NEMA 6P

**Battery:** 2 x Lithium high temperature 3 V replaceable

**Battery lifetime:** 20 days at a sampling rate of 1 sec and 120°C ambient temperature

**Dimension (D x H):** 16,5 x 22 mm (without probe)

**Housing material:** Stainless steel (V4A), PEEK

**Weight:** approx. 30 g

**Calibration:** Factory calibration

### EBI 16

**Measurands:**
- Temperature: 1 pressure channel
- Pressure: 2 temperature channels

**Measurement range:**
- Temperature: 0 °C to +150 °C
- Pressure: 1 to 4000 mbar

**Accuracy:**
- Temperature: ±0.1 °C
- Pressure: ±15 mbar

**Resolution:**
- Temperature: 0.01 °C
- Pressure: 1 mbar (100 Pa)

**Data memory:** 6,750 measurement values

**Sampling rate:** 1 sec

**Measurement mode:** Start / stop measurement

**Sensor:** Pt 1000, piezoresistive pressure sensor

**Interface:** Wireless 2.4 GHz / IEEE 802.15.4

**Operating temperature:** 0 to +150 °C

**Protection class:** IP68/NEMA 6P

**Battery:** Lithium cell 3.6 V replaceable

**Battery lifetime:** up to 2 Years

**Dimension (D x H):** 90 x 15 mm

**Housing material:** Stainless steel (V4A), PEEK

**Weight:** approx. 500 g (incl. battery)

**Calibration:** Factory calibration

### EBI 40

**Measurands:**
- Temperature: 6 or 12 temperature channels

**Measurement range:**
- Temperature Type K: -200 to +1200 °C
- Temperature Type T: -50 to +350 °C

**Accuracy:**
- Temperature: ±0.5 °C

**Resolution:**
- Temperature: 0.1 °C

**Data memory:** 240,000 measurement values

**Sampling rate:** 100 ms to 24 h

**Sensor:** pluggable thermocouple type K, thermocouple type T

**Display:** TFT 3.5” (324x240)

**Operating temperature:** 0 to +60°C

**Storage:** 0 to +70°C

**Protection class:** IP40

**Battery:** 2 x battery type AA replaceable

**Dimension (L x W x H):** 140 x 118 x 35 mm (without probe)

**Housing material:** ABS, PC

**Weight:** approx. 100 g

**Calibration:** Factory calibration

ISO or DAkkS certificate on request
**Holding clamps to fix the flexible cable probes of the EBI 10 wireless data loggers**

Characteristics:
- Secure for your sensors
- Execution in stainless steel
- Reusable
- Permanent temperature stable

**Silicone protection box**

Characteristics:
- Silicone model
- Protects temperature logger against heat peaks
- Protects temperature logger against mechanical damage
- Extends the life of temperature data loggers

**Thermal isolation boxes EBI TIB and EBI TIB 2**

Characteristics:

For EBI 10-T22x and EBI 10-T421
- Up to 40 minutes at +400°C
- Thermal protection of data loggers
- Stainless steel
- EBI TIB: Dimensions (L x W x H) 160 x 160 x 82 mm
- EBI TIB 2: Dimensions (L x W x H) 160 x 160 x 60 mm

For EBI 40
- EBI TIB 400-1: Dimensions (L x W x H) 247 x 210 x 131 mm
- Up to 120 minutes at +250 °C
Complete Validation Sets

Data logger Set SL 3100
For the validation of steam sterilizers according to ISO 17665 as well as for the validation of washer disinfectors and washer-disinfectors for endoscopes according to ISO 15883.

The set contains:
- 5 x EBI 10-T471 temperature data loggers with AL107 silicone protection boxes
- EBI 10-TP453 temperature / pressure data logger with AL101 silicone protection box
- EBI IF 200 4-port Interface with USB connection and antenna
- 12 x holding clamps for probes
- Certified Winlog.validation software
- Aluminium carrying case

Data logger Set SL 3300
Very flexible data logger system to perform validations for various thermal processes in the DAC Universal and bench top autoclaves according to ISO 17665/DIN 58929 as well as washer disinfectors according to ISO 15883.

The set contains:
- 2 x EBI 11-T235 Mini Temperature Data Logger, Needle length = 25 mm
- 2 x EBI 11-T236 Mini Temperature Data Logger, Needle length = 80 mm
- 1 x EBI 11-T237 Mini Temperature Data Logger, Needle length = 165 mm
- 1 x EBI 11-P111 Mini Pressure Data Logger
- 1 x Sealing-kit for DAC
- 1 x EBI IF 300, 4-port Interface
- 1 x Winlog.validation, Software
- 1 x EBI-TAK-ALU, Alloy carrying case
Winlog.validation Software

The Winlog.validation software is suitable for programming and readout of ebro data loggers as well as for evaluating the measurement values. The software guides you step by step through the validation process and evaluates the measurement automatically.

Powerful report and evaluation software fitting the requirements of validation and qualification of pharmaceutical and medical market.

- TÜV Industrial Services certified
- User-friendly
- Calculation of $A_0$, $F_0$ and Lethality
- Automatic report generation
- Automatic user-defined calculations
- Automatic identification of process cycles
- Creation of user-defined masters for specific devices and thermal processes
- Sensor placement in digital pictures possible
- FDA 21 CFR Part 11
- IQ / OQ available

System Requirements

To enable the software to operate smoothly, your computer must meet the following requirements:

Hardware requirements:
- Processor speed minimum 1 GHz
- Working memory 1 GB
- 1 GB free hard disc space
- USB (Universal Serial Bus)

Software requirements:
- Operating System Microsoft®
  - Windows Vista
  - Windows 7
  - Windows 8
Flexible Report Generation

A short report of the process or a tabular report with all measurement values - this all is possible by the Winlog.validation Software

Possible report generation by Winlog.validation:

- Audit Trail
- Setup report
- Compact process report
- Process report
- Tabular report
- You can export the displayed reports as file type (XLS, XLSX, PDF, RTF)

Compact process report

The compact report presents in one page all important information.

Tabular report

Audit Trail

All relevant actions will be logged with the respective time stamps and users in the audit trail.
Values such as measuring cycle, last calibration or serial number and device type can be seen on this page at a glance.

Graphical and statistical analysis

Image management

Image management, you can place your sensors directly in digital images and paste it into your validation report.
Calibration and verification of the measurement equipment

With the Winlog.validation Software it is possible to verify or calibrate your measurement equipment by yourself.

A certificate is generated after the calibration automatically.

This certificate can be stored in the Winlog.validation and used in the report.

Example for a graphical diagram of the calibration operation
Successful verification message

Report with deviance table

Summary after the verification
Our Services For You

At ebro service is more than just a word - ebro offers solution according to customer wishes.

Service And Calibrations

ebro offers a calibration service for temperature, pressure and relative humidity by our accredited DAkkS laboratory. Please contact us.

Training

Validation and software trainings on request.

IQ / OQ Documentation according GAMP

It is possible to receive from us an IQ / OQ documentation of the system according the GAMP guidelines.
On request, we can send you a technician who performs the system IQ/OQ with you on-site.

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