Professional Measurement Technology

FOOD · PHARMACEUTICAL · LABORATORY · MEDICAL · INDUSTRIAL

-ebro-
a xylem brand

We are Xylem Analytics

Xylem's analytics business is an expanding family of long-established, leading brands for quantitative and qualitative analysis of samples. Our commitment to our customers is to provide them with the best tools available to solve their measurement challenges in the field, the laboratory or wherever they may be.

For almost a century, Bellingham + Stanley has been at the forefront of instrument design and technology and today is regarded by many international brands as the leader in the field of refractometry and polarimetry.

- Refractometers
- Polarimeters
- Certified Reference Materials

Bellingham + Stanley

www.bellinghamandstanley.com

ebro has been servicing the scientific world with innovative measurement solutions for over forty years and today, customer feedback still plays an important role within the business model. To ebro, customer care not only means supporting existing product and software; it also means being able to provide custom solutions within their field of excellence too!

- Precision thermometers
- Food Safety test kits
- Frying oil monitors
- Humidity, vacuum & temperature dataloggers
- Portable digital refractometers
- Evaluation software

-ebro-

www.ebro.com

Since 1963 OI Analytical has been providing innovative products used for chemical analysis and is a key supplier of sample preparation and turn-key analytical solutions for testing food products and water for chemical contaminants.
Beverage & water analyses include:

- Benzene & cyanide
- Organophosphorous & organochlorine pesticides
- Volatile Organic Compounds (VOC)

Sample prepartion for fruit analyses include:

- Mycotoxins
- Organophosphorous pesticides
- Organochlorine pesticides

O·I·Analytical

www.oico.com

By developing the glass electrode over 75 years ago, SCHOTT® laid the foundation for the success of electrochemical measurement. SI Analytics, formerly known as Schott® Instruments, uses the same high-performance pH glass technology, innovative electrodes and electrochemical measuring instruments to ensure that chemical analysis is an indispensable, trouble-free and reliable procedure all over the world.

- Titrators & burettes
- Viscosity measuring systems
- Capillary viscometers
- High-performance laboratory and process electrodes
- pH, dissolved oxygen and conductivity meters

SI Analytics

www.si-analytics.com

Since 1945, WTW has provided outstanding leadership in the design and production of superior quality water testing instrumentation world-wide for over 65 years. WTW is proud to offer the world's broadest and most highly accepted product lines with distribution right across the globe.

- UV/Vis Spectrophotometers
- Photometers
- Turbidity meters
- pH, dissolved oxygen and conductivity meters

WTW

www.wtw.de

Founded in 1948 and formerly known as Yellow Springs Instrument Company, YSI develops and manufactures scientific instruments, sensors and systems that serve a variety of scientific markets worldwide. The latest version of the 2900 Biochemical Analyzer measures lactate and ethanol as an indicator of spoilage in ketchup, salsa and other tomato products in less than 60-seconds. The same technique can be used for fruit processing.

- Biochemical analysis
- pH & ORP sensors

YSI

www.ysi.com

The new catalog is available!

Dear Customer,

I am pleased to present our new catalog to you. Granted, it took a little longer than originally planned, but the results speak for themselves: The current catalog includes a variety of new and improved products, ranging from data loggers, the appropriate evaluation software to hand-held instruments and the matching probes.

I would like to take this opportunity to call your attention to some special product groups:

EBI 3x0 USB Data Logger Series

The USB Data Loggers of the EBI 3x0 series excel with their easy handling: they automatically create a PDF report with all important measurement data. There is no need for additional software. Please find an overview on pages 62– 67. By the way: With the help of the free online configurator on **www.ebi300.com** you can program your loggers individually!

TLC 700 Folding Thermometer

The folding thermometer TLC 700 comes with a new, modern design. It is suitable for measuring the core temperature and because of its foldable probe it can be stored conveniently. Please find more information on page 98.

FOM 320 Food Oil Quality Monitor

With the new, robust Food Oil Quality Monitor FOM 320, you can reliably determine the quality of your frying oil as well as the right time for replacing the oil. Please find more information on page 138.

A few words about our pricing: We strive to offer you absolute top conditions in all areas. Price/ performance is not just a word with us.

Scroll through the catalog and find out more about our wide product range. In this case, your opinion is important for us. Outsiders often have a different view on things and even the best product still has potential for optimization. Please send suggestions for improvement on your part to **marketing@ebro.com**. Thank you very much.

With best regards from Ingolstadt

André Brauers
Business Manager

Contents ebro Catalogue for Professional Measurement Technology

WTW Wissenschaftlich-Technische Werkstätten GmbH · Business Unit ebro Electronic
Peringerstr. 10 · 85055 Ingolstadt, Germany · Phone +49 841 95478-0 · Fax +49 841 95478-80 · Email: ebro@xyleminc.com · **www.ebro.com**

All ebro measurement devices come with a factory calibration certificate.
Exception: for the EBI 330 data loggers, a batch calibration certificate is available on request.

FOOD
Products labeled with this icon meet the standards DIN EN 12830 (data loggers), DIN EN 13485 (handhelds) and DIN EN 13846 (data loggers and handhelds).

PHARMACEUTICAL

LABORATORY

MEDICAL

INDUSTRIAL

COOL CHAIN

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Data Loggers

ebro offers data loggers for many different applications:

Validation

Description:

- High precision temperature, pressure and humidity data loggers for thermal sterilization and validation processes
- Broad set of probe types and configurations
- Wireless data loggers for real time monitoring
- Data loggers for tight spaces

Applications:

- Validation of steam sterilizers, autoclaves, at canning etc.
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- F-value and A_0 value calculation
- Process monitoring

Routine Control

Description:

- Precision temperature and pressure data loggers for monitoring of sterilization and thermal processes
- Electronic Bowie Dick Test according to ISO 17665 and EN 285/EN 13060
- Data loggers for tight spaces
- Data loggers for regular process controls

Applications:

- Routine control of steam sterilizers and autoclaves
- Routine control of washer-disinfectors and washer-disinfectors for endoscopes
- Routine control at canning etc.

Cold chain and process monitoring

Description:

- Standard temperature and humidity data loggers with automatic PDF generation
- Wireless temperature and humidity monitoring system
- Multi-channel thermocouple temperature data logger

Applications:

- Room monitoring and mapping
- Transport and storage monitoring
- Clean room and freezer monitoring

Validation Data

EBI 10
High Precision Wireless Data Loggers

Description:

- High temperature accuracy up to 0.1 °C
- Extended temperature measurement range from -85 °C up to 400 °C
- Pressure measurement up to 4000 mbar
- Humidity measurement from 0% rH to 100% rH
- Radio communication possible for real-time monitoring
- ATEX approvals in preparation

Applications:

- Wireless validation of sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- F-value and A_0-value calculation
- Process monitoring

EBI 11
Mini Data Loggers

Description:

- High temperature accuracy of 0.1 °C across the full measurement range
- Temperature measurement up to +150 °C (+302 °F)
- Pressure measurement up to 10 bar
- Extra compact design for applications where space is tight

Applications:

- Validation of steam sterilizers and autoclaves
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- Validation at canning etc.

Loggers

Complete Validation Sets

Description:

- Validation data loggers with evaluation software and extensive range of accessories
- German TÜV Industrial Services certified
- Software conforms with FDA 21 CFR Part 11

Applications:

- Validation of pasteurisation and sterilisation processes
- Validation of steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes

EBI 10 High Precision Wireless Data Loggers

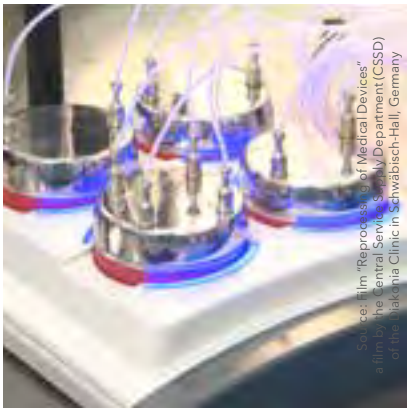
The Perfect Solution for Your Applications

To fit each of your specific processes, ebro offers a wide variety of EBI 10 temperature, pressure and humidity data loggers in many different configurations. For example you have the choice of internal sensors, rigid and bendable metal probes, fully flexible cable probes, Luer-lock or tube connection.

The user can follow the validation process in real time on his PC screen and can stop a faulty process immediately, if necessary, saving much time and effort during process monitoring or validation.

The wireless real time monitoring of hot processes up to +400 °C is suitable for many medical, pharmaceutical, laboratory and industrial applications:

- Wireless validation of sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- F-value and A_0-value calculation
- Process monitoring



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Integrated sensor | Rigid metal probe | Bendable metal probes | Flexible cable probes | Luer-lock connection | Tube connection | External humidity sensor

Interface

Programming the Data Loggers

Measurement During the Process

Automatic Data Evaluation

EBI 10 Wireless Temperature Data Loggers

General technical specifications: valid for all EBI 10 temperature data loggers*

Operating temperature: logger	-85 °C … +150 °C (-121 °F … +302 °F)
Operating temperature: radio operation	-30 °C ... +150 °C
Accuracy: Temperature	±0.5 °C (-85 °C … -40 °C) ±0.2 °C (-40 °C … 0 °C) ±0.1 °C (0 °C … +140 °C) ±0.2 °C (+140 °C … +250 °C) ±0.5 °C (+250 °C … 400 °C)
Resolution: Temperature	0.01 °C
Memory	Max. 100,000 measurement values (total)
Sensor: Temperature	Pt 1000
Measurement mode	• Endless measurement • Start / stop measurement • Measure upon start temperature • Measure until end of memory • Start immediately until end of memory
Sampling rate	250 msec ... 24 h
Data transmission	Wireless, 2,4 GHz/IEEE 802.15.4
Storage temperatur	-20 °C … +150 °C (-4 °F … +302 °F)
Battery	Lithium button cell, 3.6 V, replaceable
Dimensions (Ø x H)	48 mm x 24 mm**
Weight	Approximately 70 g **
Housing material	Stainless steel (V4A) / PEEK
Protection class	IP 68 (-30 °C … +150 °C / -22 °F … +302 °F)

** Please find the exact technical data of each EBI 10 temperature data logger type on the next pages.*
*** Dimensions and weight just refer to the EBI 10 housing*

EBI 10-T100 Temperature Data Logger
Integrated sensor

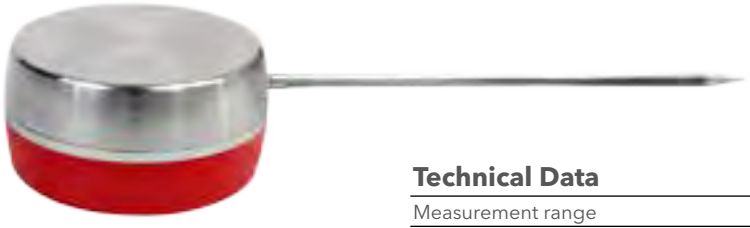
Technical Data

Measurement range	-85 °C ... +150 °C
Data memory	100,000 measurement values

- 1 internal temperature sensor

Type	Description	Part No.
EBI 10-T100	internal temperature sensor	1340-6100

EBI 10-T21x Temperature Data Logger
Rigid metal probe



Technical Data

Measurement range	-85 °C ... +150 °C
Data memory	100,000 measurement values

- 1 external temperature sensor, radial, Ø 3 mm

Type	Description	Part No.
EBI 10-T210	L = 50 mm	1340-6102
EBI 10-T211	L = 75 mm	1340-6103

EBI 10-T23x Temperature Data Logger
Rigid metal probe

Technical Data

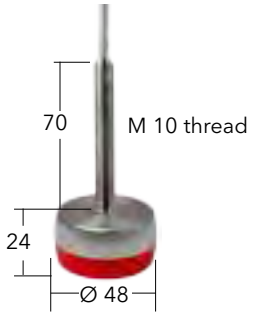
Measurement range	-85 °C ... +150 °C (-121 °F ... +302 °F) (needle length = 50 mm and 75mm) -85 °C ... +400 °C (-121 °F ... +752 °F) (needle length = 100 mm and 150 mm)
Data memory	100,000 measurement values

- 1 external temperature sensor, axial, Ø 3 mm

Type	Description	Part No.
EBI 10-T230	L = 50 mm	1340-6106
EBI 10-T231	L = 75 mm	1340-6107
EBI 10-T232	L = 100 mm	1340-6108
EBI 10-T233	L = 150 mm	1340-6109

EBI 10-T26x Bottle logger
Rigid metal probe and M10 thread

Please see page 42 for suitable bottle, can and glass adapters.



- 1 external temperature sensor, axial, Ø 6 mm

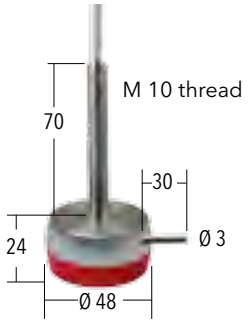
Technical Data

Measurement range	-85 °C ... +150 °C
Data memory	100,000 measurement values

Type	Description	Part No.
EBI 10-T261	L = 135 mm	1340-6123
EBI 10-T262	L = 190 mm	1340-6124
EBI 10-T263	L = 245 mm	1340-6125
EBI 10-T265	L = 300 mm	1340-6127

EBI 10-T46x Bottle logger
Rigid metal probe and M10 thread

Please see page 42 for suitable bottle, can and glass adapters.



- 2 external temperature sensors, axial and radial, Ø 6 mm

Technical Data

Measurement range	-85 °C ... +150 °C
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T461	L = 135 mm	1340-6118
EBI 10-T462	L = 190 mm	1340-6119
EBI 10-T463	L = 245 mm	1340-6120
EBI 10-T465	L = 300 mm	1340-6122

EBI 10-T22x Temperature Data Logger
Bendable metal probe

Please find suitable thermal isolation boxes for use from +150 °C (302 °F) on page 19.

- 1 external temperature sensor, radial, bendable, Ø 1.5 mm

Technical Data

Measurement range	-85 °C ... +400 °C
Data memory	100,000 measurement values

Type	Description	Part No.
EBI 10-T220	L = 250 mm	1340-6104
EBI 10-T221	L = 500 mm	1340-6105

EBI 10-T24x Temperature Data Logger
Bendable metal probe

- 1 external temperature sensor, axial, bendable, Ø 1.5 mm

Technical Data

Measurement range	-85 °C ... +400 °C
Data memory	100,000 measurement values

Type	Description	Part No.
EBI 10-T240	L = 250 mm	1340-6111
EBI 10-T241	L = 500 mm	1340-6112

EBI 10-T441 Temperature Data Logger
Bendable metal probes

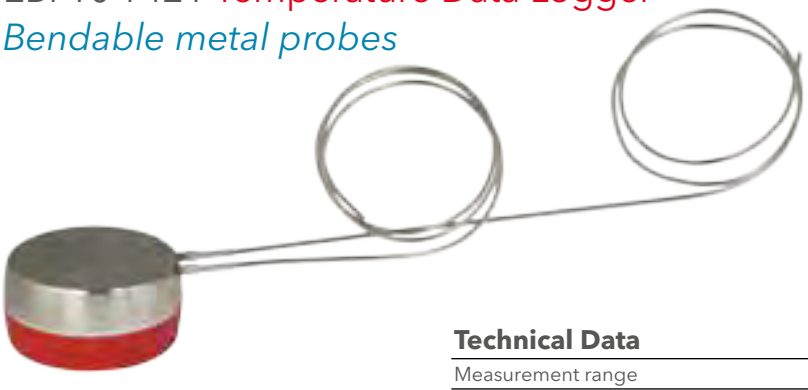
- 2 exernal temperature sensors, axial, bendable, Ø 1.5 mm

Technical Data

Measurement range	-85 °C ... +400 °C
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T441	L = 500 mm	1340-6129

EBI 10-T421 Temperature Data Logger
Bendable metal probes



- 2 external temperature sensors, radial, bendable, Ø 1.5 mm

Please find suitable thermal isolation boxes for use from +150 °C (302 °F) on page 18.

Technical Data

Measurement range	-85 °C ... +400 °C
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T421	L = 500 mm	1340-6130

EBI 10-T471 Temperature Data Logger
Flexible cable probes

- 2 external temperature sensors, axial, flexible or bendable, Ø 1.2 mm

Technical Data

Measurement range	-20 °C ... +150 °C
Data memory	2 x 50,000 measurement values

Type	Description	Part No.
EBI 10-T471	L = 1200 mm	1340-6144

EBI 10-T671 Temperature Data Logger
Flexible cable probes

- 4 external temperature sensors, axial, flexible or bendable, Ø 1.2 mm

Technical Data

Measurement range	-20 °C ... +150 °C
Data memory	4 x 25,000 measurement values

Type	Description	Part No.
EBI 10-T671	L = 1200 mm	1340-6145

Holding clamps to attach the fl exible cable probes of the EBI 10 wireless data loggers. Available in the SL 3000 data logger set (*see page 26*) or on request.

EBI 10 Wireless Temperature / Pressure Data Loggers

General technical specifications: valid for all EBI 10 temperature / pressure data loggers

Operating temperature: radio operation	-30 °C ... +150 °C
Accuracy: Temperature	±0.5 °C (-85 °C … -40 °C) ±0.2 °C (-40 °C … 0 °C) ±0.1 °C (0 °C … +140 °C) ±0.2 °C (+140 °C … +250 °C) ±0.5 °C (+250 °C … 400 °C)
Resolution: Temperature	0.01 °C
Accuracy: Pressure	±10 mbar (50 mbar … 150 mbar) ±10 mbar (2050 mbar … 2250 mbar) ±10 mbar (3000 mbar … 3250 mbar) ±15 mbar (for the remaining measurement range)
Resolution: Pressure	1 mbar
Memory	Max. 100,000 measurements (total)
Sensor: Temperature	Pt 1000
Sensor: Pressure	Piezo resistive pressure sensor (temperature compensated)
Measurement mode	• Endless measurement • Start / stop measurement • Measure upon start temperature • Measure until end of memory • Start immediately until end of memory
Sampling rate	250 msec ... 24 h
Data transmission	Wireless, 2,4 GHz/IEEE 802.15.4
Storage temperatur	-20 °C … +150 °C (-4 °F … +302 °F)
Battery	Lithium button cell, 3.6 V, replaceable
Dimensions (Ø x H)	48 mm x 24 mm**
Weight	Approximately 70 g **
Housing material	Stainless steel (V4A) / PEEK
Protection class	IP 68 (-30 °C … +150 °C / -22 °F … +302 °F) / NEMA 6P

** Please find the exact technical data of each EBI 10 temperature/pressure data logger type on the next pages.*
*** Dimensions and weight just refer to the EBI 10 housing*

EBI 10-TP230 Temperature / Pressure Data Logger
Rigid metal probe

- 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,333 measurement values

Type	Description	Part No.
EBI 10-TP230	L = 40 mm	1340-6154

EBI 10-TP221 Temperature / Pressure Data Logger
Bendable metal probe

- 1 external temperature sensor, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,333 measurement values

Type	Description	Part No.
EBI 10-TP221	L = 500 mm	1340-6153

EBI 10-TP321 Temperature / Pressure Data Logger
Bendable metal probes

- 2 external temperature sensors, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	3 x 25,000 measurement values

Type	Description	Part No.
EBI 10-TP321	L = 500 mm	1340-6161

EBI 10-TP421 Temperature / Pressure Data Logger
Bendable metal probes

- 3 external temperature sensors, axial, bendable, Ø 1.5 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP421	L = 500 mm	1340-6162

EBI 10-TP450/452 Temperature / Pressure Data Logger
Flexible cable probes

- 3 external temperature sensors, axial, flexible or bendable, Ø 1.2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	-20 °C ... +150 °C (-4 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP450	L = 600 mm	1340-6142
EBI 10-TP452	L = 1200 mm	1340-6146

EBI 10-TP460 Temperature / Pressure Data Logger
Flexible cable probes

- 3 external temperature sensors, radial, flexible or bendable, Ø 1.2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP460	L = 600 mm	1340-6148

EBI 10-TP231 Temperature / Pressure Data Logger
Luer-Lock connection

- 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... +4000 mbar
Data memory	2 x 33,333 measurement values

Type	Description	Part No.
EBI 10-TP231	L = 40 mm	1340-6155

EBI 10-TP111 Temperature / Pressure Data Logger *Luer-Lock connection*

- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,333 measurement values

Type	Description	Part No.
EBI 10-TP111	Luer-Lock connection	1340-6156

EBI 10-TP451/453 Temperature / Pressure Data Logger *Luer-Lock connection*

- 3 external temperature sensors, axial, flexible or bendable, Ø 1.2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	-20 °C ... +150 °C (-4 °F ... +302 °F)
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	4 x 20,000 measurement values

Type	Description	Part No.
EBI 10-TP451	L = 600 mm	1340-6143
EBI 10-TP453	L = 1200 mm	1340-6147

EBI 10-TP200 Temperature / Pressure Data Logger *Tube connection*

- 1 external temperature sensor, axial, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 33,333 measurement values

Type	Description	Part No.
EBI 10-TP200	Tube connection	1340-6152

EBI 10 Wireless Temperature / Humidity Data Loggers

EBI 10-TH100 Temperature / Humidity Data Logger *in standard atmospheres*

- 1 external temperature channel (Pt 1000)
- 1 humidity channel (capacitive)
- combined sensor replaceable

Technical Data

Temperature measurement range	-40 °C ... +85 °C
Humidity measurement range	0 % rH… 100 % rH
Temperature accuracy	0.1 °C
Humidity accuracy	± 2 % rH, non-condensing at 25 °C (10 % rH …90 % rH)
Temperature resolution	0.01 °C
Humidity resolution	0.1 % rH
Data memory	100,000 measurements (50,000 per channels)
Measurement channels	1 external temperature channel (Pt 1000), 1 humidity channel (capacitive); combined sensor replaceable
Measurement mode	• Endless measurement • Start / stop measurement • Start immediately until end of memory
Storage temperatur	-20 °C … +150 °C (-4 °F … +302 °F)
Battery	Lithium battery, user replaceable
Dimensions (l x w x h)	48 x 48 x 70 mm
Housing material	Stainless steel (V4A), PEEK

Type	Description	Part No.
EBI 10-TH100	Temperature/humidity data logger	1340-6171

Accessories, Interfaces and Software for EBI 10

Please find complete validation sets from page 25.

Silicone protection box AL 100
for EBI 10 and EBI 100 temperature data loggers with axial probes

- Protects temperature logger against heat peaks
- Protects temperature logger against mechanical damage
- Extends life of logger

Ø 78mm, Height: 44mm

Silicone protection box AL 101
for EBI 10 and EBI 100 temperature/pressure data loggers with axial probes

- Protects temperature/ pressure logger against heat peaks
- Protects temperature/ pressure logger against mechanical damage
- Extends life of temperature/ pressure logger

Ø 78mm, Height: 50mm

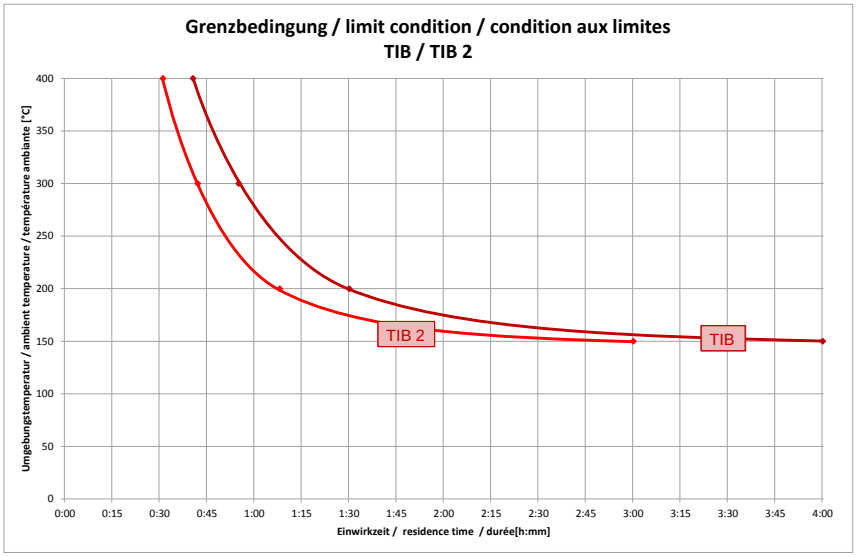
Battery changing set AL 103
for EBI 10 and EBI 100
Consisting of 3 batteries, 3 O-rings with grease, cross slot screw driver, silicone grip and silicone protection box cover for battery exchange.

AL 104 Battery Set
for EBI 10 and EBI 100
Consisting of 3 batteries and 4 O-rings with grease.

Thermal isolation boxes EBI TIB and EBI TIB 2

for EBI 10-T22x and EBI 10-T421

- Usable from +150 °C ... +400 °C
- Thermal protection of data loggers
- Stainless steel
- EBI TIB: 160 x 160 x 82 mm
  EBI TIB 2: 160 x 160 x 60 mm



Set SI 1100

for EBI 10, EBI 100 and EBI 11

- 2-port Interface IF 100
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Set SI 1200

for EBI 10 and EBI 100

- 4-port Interface IF 200
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Set SI 2100

for EBI 10, EBI 100 and EBI 11

- 2-port Interface IF 100
- Software Winlog.med
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Set SI 3200

for EBI 10 and EBI 100

- 4-port Interface IF 200
- Software Winlog.validation
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- including AL 111 antenna

Type	Description	Part No.
SI 1100	Set: EBI IF 100 interface and Winlog.pro software	1340-6061
SI 1200	Set: EBI IF 200 interface and Winlog.pro software	1340-6062
SI 2100	Set: EBI IF 100 interface and Winlog.med software	1340-6064
SI 3200	Set: EBI IF 200 interface and Winlog.validation software	1340-6068
AL 100	Silicone protection box for EBI 10 temperature data loggers	1340-6020
AL 101	Silicone protection box for EBI 10 pressure data loggers	1340-6021
AL 103	Battery changing set for EBI 10 and EBI 100	1100-0117
AL 104	Battery set for EBI 10 and EBI 100	1100-0118
EBI TIB	Thermal isolation box, 160 x 160 x 82 mm	1340-1894
EBI TIB 2	Thermal isolation box, 160 x 160 x 60 mm	1340-1892

EBI 11 Mini Data Loggers

The Perfect Solution for Tight Spaces

For temperature and pressure measurements in tight spaces, ebro offers the EBI 11 mini data loggers. Many configurations are available to suit your application, including data loggers with internal sensors, rigid metal probes, bendable metal probes, Luer-Lock connection or threaded connection versions.

The EBI 11 Mini Data Loggers are suitable not only for validation monitoring but can also be used for routine control monitoring. Please find more information on pages 30 ff.

Applications:

- For tight spaces, e.g. in small steam sterilizers, bottles, cans or bags
- Validation of steam sterilizers and autoclaves
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- Validation at canning etc.
- Pressure measurement up to 10 bar

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Bendable metal probe

Rigid metal probe

Integrated (pressure) sensor

Luer-Lock connection

M5 thread connection

Interface

Programming the Data Loggers

Measurement During the Process

Automatic Data Evaluation

General technical specifications: valid for all EBI 11 logger types*

Accuracy: Temperature	±0.1 °C
Resolution: Temperature	0.01 °C
Accuracy: Pressure (pressure data loggers only)	±15 mbar (0 mbar ... 4000 mbar) ±20 mbar (4000 mbar ... 10000 mbar)
Resolution: Pressure (pressure data loggers only)	1 mbar
Sensor: Temperature	Pt 1000
Sensor: Pressure (pressure data loggers only)	Piezo resistive pressure sensor (temperature compensated)
Sampling rate	1 sec to 24 hours., adjustable
Measurement mode	• Endless measurement • Measurement start / stop time • Measure upon start time • Start immediately until end of memory
Storage temperature	0 °C ... +60 °C (+32 °F ... +140 °F)
Battery	Lithium, 2 x BR1225 A, 3 V, user replaceable
Dimensions (Ø x h)	16.5 mm x 24 mm (without probe) **EBI 11-TP110:** 16.5 mm x 48 mm
Weight	Approximately 45 g
Housing material	V4A
Protection class	IP 68
Certificate	Factory calibration certificate

** Please find the exact technical data of each EBI 11 logger type on the next pages.*

EBI 11-P100 Mini Pressure Data Logger
Integrated sensor

- 1 internal pressure sensor, piezo resistive, temperature compensated

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar to 10000 mbar
Data memory	2 x 7,500 measurement values
Operating temperature	0 °C ... +150 °C

Type	Description	Part No.
EBI 11-P100	Mini Pressure Data Logger, 1-channel	1340-6295

EBI 11-P111 Mini Pressure Data Logger
Luer-Lock connection

- 1 internal pressure sensor, piezo resistive, temperature compensated

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar to 10000 mbar
Data memory	2 x 7,500 measurement values
Operating temperature	0 °C ... +150 °C

Type	Description	Part No.
EBI 11-P111	Mini Pressure Data Logger, 1-channel, Luerlock	1340-6296

EBI 10-TP110 Mini Temperature / Pressure Data Logger
M5 thread connection

- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive, temperature compensated

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 10000 mbar
Data memory	2 x 7500 measurement values
Sensor: temperature	Pt 1000, internal
Sensor: pressure	Piezo-resistive, internal, temperature compensated
Operating temperature	0 °C ... +150 °C (32 °F ... +302 °F)

Type	Description	Part No.
EBI 11-TP110	Mini Temperature / Pressure Data Logger	1340-6297

EBI 11-T23x Mini Temperature Data Logger
Rigid metal probe

EBI 11-T230

- 1 exernal temperature sensor, axial, Pt 1000, Ø 3 mm

Please see page 24 for suitable bottle, can and bag adapters.

Technical Data

Measurement range: temperature	-30 °C ... +150 °C
Data memory	15.000 measurement values
Operating temperature	-30 °C ... + 150 °C

Type	Description	Part No.
EBI 11-T230	Mini Temperature Data Logger, 1-channel, ext., L = 20 mm	1340-6290
EBI 11-T231	Mini Temperature Data Logger, 1-channel, ext., L = 50 mm	1340-6292
EBI 11-T233	Mini Temperature Data Logger, 1-channel, ext., L = 100 mm	1340-6293

EBI 11-T240 Mini Temperature Data Logger
Bendable metal probe

- 1 exernal temperature sensor, axial, Pt 1000, bendable, Ø 1.5 mm

Technical Data

Measurement range: temperature	-30 °C ... +150 °C
Data memory	15.000 measurement values
Operating temperature	-30 °C ... + 150 °C

Type	Description	Part No.
EBI 11-T240	Mini Temperature Data Logger, 1-channel,ext., L = 250mm, flexible	1340-6291

Accessories for EBI 11

SI 1300 Set
for EBI 11

- 4-port Interface IF 300
- Software Winlog.pro
- USB connection
- Colored LED signalling programming, readout and incorrect development
- With antenna

SI 3300 Set
for EBI 11

- 4-port Interface IF 300
- Software Winlog.validation
- USB connection
- Colored LED signalling programming, readout and incorrect development
- With antenna

Battery change set AL 113
for EBI 11
Suitable for 3 battery exchanges; contains 6 batteries, 3 O-rings with grease and changing tools.

AL 114 can / bag adapter set
for EBI 11-T231 and EBI 11-T233

Bottle adapter set AL 115
for EBI 11-T230

Type	Description	Part No.
SI 1300	Set: EBI IF 300 interface and Winlog.pro software	1340-6063
SI 3300	Set: EBI IF 300 interface and Winlog.validation software	1340-6069
AL 113	Battery changing set for EBI 11	1100-0120
AL 114	Can / bag adapter set for EBI 11-T231 and EBI 11-T233	1340-6298
AL 115	Bottle adapter set for EBI 11-T230	1340-6299

Complete Validation Sets

Flexible Data Logger System for Thermal Validations

ebro offers a flexible measurement and documentation system for validating many different thermal processes. This reliable system includes easy to use wireless data loggers of the EBI 10 series placed directly in the process and the software Winlog.validation to evaluate the processes.

The sets can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

Process Validation with Temperature and Pressure Data Loggers across many Applications in:

Medical Sector

- Washer-disinfectors
- Washer-disinfectors for endoscopes
- Bed pan washers
- Steam sterilizers
- Blood banks
- Medicine refrigerators
- Laboratories
- Freezers

Pharmaceutical Industry

- Steam sterilization
- Stability chambers
- Cold storage
- Validation of store houses
- Incubators
- Laboratories
- Freezers

Food Industry

- Retorts
- Pasteurization
- Spiral-cooker / cooler
- Transport facilities
- Freezers
- Refrigerators
- Smoke chambers
- Ovens
- Full water autoclaves

Benefits

- Full automatic and tamper-proof
- Broad range of wireless data loggers for all applications
- Highly flexible temperature wire probes (individually replaceable sensors)
- High accuracy PT 1000 temperature sensors
- High accuracy of up to ±0.1°C
- German TÜV Industrial Services certified software, conforms with FDA 21 CFR Part 11
- 2-year warranty

The System Conforms with the Following Standards

- FDA 21 CFR Part 11
- ISO 15883
- ISO 17665
- EN 285 / EN 13060
- EN 12830
- DIN 58929

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SL 2000 Complete Validation Set *for washer-disinfectors*

For the validation of washers-disinfectors according to ISO 15883.

The set can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

The set contains:

- 3 x EBI 10-T441 temperature data loggers
- EBI 10-TP231 temperature / pressure data logger
- EBI IF 200 4-port Interface with USB connection and antenna
- TDS 3 Conductivity tester
- PHX 800 pH tester
- TÜV Industrial Services certified Winlog.validation software
- Aluminium carrying case

Type	Description	Part No.
SL 2000	Validation set for washer-disinfectors	1340-6072

SL 3000 Complete Validation Set *for small steam sterilizers*

For the validation of small steam sterilizers according to ISO 17665.

The set can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

The set contains:

- EBI 10-TP453 temperature / pressure data logger with AL 101 silicone protection box
- EBI IF 200 4-port Interface with USB connection and antenna
- TÜV Industrial Services certified Winlog.validation software
- 6 x holding clamp for probes
- Aluminium carrying case

Type	Description	Part No.
SL 3000	Validation set for small steam sterilizers	1340-6079

SL 3100 Complete Validation Set
for large steam sterilizers

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 can individually be expanded or compiled yourself from one or more data loggers (EBI 10 or EBI 11), the appropriate interface and the software Winlog.validation. Talk to us!

The set contains:

- 5 x EBI 10-T471 temperature data loggers with AL 107 silicone protection boxes
- EBI 10-TP453 temperature / pressure data logger with AL 101 silicone protection box
- EBI IF 200 4-port Interface with USB connection and antenna
- TDS 3 Conductivity tester
- PHX 800 pH tester
- TÜV Industrial Services certified Winlog.validation software
- Aluminium carrying case

Type	Description	Part No.
SL 3100	Validation set for large steam sterilizers	1340-6080

Data Loggers for

EBI 11
Mini Data Loggers

Description:

- High temperature accuracy of 0.1°C across the full measurement range
- Temperature measurement up to +150 °C (+302 °F)
- Pressure measurement up to 10 bar
- Extra compact design for applications where space is tight

Applications:

- For tight spaces, e.g. in small steam sterilizers, bottles, cans or bags
- Validation of steam sterilizers and autoclaves
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- Validation at canning etc.
- Pressure measurement up to 10 bar

EBI 16
Electronic Bowie Dick Test System

Description:

- Clear, reproducible measurement result
- High-resolution graphical cycle display
- Digital data recording and storage
- Easy to use and evaluate

Applications:

- Vacuum checks
- Steam penetration tests using an Electronic Bowie and Dick Test
- Comprehensive routine checks of steam sterilizers according to ISO 17665 and EN 285/EN 13060

Routine Control

EBI 100
Precision Data Loggers

Description:

- Available in temperature and temperature/ pressure versions with internal and external, flexible and rigid probes
- Temperature/pressure data loggers with various conncetion types

Applications:

- Validation of sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- F-value calculation
- Process monitoring

Complete Routine Control Sets

Description:

- Data loggers for routine control with evaluation software and extensive range of accessories

Applications:

- Routine control of steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes
- Performing the Electronic Bowie Dick Test
- Routine control of pasteurisation and bottle cleaning processes

EBI 11 Mini Data Loggers

The Perfect Solution for Tight Spaces

For temperature and pressure measurements in tight spaces, ebro offers the EBI 11 mini data loggers. Many configurations are available to suit your application, including data loggers with internal sensors, rigid metal probes, bendable metal probes, Luer-Lock connection or threaded connection versions.

The EBI 11 Mini Data Loggers are suitable not only for routine control monitoring but can also be used for validation monitoring. Please find more information on pages 20 ff.

Applications:

- For tight spaces, e.g. in small steam sterilizers, bottles, cans or bags
- Validation of steam sterilizers and autoclaves
- Validation of washer-disinfectors and washer-disinfectors for endoscopes
- Validation at canning etc.
- Pressure measurement up to 10 bar

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Bendable metal probe

Rigid metal probe

Integrated pressure-sensor

Luer-Lock connection

M5 thread connection

Interface

Programming the Data Loggers

Measurement During the Process

Automatic Data Evaluation

General technical specifications: valid for all EBI 11 logger types*

Accuracy: Temperature	±0.1 °C
Resolution: Temperature	0.01 °C
Accuracy: Pressure (only pressure data loggers)	±15 mbar (0 mbar ... 4000 mbar) ±20 mbar (4000 mbar ... 10000 mbar)
Resolution: Pressure (only pressure data loggers)	1 mbar
Sensor: Temperature	Pt 1000
Sensor: Pressure (only pressure data loggers)	Piezo resistive pressure sensor (temperature compensated)
Sampling rate	1 sec to 24 hours., adjustable
Measurement mode	• Endless measurement • Measurement start / stop time • Measure upon start time • Start immediately until end of memory
Storage temperature	0 °C ... +60 °C (+32 °F ... +140 °F)
Battery	Lithium, 2 x BR1225 A, 3 V, user replaceable
Dimensions (Ø x h)	16.5 mm x 24 mm (without probe) **EBI 11-TP110:** 16.5 mm x 48 mm
Weight	Approximately 45 g
Housing material	V4A
Protection class	IP 68
Certificate	Factory calibration certificate

** Please find the exact technical data of each EBI 11 logger type on the next pages.*

EBI 11-P100 Mini Pressure Data Logger
Integrated sensor

- 1 internal pressure sensor, piezo resistive, temperature compensated

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar to 10000 mbar
Data memory	2 x 7,500 measurement values
Operating temperature	0 °C ... +150 °C

Type	Description	Part No.
EBI 11-P100	Mini Pressure Data Logger, 1-channel	1340-6295

EBI 11-P111 Mini Pressure Data Logger
Luer-Lock connection

- 1 internal pressure sensor, piezo resistive, temperature compensated

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar to 10000 mbar
Data memory	2 x 7,500 measurement values
Operating temperature	0 °C ... +150 °C

Type	Description	Part No.
EBI 11-P111	Mini Pressure Data Logger, 1-channel, Luerlock	1340-6296

EBI 10-TP110 Mini Temperature / Pressure Data Logger
M5 thread connection

- 1 internal temperature sensor
- 1 internal pressure sensor, piezo resistive, temperature compensated

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 10000 mbar
Data memory	2 x 7500 measurement values
Sensor: temperature	Pt 1000, internal
Sensor: pressure	Piezo-resistive, internal, temperature compensated
Operating temperature	0 °C ... +150 °C (32 °F ... +302 °F)

Type	Description	Part No.
EBI 11-TP110	Mini Temperature / Pressure Data Logger	1340-6297

EBI 11-T23x Mini Temperature Data Logger
Rigid metal probe

EBI 11-T230

- 1 exernal temperature sensor, axial, Pt 1000, Ø 3 mm

Please find suitable bottle, can and bag adapters below.

Technical Data

Measurement range	-30 °C ... +150 °C
Data memory	15.000 measurement values
Operating temperature	-30 °C ... + 150 °C

Type	Description	Part No.
EBI 11-T230	Mini Temperature Data Logger, 1-channel, ext., L = 20 mm	1340-6290
EBI 11-T231	Mini Temperature Data Logger, 1-channel, ext., L = 50 mm	1340-6292
EBI 11-T233	Mini Temperature Data Logger, 1-channel, ext., L = 100 mm	1340-6293

EBI 11-T240 Mini Temperature Data Logger
Bendable metal probe

- 1 exernal temperature sensor, axial, Pt 1000, bendable, Ø 1.5 mm

Technical Data

Measurement range	-30 °C ... +150 °C
Data memory	15.000 measurement values
Operating temperature	-30 °C ... + 150 °C

Type	Description	Part No.
EBI 11-T240	Mini Temperature Data Logger, 1-channel,ext., L = 250mm, bendable	1340-6291

Accessories for EBI 11

Please find complete routine control sets on page 43.

For more information about EBI 11 accessories, please see page 24.

SI 1300

SI 3300

AL 113

AL 114

AL 115

Type	Description	Part No.
SI 1300	Interface set for EBI 11: EBI IF 300, Winlog.pro	1340-6063
SI 3300	Interface set or EBI 11: EBI IF 300, Winlog.validation	1340-6069
AL 113	Battery changing set for EBI 11	1100-0120
AL 114	Can / bag adapter set for EBI 11-T231 and EBI 11-T233	1340-6298
AL 115	Bottle adapter set for EBI 11-T230	1340-6299

EBI 16 Electronic Bowie Dick Test System

Together with the evaluation software Winlog.med the new EBI 16 data logger forms an easy to use and very reliable electronic measurement system. With it a comprehensive routine control of steam sterilizers can be performed using an Electronic Bowie Dick Test according to EN ISO 11140-4. In addition to the review of the steam penetration, the relevant sterilization parameters are controlled.

Bowie Dick Test

The EBI 16 delivers clear results during daily checks of the air evacuation test and steam penetration test according to ISO 17665, EN ISO 11140-4 and DIN EN 285.

Early warning system

The EBI 16 provides early identification of possible failures in steam-sterilizers. Even the smallest quantities of residual air that doesn`t lead to a failed Bowie Dick Test yet are detected.

Vacuum check

The EBI 16 allows a reasonable vacuum check also for sterilizers without pressure display according to DIN EN 285.

Verification of sterilization parameters

The EBI 16 checks the sterilization parameters such as compensation time, hold time, sterilization temperature and sterilization time at +134 °C (+273 °F) for 3 minutes according to DIN EN 285.

Calculation of lethality (F_0)

The EBI 16 monitors deviations between cycles by calculating total quantity of energy expended during sterilization process which is displayed by the F_0 value.

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EBI 16 Bowie Dick Test Data Logger
according to the norms EN 285 / ISO 17665

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

Technical Data

Temperature measurement range	0 °C … +150 °C
Temperature accuracy	± 0.1 °C
Temperature resolution	0.025 °C
Pressure measurement range	0 mbar … 4000 mbar abs.
Pressure accuracy	± 15 mbar
Pressure resolution	1 mbar
Operating temperature	0 °C … +150 °C
Temperature sensor	Pt 1000 (2 channels)
Pressure sensor	Piezo-resistive (1 channel)
Measurement mode	• Endless • Start / stop measurement • Measurement from start time • Start immediately until end of memory
Sampling rate	1 sec … 24 h
Memory	27.000 measurements
Protection class	IP 68
Battery	Lithium, user replaceable
Dimensions (Ø x h)	90 mm x 150 mm
Housing material	Stainless steel (V4A), PEEK
Weight	Approximately 500 g (including battery)
Certificate	Factory calibration certificate

Type	Description	Part No.
EBI 16	Electronic Bowie and Dick Test	1340-6197

EBI 16 Bowie and Dick Test Sets

With the EBI 16 starter sets you can start your Electronic Bowie Dick Test immediately according to the norms EN 285/ISO 17665.

Please find complete routine control sets on page 43.

SL 1520 set contains:

- Bowie Dick Test EBI 16
- Winlog.med software
- EBI IF 150 Interface
- Aluminium carrying case

SL 1520 set
for steam sterilizers

SL 1620 set contains:

- Bowie Dick Test EBI 16
- EBI 100-T100 temperature data logger (*see p. 38*)
- Winlog.med software
- EBI IF 150 interface
- Aluminium carrying case

SL 1620 set
for steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes

Type	Description	Part No.
SL 1520 set	EBI 16 set for steam sterilizers	1340-6198
SL 1620 set	EBI 16 set for steam sterilizers and washer-disinfectors	1340-6573

EBI 100 Precision Data Loggers

With the EBI 100 data loggers, ebro offers reliable measurement devices for routine control according to German guidelines and ISO 15883.

The precision data loggers are available in different versions including temperature or temperature / pressure loggers with and without external probes. They record the temperature and pressure variation over time during the washer-disinfector or sterilizer process and can easily be read out on a computer using the Winlog.med software. This software will make the test evaluation easy, and automatically calculates the A_0 value.

Applications:

- Routine control of steam sterilizers
- Routine control of washer-disinfectors and washer-disinfectors for endoscopes






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Integrated sensor

Rigid metal probe

Bendable metal probe

Luer-Lock connection

Tube connection

General technical specifications: valid for all EBI 100 Data Loggers*

Accuracy: Temperature	±0.3 °C
Resolution: Temperature	0.1 C
Accuracy: Pressure (only pressure data loggers)	±20 mbar
Resolution: Pressure (only pressure data loggers)	1 mbar
Sensor: Temperature	Pt 1000, internal
Sensor: Pressure (only pressure data loggers)	Piezo resistive pressure sensor (temperature compensated)
Sampling rate	1 sec to 24 hours
Measurement mode	• Endless measurement • Measurement start / stop time • Measurement immediately until end of memory • Measurement from start time
Operating temperature	**EBI 100-T100:** -40 °C ... +150 °C **EBI 100-T101:** -85 °C ... +85 °C
Storage temperature	-40 °C … +70 °C
Battery	Lithium button cell, 3,6 V, replaceable
Battery lifetime	Up to 2 years, depending on measurement interval and operating temperature (**EBI 100-T100**: only 100 hours at -85 °C / -121 °F)
Dimensions (L x W x H)	48 x 48 x 24 mm**
Weight	Approximately 70 g**
Housing material	Stainless steel (V4a), PEEK
Protection class	IP 68 (-30 °C … +150 °C / -22 °F … +302 °F)
Certificate	Factory calibration certificate

** Please find the exact technical data of each EBI 100 t logger type on the next pages.*
*** Dimensions and weight just refer to the EBI 100 housing.*

EBI 100-T10x (Low) Temperature Data Logger
Integrated sensor

Technical Data

Measurement range	EBI 100-T100: -40 °C ... +150 °C EBI 100-T101: -85 °C ... +85 °C
Data memory	27,000 measurement values

- 1 internal temperature sensor, Pt 1000

Type	Description	Part No.
EBI 100-T100	Temperature Data Logger, 1-port, internal	1340-6500
EBI 100-T101	Low Temperature Data Logger, 1-port, internal	1340-6501

EBI 100-T21x Temperature Data Logger
Rigid metal probe

Technical Data

Measurement range	-40 °C ... +150 °C
Data memory	27,000 measurement values

- 1 external temperature sensor, radial, pointed, Ø 3 mm

Type	Description	Part No.
EBI 100-T210	Temperature logger, 1-channel, L = 50 mm	1340-6502
EBI 100-T211	Temperature logger, 1-channel, L = 75 mm	1340-6503

EBI 100-T23x Temperature Data Logger
Rigid metal probe

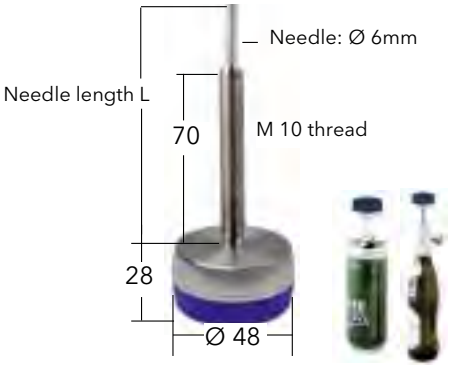
Technical Data

Measurement range	-40 °C ... +150 °C
Data memory	27,000 measurement values

- 1 external temperature sensor, axial, pointed, Ø 3 mm

Type	Description	Part No.
EBI 100-T230	Temperature logger, 1-channel, L = 50 mm	1340-6506
EBI 100-T231	Temperature logger, 1-channel, L = 75 mm	1340-6507
EBI 100-T232	Temperature logger, 1-channel, L = 100 mm	1340-6508
EBI 100-T233	Temperature logger, 1-channel, L = 150 mm	1340-6509

EBI 100-T26x Bottle Logger
Rigid metal probe



Please see page 42 for suitable bottle, can and glass adapters.

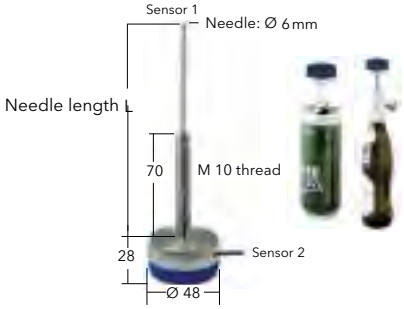
- 1 external temperature sensor, axial, blunt, Ø 6 mm

Technical Data

Measurement range	-40 °C ... +150 °C
Data memory	27,000 measurement values

Type	Description	Part No.
EBI 100-T261	Bottle logger, 1-channel, L = 135 mm	1340-6518
EBI 100-T262	Bottle logger, 1-channel, L = 190 mm	1340-6519
EBI 100-T263	Bottle logger, 1-channel, L = 245 mm	1340-6520
EBI 100-T264	Bottle logger, 1-channel, L = 270 mm	1340-6521
EBI 100-T265	Bottle logger, 1-channel, L = 300 mm	1340-6522

EBI 100-T46x Bottle Logger
Rigid metal probes



Please see page 42 for suitable bottle, can and glass adapters.

- 2 external temperature sensors, axial and radial, blunt, Ø 6 mm

Technical Data

Measuring range	-40 °C ... +150 °C
Data memory	2 x 13,500 measurement values

Type	Description	Part No.
EBI 100-T461	Bottle logger, 2-channel, L = 135 mm	1340-6523
EBI 100-T462	Bottle logger, 2-channel, L = 190 mm	1340-6524
EBI 100-T463	Bottle logger, 2-channel, L = 245 mm	1340-6525
EBI 100-T464	Bottle logger, 2-channel, L = 270 mm	1340-6526
EBI 100-T465	Bottle logger, 2-channel, L = 300 mm	1340-6527

EBI 100-T221 Temperature Data Logger
Bendable metal probe

- 1 external temperature sensor, radial, bendable, blunt, Ø 1.5 mm

Technical Data

Measurement range	-40 °C ... +150 °C
Data memory	27,000 measurement values

Type	Description	Part No.
EBI 100-T221	Temperature data logger, 1-channel, L = 500 mm	1340-6505

EBI 100-T241 Temperature Data Logger
Bendable metal probe

- 1 exernal temperature sensor, axial, bendable, blunt, Ø 1.5 mm

Technical Data

Measurement range	-40 °C ... +150 °C
Data memory	27,000 measurement values

Type	Description	Part No.
EBI 100-T241	Temperature data logger, 1-channel, L = 500 mm	1340-6512

EBI 100-TP230 Temperature / Pressure Data Logger
Rigid metal probe

- 1 external temperature sensor, axial, Pt 1000, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar to 4000 mbar
Data memory	2 x 9,000 measurement values

Type	Description	Part No.
EBI 100-TP230	Temperature / Pressure logger, 2-channel, L = 40 mm	1340-6554

EBI 100-TP231 Temperature / Pressure Data Logger
Luer-Lock connection

- 1 external temperature sensor, axial, blunt, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar ... 4000 mbar
Data memory	2 x 9.000 Messwerte

Type	Description	Part No.
EBI 100-TP231	Temperature/pressure data logger, 2-channel, L = 40 mm	1340-6555

EBI 100-TP200 Temperature / Pressure Data Logger
Tube connection

- 1 external temperature sensor, axial, Pt 1000, Ø 2 mm
- 1 internal pressure sensor, piezo resistive

Technical Data

Measurement range: temperature	0 °C ... +150 °C
Measurement range: pressure	1 mbar to 4000 mbar
Data memory	2 x 9,000 measurement values

Type	Description	Part No.
EBI 100-TP200	Temperature/pressure data logger, 2-channel, L = 40 mm, with tube connection	1340-6552

Interfaces and Software Sets for EBI 100

Please find complete routine control sets on page 43.
Please find accessories for the EBI 100 data loggers on page 42.

Set SI 1100
for EBI 10, EBI 100 and EBI 11
- 2-port Interface IF 100
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Set SI 1110
for EBI 100 and EBI 11
- 2-port Interface IF 100-1
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development

Set SI 1200
for EBI 10 and EBI 100
- 4-port Interface IF 200
- Software Winlog.pro
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Set SI 2100
for EBI 10, EBI 100 and EBI 11
- 2-port Interface IF 100
- Software Winlog.med
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Set SI 3200
for EBI 10 and EBI 100
- 4-port Interface IF 200
- Software Winlog. validation
- USB connection
- Colored LEDs signaling programming, readout and incorrect development
- With antenna

Type	Description	Part No.
SI 1100	Set: EBI IF 100 interface and Winlog.pro software	1340-6061
SI 1110	Set: EBI IF 100-1 interface and Winlog.pro software	1340-6561
SI 1200	Set: EBI IF 200 interface and Winlog.pro software	1340-6062
SI 2100	Set: EBI IF 100 interface and Winlog.med sofware	1340-6064
SI 3200	Set: EBI IF 200 interface and Winlog.validation software	1340-6068

Accessories for EBI 100

Silicone protection box AL 100
for EBI 10 and EBI 100 temperature data loggers with axial probes

- Protects temperature logger against heat peaks
- Protects temperature logger against mechanical damage
- Extends life of logger

Ø 78mm, Height: 44mm

Silicone protection box AL 101
for EBI 10 and EBI 100 temperature/pressure data loggers with axial probes

- Protects temperature/ pressure logger against heat peaks
- Protects temperature/ pressure logger against mechanical damage
- Extends life of temperature/ pressure logger

Ø 78mm, Height: 50mm

Battery changing set AL 103
for EBI 10 and EBI 100
Consisting of 3 batteries, 3 O-rings with grease, cross slot screw driver, silicone grip and silicone protection box cover for battery exchange.

AL 104 Battery Set
for EBI 10 and EBI 100
Consisting of 3 batteries and 4 O-rings with grease.

Thermal isolation box EBI TIB and EBI TIB 2
for EBI 10-T221 and EBI 10-T421

- Usable from +150 °C ... +400 °C
- Thermal protection of data loggers
- Stainless steel
- EBI TIB: 160 x 160 x 82 mm
  EBI TIB 2: 160 x 160 x 60 mm

Please find a temperature graph with the length of stay on page 19.

Can adapter-Set EBI DA-Set
With this adapter set you can fix the data loggers at cans or plastic bags. Adequate for data loggers of the EBI-series with axial, radial or external sensors. Hereby you assure the data logger measuring at the right spot.

Bottle adapter EBI DA
for bottle loggers
(*see page 11 and page 39*)

Bottle adapter EBI FL-S
silicone
for bottle loggers
(*see page 11 and page 39*)

Bottle adapter EBI FL-1T
with 2 lateral threaded rods.
Also suitable for cans.
When ordering, please specify type of bottle and bottle size.

Grommets for sensor fixing EBI NI-140
Allows exact fixation of the logger sensor in cans and glasses.

Compression fitting EBI KV-3
Allows exact fixation of the logger sensor in glasses (caps).

Please find complete routine control sets from page 43.

Please see page 41 for EBI 100 interfaces and software.

Type	Description	Part No.
AL 100	Silicone protection box	1340-6020
AL 101	Silicone protection box	1340-6021
AL 103	Battery changing set for EBI 10 and EBI 100	1100-0117
AL 104	Battery set for EBI 10 and EBI 100, 3 batteries	1100-0118
EBI TIB	Thermal isolation box, 160 x 160 x 82 mm	1340-1894
EBI TIB 2	Thermal isolation box, 160 x 160 x 60 mm	1340-1892
EBI DA	Bottle adapter for bottle loggers	1340-1963
EBI DA-Set	Bottle adapter-set	1340-1984
EBI FL-S	Bottle adapter, silicone	1340-1961
EBI FL-1T	Bottle adapter with lateral threaded rods	1340-2185
EBI NI-140	Grommets up to 140 °C / 284 °F (100 pieces)	1340-1988
EBI KV-3	Compression fitting EBI KV-3	1340-2005

Data Logger Sets for Routine Control

- **EBI 11 Mini Data Logger Sets**
  for routine control of food processes.
  SL 4001: for temperature monitoring in cans and glasses (*see page 45*)
  SL 4101: for temperature monitoring in bottles (*see page 46*)

- **EBI 16 Bowie and Dick Test Sets**
  for performing the Electronic Bowie and Dick Test according to the norms EN 285 / ISO 17665.
  SL 1520: for steam sterilizers (*see page 44*)
  SL 1620: for steam sterilizers and washer-disinfectors (*see page 45*)

- **EBI 100 Precision Data Logger Sets**
  for routine control of food processes and of medical processes according to the German guideline.
  SL 1010: for bed pan washers (*see page 43*)
  SL 1110: for steam sterilizers and washer-disinfectors (*see page 44*)
  SL 4010: for temperature monitoring in tins (*see page 46*)
  SL 4110: for temperature monitoring in bottles and cans (*see page 47*)
  SL 4210: for temperature monitoring in different applications (*see page 47*)

The sets can individually be expanded or compiled yourself from one or more data loggers (EBI 11, EBI 16 or EBI 100), the appropriate interface and the corresponding software. Talk to us!

SL 1010 Temperature data logger set
for temperature monitoring and A_0 value calculation in bed pan washers

The set contains:

- EBI 100-T100 temperature data loggerr (*see p. 38*)
- PHX 800 pH tester
- TDS 3 Conductivity tester
- Winlog.med Software
- EBI IF 150 Interface
- Aluminium carrying case

Extend this set with an EBI 16 Data Logger *(see page 35)*, and you will be able to perform Electronic Bowie and Dick Tests.

Type	Description	Part No.
SL 1010	EBI 100 data logger set for bed pan washers	1340-6570

SL 1110 Temperature / pressure data logger set
for temperature and pressure monitoring as well as for A_0 value calculation in steam sterilizers, washer-disinfectors and washer-disinfectors for endoscopes

The set contains:

- EBI 100-TP231 pressure / temperature data logger with Luer-Lock connection *(see page 40)*
- PHX 800 pH tester
- TDS 3 Conductivity tester
- AL 101 Silicone protection box for logger
- Winlog.med Software
- EBI IF 150 Interface
- Aluminium carrying case

Extend this set with an EBI 16 Data Logger (see page 35), and you will be able to perform daily Electronic Bowie and Dick Tests.

Type	Description	Part No.
SL 1110	EBI 100 Data logger set for steam sterilizers and washer-disinfectors	1340-6571

SL 1520 EBI 16 Bowie and Dick Test Set
for steam sterilizers

For performing the Bowie and Dick Test according to the norms EN 285 and ISO 17665.

The set contains:

- Bowie Dick Test Logger EBI 16 *(see page 35)*
- Winlog.med software
- EBI IF 150 Interface
- Aluminium carrying case

Type	Description	Part No.
SL 1520	EBI 16 Bowie and Dick Test Set for steam sterilizers	1340-6198

SL 1620 EBI 16 Bowie and Dick Test Set
for steam sterilizers and washer-disinfectors

For performing the daily Bowie and Dick Test according to the norms EN 285 and ISO 17665 as well as for routine control.

The set contains:

- Bowie Dick Test EBI 16 *(see page 35)*
- EBI 100-T100 temperature data logger (*see p. 38*)
- Winlog.med software
- EBI IF 150 interface
- Aluminium carrying case

Type	Description	Part No.
SL 1620	EBI 16 Bowie and Dick Test Set for steam sterilizers and washer-disinfectors	1340-6573

SL 4001 EBI 11 Mini Data Logger Set for Pasteurisation and Sterilisation
for temperature monitoring in cans and glasses

The set contains:

- EBI 11-T23x Mini temperature data logger: Needle length: 20 mm, 50 mm or 100 mm *(Special needle lengths on request)*
- AL 114 can adapter set
- EBI IF 100 interface
- Winlog.pro software
- Aluminum carrying case

Please name us the correct type of data logger in your order.

Mini Temperature Data Logger, 1-channel
Type
Needle length = 20 mm EBI 11-T230
Needle length = 50 mm EBI 11-T231
Needle length = 100 mm EBI 11-T233

Type	Description	Part No.
SL 4001	EBI 11 set for pasteurisation and sterilisation	1340-6091

SL 4010 EBI 100 Data Logger Set for Pasteurisation and Sterilisation
for temperature monitoring in tins

The set contains:

- EBI 100-T230 Temperature Data Logger
- EBI DA-SET Can Adapter
- EBI IF 100-1 Interface
- Winlog.pro Software
- Aluminum carrying case

Type	Description	Part No.
SL 4010	EBI 100 Data Logger Set for Pasteurisation and Sterilisation	1340-6575

SL 4101 EBI 11 Mini Data Logger Set for Pasteurisation
for temperature monitoring in bottles

The set contains:

- EBI 11-T23x Mini temperature data logger:
  Needle length: 20 mm, 50 mm or 100 mm
  (Special needle lengths on request)
- AL 115 Bottle adapter set
- EBI IF 100 interface
- Winlog.pro software
- Aluminum carrying case

Please name us the correct type of data logger in your order.

Mini Temperature Data Logger, 1-channel

Type	
Needle length = 20 mm	EBI 11-T230
Needle length = 50 mm	EBI 11-T231
Needle length = 100 mm	EBI 11-T233

Type	Description	Part No.
SL 4101	EBI 11 mini data logger set for pasteurisation	1340-6093

SL 4110 EBI 100 Data Logger Set for Pasteurisation
for temperature monitoring in bottles and cans

The set contains:

- EBI 100-T261 Temperature Data Logger
- EBI FL-S Bottle Adapter
- EBI DA Can Adapter
- EBI IF 100-1 Interface
- Winlog.pro Software
- Aluminum carrying case

Type	Description	Part No.
SL 4110	EBI 100 data logger set for pasteurisation	1340-6576

SL 4210 EBI 100 Basic Temperature Monitoring Set
Temperature monitoring system for different applications

The set contains:

- EBI 100-T100 Temperature Data Logger
- EBI IF 100-1 Interface
- Winlog.pro Software
- Aluminum carrying case

Type	Description	Part No.
SL 4210	EBI 100 Basic temperature monitoring set	1340-6577

Cold chain and Process

EBI 20
Standard Data Loggers

Description:

- Data logger versions for temperature and humidity measurements available
- With internal and external temperature probes
- Very easy to use
- Excellent price-performance ratio

Applications:

- Transport monitoring
- Storage monitoring
- Process monitoring

EBI 25
Wireless Data Logger System

Description:

- Radio data logger system for temperature and humidity measurements
- Other measurements can be integrated using Modbus over IP or other protocols

Applications:

- Continuous monitoring of cooling equipment, cool rooms and deep-freeze rooms
- Storage monitoring

Monitoring

EBI 40
Multi-Channel Temperature Data Logger

Description:

- Temperature data logger for 6 or 12 thermocouple sensors with SMP connection
- Current measurement values and measurement curve shown on multi-color TFT display
- With USB connection for fast programming and readout of the measurement data

Applications:

- Process monitoring
- Process validation

EBI 3x0
USB Data Loggers

Description:

- Single-use and multi-use data loggers for temperature and humidity measurement
- USB connection
- Automatic PDF report generation with all measurement data
- Easy programming of the data loggers via the free online configurator at **www.ebi300.com**, no special software required

Applications:

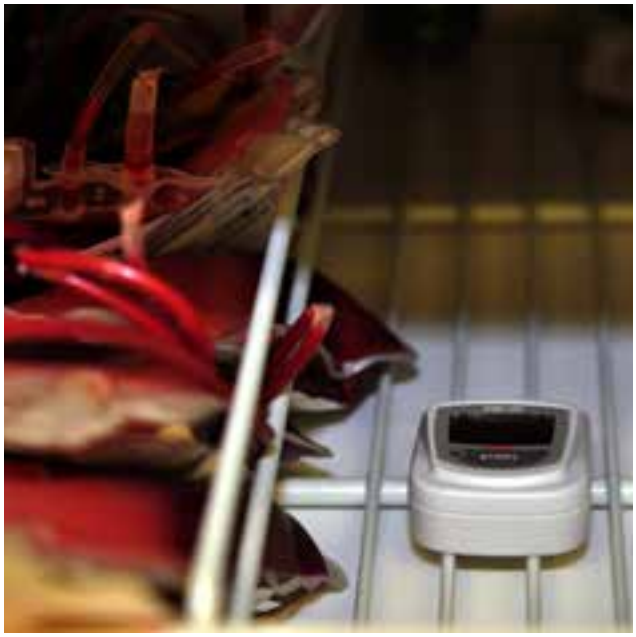
- Transport monitoring
- Storage monitoring

EBI 20 Standard Data Loggers

With a memory capacity of 40,000 measurements the easy to use EBI 20 data loggers are suitable for the continuous documentation and monitoring of temperature and humidity. All EBI 20 data loggers are delivered with a factory calibration certificate and a user replaceable battery. The data loggers are particularly attractive because of their excellent price-performance ratio.

Applications:

- Transport monitoring
- Storage monitoring
- Process monitoring



General technical specifications: valid for all types*

Resolution: Temperature	0.1 °C (0.2 °F)
Accuracy: Humidity (only humidity data loggers)	±3% rH (10% rH ... 90% rH)
Resolution: Humidity (only humidity data loggers)	0.1 % rH
Measurement mode	• Endless measurement • Start immediately until end of memory • Start / stop measurement • Start with key press
Battery	3 V lithium (CR2450), user replaceable
Battery lifetime	Up to 24 months, at a sampling rate of 15 min. at +25 °C (77 °F)
Housing material	ABS
Dimensions (L x W x H)	69 x 48 x 22 mm**
Weight	Approximately 45 g**
Certificate	Factory calibration certificate

** Please find the exact technical data of each EBI 20 logger type on the next pages.*
*** Dimensions and weight just refer to the EBI 20 housing.*

EBI 20-T1 Standard Temperature Data Logger
with internal temperature sensor

Technical Data

Measurement range	-30 °C ... +60 °C (-22 °F ... +140 °F)
Accuracy	±0.5 °C (-20 °C ... +40 °C) / ±0.9 °F (-4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Data memory	1 channel, 40,000 measurements
Sensor	NTC
Sampling rate	1 min to 24 hours
Protection class	IP 67

Type	Description	Part No.
EBI 20 T1	Temperature logger	1601-0042

EBI 20-TE1 Standard Temperature Data Logger
with external probe

Technical Data

Measurement range	-30 °C ... +60 °C (-22 °F ... +140 °F)
Accuracy	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Data memory	1 channel, 40,000 measurements
Sensor	NTC
Sampling rate	1 min to 24 h
Protection class	IP 67

Type	Description	Part No.
EBI 20-TE1	Temperature logger with external probe	1601-0043

EBI 20-TF Standard Temperature Data Logger
with external probe up to +100 °C (+212 °F)

Technical Data

Measurement range	0 °C ... +100 °C (+32 °F ... 212 °F)
Accuracy	±0.5 °C (+50 °C ... +100 °C) ±1 °C for the remaining measurement range
Data memory	1 channel, 8000 measurements
Sensor	NTC
Storage temperature	-40 °C ... +70 °C / -40 °F ... 158 °F (logger) -40 °C ... +110 °C / -40 °F ... 230 °F (probe)
Sampling rate	Adjustable from 1 sec to 24 hours
Protection class	IP 67

Type	Description	Part No.
EBI 20-TF	Temperature data logger with external probe	1601-0010

EBI 20-TH1 Standard Temperature / Humidity Data Logger *with internal humidity sensor*

Technical Data

Measurement range: temperature	-30 °C ... +60 °C (-22 °F ... +140 °F)
Measurement range: humidity	0 % rH ... 100 % rH
Accuracy: temperature	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Data memory	40,000 measurements
Channels	channel 1: relative humidity channel 2: temperature
Sensor	NTC, capacitive humidity sensor
Sampling rate	1min ... 24h
Protection class	IP 52

Type	Description	Part No.
EBI 20-TH1	Temperature/Humidity Data Logger	1601-0044

Sets and Accessories for EBI 20

EBI 20-T1-Set Starter set (logger, evaluation software, interface)

EBI 20-TE1-Set Temperature logger set (logger with external probe, evaluation software, interface)

EBI 20-TH1-Set Temperature Humidity Logger Set (Logger, Evaluation software, Interface)

EBI 20-IF Interface

EBI 20-WM wall bracket

EBI 20-WM-1 truck wall bracket

Type	Description	Part No.
EBI 20-T1-Set	Starter set (logger, evaluation software, interface)	1601-0046
EBI 20-TE1-Set	Temperature logger set (logger with external probe, evaluation software, interface)	1601-0047
EBI 20-TH1-Set	Temperature Humidity Logger Set (Logger, Evaluation software, Interface)	1601-0048
EBI 20-IF	Interface for EBI 20	1601-0020
EBI 20-WM	EBI 20 wall bracket with padlock	1601-0030
EBI 20-WM-1	EBI 20 truck wall bracket	1601-0033

EBI 25 Wireless Data Logger System

The EBI 25 system for wireless monitoring of temperature, humidity and other measurements assures that perishable goods are produced and stored at the right conditions at all times. Other measurements can be integrated using Modbus over IP.

Benefits:

- Continuous monitoring
- Avoid loss of goods
- Quick intervention before it is too late
- Automatic documentation
- Worldwide access to the measurement data
- Easy handling, user replaceable battery









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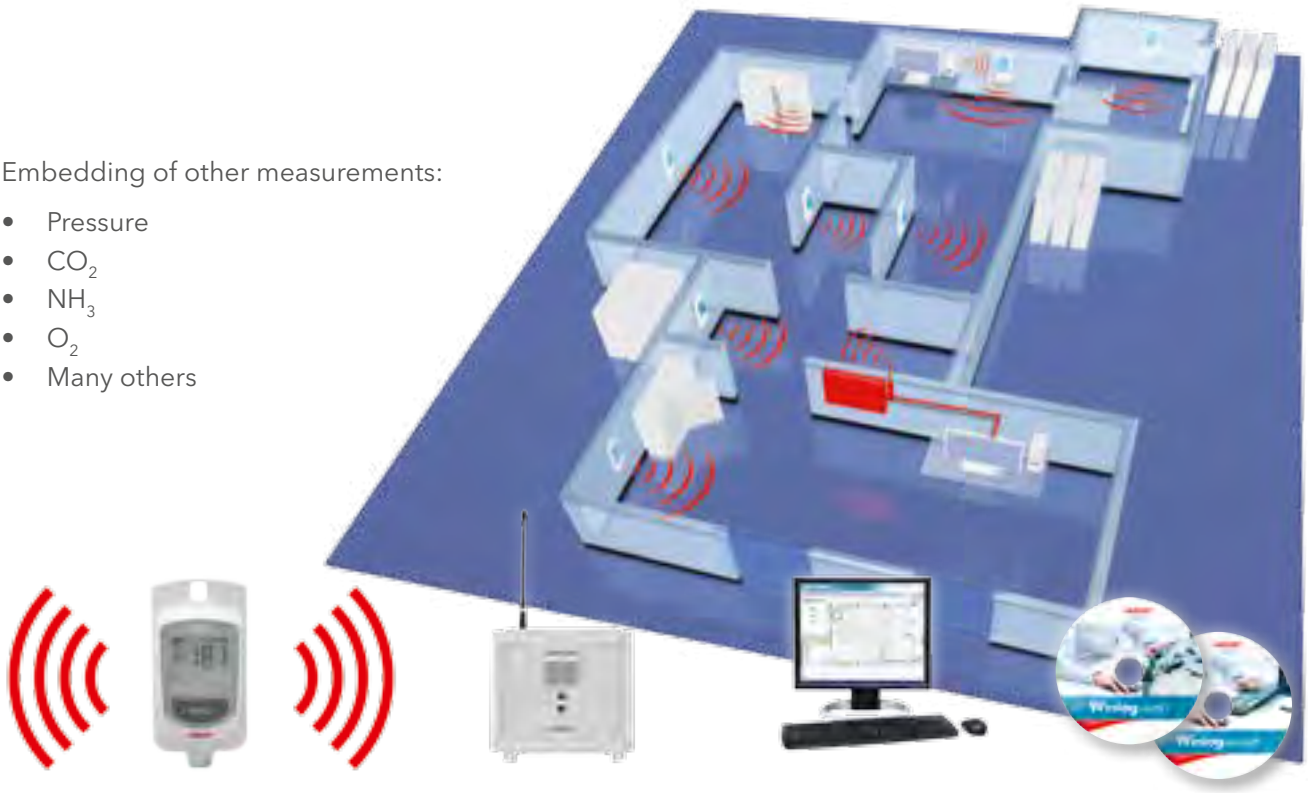
Embedding of other measurements:

- Pressure
- CO_2
- NH_3
- O_2
- Many others



EBI 25 data loggers

- Precise measurement of temperature and humidity (depends on logger type)
- Very large range of up to 500 m in a free field
- Long battery lifetime
- Easy installation

Base station: IF 400 interface

- Collects and stores the data of all connected EBI 25 data loggers
- Connection of up to 50 loggers per interface possible
- Stores up to 576 measurements per logger
- Direct connection of any number of interfaces to a PC or the network
- Audible alarm (with optional alarm box)

Evaluation software: Winlog.web and Winlog.wave

Winlog.wave: Basic version for local PC usage.

Winlog.web: Professional version for internet and local network based use.

Please find more information from page 72.

General technical specifications: valid for all EBI 25 data logger types*

Resolution: Temperature	0.1 °C (0.2 °F)
Resolution: Humidity (humidity data loggers only)	0.1% rH
Memory	288 measurement values (per channel)
Sampling rate	1 min. to 24 hours, adjustable
Radio frequency	868 MHz
Battery	3.6 V lithium (user replaceable)
Battery lifetime	Up to 2 years, depending on measurement and transmission rate
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Operating temperature	-30 °C ... +60 °C (-22 °F ... +140 °F)
Measurement mode	Endless measurement
Housing material	ABS
Weight	Approximately 65 g

** Please find the exact technical data of each EBI 25 data logger type on the next pages.*

EBI 25-T Wireless Temperature Data Logger *with internal temperature sensor*

Technical Data

Measurement range	-30 °C ... +60 °C (-22 °F ... 140 °F)
Accuracy	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Sensor	NTC
Protection class	IP67
Dimensions (L x W x H)	95 x 48 x 27 mm

Type	Description	Part No.
EBI 25-T	Wireless temperature logger (with internal sensor)	1340-6200

EBI 25-TE Wireless Temperature Data Logger *with external probe*

Technical Data

Measurement range	-40 °C ... +85 °C (-40 °F ... +185 °F)
Accuracy	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at 4 °F ... 104 °F) ±0.8 °C at -30 °C ... -20 °C / +40 °C ... +60 °C (±1.4 °F at -22 °F ... -4 °F / +104 °F ... +140 °F) ±1.5 °C at -40 °C ... -30 °C / +60 °C ... +85 °C (±2.7 °F at -40 °F ... -22 °F / +140 °F ...+185 °F)
Sensor	NTC
Protection class	IP 67
Dimensions (L x W x H)	95 x 48 x 27 mm (without probe)

Type	Description	Part No.
EBI 25-TE	Wireless temperature logger (with external probe)	1340-6201

EBI 25-TX Wireless Temperature Data Logger *for high and low temperatures*

Special probes available upon request.

Technical Data

Measurement range	-200 °C ... +199.9 °C
Accuracy	±0.5 °C (-100 °C ... -20 °C and +60 °C ... +199.99 °C) ±0.2 °C (-20 °C ... +60 °C) Accuracy only applies when using an adjusted probe
Probe	Ø 5 mm, cable length = 3 m
Probe connection	Binder, series 620
Sensor	Pt 1000
Protection class	IP 67
Dimensions (L x W x H)	135 x 48 x 27 mm (without probe)

Type	Description	Part No.
EBI 25-TX	Temperature data logger (with probe)*	1340-6204
EBI 25-TX	Temperature data logger (without probe)	1340-0025
TPX 25	Pt 1000 probe for EBI 25-TX	1341-0025

** Calibration certificate valid only for logger and probe.*

EBI 25-TH Wireless Temperature / Humidity Data Logger
with external humidity sensor

Technical Data

Measurement range: Temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Measurement range: Humidity	0% rH ... 100% rH
Accuracy: Temperature	±0.5 °C at -20 °C ... +40 °C (±0.9 °F at -4 °F ... 104 °F) ±0.8 °C (±1.4 °F) for the remaining measurement range
Accuracy: Humidity	±3 % rH (10 % ... 90 %)
Sensor	NTC for temperature / capacity humidity sensor
Protection class	IP 20
Dimensions (L x W x H)	124 x 48 x 27 mm (with probe)

Type	Description	Part No.
EBI 25-TH	Wireless temperature / humidity logger	1340-6202

Sets and Accessories for EBI 25

Please find evaluation software for EBI 25 data loggers from page 72.

EBI 25-T-SET Wireless temperature logger set (3 loggers, evaluation software, interface)

EBI 25-TE-SET Wireless temperature logger set

EBI IF 400 Interface including antenna

AG 152 wall mount for EBI 25

Winlog.wave Evaluation software (single-user version)

Winlog.web Evaluation software (web-based server version)

AL 116 external antenna ·for the interface EBI IF 400 interface for more power, optional

Type	Description	Part No.
EBI 25-T-SET	Wireless temperature logger set (3 loggers, evaluation software, interface)	1340-6220
EBI 25-TE-SET	Wireless temperature logger set	1340-6221
EBI IF 400	Interface incl. antenna	1340-6210
AG 152	Wall mount for EBI 25	1340-6215
Winlog.wave	Software (singele-user version)	1340-2391
Winlog.web	Software (web-based version)	1340-2390
AL 116	External antenna for EBI IF 400 for increasing the transmission power	1340-6211

EBI 40 Multi-Channel Temperature Data Logger

The EBI 40 Multi-Channel Temperature Data Logger records temperatures during production development and process monitoring. Current measurement values and the measurement curve can be read on the multi-colored TFT display. The thermal insulation using the thermo isolation box allows the use of the data logger at very high temperatures. The EBI 40 is suitable for the connection of six or twelve thermocouple probes.

Applications:

Monitoring and validation of processes in:

- Incubators
- Refrigerators
- Climate cabinets
- Storage rooms,
- Transport studies
- Freeze-dryers etc.









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EBI 40-TC Multi-Channel Data Logger
for type K thermocouple sensors

EBI 40-TC-01

Technical Data

Measurement range	-200 °C ... 1,200 °C
Accuracy	±0.5 °C (at 25 °C)
Resolution	0.1 °C (0.2 °F)
Channels	6 or 12 temperature channels
Sampling rate	Adjustable from 0.1 sec to 24 hours
Sensor	Thermocouple Type K / SMP connection
Operating temperature	0 °C ... +60 °C (0 °F ... +140 °F)
Storage temperature	0 °C ... +70 °C (32 °F ... 158 °F)
Memory	20.000 measureents per channell (max. 240,000 measurements))
Measurement mode	• Endless measurement immediatley • Measure immediatley until end of memory • Start / stop measurement
Display	TFT-display 3.5" (324 x 240 Pixel)
Dimensions (L x W x H)	140 x 118 x 35 mm
Housing material	ABS + PC
Protection class	IP 40
Certificate	Factory Calibration Certificate

Please find various thermocouple probe from page 106.

Type	Description	Part No.
EBI 40-TC-01	6-channel data logger (without probes)	1340-6400
EBI 40-TC-02	12-channel data logger (without probes)	1340-6401

Accessories for EBI 40

EBI TIB 400-01 Thermal Isolation Box for EBI 40
Sturdy thermal barrier (stainless steel and ceramic)

- Absolutely heat resistant insulation
- Replaceable sealing and cooling element
- Easy to transport
- Protects EBI 40 for 2 hours at +250°C (+482 °F)
- Dimensions (with folded handles): 247 x 210 x 131 mm

AN 144 Extension cable, 2.5 m, silicone, SMP

Wall mount **EBI 40-WH**
Bracket for 35 mm cap rail

Type	Description	Part No.
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627
EBI TIB 400-01	Thermal Isolation Box for EBI 40	1340-6430
EBI 40-WH	EBI 40 wall mount	1340-6431

EBI 3x0 USB Data Loggers

Cold Chain Monitoring

The easy to use data loggers with USB connection monitor the temperature and/or humidity during transport and storage of sensitive goods like medicine, food, serums etc. Measurement reports are created automatically as PDF files when you connect the logger to a PC.

The EBI 300 and EBI 310 USB data loggers are suitable for multi-use, the EBI 330 data loggers are single-use versions which can be ordered preconfigurated and are used especially when returning a more expensive multi-use logger to the sender after a shipment is difficult. Please contact us for more information.







Program | Measure

- Programming of the logger with the help of the free online configurator at **www.ebi300.com** or optional via the ebro software Winlog.basic, Winlog.light or Winlog.pro
- Set optional limits and start to record the measurement data

Connect | Readout

- Connection of the logger to any PC via the USB port
- Automatic generation of a PDF report with all important measurement data

Evaluate | Archive

- Store, save or email the PDF-report
- Further processing of the measurement data with the software Winlog.basic, Winlog.light or Winlog.pro

Benefits

- Direct USB connection
- Automatic PDF report generation
- Programmable at **www.ebi300.com**, no special software for programming and readout required but available
- Indication of alarm status via flashing LED
- Data integrity
- Conforms with FDA 21 CFR Part 11, DIN EN 12830 and ATP
- The data loggers help you to comply with GMP and VO (EG) 37/2005

Which data logger is right for you?

	Multi-use data loggers		**Single-use data loggers**	
	EBI 300	EBI 310	EBI 330-T30	EBI 330-T85
Monitoring of cryogenic temperatures		✓*		✓
Monitoring of high temperatures*		✓		
Humidity monitoring*	✓	✓		
Display	✓	✓		
High accuracy (± 0.2 °C)		✓		
High memory capacity (120,000 readings)		✓		
Very flexible alarms (5 limits and MKT)		✓		
Calibration certificate included	✓	✓		
Batch calibration certificate available on request			✓	✓
Low-cost			✓	✓

**With attached probe only.*

-ebro- a xylem brand
WTW Wissenschaftlich-Technische Werkstätten GmbH · Business Unit ebro Electronic
Peringerstr. 10 · 85055 Ingolstadt, Germany · Phone +49 841 95478-0 · Fax +49 841 95478-80 · Email: ebro@xyleminc.com · **www.ebro.com**

EBI 300 Multi-Use USB Data Logger
Standard version

The device has been certified together with the EB 4401 food inspection case (*please see page 139*).

Various probes for temperature and humidity measurement available (see page 63).

Technical Data

Measurement range/operating temperature	-30 °C … +70 °C (-22 °F ... +158 °F) *By connecting an external probe, the temperature measurement range can be extended.*
Accuracy	± 0.5 °C (- 20 °C … +40 °C / - 4 °F ... +104 °F) ± 0.8 °C for the remaining measurement range
Sensor	NTC
Memory capacity	40,000 measurements
Alarm	2 limits
PDF creation	PDF
LED	Yes (red)
Resolution	0.1 °C
Storage temperature	-40 °C ... +85 °C (- 40 °F ... +185 °F)
Sample rate	1 min … 24 h
Measurement modes	• Endless measurement • Start / Stop • Measurement until end of memory • Start with key press
Display	Value, MIN / MAX, until end of memory, alarm on / off
Maximum start delay	72 h
Dimensions (L x W x H)	80 x 33 x 14 mm
Housing material	Polycarbonate
Protection class	IP 65
Certificate	Factory calibration certificate
Battery	Lithium button cell (CR 2450), 3 V
Battery lifetime	Up to 2 years, depending on applications

Type	Description	Part No.
EBI 300	Standard USB Data Logger	1340-6330

Accessories for EBI 300

EBI 300-WM Wall Mount for EBI 300 / 310

Type	Description	Part No.
EBI 300-WM	Wall Mount for EBI 300 / 310	1340-6340

External Probes for EBI 300

Fast, flexible core temperature measurements

TPC 300 External NTC temperature probe

Technical Data

Measurement range/operating temperature	-35 °C … +70 °C (-31 °F … +158 °F)
Accuracy	± 0.5 °C (-20 °C … +40 °C / -4 °F … +104 °F) ± 0.8 °C for the remaining measurement range
Probe needle	Stainless steel, Ø 4 mm, L = 50 mm, pointed
Cable	PVC, L = 1 m
Protection class	IP 65

Relative humidity monitoring in storages and during transport

TPH 400 External capacitive humidity probe

Technical Data

Measurement/operating range	Humidity: 0% rF … 100% rH Temperature: 0 °C … +70 °C (+32 °F … +158 °F)
Humidity accuracy	± 3% between 10% rH … 90% rH (at +25 °C / +77 °F) ± 5% for the remaining measurement range
Temperature accuracy	± 0.5 °C at +20 °C ... +40 °C (+68 °F … +104 °F) ± 1 °C for the remaining measurement range
Probe	Capacitive humidity sensor
Protection class	IP 20

EBI 300 + TPC 300 EBI 300 + TPH 400

General technical data, valid for all EBI 300 probes:

Temperature resolution	0.1 °C
Humidity resolution (logger dependent)	0.1% rH
Storage temperature	-40 °C … +85 °C (-40 °F … +185 °F)
Norms	DIN EN 12830, ATP
Certificate	Factory calibration certificate
Cable (logger dependent)	Water tight, oil resistant and food safe

Type	Description	Part No.
TPC 300	External Temperature Probe for EBI 300 (- 35 °C … + 70 °C / - 31 °F … +158 °F)	1341-6331
TPH 400	External Humidity Probe for EBI 300 (0% rH ... 100% rH)	1341-6336

EBI 310 Multi-Use USB Data Logger

High precision version

Various probes for temperature and humidity measurement available (see pages 65 and 66).

Technical Data

Measurement range/operating temperature	-30 °C … +75 °C (-22 °F ... +167 °F) *By connecting an external probe, the temperature measurement range can be extended.*
Accuracy	±0.2 °C (-30 °C … +30 °C / -22 °F ... +86 °F) ±0.5 °C for the remaining measurement range
Sensor	PT 1000
Memory capacity	120,000 measurements
Alarm	5 ranges
PDF creation	PDF/A 1b
LED	Yes (red and yellow)
Resolution	0.1 °C
Storage temperature	-40 °C ... +85 °C (-40 °F ... +185 °F)
Sample rate	1 s … 24 h
Measurement modes	• Endless measurement • Start / Stop • Measurement until end of memory • Start with key press
Display	Value, MIN / MAX, until end of memory, alarm on / off
Maximum start delay	72 h
Dimensions (L x W x H)	80 x 33 x 14 mm
Housing material	Polycarbonate
Protection class	IP 65
Certificate	Factory calibration certificate
Battery	Lithium button cell (CR 2450), 3 V
Battery lifetime	Up to 2 years, depending on applications

Type	Description	Part No.
EBI 310	High Precision USB Data Logger	1340-6331

Accessories for EBI 300

EBI 300-WM Wall Mount for EBI 300 / 310

Type	Description	Part No.
EBI 300-WM	Wall Mount for EBI 300 / 310	1340-6340

External Probes for EBI 310

Measurement of high and low temperatures

TPX 220 External Pt 1000 precision temperature probe

Technical Data

Operating temperature (logger)	-30 °C ... +75 °C (-22 °F ... +167 °F)
Measurement range (probe)	-200 °C … +250 °C (-328 °F … +482 °F)
Accuracy	± 2 °C (-200 °C … -100 °C / -328 °F … -148 °F) ± 1 °C (-100 °C … -20 °C / -148 °F … -4 °F) ± 0.2 °C (-20 °C … +60 °C / -4 °F … +140 °F) ± 0.5 °C (+60 °C … +250 °C / +140 °F … +482 °F)
Probe	Stainless steel, Ø 5 mm, L = 50 mm, blunt
Cable	PTFE, L = 1 m *
Protection class	IP 65

**Customized lengths up to 3 m available on request*

Measurements in dry ice

TPX 250 External Pt 1000 precision temperature probe with additional deep temperature battery

Technical Data

Measurement range/operating temperature (probe and logger)	-85 °C … +50 °C (-121 °F … +122 °F)
Accuracy	± 1 °C (-85 °C … -20 °C / -121 °F … -4 °F) ± 0.2 °C (-20 °C … +50 °C / -4 °F … +122 °F)
Probe	Stainless steel, Ø 5 mm, L = 50 mm, blunt
Cable	PTFE, L = 60 cm *
Battery	1 lithium cell in EBI 310, 1 lithium battery in TPX 250, both user exchangeable
Battery lifetime	Up to 2 years, application dependent (EBI 310) 10 transports of max. 100 hours each (TPX 250)
Protection class	IP 65

**Customized lengths up to 3 m available on request*

Relative humidity monitoring in storages and during transport

TPH 500 External capacitive humidity probe

Technical Data

Measurement and operating range	Humidity: 0% rH … 100% rH Temperature: 0 °C … +75 °C (+32 °F … +167 °F)
Humidity accuracy	± 2% between 10% rH … 90% rH (at +25 °C / +77 °F) ± 4% for the remainder
Temperature accuracy	± 0.5 °C at 0 °C … +60 °C (+32 °F … +140 °F) ± 0.8 °C for the remainder
Probe	Capacitive humidity sensor
Protection class	IP 20

EBI 310 + TPX 220 | EBI 310 + TPX 250 | EBI 310 + TPH 500

General technical data, valid for all EBI 310 probes:

Temperature resolution	0.1 °C
Humidity resolution (logger dependent)	0.1% rH
Storage temperature	-40 °C … +85 °C (-40 °F … +185 °F)
Norms	DIN EN 12830, ATP
Certificate	Factory calibration certificate
Cable (logger dependent)	Water tight, oil resistant and food safe

Type	Description	Part No.
TPX 220	External Temperature Probe for EBI 310	1341-6332
TPX 250	External Temperature Probe for EBI 310 with additional battery	1341-6333
TPH 500	External Humidity Probe for EBI 310	1341-6337

External 2-channel Probes for EBI 310

Temperature monitoring in storages and during transport, process monitoring

TPX 310 External 2-channel Pt 1000 precision temperature probe

TPX 310

EBI 310 + TPX 310 + exchangeable sensors

Technical Data

Operating temperature (logger)	-30 °C … +75 °C (-22 °F … +167 °F)
Measurement range (probe)	-200 °C … +400 °C (-328 °F …+752 °F), depending on probe type
Accuracy	±2.0 °C at -200 °C … -100 °C (-328 °F … -148 °F) ±1.0 °C at -100 °C … -20 °C (-148 °F … -4 °F) ±0.2 °C at -20 °C … +60 °C (-4 °F … +140 °F) ±0.5 °C at +60 °C … +250 °C (+140 °F … +482 °F) ±1.0 °C at +250 °C … +400 °C (+482 °F … +752 °F)
Protection class	IP 65

Exchangeable sensors for TPX 310:

TPX 310-P1

- Measurement range: -200 °C ... +200 °C (-328 °F ... +392 °F)
- Needle: L = 45 mm, Ø = 5 mm, blunt
- Cable: PTFE, : = 3 m

TPX 310-P2

- Measurement range: -200 °C ... +200 °C (-328 °F ... +392 °F)
- Needle: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 3 m

TPX 310-P3

- Measurement range: -200 °C ... +200 °C (-328 °F ... +392 °F)
- Needle: L = 130 mm, Ø = 3 mm, blunt
- Cable: PTFE, L = 1 m

TPX 310-P4

- Measurement range: -200 °C ... +400 °C (-328 °F ... +752 °F)
- Needle: L = 50 mm, Ø = 1.5 mm, blunt
- Cable: metal, L = 3 m

Type	Description	Part No.
TPX 310	External 2-channel temperature probe for EBI 310	1341-6335
TPX 310-P1	External sensor for TPX 310	1341-6338
TPX 310-P2	External sensor for TPX 310	1341-6339
TPX 310-P3	External sensor for TPX 310	1341-6340
TPX 310-P4	External sensor for TPX 310	1341-6341

EBI 330-T30 Single-Use USB Data Logger
Standard version

Technical Data

Measurement range / operating temperature	-30 °C … +60 °C (-22 °F … +140 °F)
Accuracy	± 0.5 °C (-20 °C … +40 °C / - 4 °F … +104 °F) ± 0.8 °C for the remaining measurement range
Sensor	NTC
Memory capacity	20,000 measurements
Alarm	2 limits
PDF creation	PDF/A 1b
LED	Yes (red and green)
Resolution	0.1 °C
Storage temperature	-40 °C ... +85 °C (- 40 °F ... +185 °F)
Sample rate	1 min. to 24 hours
Measurement modes	• Start with key press • Start immediately until end of memory
Maximum start delay	24 h
Dimensions (L x W x H)	80 x 28 x 12 mm
Housing material	ABS
Protection class	IP 65
Certificate	Batch calibration certificate available on request
Battery	Lithium button cell (CR2032), 3V
Battery lifetime	100 days

Type	Description	Part No.
EBI 330-T30	Single-use USB data logger, **package unit: 10 pieces**	1340-6332

EBI 330-T85 Single-Use USB Data Logger
Low temperature version

Technical Data

Measurement range / operating temperature	-85 °C … +50 °C (-121 °F … +122 °F)
Accuracy	± 2.0 °C (-85 °C … -30 °C / - 85 °F … - 22 °F) ± 0.8 °C (-30 °C … -20 °C / - 22 °F … - 4 °F) ± 0.5 °C (-20 °C … +50 °C / - 4 °F … +122 °F)
Sensor	Pt 1000
Memory capacity	20,000 measurements
Alarm	2 limits
PDF creation	PDF/A 1b
LED	Yes (red and green)
Resolution	0.1 °C
Storage temperature	-40 °C ... +85 °C (- 40 °F ... +185 °F)
Sample rate	1 min. to 24 hours
Measurement modes	• Start with key press • Start immediately until end of memory
Maximum start delay	24 h
Dimensions (L x W x H)	80 x 28 x 12 mm
Housing material	ABS
Protection class	IP 65
Certificate	Batch calibration certificate available on request
Battery	Lithium button cell (TL-2450), 3.6 V
Battery lifetime	100 days at temperatures down to -30 °C (-22 °F); 100 hours at temperature below -30 °C (-22 °F)

Type	Description	Part No.
EBI 330-T85	Single-use USB data logger for deep temperatures, **package unit: 10 pieces**	1340-6333

Software

ebro offers exactly the software you need:

- Evaluation software for any applications:
  Winlog.basic, Winlog.light and Winlog.pro
- Evaluation software for EBI 25 data loggers:
  Winlog.web and Winlog.wave
- Evaluation software for pharmaceutical and medical applications:
  Winlog.med and Winlog.validation

Software/Features	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog. validation	Winlog.wave	Winlog.web
Current Release	V2.64	V2.64	V2.64	V3.51	V3.51	V2.27	V2.27
Event Triggered Recording			●	●	●		●
Script-Calculations			●				●
System-Scripts			●				
Picture Manager			●		●		
Measure in Charts			●				
Cursor		●	●	●	●		
Realtime Calculations			●	●	●		●
Ranges			●	●	●		
Range-based Calculations			●	●	●		
Statistics per Range			●	●	●		
Relative Time Axis			●				
Configurations		●	●	●(2)	●(2)		
Firmware-Update		●	●	●	●		●
Import		●(1)	●(1)				
Calibration			●	●	●		
Automatic File Name Generation			●				
21 CFR Part 11	●	●	●	●	●	●	●
User Administration	●	●	●	●	●	●	●
Audit-Trail	●	●	●	●	●	●	●
Advanced Chart Features		●	●				
Multi Document Support		●	●	●	●		
Export (Excel, PDF)	●	●	●	●	●	●	●
Customizable Company Logo	●	●	●	●	●	●	●
Wireless Support			●	●	●	●	●
2D Placement		●	●		●	●	●
3D Placement					●		
Routine Check			●(3)	●	●		
Validation			●(3)		●		
Unit Administration	●	●	●	●	●		●
Split Measurements			●	●	●		
Advanced Alarm-Management (Zones)	●(5)	●(5)	●(5)				

(1) Winlog.basic, Winlog.validation
(2) Template based
(3) Manual
(4) Since V2.5
(5) Only EBI310
(6) Since V2.6
(7) Since V3.3
(8) Since V2.63
(9) Since V3.5

Last change: March 2014

Supported Logger Types	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog. validation	Winlog.wave	Winlog.web
EBI 1/2		●	●	●	●		●
EBI 6	●	●	●				
EBI 10		●	●	●	●		
EBI 11		●	●	●	●		
EBI 15				●	●		
EBI 16				●(9)	●(9)		
EBI 20	●	●	●	●(7)	●(7)		
EBI 25						●	●
EBI 30			●	●	●		
EBI 40		●	●	●(7)	●(7)		
EBI 100		●	●	●	●		
EBI 300	●(4)	●(4)	●(4)	●(7)	●(7)		
EBI 310	●(6)	●(6)	●(6)	●(7)	●(7)		
EBI 330	●(8)	●(8)	●(8)				

System Requirements	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog. validation	Winlog.wave	Winlog.web
Windows XP (SP3 or better)	●	●	●	●	●	●	●
Windows Vista 32 bit	●	●	●	●	●	●	●
Windows Vista 64 bit	●	●	●	●	●	●	●
Windows 7 / 32 bit	●	●	●	●	●	●	●
Windows 7 / 64 bit	●	●	●	●	●	●	●
Windows 8 / 32 bit	●	●	●	●	●	●	●
Windows 8 / 64 bit	●	●	●	●	●	●	●
Memory	≥ 1GB	≥ 1GB	≥ 1GB	≥ 1GB	≥ 1GB	≥ 1GB	≥ 4 GB
Hard Disc Memory	> 300 MB	> 300 MB	> 300 MB	> 1 GB	> 1 GB	> 1 GB	> 20 GB
CD/DVD Drive	●	●	●	●	●	●	●
Screen Resolution	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768	≥ 1024x768
Processor	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Pentium 1GHz+	Pentium 2GHz+

Market Overview	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog. validation	Winlog.wave	Winlog.web
Food	●	●	●			●	●
Industry	●	●	●		●	●	●
Pharmaceutical		●	●		●		
Medical		●	●	●	●		

Available Languages	Winlog.basic	Winlog.light	Winlog.pro	Winlog.med	Winlog. validation	Winlog.wave	Winlog.web
English	●	●	●	●	●	●	●
French	●	●	●	●	●		●
Italian	●	●	●	●	●		●
Spanish	●	●	●	●	●	●	●
Chinese	●	●	●	●	●	●	●
Japanese	●	●	●	●	●		
Korean			●	●	●		
Portuguese				●	●		
Greek				●	●		
Czech	●	●	●	●	●		
Swedish	●	●	●	●	●		
Dutch			●	●	●		
German	●	●	●	●	●	●	●
Turkish				●	●		
Polish				●	●		

Evaluation Software for any applications

Winlog.basic, Winlog.light, Winlog.pro

For programming and readout of ebro data loggers and for evaluating the measurement values ebro offers three different software versions: the **free Winlog.basic**, the **standard software Winlog.light** and the **professional software Winlog.pro**.

Benefits

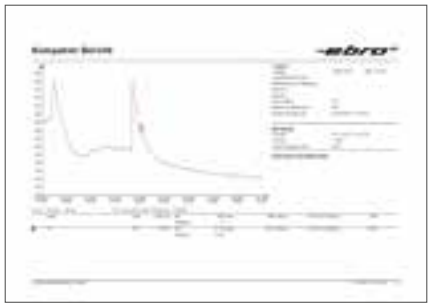
- Easy installation
- Easy programming of the data loggers, no prior knowledge required
- Extensive and custom report generation
- Suitable for all applications
- Security by compliance with FDA 21 CFR Part 11

Extensive Report Generation

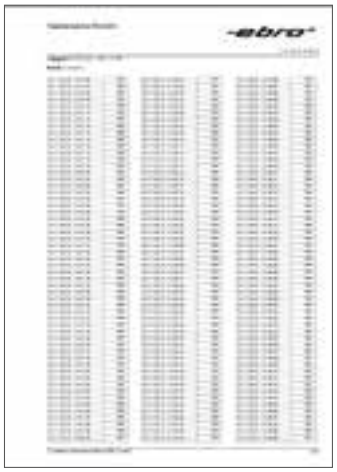
The software makes it easy to generate standard and custom reports:

- Compact, one-sided report (1)
- Multi-page, detailed report (2)
- Tabular report with the measurement values (3)
- Insertion of your own company logo possible (4)
- Export data to Microsoft Excel® and PDF (5)
- Integration of pictures and graphics possible (Winlog.pro only) (6)

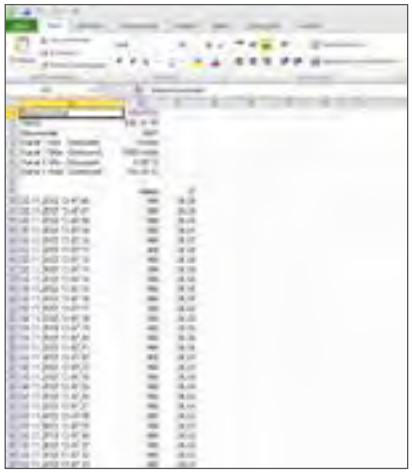
(1)



(3)

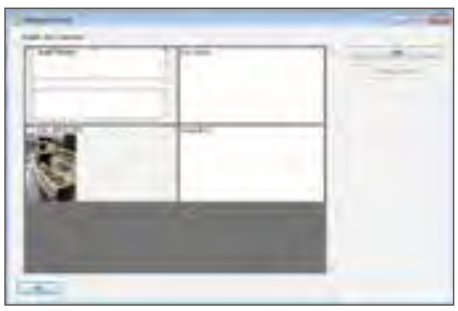


(5)



(2)

(4)



(6)

Winlog.basic

Easy to use, free software

- User friendly: intuitive and easy to use
- Graphical and numerical display of measurement data
- Protocol print (with printer and computers)
- Scan and enlarge of the measurement data
- Data export to Microsoft® Excel and PDF
- 21 CFR Part 11 - functionality as an option

Winlog.light

Standard software

- Contains all the features of Winlog.basic
- Data import from other ebro application programs
- Many standard reports
- Displays statistics on measurement data (e.g. MIN/MAX, mean, standard deviation etc.)
- Creation of confi gurations possible

Winlog.pro

Professional software

- Contains all the features of Winlog.basic and Winlog.light
- Enables real-time monitoring with wireless data loggers
- Formula editor for calculating the F0-value of the absolute humidity, the PE value etc.
- Display oft the timeline either absolute or relative
- Customized definition of individual areas possible (with their own statistics and calculations)
- Including calibration tool for data loggers
- Integration of pictures and graphics into reports possible
- IQ/OQ documentation optional

System Requirements
So that the software can run on your computer with any problem, your computer must meet the following requirements:

Hardware Requirements:
- At least 1 GHz processor speed
- At least 1 GB working memory
- At least 300 MB free hard disc space
- USB (Universal Serial Bus)

Software requirements:
Operating system Microsoft®
- Windows XP
- Windows Vista (32 Bit and 64 Bit)
- Windows 7 (32 Bit and 64 Bit)

Type	Description	Part No.
Winlog.basic	Free evaluation software	1340-2375
Winlog.light	Standard evaluation software	1340-2354
Winlog.pro	Professional evaluation software	1340-2355

Evaluation Software for EBI 25 Data Loggers

Winlog.wave and Winlog.web

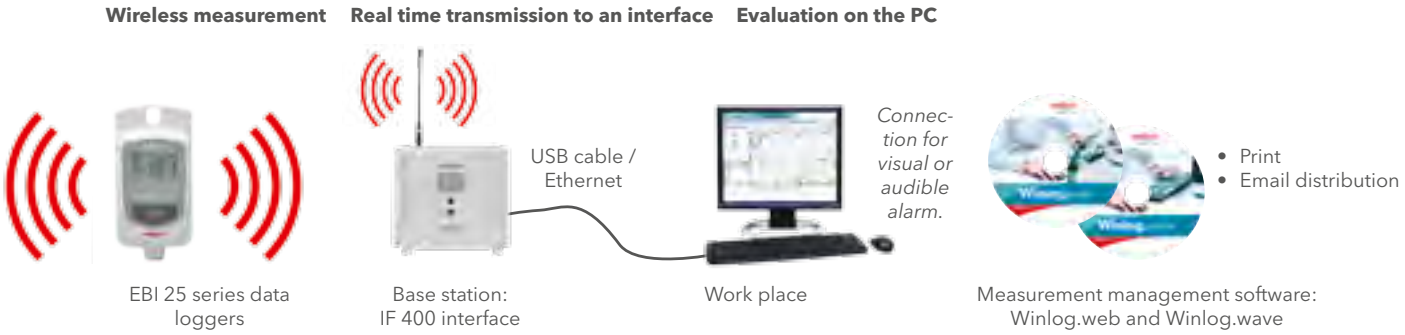
For programming and readout of EBI 25 data loggers as well as for evaluating the measurement values. The software automatically collects and evaluates data and alerts if necessary.

Functionality

The innovative EBI 25 system monitors wirelessly, transmits the data in real time to an interface (base station) and from there to the desired server or PC.

As soon as a temperature, humidity or any other measurement has exceeded a user defined limit, an alarm is immediately sent via email.

Please find the EBI 25 Data Logger Family on pages 54 ff.



Quick graphical overview of all measurement points including an image or floor plan view:

Winlog.wave

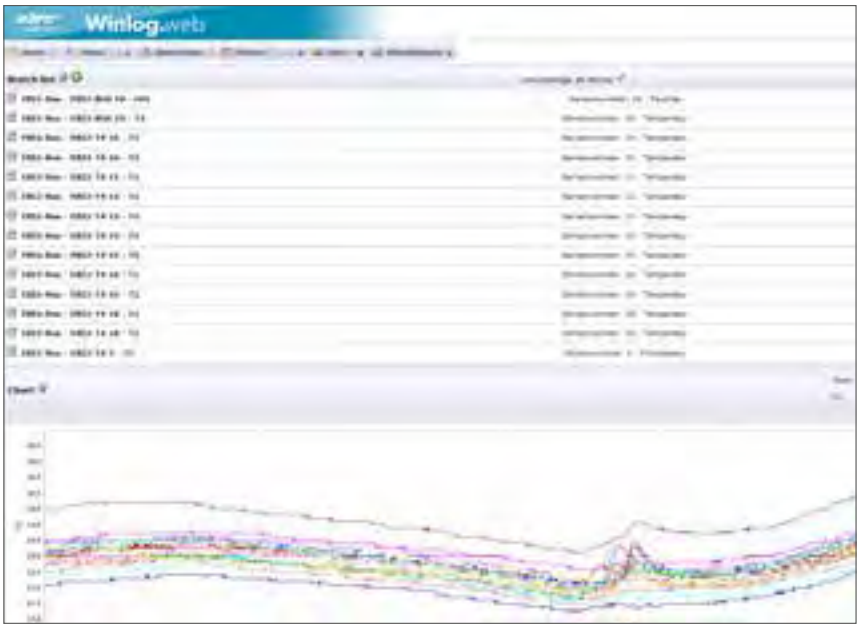
Basic version for local PC usage

- Single PC solution: The basic version for easy measurement data evaluation on a single PC- no network required.
- Flexible alarm management: graphic and email alarm notifications upon user defined conditions
- Connection to the IF 400 via USB
- FDA 21 CFR Part 11 data security functionality

Winlog.web

Professional version internet and local network based use

- Web based client/server solution: the measurement data can be evaluated on all PCs and smartphones via the internet or connected to the local network
- Very flexible and wide alarm management: alarm notifications upon user defined conditions, alarm notification via email; visual and audible alarm via the graphical user interface
- Connection of the interface IF 400 via USB and Ethernet
- FDA 21 CFR Part 11 data security functionality
- Management of larger data sets
- IQ / OQ documentation 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
- 300 MB free hard disc space
- USB (Universal Serial Bus)

Software requirements:
Operating System Microsoft®
- Windows® XP
- Windows 7
- Windows Vista

Further requirements:
- Mozilla Firefox 3.0
- Microsoft Internet Explorer 7

Type	Description	Part No.
Winlog.wave	Evaluation software (single-user version)	1340-2391
Winlog.web	Evaluation software (web-based server version)	1340-2390

Evaluation Software for Pharmaceutical and Medical Applications

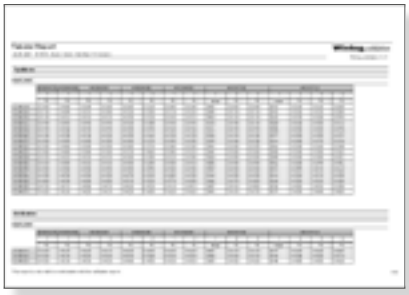
Winlog.med and Winlog.validation

The Winlog.med and Winlog.validation software versions 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 or routine control process and evaluates the measurement automatically.

Flexible Report Generation

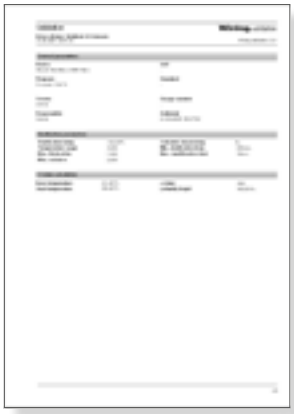
Whether you need a short process report or a table report with all measurement data – ebro's Winlog software makes it easy.

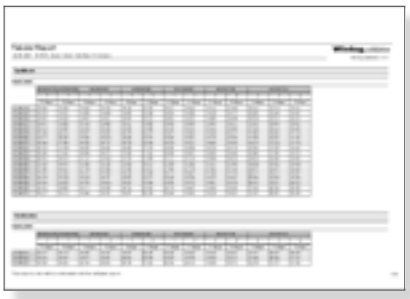
Table report



Detailed result overview

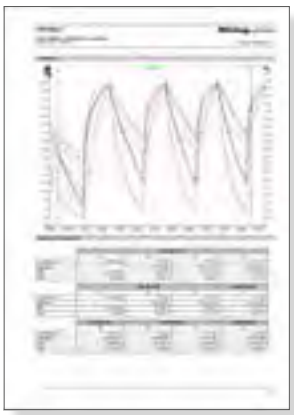
Process parameters, e.g. theoretical steam temperature calculation





Lethality report

Equipment used



Graphical data

Statistical data

a xylem brand

WTW Wissenschaftlich-Technische Werkstätten GmbH · Business Unit ebro Electronic
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Winlog.med

For routine controls

- User-friendly
- High precision measurements
- Automatic report generation
- Automatic user-defined calculations
- Automatic identification of process cycles
- Creation of user-defined masters for spezific devices and thermal processes
- Three-dimensional demonstration of sensor placement
- FDA 21 CFR Part 11

Winlog.validation

For routine controls and validations

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

- TÜV Industrial Services certified
- User-friendly
- High precision measurements
- Automatic report generation
- Automatic user-defined calculations
- Automatic identification of process cycles
- Creation of user-defined masters for specific devices and thermal processes
- Three-dimensional demonstration of sensor placement
- FDA 21 CFR Part 11
- IQ / OQ available
- Automatic completion of validation processes

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
- 300 MB free hard disc space
- USB (Universal Serial Bus)

Software requirements:
Operating System Microsoft®
- Windows® XP
- Windows 7
- Windows Vista

Further requirements:
- Mozilla Firefox 3.0
- Microsoft Internet Explorer 7

Type	Description	Part No.
Winlog.med	Standard evaluation software for routine controls	1340-2363
Winlog. validation	Professional evaluation software for routine controls and validations	1340-2394

Handhelds

ebro offers handheld instruments for many different measurement tasks:

- Core thermometers
- Officially calibrated thermometers
- Fold-back thermometers
- Infrared thermometers
- pH measurement devices
- Hygrometers
- Salt meter
- Food oil meter
- Refractomers


ON / OFF
-ebro-


TLC 730
MODE
-ebro-


NEW
FOM 320
HOLD
-ebro-

Temperature

ebro offers a wide variety of thermometers for various applications:

- Thermometers
- Folding thermometers
- Infrared thermometers

An overview is given on this double page.

Thermometers

Description:

- Thermometers with fixed probes or exchangeable probes
- Thermometers with rigid probes or probes with cable and hand grip
- Broad range of various probes available for certain models

Applications:

- Surface temperature measurement
- Core temperature measurement

Folding Thermometers

Description:

- Thermometers with foldable probe for safe and convenient measurement and storage
- One certain model is available with infrared measurement technology

Applications:

- Core temperature measurement
- Surface temperature measurement (via infrared)

Infrared Thermometers

Description:

- Non-contact surface temperature measurement with infrared technology
- Measurement anywhere where direct contact is not possible or convenient
- Various models with additional penetration probe, humidity probe or SMP connection available

Applications:

- Non-contact surface temperature measurement
- Core temperature measurement (via external probe)
- Humidity measurement

Thermometers

On the next pages you will find a broad range of thermometers with fixed probes or exchangeable probes with rigid probes or probes with cable and hand grip. The thermometers are applicable at the broadest site of applications.

Applications

- Core temperature measurement
- Surface temperature measurement
- Temperature measurement of fluids
- Environmental temperature measurement
- Process monitoring
- Temperature regulation

Find your perfect thermometer:

Probe Thermometers	Measurement range	High accuracy	Probe type	Probe connection	Channels	Fast response time	MIN/MAX/hold	Waterproof housing	PTB Certification	Control Thermometer
TDC 110 Basic Thermometer	-50 °C … +150 °C		NTC	Fixed	1					
TDC 150 Basic Thermometer	-50 °C … +150 °C		NTC	Fixed	1			✗		
TTX 100 Type T Thermometer	-50 °C … +350 °C		Thermocouple type T	Fixed rigid probe	1	✗				
TTX 110 Type T Thermometer	-50 °C … +350 °C		Thermocouple type T	Fixed cable probe	1	✗				
TFE 510 Core Thermometer	-50 °C … +300 °C		Thermocouple type T	Lemo	1	✗		✗		
TFX 410 Laboratory Thermometer	-50 °C … +300 °C	✗	Pt 1000	Fixed	1			✗		
TFX 410-1 Laboratory Thermometer without Probe	-50 °C … +300 °C	✗	Pt 1000	Lemo	1			✗		
TFX 420 Laboratory Thermometer without probe	-50 °C … +400 °C	✗	Pt 1000	Lemo	1		✗	✗		
TFX 422 Laboratory Thermometer	-50 °C … +200 °C	✗	Pt 1000	Fixed	1		✗	✗	✗	
TFX 430 Precision Thermometer	-100 °C … +500 °C	✗	Pt 100	Lemo	1		✗	✗		
TTX 120 Type K Thermometer	-60 °C … +1200 °C		Thermocouple type K	SMP	1					
TFN 520 Type K Thermometer	-200 °C … +1200 °C	✗	Thermocouple type K	Lemo or SMP	1		✗			
TFN 520 Type J Thermometer	-100 °C … +800 °C	✗	Thermocouple type J	Lemo or SMP	1		✗			
TFN 520 Type T Thermometer	-50 °C … +300 °C	✗	Thermocouple type T	Lemo or SMP	1		✗			
TFN 520 Type E Thermometer	-100 °C … +600 °C	✗	Thermocouple type E	Lemo or SMP	1		✗			
TFN 530 Type K Thermometer	-200 °C … +1200 °C	✗	Thermocouple type K	Lemo or SMP	2		✗			
TFN 530 Type J Thermometer	-100 °C … +800 °C	✗	Thermocouple type J	Lemo or SMP	2		✗			
TFN 530 Type T Thermometer	-50 °C … +300 °C	✗	Thermocouple type T	Lemo or SMP	2		✗			
TFN 530 Type E Thermometer	-100 °C … +600 °C	✗	Thermocouple type E	Lemo or SMP	2		✗			
GFX 460 Electronic Control Thermometer	-50 °C … +300 °C		Pt 1000	Fixed	1			✗		✗
GFX 460B Electronic Control Thermometer	-50 °C … +300 °C		Pt 100	Lemo	1			✗		✗
GFX 460G Electronic Control Thermometer	-50 °C … +300 °C		Pt 1000	Fixed glass-coated probe	1			✗		✗

TDC 110 BasicThermometer
with spare battery

Technical Data

Measurement range	-50 °C ... +150 °C
Resolution	0.1 °C
Measurement accuracy	± 1 °C (-10 °C ... +120 °C), ± 2 °C for the remaining measurement range
Sensor	NTC
Probe needle	Stainless steel, Ø4 mm, L = 120 mm, pointed
Response time (t_{99})	19 sec (water)
Operating temperature	0 °C ... +50 °C
Storage temperature	-10 °C ... +60 °C
Display	7 mm LCD
Battery	1.5 V, G 10-A
Dimensions (L x W)	50 x 40 mm; needle length = 120 mm
Weight	Approximately 13 g

- Automatic shut off after approximately 10 minutes
- Including needle guard

Type	Description	Part No.
TDC 110	Low-Cost Thermometer, incl. needle protection and spare battery	1340-5121

TDC 150 Basic Thermometer
with fast response time

Technical Data

Measurement range	-50 °C ... +150 °C
Resolution	0.1 °C (-20 °C ... + 150 °C)
Measurement accuracy	± 1 °C (-30 °C ... +150 °C)
Sensor	NTC
Probe	Stainless steel, Ø 3,5 mm, L = 125 mm, pointed
Response time (t_{99})	10 sec (water)
Operating temperature	0 °C ... + 50 °C
Storage temperature	-10 °C ... + 60 °C
Display	LCD-7 mm
Battery	1.5 V LR44, G13
Battery lifetime	Approximately 5.000 h
Dimensions (L x W x H)	24 x 26 x 85 mm
Housing material	ABS

- Approximately 5000 hours battery lifetime
- Waterproof housing (IP 65)
- Including needle protection

Type	Description	Part No.
TDC 150	Thermometer, incl. needle protection	1340-1611

TTX 100 Type T Thermometer
Thermocouple thermometer with cable probe

Technical Data

Mesurement range type T	-50 °C ... +350 °C
Accuracy type T (at +25 °C)	± 0.8 °C or ±0.8 %, whichever is larger
Resolution	0.1 °C (-60 °C ... +199.9 °C) 1 °C for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Response time (t_{90})	2 sec
Dimensions (L x W x H)	90 x 42 x 17 mm (without probe)
Battery	CR 2032, replaceable
Battery lifetime	Typically 100 hours of uninterrupted use
Temperature probe	Permanently attached to the device, with 60 cm silicone cable, probe with grip, needle Ø 3 mm, L = 105 mm, pointed
Protection class	IP 55

- Automatic shut off
- Replaceable battery

Type	Description	Part No.
TTX 100	Thermometer (Thermocouple type T) with cable	1340-5100
TTX-WM	Wall bracket for TTX 100 and TTX 110	1340-5040

TTX 110 Type T Thermometer
Thermocouple thermometer with fixed probe

Technical Data

Mesurement range type T	-50 °C ... +350 °C
Accuracy type T (at +25 °C)	± 0.8 °C or ±0.8 %, whichever is larger
Resolution	0.1 °C (-60 °C ... +199.9 °C) 1 °C for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Response time (t_{90})	2 sec
Dimensions (L x W x H)	90 x 42 x 17 mm (ohne Fühler)
Battery	CR 2032, replaceable
Battery lifetime	Typically 100 hours of uninterrupted use
Temperature probe	Permanently attached to the device, needle Ø 3 mm, L = 90 mm, pointed
Protection class	IP 55

- Including needle protection
- Automatic shut off
- Replaceable battery

Type	Description	Part No.
TTX 110	Thermometer (Thermocouple type T) with fixed probe, including needle protection	1340-5110
TTX-WM	Wall bracket for TTX 100 and TTX 110	1340-5040

TFE 510 Core Thermometer
with fast response time

TFE 510 TPE 400

- With replaceable probe
- Approximately 5 years battery life time

Technical Data

Measurement range	-50 °C ... +300 °C (-58 °F ... 572 °F)
Accuracy	±0.5 °C (0.9 °F)
Resolution	0.1 °C (0.2 °F)
Measurement probe	Thermocouple, type T
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
Thermal constant (t_{99})	3s
Battery	Lithium 3.0 V
Battery lifetime	Approximately 5 years
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Weight	Approximately 90g
Protection class	IP 67
Sampling rate	0.5 s to 15 s
Certificate	3-point factory calibration
Automativ shut off	After 2 hours, optional

Type	Description	Part No.
TFE 510-1	Thermometer without probe	1340-5510
TFE 510 + TPE 400	Thermometer with probe, with blue silicone cable, 0.6 m	1340-5516
TPE 400	Probe with blue silicone cable, 0.6 m, for TFE 510	1341-5516
AG 140	Protective cover for handheld devices, red	1340-5005

TFX-410/420/422 Series Laboratory Thermometers

TFX 410

TFX 410-1

TFX 420

TFX 422

General Technical Specifications

Accuracy	±0.3 °C
Resolution	0.1 °C
Operating temperature	-25 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Battery lifetime	Approximately 5 years
Housing material	ABS
Protection class	IP 67
Weight	Approximately 90 g
Deactivation	Automatic after 2 hours, deactivatable

TFX 410 Laboratory Thermometer *with fixed Pt 1000 probe*

- High precision
- Approximately 5 years battery life time

Technical Data

Measurement range	-50 °C ... +300 °C
Sensor	Pt 1000
Battery	3.0 V lithium, user replaceable
Dimensions (L x W x H)	54 x 22 x 109 mm (without probe)
Certificate	3-point factory calibration

Type	Description	Part No.
TFX 410	Thermometer with TPX 410 probe, pointed, 60 cm silicone cable	1340-5410

TFX 410-1 Laboratory Thermometer without probe *for various Pt 1000 probes*

Various probes available (see page 87)

- High precision
- Approximately 5 years battery life time

Technical Data

Measurement range	-50 °C ... +300 °C
Sensor	Pt 1000
Sensor connection	Lemosa size 0
Battery	3.0 V Lithium, replaceable
Dimensions (L x W x H)	54 x 22 x 109 mm (without probe)
Certificate	3-point factory calibration

Type	Description	Part No.
TFX 410-1	Thermometer without probe	1340-5415

TFX 420 Laboratory Thermometer without probe *with MIN/MAX and hold options*

Various probes available (see page 87)

- High precision
- Approximately 5 years battery life time

Technical Data

Measurement range	-50 °C ... +400 °C
Sensor	Pt 1000
Sensor connection	Lemosa size 0
Battery	3.0 V Lithium, replaceable
Dimensions (L x W x H)	54 x 22 x 109 mm (without probe)
Extra functions	Hold, MIN / MAX
Certificate	3-point factory calibration

Type	Description	Part No.
TFX 420	Thermometer without probe	1340-5425

TFX 422 Laboratory Thermometer
with fixed Pt 1000 probe and PTB Certification

The device has been certified together with the EB 4401 food inspection case (*please see page 139*).

- MIN/MAX and hold options
- High precision
- Approximately 5 years battery life time

Technical Data

Measurement range	-50 °C ... +200 °C
Sensor	Pt 1000 (lenght 120 mm, Ø 3 mm)
Cable lenght	60 cm, silicone
Response time (t_{99})	Approximately 8 sec (moving water)
Battery	Lithium battery 3 V / 1 Ah, Type CR 2477
Dimensions (L x W x H)	109 x 54 x 22mm

Type	Description	Part No.
TFX 422-with PTB certification	Thermometer, with PTB certification, with 0.6 m cable	1340-5423
TFX 422-PTB certification possible	Thermometer, PTB certification possible, with 0.6 m cable	1340-5422
TFX 422-150	Thermometer, with PTB certification, with 1.5 m cable	1340-5424
TFX 422-150	Thermometer, PTB certification possible, with 1.5 m cable	1340-5421

Accessories for TFX Thermometers

AG 130 Transport case

AG 140 Protective cover, red

AG 150 Plastic bracket suitable for 10 mm and 12 mm lamus tripods

AG 160 Stainless steel bracket

AG 170 Battery exchange set

AX 100 Extension cable for TFX devices, 1m, Lemosa size 0

AG 161 Stainless steel bracket for thermometers with protective cover AG 140

Type	Description	Part No.
AG 130	Transport case	1341-3854
AG 140	Protective cover	1340-5005
AG 150	Plastic bracket	1340-5000
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket for TFX devices in protective cover AG 140 (AG 140 not included)	1340-0596
AG 170	Battery-change set (incl. 3V lithium CR 2477 battery, needle, screws, tamping, O-ring, direction)	1100-0106
AX 100	Extension cable 1m for TFX devices (Lemosa size 0)	1340-5015

Probes for TFX 410-1 / TFX 420

Pt 1000 Probe (with Lemosa size 0)

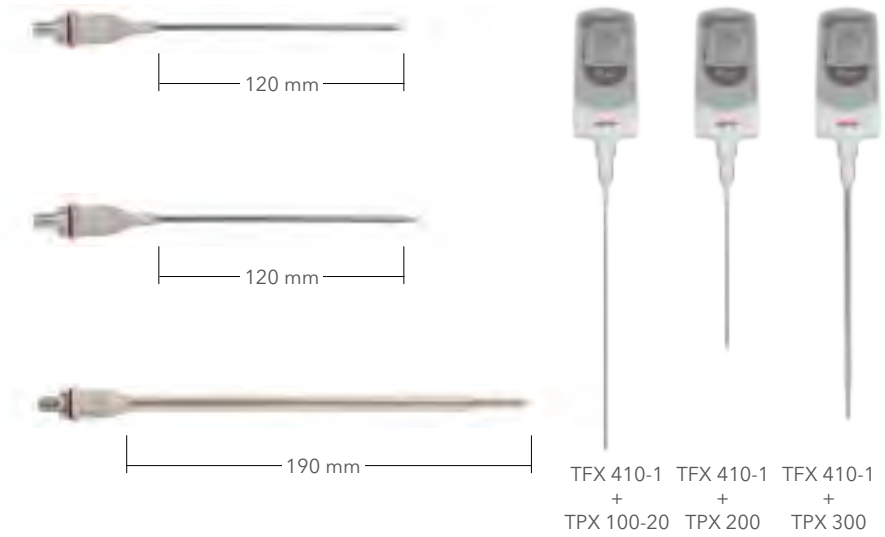
TPX 100 blunt probe
(Needle length = 120 mm,
Ø 3 mm, blunt, stainless steel needle, up to +400 °C)

TPX 200 pointed probe
(Needle length= 120 mm,
Ø 3 mm, pointed, stainless steel needle, up to +400 °C)

TPX 300 glass-coated probe
(Needle length = 190 mm,
Ø 8 mm, glass-coated, stainless steel needle, up to +400 °C)

TPX 400 pointed probe
(Needle length = 120 mm,
Ø 3 mm, pointed, with 60 cm silicone cable, stainless steel needle, up to +400 °C)

TPX 440 pointed probe
(Needle length = 120 mm,
Ø 3 mm, with 150 cm PTFE cable, stainless steel needle, up to +400 °C)



TFX 420 + TPX 400-150 | TFX 420 + TPX 440

Technical Data

Accuracy	Exceeds DIN IEC 584, class 1

Type	Description	Part No.
TPX 100	Blunt probe, needle length = 120mm, Ø 3 mm, without cable	1341-5417
TPX 200	Pointed probe, needle length = 120 mm, Ø 3 mm, without cable	1341-5418
TPX 200-20	Pointed probe, needle length = 200 mm, Ø 3 mm, without cable	1341-4182
TPX 200-30	Pointed probe, needle length = 300 mm, Ø 3 mm, without cable	1341-4183
TPX 200-40	Pointed probe, needle length = 400 mm, Ø 3 mm, without cable	1341-4184
TPX 300	Glass-coated probe, needle length = 120 mm, Ø 8 mm, without cable	1341-5419
TPX 400	Pointed probe with 60 cm silicone cable (red) and grip, needle length = 120 mm, Ø 3 mm	1341-5416
TPX 400-40	Pointed probe with 40 cm silicone cable (red) and grip, needle length = 120 mm, Ø 3 mm	1341-4164
TPX 400-150	Pointed probe with 150 cm silicone cable (red) and grip, L = 120 mm, Ø 3 mm	1341-4168
TPX 440	Pointed probe with 150 cm PTFE cable (white) and grip, L = 120 mm, Ø 3mm	1341-4169

TFX 430 Precision Thermometer

Reference thermometer with exchangeable Pt 100 probe

TFX 430 without probe

TFX 430 + TPX 130

TFX 430 + TPX 230

TFX 430 + TPX 330

TFX 430 set

Various probes available (see page 89)

- MIN/MAX and hold options
- Approximately 5 years battery life time

Technical Data

Measurement range	-100 °C ... +500 °C
Measurement accuracy	0.05 °C (-50 °C ... +199.99 °C) ±0.2 ° for the remaining measurement range
Resolution	0.01 °C (-10.00 °C ... +199.99 °C) 0.1 °C for the remaining measurement range
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Sensor	Pt 100
Sampling rate	1 sec to 15 sec
Battery	Lithium battery 3 V / 1 Ah, Type CR 2477
Battery lifetime	Approximately 5 years
Deactivation	Automatic after 2 hours, deactivatable
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Protection class	IP 67
Weight	Approximately 90 g

Type	Description	Part No.
TFX 430	Thermometer Pt 100 (without probe)	1340-5430
TFX 430 + TPX 130	Thermometer Pt 100 with probe (needle length = 200 mm, Ø 3 mm, blunt)	1340-5437
TFX 430 + TPX 230	Thermometer Pt 100 with probe (needle length = 200 mm, Ø 3 mm, pointed)	1340-5438
TFX 430 + TPX 330	Thermometer Pt 100 with probe (needle length = 190 mm, Ø 8 mm, glazed)	1340-5439
TFX 430 set	TFX set (Thermometer TFX 430, blunt probe TPX 130, extension cable AX 110, DAkkS calibration, Aluminum case AG130)	1340-5432

Accessories for TFX devices

AG 120 Artificial leather case

AG 130 Small case

AG 140 Protective cover, red

AG 150 Plastic bracket ,suitable for 10 mm and 12 mm lamus tripods

AX 110 Extension cable for TFX 430 only

Type	Description	Part No.
AG 120	Plastic case	1341-0619
AG 130	Transport case	1341-3854
AG 140	Protective cover, red	1340-5005
AG 150	Plastic bracket	1340-5000
AX 110	Extension cable for TFX 430 (1m silicone) *	1340-5020

Alternate probes for TFX 430

Pt 100, 4 conductors class A, Lemo size 1

TPX 130 blunt probe
(Needle length= 200 mm,
Ø 3 mm, stainless steel needle,
up to +400 °C)

TPX 230 pointed probe
(Needle length = 200 mm,
Ø 3 mm, stainless steel needle,
up to +400 °C)

TPX 330 blunt, glass coated probe
(Needle length= 190 mm,
Ø 8 mm, stainless steel needle,
up to +400 °C)

Technical Data

Accuracy	Pt 100, 4 conductors class A, Lemo size 1

Type	Description	Part No.
TPX 130	Blunt probe, needle length = 200 mm, Ø 3 mm	1341-5437
TPX 230	Pointed probe, needle length = 200 mm, Ø 3 mm	1341-5438
TPX 330	Blunt, glass coated probe, blunt, needle length = 190 mm, Ø 8 mm	1341-5439

TTX 120 Type K Thermometer

Basic multi-purpose thermometer

Required accessories:
NiCr-Ni probe (see pages 106)

- SMP connection
- User replaceable battery
- Measurement range to 1200 °C

Technical Data

Measurement range type K	-60 °C ... +1.200 °C
Accuracy Type K (at +25 °C)	±1 °C or ±1%, whichever is larger
Resolution	0.1 °C (-60 °C ... +199.9 °C) 1 °C for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Reaction time (t_{90})	Depends on probe
Dimensions (L x W x H)	90 x 42 x 17 mm
Battery	CR 2032, replaceable
Battery lifetime	Typically 100 hours of uninterrupted use
Protection class	IP 40
Connection	SMP
Channel	1
Sensor	Thermocouple, type K
Certificate	Factory calibration certificate

Type	Description	Part No.
TTX 120	Thermometer with SMP connection (without probe)	1340-5120
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627

TFN-520/530 Series 1-/2-Channel-Thermometers

General Technical Specifications

Measurement range type K	-200 °C ... +1200 °C
Measurement range type J	-100 °C ... +800 °C
Measurement range type T	-100 °C ... +300 °C
Measurement range type E	-100 °C ... +600 °C
Accuracy at +25 °C, type K	±0.3 °C (-99.9 °C ... +250 °C)
Accuracy at +25 °C, type J	±0.3 °C (-50 °C ... +190 °C)
Accuracy at +25 °C, type T	±0.3 °C (-50 °C ... +220 °C)
Accuracy at +25 °C, type E	±0.3 °C (-50 °C ... +150 °C) ±0.5 % for the remaining measurement range
Resolution type K	0.1 °C (-99.9 °C ... +250 °C), 1 °C for the remaining measurement range
Resolution type J	0.1 °C (-99.9 °C ... +190 °C), 1 °C for the remaining measurement range
Resolution type T	0.1 °C (-99.9 °C ... +220 °C), 1 °C for the remaining measurement range
Resolution type E	0.1 °C (-99.9 °C ... +150 °C), 1 °C for the remaining measurement range
Operating temperature	-5 °C ... +50 °C
Storage temperature	-25 °C ... +60 °C
Sampling rate	0.5 sec ... 15 sec
Sensor	External; Thermocouple type K, J, T, E
Battery	Lithium, 3V
Battery lifetime	5 years
Dimensions (l x w x h)	115 x 54 x 22 mm
Weight	Approximately 90 g
Housing material	ABS

TFN 520 Type K, J, T, E Thermometer
1-channel high accuracy thermocouple thermometer

See pages 106 ff. for probe variants.

- With Lemo connection
- Robust design for years of industrial use
- Approximately 5 year battery life time

Technical Data

Sensor connection	LEMO size 0
Channels	1 external (sensor/channel…)
Protection class	IP 52

Type	Description	Part No.
TFN 520	1-channel thermometer with Lemo connection	1340-5520

TFN 520-SMP Type K, J, T, E Thermometer
1-channel high accuracy thermocouple thermometer

See pages 106 ff. for probe variants.

- With SMP connection
- Robust design for years of industrial use
- Approximately 5 year battery life time

Technical Data

Sensor connection	SMP
Channels	1 external
Protection class	IP 40

Type	Description	Part No.
TFN 520-SMP	1-channel thermometer with SMP connection	1340-5522

TFN 530 Type K, J, T, E Thermometer
2-channel high accuracy thermocouple thermometer

Please see pages 106 ff. for probe variants.

- With Lemo connection
- Robust design for years of industrial use
- Approximately 5 year battery life time

Technical Data

Sensor connection	LEMO size 0
Channels	2 external
Protection class	IP 52

Type	Description	Part No.
TFN 530	2-channel thermometer with Lemo connection	1340-5530

TFN 530-SMP Type K, J, T, E Thermometer

2-channel high accuracy thermocouple thermometer

Please see pages 106 ff. for probe variants.

- With SMP connection
- Robust design for years of industrial use
- Approximately 5 year battery life time

Technical Data

Sensor connection	SMP
Channels	2 external
Protection class	IP 40

Type	Description	Part No.
TFN 530-SMP	2-channel thermometer with SMP connection	1340-5532

Accessories for TFN devices

AG 120 Synthetic leather case

AG 130 Small case

AN 150 Large case (without device and accessories)

AG 140 Protective cover for thermometer

AN 140 Extension cable, 1 m silicone with Lemo connection

AN 142 Extension cable, 1m silicone, SMP

AN 141 Adapter cable, 1m silicone (Lemo/ SMP)

AN 143 Extension cable, 2.5m silicone, Lemo

AN 144 Extension cable, 2.5 m silicone, SMP

AG 160 Stainless steel bracket

AG 161 Stainless steel bracket for TFN devices with protective cover AG 140

Type	Description	Part No.
AG 120	Synthetic leather case	1341-0619
AG 130	Small case	1341-3854
AG 140	Protective cover for thermometer	1340-5005
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket for TFN devices in protective cover AG 140 (AG 140 not included)	1340-0596
AN 140	Extension cable, 1m silicone, Lemo	1341-2626
AN 141	Adapter cable, 1m silicone Lemo/SMP	1341-2629
AN 142	Extension cable, 1m silicone, SMP/SMP	1343-2626
AN 143	Extension cable, 2.5m silicone, Lemo	1341-2627
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627
AN 150	Large case	1341-3857

GFX 460 Series Electronic Contact Thermometers

GFX 460

GFX 460 G

GFX 460 B

General Technical Specifications

Measurement range	-50 °C ... +300 °C
Resolution	1 °C
Measurement accuracy	±1 °C
Measurement interval	1 sec
Operating temperature	-5 °C ... +60 °C
Storage temperature	-30 °C ... +70 °C
Regulation	Fuzzy regulation
Security features	• Identification of probe breakage • Identification of probe access • Security and regulation cycle according to DIN 12878 class 1 / 2
Access	DIN 45322 Diode plug, 5-pole
Other options	Green display background lighting
Protection class	IP 65

GFX 460 Electronic Contact Thermometer
with fixed stainless steel Pt 1000 probe

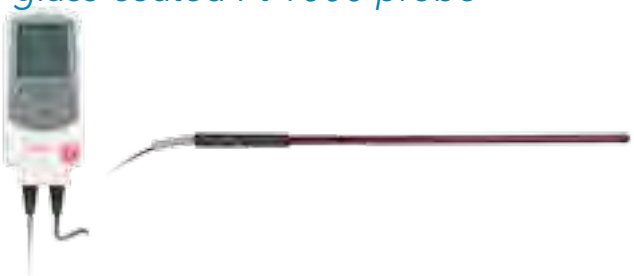
- Fuzzy control
- Control loop according to DIN EN 12878 class 1 and 2
- Green display background light

Technical Data

Probe	Pt 1000, permanently attached

Type	Description	Part No.
GFX 460	Electronic contact thermometer with fixed stainless steel Pt 1000 probe, L = 205mm, Ø 3 mm, cable length 70cm	1340-5460

GFX 460 G Electronic Contact Thermometer
with fixed glass-coated Pt 1000 probe



- Fuzzy control
- Control loop according to DIN EN 12878 class 1 and 2
- Green display background light

Technical Data

Probe	Pt 1000, glass-coated, permanently attached

Type	Description	Part No.
GFX 460 G	Electronic contact thermometer with glass coated probe, L = 235mm, Ø 7 mm, cable length 70cm	1340-5462

GFX 460 B Electronic Contact Thermometer
for replaceable Pt 100 probes

- Fuzzy control
- Control loop according to DIN EN 12878 class 1 and 2
- Green display background light

Technical Data

Probe	Pt 100, exchangeable

Type	Description	Part No.
GFX 460 B	Electronic contact thermometer without probe	1340-5464

External Probes for GFX 460 B

Pt 100, 4 conductors class A, Lemo size 1

TPX 130 blunt probe
(Needle length = 200 mm,
Ø 3 mm, stainless steel needle,
up to +400 °C)

TPX 230 pointed probe
(Needle length = 200 mm,
Ø 3 mm, stainless steel needle,
up to +400 °C)

TPX 330 blunt, glass coated probe
(Needle length = 190 mm,
Ø 8 mm, stainless steel needle,
up to +400 °C)

GFX 430 B + TPX 130

GFX 430 B + TPX 230

GFX 430 B + TPX 330

Technical Data

Accuracy	Pt 100, 4 conductors class A, size 1

Type	Description	Part No.
TPX 130	Blunt probe, needle length = 200 mm, Ø 3 mm	1341-5437
TPX 230	Pointed probe, needle length = 200 mm, Ø 3 mm	1341-5438
TPX 330	Blunt, glass coated probe, needle length = 190 mm, Ø 8 mm	1341-5439

Accessories for GFX 460 Series

AG 151 Stand adapter

AX 110 Extension cable for GFX 460 B only

AX 400 Relay box

Type	Description	Part No.
AG 151	Stand bracket	1340-5001
AX 110	Extension cable for GFX 460 B, xilicone cable, L = 1 m	1340-5020
AX 400	Relay box	1340-0157

Fold-Back Thermometers

On the next pages you will find various fold-back thermometers with and without infrared measurement technology. The penetration probe is foldable for a secure and convenient storage of the measurement device.

Applications

- Core temperature measurement
- Surface temperature measurement with infrared
- Temperature measurement of fluids
- Environmental temperature measurement
- Process monitoring

Find your perfect fold-back thermometer:

Fold-Back Thermometers	Measurement range	High accuracy	Probe type	Channels	Fast response time	Waterproof housing
TLC 700 Basic Fold-Back Thermometer	-40 °C … +250 °C		NTC	1		✗
TLC 730 Dual Infrared/ Fold-Back Thermometer	-50 °C … +350 °C		Infrared and thermocouple type K	2	X (Infrared)	✗
TLC 1598 Precision Fold-Back Thermometer	-50 °C … +200 °C	✗	Pt 1000	1		

TLC 700 Basic Fold-Back Thermometer
with foldable penetration probe

- Small size easily fits in a pocket
- Waterproof housing (IP 65)

Technical Data

Temperature measurement range	-40 °C … +250 °C
Accuracy	±0.5 °C (at -20 °C … +150 °C), ±1.0 °C for the remaining measurement range
Resolution	0.1 °C
Operating temperature	0 °C … +50 °C
Battery	Lithium button cell (CR 2032)
Dimensions (L x W x H)	118 x 33 x 15 mm, needle length = 70 mm
Certificate	Factory calibration certificate

Type	Description	Part No.
TLC 700	Folding Thermometer	1340-5734

TLC 730 Dual Infrared/Fold-Back Thermometer
with foldable penetration probe and infrared sensor

The device has been certified together with the EB 4401 food inspection case (*please see page 139*).

- Double laser pointer
- Including drill for the measurement of frozen food
- Visible and audible alarm upon exceeding/shortfall of limit value

Technical Data

Measurement range	-50 °C ... +350 °C (-58 °F ... 662 °F)
Accuracy infrared	±4 °C at -50 °C ... -30.1 °C (±7.2 °F at -58 °F ... -22 °F) ±2.5 °C at -30 °C ... -18.1 °C (±4.5 °F at -22 °F ... -0.4 °F) ±1.5 °C at -18 °C ... -0.1 °C (±2.7 °F at -0.4 °F ... 32 °F) ±1.0 °C at 0 °C ... +65 °C (±1.8 °F at 32 °F ... 149 °F) ±2.0 °C or 2 % at +65 °C ... +350 °C (±3.6 °F at 149 °F ... 662 °F)
Accuracy penetration probe	±0.5 °C at -18 °C ... +120 °C (±0.9 °F at -0.4 °F ... 248 °F) ±1 °C (±2 °F) or 1 % for the remaining measurement range (whichever is larger)
Resolution	0.1 °C / 0.2 °F
Sensor	Thermocouple type K
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Battery	2 x AAA (Micro), user replaceable
Battery lifetime	Approximately 15 h of continuous use
Dimensions (L x W x H)	48 x 24 x 172 mm (without probe)
Housing material	ABS
Weight	Approximately 140 g
Protection class	IP 55
Automatic deactivation	Automatically after 15 seconds, deactivatable
Certificate	Factory calibration certificate

Type	Description	Part No.
TLC 730	Dual Infrared / Fold-Back Thermometer	1340-5730

TLC 1598 Precision Fold-Back Thermometer
with foldable Pt 1000 penetration probe and high accuracy

- High accuracy of ±0.3 °C
- Short response time
- Approximately 4 years battery life time

Technical Data

Measurement range	-50 °C ... +200 °C (-58 °F ... 392 °F)
Accuracy	±0.3 °C (±0.5 °F)
Resolution	0.1 °C (0.2 °F)
Sensor	Pt 1000
Needle type probe	Stainless steel, Ø 3 mm, L = 105 mm, pointed
Response time (t_{99})	8 s (water)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-10 °C ... +60 °C (14 °F ... 140 °F)
Display	LCD 9 mm
Battery	3.6 V lithium
Battery lifetime	Approximately 4 years
Dimensions (L x W x H)	44 x 18 x 158 mm
Housing material	ABS
Weight	Approximately 70 g
Protection class	IP 54
Certificate	3-point factory calibration

Type	Description	Part No.
TLC 1598	Precision Fold-Back Thermometer	1340-1620

Accessories for Folding Thermometers TLC 730 and TLC 1598

AG 121 Nylon Case

AG 190 Drill for frozen food for TLC 730

Type	Description	Part No.
AG 121	Nylon case for TLC 1598 and TLC 730	1341-0624
AG 190	Drill for frozen food for TLC 730	1341-3834

Infrared Thermometers

On the next pages you will find various infrared thermometers for non-contact surface temperature measurements. The infrared thermometers are suitable for measurements wherever direct contact is impossible or impractical. ebro also offers models that measure not only the surface temperature but also the relative humidity or the core temperature by means of an external probe.

Applications

- Surface temperature measurement
- Core temperature measurement with penetration probe
- Humidity measurement
- Process monitoring

Find your perfect infrared thermometer:

Infrared Thermometers	Measurement range	Probe type	Probe connection	Channels	Distance:spot ratio	Fast response time	Splashproof housing
TFI 54 Infrared Thermometer	-60 °C … +550 °C	Infrared		1	12:1	✗	✗
TFI 250 Basic Infrared Thermometer	-60 °C … +550 °C	Infrared		1	12:1	✗	
TFI 550 Infrared Dual Thermometer	-60 °C … +550 °C	Infrared and NiCr-Ni	SMP	2	30:1	✗	
TFI 650 Infrared Dual Thermometer	-60 °C … +1500 °C	Infrared and NiCr-Ni	SMP	2	50:1	✗	
THI 350 Infrared Thermometer/Hygrometer	-60 °C … +500 °C	Infrared (temperature and humidity)		2	12:1	✗	
TLC 730 Dual Infrared/Fold-Back Thermometer	-50 °C … +350 °C	Infrared and thermocouple type K		2	8:1	✗ (Infrared)	✗

TFI 250 Basic Infrared Thermometer
with two fixed emissivity factors

Technical Data

Measurement range	-60 °C ... +550 °C (-76 °F... 1,022 °F)
Accuracy	±2 °C + 0,05 °C per °C below 0 °C (at -60 °C ... 0 °C) ±2 °C (at 0 °C ... +15 °C) ±1,5 °C (at +15 °C ... +35 °C) ±2 °C or 2%, larger value is applicable (at +35 °C ... +550 °C)
Resolution	±0.1 °C
Operating temperature	0 °C ... +50 °C (+32 °F ... 122 °F)
Response time	1 s
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Distance : spot ratio	12:1
Battery	2 x AAA (Micro)
Battery lifetime	Approximately 14 hours of continuous use
Housing material	ABS
Dimensions (L x W x H)	153 x 115 x 48 mm
Weight	177 g (with batteries)
Protection class	IP 20
Certificate	Factory calibration certificate

- Single laser pointer
- Distance:spot ratio = 12:1
- Replaceable battery

Type	Description	Part No.
TFI 250	Infrared Thermometer including factory calibration certificate	1340-1753

TFI 54 Infrared Thermometer
with splash proof housing

Technical Data

Measurement range	-60 °C ... +550 °C (-76 °F ... +1,022 °F)
Accuracy	±2 °C + 0,05 °C per °C below 0 °C (at -60 °C ... 0 °C) ±2 °C (at 0 °C ... +15 °C) ±1,5 °C (at +15 °C ... +35 °C) ±2 °C or 2%, larger value is applicable (at +35 °C ... +550 °C)
Resolution	±0.1 °C
Operating temperature	0 °C ... +50 °C (+32 °F ... +122 °F)
Response time	1 s
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Distance : spot ratio	12:1
Battery	2 x AAA (Micro)
Battery life time	Approximately 14 hours of continuous use
Housing material	Rubberized
Dimensions (L x W x H)	144 x 117 x 43 mm
Weight	180 g (with batteries)
Protection class	IP 54
Certificate	Factory calibration certificate

- Single laser pointer
- Distance:spot ratio = 12:1
- Replaceable battery

Type	Description	Part No.
TFI 54	Infrared Thermometer including factory calibration certificate	1340-1754

TFI 550 Infrared Dual Thermometer *with NiCr-Ni connection*

Optional external NiCr-Ni probes with SMP connection available (pages 106 ff.).

- Double laser pointer
- Distance:spot ratio = 30:1
- Alarm when MIN/MAX exceeded

Technical Data

Measurement range	-60 °C ... +550 °C (-76 °F ... 1022 °F)
Accuracy	±2 °C at -18 °C ... +23 °C (±3.6 °F at 0 °F ... 73 °F) ±1 % of measurement ±1 °C (whichever is larger) at +23 °C ... +510 °C ±1.8 °F (whichever is larger) at 73 °F ... 950 °F
Resolution	0.1 °C at -9.9 °C ... +199 °C, otherwise 1 °C (0.2 °F at 14 °F ... 391 °F, otherwise 1.8 °F)
Response time (t_{99})	Approximately 1 s
Emissivity factor	0.1 ... 1.0
Distance : spot ratio	30:1
NiCr-Ni probe measurement	
Measurement range	-64 °C ... +1400 °C (-83 °F ... 2552 °F)
Connection	SMP
Accuracy	±1 % of measurement value / ±1 °C (±1.8 °F), whichever is larger
Battery	2 x AAA (Micro)
Battery lifetime	Typically 180 hours
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-20° C ... +65 °C (-4 °F ... 149 °F)
Housing material	ABS
Protection class	IP 20
Weight	Approximately 180 g
Certificate	Factory calibration certificate

Type	Description	Part No.
TFI 550	Infrared thermometer with NiCr-Ni connection	1340-1786
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627

TFI 650 Infrared Dual Thermometer *with NiCr-Ni connection and wide measurement range*

Optional external NiCr-Ni probes with SMP connection available (pages 106 ff.).

- Double laser pointer
- Distance:spot ratio = 50:1
- Alarm when MIN/MAX exceeded

Technical Data

Measurement range	-60 °C ... +1500 °C
Accuracy	±2% of measurement value / ±2 °C (whichever is larger)
Resolution	0.1 °C
Response time	Approximately 1 sec
Emissivity factor	0.1 ... 1.0
Distance:spot ratio	50:1
Probe	With SMP connection
Operating temperature	0 °C ... +50 °C
Storage temperature	-20 °C ... +65 °C
Housing material	ABS
Protection class	IP 20
Battery	2 x AAA (Micro)
Battery lifetime	Typically 140 hours
Dimensions (L x W x H)	47 x 197 x 203.3 mm
Weight	Approximately 385 g (with battery)
Certificate	Factory calibration certificate

Type	Description	Part No.
TFI 650	Infrared Thermometer with NiCr-Ni connection	1340-1783
AN 144	Extension cable, 2.5 m silicone, SMP	1343-2627

THI 350 Infrared Thermometer/Hygrometer
with automatic dew point calculation

- Visible and audible alarm upon exceeding of user setable limits
- Distance:spot ratio = 12:1

Technical Data

Measurement range	-60 °C ... +500 °C
Temperature accuracy	±1.0 °C (+15 °C ... + 35 °C), ±2 °C (-33 °C ... 500 °C), ±2 °C for the remaining measurement range
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Resolution (-9,9~199,9 °C)	0.1 °C / 0.1 °F
Response time	1 sec
Operating Temperature	0 °C to +50 °C (+32 °F to +122 °F)
Distance:Spot ratio	12:1
Measurement range relative air humidity (Tamb = 23 ± 5degC)	1~99 %, Accuracy: ± 3 % of 20~80 %, otherwise ±5 %
Dew point	-50~50 °C, Accuracy: ±2.5 °C of 20~30 % rH; ±2 °C of 31~40 % rH; ±1,5 °C of 41~95 rH
Battery	2 x AAA Micro (Alkaline recommended)
Battery lifetime	Typically 180 h, at least 140 h of continuous use
Dimensions (L x W x H)	46 x 143 x 184.8 mm
Certificate	Factory calibration certificate

Type	Description	Part No.
THI 350	Infrared thermometer with air humidity measurement	1340-1790

TLC 730 Dual Infrared/Fold-Back Thermometer
with foldable penetration probe and infrared sensor

The device has been certified together with the EB 4401 food inspection case (*please see page 139*).

- Double laser pointer
- Distance:spot ratio = 8:1
- Visible and audible alarm upon exceeding/shortfall of limit value

Technical Data

Measurement range	-50 °C ... +350 °C (-58 °F ... 662 °F)
Accuracy infrared	±4 °C at -50 °C ... -30.1 °C (±7.2 °F at -58 °F ... -22 °F) ±2.5 °C at -30 °C ... -18.1 °C (±4.5 °F at -22 °F ... -0.4 °F) ±1.5 °C at -18 °C ... -0.1 °C (±2.7 °F at -0.4 °F ... 32 °F) ±1.0 °C at 0 °C ... +65 °C (±1.8 °F at 32 °F ... 149 °F) ±2.0 °C or 2 % at +65 °C ... +350 °C (±3.6 °F at 149 °F ... 662 °F)
Accuracy penetration probe	±0.5 °C at -18 °C ... +120 °C (±0.9 °F at -0.4 °F ... 248 °F) ±1 °C (±2 °F) or 1 % for the remaining measurement range (whichever is larger)
Resolution	0.1 °C / 0.2 °F
Sensor	Thermocouple type K
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Battery	2 x AAA (Micro), user replaceable
Battery lifetime	Approximately 15 h of continuous use
Dimensions (L x W x H)	48 x 24 x 172 mm (without probe)
Housing material	ABS
Weight	Approximately 140 g
Protection class	IP 55
Automatic deactivation	Automatically after 15 seconds, deactivatable
Certificate	Factory calibration certificate

Type	Description	Part No.
TLC 730	Dual Infrared / Fold-Back Thermometer	1340-5730

Recommendations for Infrared Measurements

Infrared Radiation Properties of Different Materials

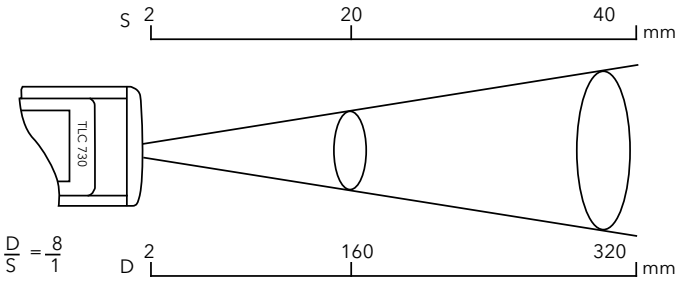
Various materials and surfaces have different infrared light emitting properties and therefore affect the temperature data being measured (emissivity). Most common products (including liquids and foodstuffs packaged in cartons or plastic containers) have an emissivity of 0.95.

Bare or metallic surfaces cause inaccurate measurements due to their reflectivity of light and heat radiation. It is possible to circumvent these problems by measuring parts of the object you are measuring that are already black (e.g. for a grill) or by painting the surface of the respective object black or by covering with matt tape. After covering the object, wait some time before performing the measurement to ensure that the material used for covering can acquire the temperature of the object being measured.

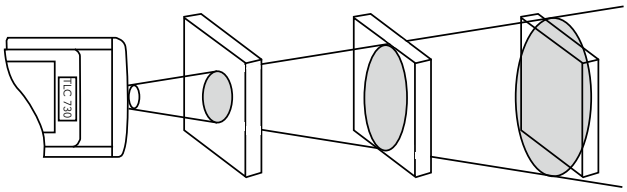
Our thermometers have a factory set emissivity of 0.95. The emissivity value can be set within a range of 0.10 (value shown on display: 10E) and 1 (display: 100E).

Tips for Precise Infrared Measurements

As the distance between the thermometer and the object being measured increases, so does the diameter of the surface being measured (spot size). You can observe this because the distance between the two red laser points projected on the measured object increases as the distance between the thermometer and the measured object increases. The ideal measuring distance is between 5 cm and 10 cm.



Please ensure that the object being measured is larger than the distance between the two laser points. The smaller the measured object is, the closer you must be to the object.



If the accuracy of the measurement is crucial, the object being measured should be at least twice as large as the distance between the two laser points. The device is not well-suited for taking temperature measurements on shiny or highly polished metallic surfaces (e.g. stainless steel, aluminum etc.). The device cannot take measurements through transparent surfaces such as glass. The device will instead measure the surface temperature of the glass. Steam, dust, smoke and other obstructions can interfere with measuring the correct temperature. If you would like to measure liquids, stir up the liquid thoroughly while taking the measurement.

Table of certain known emissivities

Material Emissivity	Emission 8–14 µm
Aluminium, oxidised	0.2 - 0.4
Aluminium, blank	0.04
Lead, scraggly	0.4
Lead, oxidised	0.2 - 0.6
Iron, oxidised	0.5 - 0.9
Iron, polished	0.24
Iron, rusted	0.5 - 0.7
Copper, polished	0.03
Copper, oxidised	0.4 - 0.8
Inconel, oxidised	0.7 - 0.95
Inconel, polished	0.3 - 0.6
Asphalt	0.95
Concrete	0.95
Ice	0.98
Cement	0.8 - 0.95
Glass pane	0.85
Rubber	0.95
Limestone	0.98
Wood	0.9 - 0.95
Cork	0.7
Graphite	0.7 - 0.8
Ceramics	0.95
Gravel	0.95
Paper	0.95
Cloth	0.95
Sand	0.9
Snow	0.9
Potter's clay	0.95
Water	0.93

Various Exchangeable Thermocouple Probes

For each application, ebro provides the right thermometer and also offers a wide selection of precise and robust probes for the following thermometers:

- TTX 120 *(see page 90)*
- TFN 520 series *(see pages 90 ff.)*
- TFN 530 series *(see pages 90 ff.)*
- TFI 550 *(see page 103)*
- TFI 650 *(see page 103)*

To solve each of your measurement tasks perfectly, you can choose between various probe types:

- Various low-cost probes
- Rod probes
- Surface probes
- High temperature probes
- Other probes

The probes are available with Lemo and/or SMP connection.

Find your perfect probe on the next pages.

Extension cables for probes

Please find more information on page 92.

AN 140 Extension cable, 1 m silicone with Lemo connection

AN 142 Extension cable, 1 m silicone, SMP

AN 141 Adapter cable, 1 m silicone (Lemo/SMP)

AN 144 Extension cable, 2.5 m silicone, SMP

AN 143 Extension cable, 2.5 m silicone, Lemo

Type	Description	Part No.
AN 140	Extension cable, 1m silicone, Lemo	1341-2626
AN 141	Adapter cable, 1m silicone (Lemo/SMP)	1341-2629
AN 142	Extension cable, 1m silicone, SMP	1343-2626
AN 143	Extension cable, 2.5m silicone, Lemo	1341-2627
AN 144	Extension cable, 2.5m silicone, SMP	1343-2627

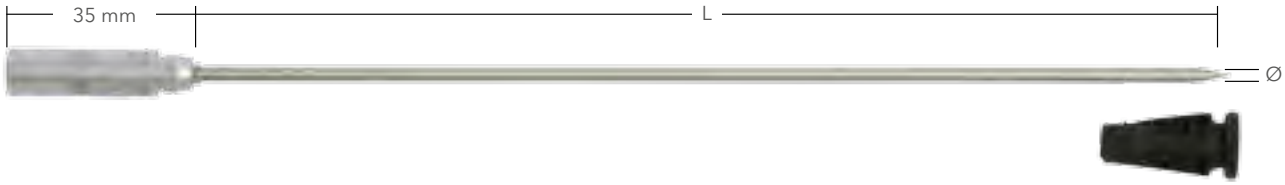
Low-cost probes

Temperature measurement of plastic masses, fluids, air and surfaces.

Penetration probes

TPN 200

- Probe (L = 185, Ø 3 mm, pointed, inconel needle with tip, without cable)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 3 sec



TPN 210

- Probe (L = 130 mm, Ø 3 mm, pointed, stainless steel, up to +400 °C, with 1 m silicone cable)
- Range: -40 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 1

TPN 211

- same as TPN 210 but with SMP connection

Type	Description	Part No.
TPN 200	Penetration probe, L= 185 mm, Ø 4 mm, pointed, Lemo	1341-0608
TPN 210	Penetration probe with 1m silicone cable, L = 130 mm, Ø 3 mm, pointed, Lemo	1341-1005
TPN 211	Penetration probe with 1m silicone cable, L = 130 mm, Ø 3 mm, pointed, SMP	1343-1005

Surface paddle probes

TPN 340

- Probe (Paddel: 40 x 7 x 0.35 mm, stainless steel sheett, for surfaces up to +400 °C, with 1m silicone cable)
- Range: -50 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 1

TPN 341

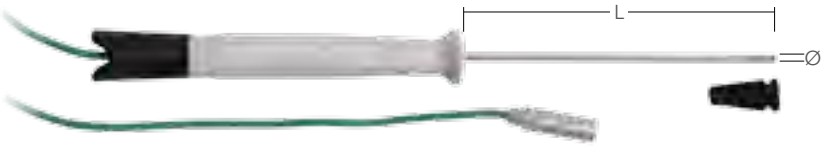
- same as TPN 340 but with SMP connection

Type	Description	Part No.
TPN 340	Surface / Paddle probe with 1 m silicone cable, 40 x 7 x 0.35 mm paddle, Lemo	1341-1015
TPN 341	Surface / Paddle probe with 1 m silicone cable, 40 x 7 x 0.35 mm paddle, SMP	1343-1015

Immersion probes

TPN 400

- Probe (L = 130 mm, Ø 3 mm, blunt, stainless steel, up to +1000 °C, with 1 m silicone cable)
- Range: -40 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 1



TPN 401

- same as TPN 400 but with SMP connection

Type	Description	Part No.
TPN 400	Immersion probe with 1m silicone cable, L = 130 mm, Ø 3 mm, blunt, Lemo	1341-1000
TPN 401	Immersion probe with 1m silicone cable, L = 130 mm, Ø 3 mm, blunt, SMP	1343-1000

Rod probes

Basic rod probes

Temperature measurement of air, ovens, fluids and gases.

TPN 100

- Probe (L = 185 or 300 mm, Ø 0.5 mm, pointed, inconel needle)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} water 0.2m/s): 0.4 sec

TPN 110

- Probe (L = 185, 300 or 500 mm, Ø 1 mm, pointed, inconel needle)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} water 0.2m/s): 1sec
- Approved according to guideline 94/9 ATEX

TPN 111 same as TPN 110 but

- Probe (L = 185 or 500 mm)
- with SMP connection

TPN 120

- Probe (L = 185, 300, 500, 600, 700 or 1000 mm, Ø 1.5 mm, pointed, inconel needle)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} water 0.2 m/s): 2sec
- Approved according to guideline 94/9 ATEX

TPN 121 same as TPN 120 but

- Probe (L = 185, 300 or 400 mm)
- with SMP connection

TPN 140

- Probe (L = 185 or 300 mm, Ø 3 mm, pointed, inconel needle)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} water 0.2 m/s): 4 sec
- Approved according to guideline 94/9 ATEX

TPN 141

- same as TPN 140 but with SMP connection

TPN 142

- Probe (L = 200 mm, Ø 3 mm, pointed, inconel needle, with cable L2 = 3 m silicone, permanently attached)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 4sec

TPN 143

- same as TPN 142 but with SMP connection

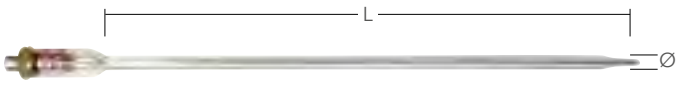
Type	Description	Part No.
TPN 100	Rod probe without cable, L = 185 mm, Ø 0.5 mm, pointed, Lemo	1341-0611
TPN 100-30	Rod probe without cable, L = 300 mm, Ø 0.5 mm, pointed, Lemo	1341-0805
TPN 110	Rod probe without cable, L = 185 mm, Ø 1 mm, pointed, Lemo	1341-0810
TPN 110-30	Rod probe without cable, L = 300 mm, Ø 1 mm, pointed, Lemo	1341-0812
TPN 110-50	Rod probe without cable, L = 500 mm, Ø 1 mm, pointed, Lemo	1341-0814
TPN 111	Rod probe without cable, L = 185 mm, Ø 1 mm, pointed, SMP	1343-0810
TPN 111-50	Rod probe without cable, L = 500 mm, Ø 1 mm, pointed, SMP	1343-0814
TPN 120	Rod probe without cable, L = 185 mm, Ø 1.5 mm, pointed, Lemo	1341-0609
TPN 120-30	Rod probe without cable, L = 300 mm, Ø 1.5 mm, pointed, Lemo	1341-0400
TPN 120-50	Rod probe without cable, L = 500 mm, Ø 1.5 mm, pointed, Lemo	1341-0406
TPN 120-60	Rod probe without cable, L = 600 mm, Ø 1.5 mm, pointed, Lemo	1341-0409
TPN 120-70	Rod probe without cable, L = 700 mm, Ø 1.5 mm, pointed, Lemo	1341-0412
TPN 120-100	Rod probe without cable, L = 1000 mm, Ø 1.5 mm, pointed, Lemo	1341-0414
TPN 121	Rod probe without cable, L = 185 mm, Ø 1.5 mm, pointed, SMP	1343-0609
TPN 121-30	Rod probe without cable, L = 300 mm, Ø 1.5 mm, pointed, SMP	1343-0400
TPN 121-40	Rod probe without cable, L = 400 mm, Ø 1.5 mm, pointed, SMP	1343-0403
TPN 140	Rod probe without cable, L = 185 mm, Ø 3 mm, pointed, Lemo	1341-0607
TPN 140-30	Rod probe without cable, L = 300 mm, Ø 3 mm, pointed, Lemo	1341-0415
TPN 141	Rod probe without cable, L = 185 mm, Ø 3 mm, pointed, SMP	1343-0607
TPN 141-30	Rod probe without cable, L = 300 mm, Ø 3 mm, pointed, SMP	1341-0415
TPN 142	Rod probe with fixed cable, L = 3 m, needle length = 200 mm, Ø 3 mm, pointed, Lemo	1341-0605
TPN 143	Rod probe with fixed cable, L = 3 m, needle length = 200 mm, Ø 3 mm, pointed, SMP	1343-0605

Glass coated rod probes

Temperature measurement in chemically aggressive stages and fluids (materials reacting with stainless steel).

TPN 132-20

- Probe (L = 200, 300 or 400 mm, Ø 8 mm, coated with Duran glass)
- Range: -40 °C ... +1100 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} water): 40 sec



Type	Description	Part No.
TPN 132-20	Rod probe without cable, L = 200 mm, Ø 8 mm, glass-coated, Lemo	1342-0200
TPN 132-30	Rod probe without cable, L = 300 mm, Ø 8 mm, glass-coated, Lemo	1342-0300
TPN 132-40	Rod probe without cable, L = 400 mm, Ø 8 mm, glass-coated, Lemo	1342-0400

Surface probes

Basic surface probes

Surface temperature measurement of motors, turbines, pumps, casting molds, heating tubes, heating plates, injection molding, heating boilers, incinerators etc.

TPN 360

- Probe (L = 30mm, with 1m silicone cable)
- Range: -50 °C ... +500 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 1.5 sec
- Approved to guideline 94/9 ATEX

TPN 361

- same as TPN 360 but with SMP connection

TPN 380

- Probe (L = 300mm, with 1m silicone cable)
- Range: -50 °C ... +800 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 1.5 sec
- Particulary suitable for hot surfaces

TPN 381

- same as TPN 380 but with SMP connection

Type	Description	Part No.
TPN 360	Surface probe with 1m silicone cable, L = 30 mm, up to +500 °C, Lemo	1341-0710
TPN 361	Surface probe with 1m silicone cable, L = 30 mm, up to +500 °C, SMP	1343-0710
TPN 380	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C, Lemo	1341-0720
TPN 381	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C, SMP	1343-0720

Surface probes for sensitive surfaces

Surface temperature measurement of plastic, glass, gum, paper, metal, injection molding, tubes etc. To protect sensitive surfaces, the probe heads consist of PTFE.

TPN 310

- Probe (Measuring tape: N-version, with 1m silicone cable)
- Range: -50 °C ... +300 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 1.5 sec
- For highly sensitive surfaces

Grip Ø 16 x 100 mm

TPN 311

- same as TPN 310 but with SMP connection

TPN 320

- Probe (Measuring tape: N-version, with 1m silicone cable)
- Range: -50 °C ... +300 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 1.5 sec
- For highly sensitive surfaces

Grip Ø 16 x 100 mm

TPN 321

- same as TPN 320 but with SMP connection

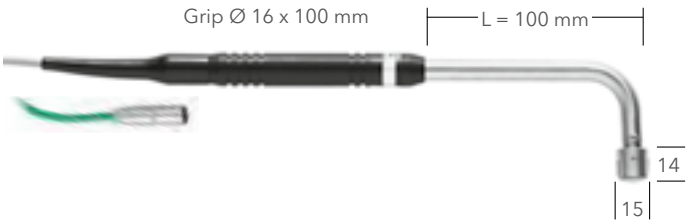
Type	Description	Part No.
TPN 310	Surface probe with 1m silicone cable, -50 °C ... +300 °C, Lemo	1341-0702
TPN 311	Surface probe with 1m silicone cable, -50 °C ... +300 °C, SMP	1343-0702
TPN 320	Surface probe with 1m silicone cable, -50 °C ... +300 °C, Lemo	1341-0717
TPN 321	Surface probe with 1m silicone cable, -50 °C ... +300 °C, SMP	1343-0717

Surface probes for hard to reach surfaces

Surface temperature measurement of machine parts.

TPN 350

- Probe (L = 100mm, with 1m silicone cable)
- Range: -50 °C ... +500 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 1.5 sec

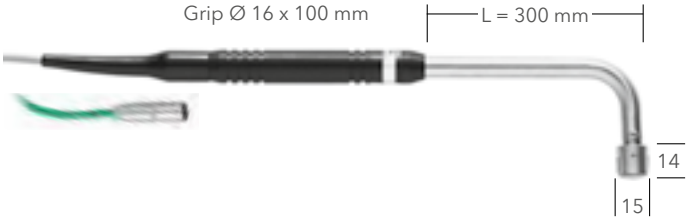


TPN 351

- same as TPN 350 but with SMP connection

TPN 390

- Probe (L = 300mm, with 1m silicone cable)
- Range: -50 °C ... +800 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 1.5 sec
- Particulary suitable for hot surfaces



TPN 391

- same as TPN 390 but with SMP connection

Type	Description	Part No.
TPN 350	Surface probe with 1m silicone cable, L = 100 mm, up to +500 °C, Lemo	1341-0712
TPN 351	Surface probe with 1m silicone cable, L = 100 mm, up to +500 °C, SMP	1343-0712
TPN 390	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C, Lemo	1341-0721
TPN 391	Surface probe with 1m silicone cable, L = 300 mm, up to +800 °C, SMP	1343-0721

Surface probes with mini sensor

Temperature measurement on very small surfaces like boards, small transformers, small heating blocks, thin tubes, rotors as well as materials such as plastic, glass, gum and metal.

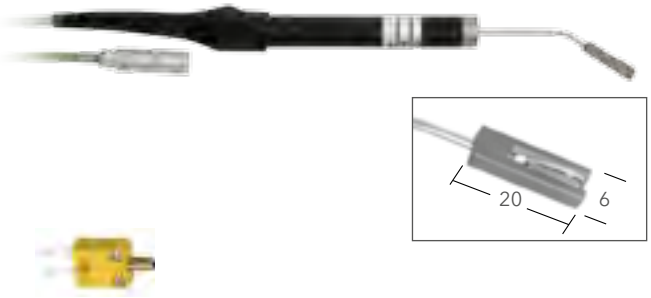
TPN 330

- Probe (Probe head: Econol, slightly angled, with 1m silicone cable)
- Range: -50 °C ... +250 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 0.5 sec

TPN 331

- same as TPN 330 but with SMP connection

Grip Ø 12 x 90 mm



TPN 1100

- Probe (Measuring head: Ø 3.8 mm, Measuring tape: coated with polyimid film, with 1m silicone cable)
- Range: -50 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 2.0 sec

TPN 1101

- same as TPN 1100 but with SMP connection

Grip Ø 12 x 80 mm

TPN 1110

- Probe (Measuring head: Ø 3.8 mm, Measuring tape: coated with polyimid film, with 1m silicone cable)
- Range: -50 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 2.0 sec

TPN 1111

- same as TPN 1110 but with SMP connection

Type	Description	Part No.
TPN 330	Surface probe with 1m silicone cable, 6 x 6 x 20 mm, Lemo	1341-0635
TPN 331	Surface probe with 1m silicone cable, 6 x 6 x 20 mm, SMP	1343-0635
TPN 1100	Mini surface probe with 1m silicone cable, Ø 3,8 mm, up to +400 °C, Lemo	1341-0653
TPN 1101	Mini surface probe with 1m silicone cable, Ø 3,8 mm, up to +400 °C, SMP	1343-0653
TPN 1110	Mini surface probe with 1m silicone cable, Ø 3,8 mm, up to +400 °C, Lemo	1341-0654
TPN 1111	Mini surface probe with 1m silicone cable, Ø 3,8 mm, up to +400 °C, SMP	1343-0654

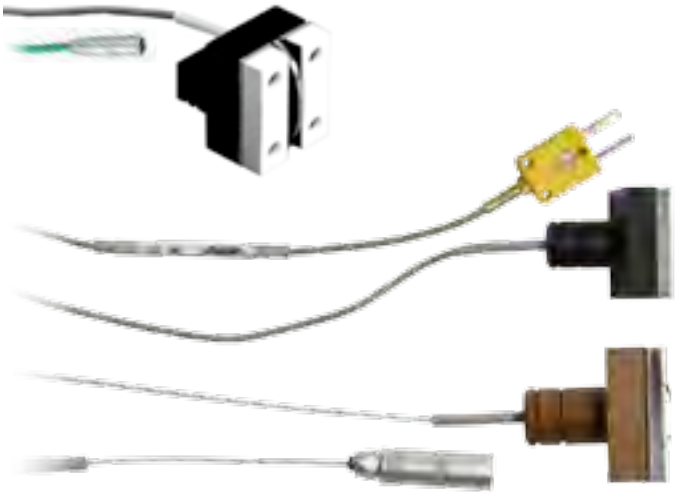
Magnetic surface probes

Long time surface temperature measurement of steel containing compounds, e.g. heating plates, heating tubes, pumps, flushing tools, motors, turbines etc.

TPN 900
- Probe (Contact area: 25 x 30 mm, with 1m silicone cable)
- Range: -50 °C ... +250 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 2.0 sec
- Contact pressure: by magnetic force

TPN 901
- same as TPN 900 but with SMP connection

TPN 920 same as TPN 900 but
- with 1m glasscoated cable
- Range: -50 °C ... +400 °C



TPN 910
- Probe (Contact area: 11 x 15 mm, Thermocouple coated with polyamid film, with 1m glasscoated cable)
- Range: -50 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 2.0 sec
- Contact pressure: by magnetic force

TPN 911
- same as TPN 910 but with SMP connection

TPN 912 same as TPN 910 but
- with 1m silicone cable
- Range: -50 °C ... +250 °C

TPN 913
- same as TPN 912 but with SMP connection

Type	Description	Part No.
TPN 900	Magnetic surface probe with 1 m silicone cable, 25 x 30 mm, up to +250 °C, Lemo	1341-0640
TPN 901	Magnetic surface probe with 1 m silicone cable, 25 x 30 mm, up to +250 °C, SMP	1343-0640
TPN 910	Magnetic surface probe, with 1 m glasscoated cable, 11 x 15 mm, up to +400 °C, Lemo	1341-0641
TPN 911	Magnetic surface probe, with 1 m glasscoated cable, 11 x 15 mm, up to +400 °C, SMP	1343-0641
TPN 912	Magnetic surface probe, with 1 m silicone cable, 11 x 15 mm, up to +250 °C, Lemo	1341-0644
TPN 913	Magnetic surface probe, with 1 m silicone cable, 11 x 15 mm, up to +250 °C, SMP	1343-0644
TPN 920	Magnetic surface probe with 1 m glasscoated cable, 25 x 30 mm, up to +400 °C, Lemo	1341-0642

Roller surface probes

Temperature measurement of solid, moving and rotating surfaces, such as turned parts, rollers, metal and paper blanks as well as at mold design and construction.

TPN 700

- Probe (Measuring head with PTFE runners (35 x 60 mm) (5 different types for rollers Ø 85–600 mm), with 1m silicone cable)
- Range: -50 °C ... +250 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 3.0 sec
- Max. speed: 800m/min

TPN 701

- same as TPN 700 but with SMP connection

Type	Description	Part No.
TPN 700	Roller probe with 1 m silicone cable, 35 x 60 mm PTFE runners, Ø 85-600 mm up to flat, Lemo	1341-0845
TPN 701	Roller probe with 1 m silicone cable, 35 x 60 mm PTFE runners, Ø 85-600 mm up to flat, SMP	1343-0845

Sheet surface probes

Temperature measurement in stacked goods, such as wood, paper, ironing presses etc.

TPN 1010

- Probe (Sheet length: 75 mm, Sheet thickness: 0.05mm at the measuring surface, with 1m silicone cable)
- Range: -50 °C ... +210 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 2.0 sec

TPN 1011

- same as TPN 1010 but with SMP connection

Type	Description	Part No.
TPN 1010	Sheet probe with 1 m silicone cable, up to +210 °C, Lemo	1341-0652
TPN 1011	Sheet probe with 1 m silicone cable, up to +210 °C, SMP	1343-0652

Rail surface probes

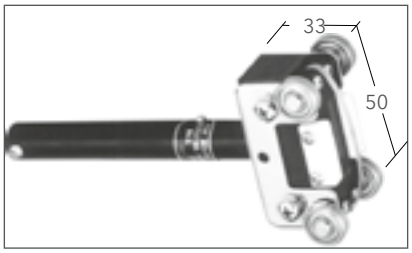
Temperature measurement of moving surfaces.

TPN 800

- Probe (Measuring head: (33 x 50 mm) with rollers, with 1m silicone cable)
- Range: -50 °C ... +250 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 3 sec
- Max. speed: 500 m/min

TPN 801

- same as TPN 800 but with SMP connection



Type	Description	Part No.
TPN 800	Rail probe with rollers and 1 m silicone cable, 33 x 50 mm measuring head,, Lemo	1341-0639
TPN 801	Rail probe with rollers and 1 m silicone cable, 33 x 50 mm measuring head, SMP	1343-0639

High temperature probes

Basic high temperature probes

Temperature measurement on ingots (glowing metal blocks with high thermal capacity).

TPN 1201

- Probe (Probe element: protected by stainless steel, with 1 m silicone cable)
- Range: -50 °C ... +1200 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 15 sec

Type	Description	Part No.
TPN 1201	High-temperature probe with 1 m silicone cable, up to +1200 °C, SMP	1343-0678

Flexible high temperature probes

High temperature measurement of air and gases.

TPN 1220

- Probe (L = 1 m, Ø 2 mm)
- Flexible coated mantle thermocouple, mantle Ø 2 mm
- Thermopile: blank
- Range: -40 °C ... +1200 °C
- Accuracy: exceeds DIN IEC 584, class 1
- Response time (t_{99}): 2.5 sec (water)

TPN 1221

- same as TPN 1220 but with SMP connection

Type	Description	Part No.
TPN 1220	Flexible high-temperature probe without cable, L = 1 m, Ø 2 mm, up to +1200 °C, Lemo	1341-0927
TPN 1221	Flexible high-temperature probe without cable, L = 1 m, Ø 2 mm, up to +1200 °C, SMP	1343-0927

Other probes

Thermal wire probes

Measurement of air, oven and gas temperatures.

TPN 600

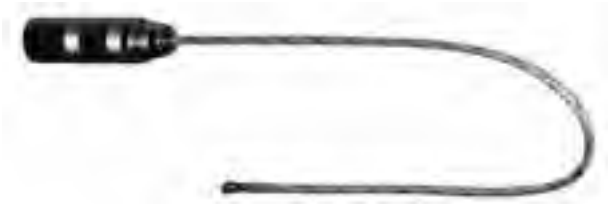
- Probe (L = 1 m, outside 1.4 x 2.0 mm, Isolation: glass/silk meshwork)
- Range: -50 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} Air 0.2 m/s): 25 sec
- Approved to guideline 94/9 ATEX

TPN 601 same as TPN 600 but

- with SMP connection
- Without approval according to guideline 94/9 ATEX

TPN 610

- Probe (L = 1 m, outside 0.8 x 1.2 mm, Isolation: glass/silk meshwork)
- Range: -50 °C ... +400 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99} Air 0.2 m/s): 25 sec



TPN 601

- same as TPN 610 but with SMP connection

Type	Description	Part No.
TPN 600	Flexible thermal wire probe without cable, L = 1 m, outside 1.4 x 2.0 mm, Lemo	1341-0646
TPN 601	Flexible thermal wire probe without cable, L = 1 m, outside 1.4 x 2.0 mm, SMP	1343-0646
TPN 610	Flexible thermal wire probe without cable, L = 1 m, outside 0.8 x 1.2 mm, Lemo	1341-0800
TPN 611	Flexible thermal wire probe without cable, L = 1 m, outside 0.8 x 1.2 mm, SMP	1343-0800

Penetration probes

Temperature measurement of viscoplastic masses like asphalt, bitumen or grounds.

TPN 220

- Probe (L = 100 mm, Ø 5 mm, stainless steel needle with tip, 1m silicone cable)
- Range: -200 °C ... +500 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 3.0 sec

TPN 221

- same as TPN 220 but with SMP connection

TPN 230

- Probe (L = 100 mm, Ø 2.1 mm, stainless steel needle with tip, 1m silicone cable)
- Range: -200 °C ... +500 °C
- Accuracy: exceeds DIN IEC 584, class 2
- Response time (t_{99}): 2.5 sec
- Approved to guideline 94/9 ATEX

TPN 231

- same as TPN 220 but with SMP connection

Type	Description	Part No.
TPN 220	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 5 mm, -200 °C ... +500 °C, Lemo	1341-0664
TPN 221	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 5 mm, -200 °C ... +500 °C, SMP	1343-0664
TPN 230	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 2.1 mm, -200 °C ... +500 °C, Lemo	1341-0674
TPN 231	Penetration probe with 1 m silicone cable, L = 100 mm, Ø 2.1 mm, -200 °C ... +500 °C, SMP	1343-0674

Humidity

On the next pages you will find three different hygrometers: one hygrometer with fixed humidity probe, one with humidity probe and cable and one hygrometer which also measures the surface temperature via infrared.

Hygrometers

Applications:

- Humidity and temperature measurement
- Surface temperature measurement with special probes
- Process monitoring

Hygrometers

Find your perfect hygrometer:

Hygrometers	Measurement range	Probe type	Probe connection
TFH 610 Hygrometer	0% rH … 100% rH	Capacitive	Fixed
TFH 620 Hygrometer	0% rH … 100% rH	Capacitive	Lemo
THI 350 Hygrometer/Infrared Thermometer	0% rH … 100% rH	Infrared (temperature and humidity)	

TFH 610 Hygrometer
with fixed humidity probe

Technical Data

Measurement range: Humidity	0° % rH ... 100 % rH
Measurement range: Temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Accuracy: Humidity	±2.5 % rH (from 10 % ... 90 %)
Accuracy: Temperature	±0.5 °C (±0.9 °F)
Resolution: Humidity	0.1 %
Resolution: Temperature	0.1 °C (0.2 °F)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Protection class	IP 40
Dimensions (L x W x H)	115 x 54 x 22 mm
Weight	Approximately 90 g
Humidity sensor	External capacitive sensor, fixed
Temperature sensor	External thermistor
Battery	Lithium battery 3.0 V / 1000 mAh
Battery lifetime	Up to 5 years
Sampling rate	1 sec to 15 sec
Certificate	Factory calibration certificate

- High precision
- Approximately 5 years battery life time

Type	Description	Part No.
TFH 610	Hygrometer for humidity and temperature measurement (including probe)	1340-5610

TFH 620 Hygrometer
with MIN/MAX and hold options

Technical Data

Measurement range: Humidity	0 % rH ... 100 % rH
Measurement range: Temperature	0 °C ... +60 °C (32 °F ... 140 °F)
Accuracy: Humidity	±2 % rH (from 5 % ... 95 %)
Accuracy: Temperature	±0.3 °C (±0.5 °F)
Resolution: Humidity	0.1 %
Resolution: Temperature	0.1 °C (0.2 °F)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Protection class	IP 67 (device without probe)
Dimensions (L x W x H)	115 x 54 x 22 mm
Weight	Approximately 90 g
Humidity sensor	External capacitive sensor, removeable
Temperature sensor	External Pt 1000 sensor
Probe position	External, plug-in probe
Battery	Lithium battery 3.0 V / 1000 mAh
Battery lifetime	Up to 5 years
Sampling rate	1 sec to 15 sec
Certificate	Factory calibration certificate

- Cable probe available
- High precision
- Approximately 5 years battery life time

Type	Description	Part No.
TFH 620 + TPH 100	Hygrometer for humidity and temperature measurements with air probe	1340-5621

Accessories for TFH Hygrometers

AG 140 Protective cover, red

AH 600 Calibration set for TFH 620

Type	Description	Part No.
AG 140	Protective cover for handheld devices, red	1340-5005
AH 600	Calibration set for TFH 620	1340-5097

THI 350 Hygrometer/Infrared Thermometer
with automatic dew point calculation

- Visible and audible alarm upon exceeding of user setable limits
- Distance:spot ratio = 12:1

Technical Data

Measurement range	-60 °C ... +500 °C
Temperature accuracy	±1.0 °C (+15 °C ... + 35 °C), ±2 °C (-33 °C ... 500 °C), ±2 °C for the remaining measurement range
Emissivity factor	0.95 standard, adjustable from 0.1 to 1.0
Resolution (-9,9~199,9 °C)	0.1 °C / 0.1 °F
Response time	1 sec
Operating Temperature	0 °C to +50 °C (+32 °F to +122 °C)
Distance:Spot	12:1
Measurement range relative air humidity (T_{amb} = 23 ± 5degC)	1~99 %, Accuracy: ± 3 % of 20~80 %, otherwise ±5 %
Dew point	-50~50 °C, Accuracy: ±2.5 °C of 20~30 %rH; ±2 °C of 31~40 % rH; ±1,5 °C of 41~95 rH
Battery	2 x AAA Micro (Alkaline recommended)
Battery lifetime	Typically 180 h, at least 140 h of continuous use
Dimensions (L x W x H)	46 x 143 x 184.8 mm
Certificate	Factory calibration certificate

Type	Description	Part No.
THI 350	Infrared thermometer with air humidity measurement	1340-1790

pH

On the next pages, you will find two different devices for measuring the pH value: the Basic PHX 800 pH Tester and the professional PHT 810 pH Meter which can be used together with various electrodes.

The device has been certified together with the EB 4401 food inspection case (*please see page 139*).

PHT 810 pH-Meter

PHX 800 pH Tester

pH-Meter and Tester

PHT 810 pH Meter without electrode
with automatic pH calibration

The device has been certified together with the EB 4401 food inspection case (*please see page 139*).

- * Different electrodes available
- MIN/MAX and hold options
- Approximately 5 years battery life time

Technical Data

pH measurement range	0 pH ... 14 pH
pH measurement accuracy	0.03 pH
pH resolution	0.01 pH
Memory	Hold, MIN / MAX
Connector	BNC
Battery lifetime	Up to 5 years
Display	LCD, 12 mm
Operating temperature	0 °C ... +50 °C
Storage temperature	-25 °C ... +60 °C
Dimensions (L x W x H)	110 x 54 x 22 mm
Temperature compensation	Manual
Weight	Approximately 200 g
Certificate	2-point factory calibration certificate (included at pH meter set)

Type	Description	Part No.
PHT 810	pH Meter (without electrode*)	1340-5810

Various electrodes for PHT 810

AT 200 plastic electrode
Housing material: plastic
Diameter: 12 mm
Shaft length: 120 mm

AT 201 laboratory electrode
Shaft housing material: glass
Shaft diameter: 12 mm
Shaft length: 900 mm

AT 206 penetration electrode
Housing material: glass
Shaft/electrode diameter:
25 mm/5 mm
Shaft/electrode length:
65 mm/12 mm

Technical Data	AT 200	AT 201	AT 206
pH measurement range	0 pH ... 14 pH	0 pH ... 14 pH	2 pH ... 13 pH
Temperature measurement range	-5 °C ... +80 °C	-15 °C ... +130 °C	+5 °C... +80 °C
Electrolyte	Gel	Gel	Referid®

Type	Description	Part No.
AT 200	Plastic electrode	1339-0631
AT 201	Measurement electrode for laboratories	1339-0632
AT 206	Penetration electrode	1339-0629

Accessories for PHT 810

AG 140 Protective cover, red

AT 100-PHT
Carrying case

AT 400
Buffer solution pH 4

AT 401
Buffer solution pH 7

AT 405
KCl solution

AT 410
Electrode cleaner

Type	Description	Part No.
AG 140	Protective cover, red	1340-5005
AT 100-PHT	Carrying case	1340-5091
AT 400	Buffer solution pH 4	1341-3836
AT 401	Buffer solution pH 7	1341-3838
AT 405	KCl solution	1341-3839
AT 410	Electrode cleaner	1341-3840

PHX 800 Basic pH Tester
with acoustic signal

- Automatic deactivation
- Battery charge indicator
- Replaceable battery

Technical Data

pH measurement range	0 pH ... 14 pH
pH measurement accuracy	0.1 pH
pH resolution	±0.2 pH
Operating temperature	0 °C ... +50 °C
Storage temperature	-25 °C ... +60 °C
Housing material	ABS plastic
Dimension (L x W x H)	170 x 32 x 15 mm
Weight	Approximately 70 g
Battery	1.5 V A76/LR44
Battery lifetime	Approximately 150 hours
Deactivation	Automatically after 15 minutes

Type	Description	Part No.
PHX 800	Basic pH Tester	1340-5800

Pressure

On the next pages you will find more information about the robust and highly accurate VAM 320 Vacumeter which is also available with EX certification.

Vacumeter

Applications:

- Measurement of low atmosphere pressure
- Measurement in EX protected areas: Ⓔx II 2G Ex ib IIC T4 Gb for ambient temperatures up to +50 °C (+122 °F)
- Process monitoring

Vacumeter

VAM 320/VAM 320-EX Vacumeter

Robust high accuracy vacumeter

Technical Data

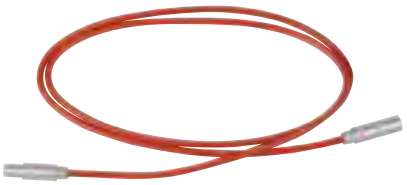
Measurement range	0 mbar ... 2000 mbar
Maximum pressure	3200 mbar
Resolution	1 mbar 0.1 kPa 0.01psi 1torr
Accuracy	±0.4 % ±1 digit of measurement range
Sampling rate	0.25 sec to 15 sec, adjustable
Sensor connection	Lemo plug, size 0, 4-pole
Electric power supply	Integrated rechargeable Li-Polymer battery
Operating temperature	0 °C ... +50 °C (at max. 85 % rF)
Storage temperature	-5 °C ... +50 °C
Dimensions (L x W x H)	170 x 45 x 24 mm (Polyamid 6.6)
Sensor dimensions	30 mm x Ø 40 mm (PEEK)
Protection class	IP 50 (device without probe)
Weight	Approximately 150 g
Certificate	2-point factory calibration
EX certification number	BVS 03 ATEX E 068

- Including tube, glass and bead connector
- Acid and base resistent plug-in sensor

Type	Description	Part No.
VAM 320	Vacumeter	1340-5350
VAM 320-Set	Vacumeter with charging station	1340-5351
VAM 320-EX	Vacumeter with EX certification	1340-5352
VAM 320-EX set	Vacumeter with EX certification and charging station	1340-5353

Accessories for VAM 320 and VAM 320-EX

AG 200 Charging station



AG 210 Extension cable, 1m, silicone

Type	Description	Part No.
AG 200	Charging station	1340-5050
AG 210	Extension cable, 1m, silicone	1340-2675

Concentration

On the next pages you will find various Digital Hand Refractometers which are available as single and dual scale models for a broad application range. In addition, we have a Salt Meter for measuring the salt content for example in fluid and semi solid food in our range.

Refractometer

Description:

Digital handheld refractometers for measuring the concentration of different substances in liquid and semi-solid products. The devices feature an automatic temperature compensation and are easy to use.

Applications:

Concentration measurement of:

- Sugar
- Salt
- Alcohol
- Adblue
- Urea

Salt Meter

Description:

The SSX 210 Salt Meter is used to measure the salt content in fluid and semi-solid food products, such as meat, cold cuts, cheese, salads etc. The measurement is performed by determination of the electrical conductivity, as it is dependent on the salt content.

Applications:

Concentration measurement of:

- Salt

Refractometer and Salt Meter

-ebro-
a xylem brand
WTW Wissenschaftlich-Technische Werkstätten GmbH · Business Unit ebro Electronic
Peringerstr. 10 · 85055 Ingolstadt, Germany · Phone +49 841 95478-0 · Fax +49 841 95478-80 · Email: ebro@xyleminc.com · **www.ebro.com**

DR Digital Hand Refractometers
with internal light source

- Wide application scope
- Single and duo scale models
- Zero-calibration with water

Technical Data

Measurement Performance	
Automatic Temperature Compensation (ATC)	ICUMSA (depending on model)
Working temperature range	+5 °C to +40 °C
Sample temperature range	+5 °C to +60 °C
Temperature sensor accuracy	±1 °C (+5 °C ... +40 °C)
Measurement time	2 sec.
Sample indicator	High, Low or No sample
Protection class	IP 65 (water resistant)
Battery	3V 2 x AAA (LR03)
Battery lifetime	10000 readings (minimum)
Construction	
Prism material	Optical glass
Prism seal	Silicon rubber and Viton
Sample dish	316 stainless steel
Sample surface diameter	8 mm
Sample volume	0.3 ml
Case material	ABS

Type	Channel	Scale	Range	Resolution	Accuracy	ATC	Part No.
DR-10	A	Sugar % (°Brix)	0-54	0.1	±0.2	Bx	1340-5650
DR-11	A	Sugar % (°Brix)	0-54	0.1	±0.2	NONE	1340-5651
DR-60	A	Refractive Index (RI)	1.33-1.42	0.0001	±0.0003	Bx	1340-5652
DR-50	A	Starch %	0-30	0.1	±0.2	Bx	1340-5653
DR-20	A	Seawater SG	1.000-1.090	0.0005	±0.001	NaCl	1340-5654
DR-21	A	Seawater PPT	0-180	1	±1	NaCl	1340-5655
DR-61	A	Wort SG (Sucrose Equivalent)	1.000-1.120	0.0005	±0.001	Bx	1340-5656
DR-22	A	Salinity (% NaCl)	0-28	0.1	±0.2	NaCl	1340-5657
DR-30	A	% Urea (CRC data)	0-40	0.1	±0.2	AUS32	1340-5658
DR-31	A	% Urea (AUS-32)	0-40	0.1	±0.2	AUS32	1340-5660
DR-740	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5661
DR-740	B	Alcohol Probable (AP)	0-22	0.1	±0.2	Bx	
DR-710	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5662
DR-710	B	Oechsle (German)	30-130	1	±1	Bx	
DR-711	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5663
DR-711	B	Oechsle (Swiss)	0-130	1	±1	Bx	
DR-712	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5664
DR-712	B	KMW (Babo)	0-25	1	±1	Bx	
DR-713	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5665
DR-713	B	°Baumé	0-28	0.1	±0.2	Bx	
DR-140	A	°Baumé	0-28	0.1	±0.2	Bx	1340-5666
DR-140	B	Alcohol Probable (AP)	0-22	0.1	±0.2	Bx	
DR-741	A	% Mass w/w	0-35	0.1	±0.2	Bx	1340-5667
DR-741	B	ABV (°Zeiss)	10-135	0.1	±0.5	Bx	
DR-620	A	°Brix	0-54	0.1	±0.2	Bx	1340-5668
DR-620	B	Salinity (% NaCl)	0-28	0.1	±0.2	NaCl	
DR-640	A	°Brix	0-54	0.1	±0.2	Bx	1340-5669
DR-640	B	Ethylene Glycol °C Protection (freezing point)	0 to -50	1	±1	EG	
DR-630	A	°Brix DEF	0-54	0.1	±0.2	AUS32	1340-5670
DR-630	B	Adblue®	0-40	0.1	±0.2	AUS32	
DR-641	A	°Brix	0-54	0.1	±0.2	Bx	1340-5671
DR-641	B	Propylene Glycol °C Protection (freezing point)	0 to -50	1	±1	PG	
DR-340	A	DEF Adblue®	0-40	0.1	±0.2	AUS32	1340-5672
DR-340	B	Ethylene Glycol °C Protection /freezing point)	0 to -50	1	±1	EG	
DR-341	A	DEF Adblue®	0-40	0.1	±0.2	AUS32	1340-5673
DR-341	B	Ethylene Glycol °F Protection (freezing point)	30 to -40	1	±1	EG	
DR-440	A	Ethylene Glycol °C Protection (freezing point)	0 to -50	1	±1	EG	1340-5674
DR-440	B	Propylene Glycol °C Protection (freezing point)	0 to -50	1	±1	PG	
DR-441	A	Ethylene Glycol °F Protection (freezing point)	30 to -40	1	±1	EG	1340-5675
DR-441	B	Propylene Glycol °F Protection (freezing point)	30 to -40	1	±1	PG	
DR-690	A	Refractive Index (RI)	1.33-1.42	0.0001	±0.0003	NONE	1340-5676
DR-690	B	FSII DiEGME ATC	0.0 to 0.25	0.01	±0.02	Bx	

SSX 210 Salt Meter Set
with gold-plated electrodes probe

- Automatic deactivation
- Approximately 5 years battery life time

Technical Data

Measurement range	0 ... 100
Resolution	1 Digit
Accuracy (at +25 °C / 77 °F)	±1 Digit
Operating temperature	+10 °C ... +40 °C (50 °F ... 104 °F)
Measurement rate	1 s to 15 s, adjustable
Deactivation	Automatically after 5 min., deactivatable
Protection class	IP 54
Dimensions (L x W x H)	100 x 46 x 25 mm
Housing material	ABS
Probe	2-conductor-measurement probe with gold-plated electrodes
Probe cable	Silicone
Weight	Approximately 200 g
Battery	Lithium 3 V / 1 Ah, type CR2477
Battery lifetime	Up to 5 years, depending on use

Type	Description	Part No.
SSX 210-Set	Salt meter set (consisting of salt meter and case)	1340-5211

Accessories for SSX 210

AG 140 Protective cover for handheld devices, red

Type	Description	Part No.
AG 140	Protective cover for handheld devices, red	1340-5005

Others

On the next pages you will find devices which are especially suitable for the food sector: the robust FOM 320 Food Oil Monitor for measuring the food oil quality and the EB 4401 Food Inspection Case which contains various devices for comprehensive food inspections.

FOM 320 Food Oil Monitor

Description:

- Fast and reliable measurement of the food oil quality directly in the hot food oil
- Determination of the right time to replace the food oil for consistently high frying quality and food oil savings of up to 10%

Applications:

Food oil measurement for:

- Process optimization
- Quality control

EB 4401 Food Inspection Case

Description:

Contains the required handhelds, data loggers and tools for comprehensive food inspections.

Applications:

- For food inspection

Food Oil Monitor and Food Inspection Case

-ebro-
a xylem brand
WTW Wissenschaftlich-Technische Werkstätten GmbH · Business Unit ebro Electronic
Peringerstr. 10 · 85055 Ingolstadt, Germany · Phone +49 841 95478-0 · Fax +49 841 95478-80 · Email: ebro@xyleminc.com · **www.ebro.com**

FOM 320 Food Oil Monitor
with simple oil type selection

Back

- Rugged sensor protection
- Impact resistant, waterproof housing (IP 67)
- Simple one-button operation

Technical Data

Measurement range: oil	0 % ... 40 % TPM* (oil temperature of +50 °C to +200 °C / +122 °F to +392 °F)
Accuracy: oil	Typically ± 2 %
Resolution: oil	0.5 %
Measurement range: temperature	+50 °C ... +200 °C (122 °F ... 392 °F)
Accuracy: temperature	± 1 °C
Resolution: temperature	0.1 °C
Operating temperature	-20 °C ... +50 °C (-4 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Battery	3V lithium, replaceable
Battery lifetime	Up to 3 years
Dimensions (L x B x H)	304 x 54 x 22 mm
Housing material	ABS (food safe)
Weight	Approximately 200 g
Protection class	Waterproof IP 67
Certificate	Factory calibration certificate

**TPM: Total polar materials*

Type	Description	Part No.
FOM 320 Set	Food Oil Monitor Set (incl.: food oil monitor, protective cover, carrying case)	1340-1570

Accessories for FOM 320

AM 130 Carrying case

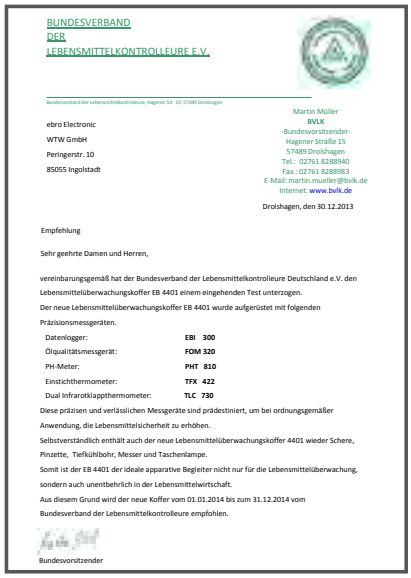
AM 140 Protective cover

AG 160 Stainless steel bracket

AG 161 Stainless steel bracket for thermometers in protective cover AM 140

Type	Description	Part No.
AG 160	Stainless steel bracket	1340-0595
AG 161	Stainless steel bracket (for handheld devices with AM 140)	1340-0596
AM 130	Carrying case	1340-1594
AM 140	Protective cover with strap, red (more colors available on request)	1340-5007

EB 4401 Food Inspection Case
for extensive food analysis



BUNDESVERBAND
DER
LEBENSMITTELKONTROLLEURE E.V.

Bundesverband der Lebensmittelkontrolleure, Hagener Str. 15, 57489 Drolshagen

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Drolshagen, den 30.12.2013

Empfehlung

Sehr geehrte Damen und Herren,

vereinbarungsgemäß hat der Bundesverband der Lebensmittelkontrolleure Deutschland e.V. den Lebensmittelüberwachungskoffer EB 4401 einem eingehenden Test unterzogen.
Der neue Lebensmittelüberwachungskoffer EB 4401 wurde aufgerüstet mit folgenden Präzisionsmessgeräten.

Datenlogger:	**EBI 300**
Ölqualitätsmessgerät:	**FOM 320**
PH-Meter:	**PHT 810**
Einstichthermometer:	**TFX 422**
Dual Infrarotklappthermometer:	**TLC 730**

Diese präzisen und verlässlichen Messgeräte sind prädestiniert, um bei ordnungsgemäßer Anwendung, die Lebensmittelsicherheit zu erhöhen.
Selbstverständlich enthält auch der neue Lebensmittelüberwachungskoffer 4401 wieder Schere, Pinzette, Tiefkühlbohr, Messer und Taschenlampe.
Somit ist der EB 4401 der ideale apparative Begleiter nicht nur für die Lebensmittelüberwachung, sondern auch unentbehrlich in der Lebensmittelwirtschaft.
Aus diesem Grund wird der neue Koffer vom 01.01.2014 bis zum 31.12.2014 vom Bundesverband der Lebensmittelkontrolleure empfohlen.

Bundesvorsitzender

The new standard Food Inspection Case contains:

- Frying oil quality measurement device **FOM 320**
- verifiable temperature measurement device **TFX 422**
- pH-measurement device **PHT 810** incl. accessories (penetration electrode, buffer solution, electrode cleaner)
- Dual Infrared / Fold-Back Thermometer **TLC 730**
- **EBI 300** USB temperature data logger with Winlog.basic evaluation software
- Flashlight
- Knife, tweezers, scissors, magnifying glass

The **FOM 320 food oil monitor** measures frying oil quality directly in the fryer. Through regular tests, it is possible to achieve consistently good quality of fried products in accordance with the food hygiene regulations (HACCP). The user has the greatest possible assurance that he is changing the oil at the right time.
Measurement range: 50 °C ... +220 °C (122 °F ... 428 °F)
Polar compounds (TPM): 0 % ... 40 %

see p. 138

The **TFX 422 thermometer** is PTB (German National Metrology Laboratory) approved and particularly suitable for measuring core temperatures and measuring the temperature of deep-frozen food products. When calibrated by an offical German calibration laboratory, it is certified to remain within calibration specifications for two years. ebro standard calibration is also available.
The measurement range is -50 °C ... +200 °C (-58 °F ... 392 °F)

see p. 86

The **PHT 810 pH meter** measures pH-values in meat, cold cuts, cheese and liquids. The device features user-friendly calibration using the keypad.
The measurement range is 0 pH ... 14 pH

see p. 128

The **TLC 730 Dual Infrared thermometer with laserpointer** for food is suitable for fast checks on refrigerated goods during storage, goods receipt checks and process monitoring. It avoids product contamination by using a non-contact measurement process. Its practical pocket size makes it easy to transport.
The measurement range is -50 °C ... +350 °C (-58 °F ... 662 °F)

see p. 98

The **EBI 300 USB temperature data logger** monitors temperature during transport and storage. After the measurement, just plug in the data logger in the USB port of a PC and the logger automatically generates a PDF report with all important measurement data,.
Measurement range: -30 °C ... +70 °C (-22 °F ... +158 °F)

see p. 62

Type	Description	Part No.
EB 4401	Food inspection case	1341-4405

Calibration

ISO/DAkkS Calibrations

for EBI 15/EBI 16/EBI 10/EBI 100/EBI 125/EBI 11/EBI 20/EBI 25/EBI 30/EBI 40

Calibration as per ISO 9000 ff

Modern quality assurance systems like ISO 9000ff, QS 9000, GxP and FDA require testing and measuring equipment checks, which also include a regular calibration of these devices. ebro ISO calibration is an economical, fast and precise option for the fulfillment of these requirements.

- Calibration is done by calibration experts in a special laboratory
- The results are documented in detail, including traceabilty information of the reference devices, in a so.called ISO certificate
- Manufacturer-independent calibration, devices from other manufacturers can be calibrated
- Calibration also includes device adjustment, if necessary (only for ebro devices)

We recommend that calibration be completed once per year for thermometers and pressure meters and once every 6 months for humidty meters. We will be happy to include you in our free ebro calibration reminder service.

DAkkS Calibration

DAkkS calibration is often needed for working standard measuring equipment, measuring equipment used by certified experts and for certain measurement procedures in medicine and pharmaceuticals – in other words, everywhere where an especially high degree of safety is required. This calibration is done by special DAkkS laboratories that are monitored by the Physikalisch-Technische Bundesanstalt (PTB).

- Calibration is done by accredited laboratories.
- Internationally recognized and comparable measurement results.
- DAkkS calibration is done by specially certified persons only.
- Traceable calibration in accordance with EN ISO 9001 and EN ISO/IEC 17025.
- Identification and documentation of the measurement uncertainty.
- Manufacturer-independent calibration, deviced from other manufacturers can be calibrated.

We recommend that calibration be completed once per year for thermometers and once every 6 months for pressure and humidty meters. We will be happy to include you in our ebro calibration reminder service free of charge.

ISO Calibration

[1] *According to DIN ISO 9000ff including certificate*

Type	Description	Part No.
EBI 15	3-Point-ISO [1]	1020-3515
EBI 10-T, 1 temperature channel	3-Point-ISO [1]	1020-3510
EBI 10-T, 2 temperature channels	3-Point-ISO [1]	1020-3511
EBI 10-TP, 1 temperature and 1 pressure channel	3-Point-ISO [1]	1020-3520
EBI 10-TP, 1 temperature and 2 pressure channels	3-Point-ISO [1]	1020-3521
EBI 10-TP, 1 temperature and 3 pressure channels	3-Point-ISO [1]	1020-3522
EBI 11-T / EBI 100-T, 1 temperature channel	3-Point-ISO [1]	1020-3550
EBI 125-A ... / 1-Channel	3-Point-ISO [1]	1020-3500
EBI 125-A ... / 2-Channel	3-Point-ISO [1]	1020-3501
EBI 125-A-PT, 1 temperature and 1 pressure channel	3-Point-ISO [1]	1020-3502
EBI 125-A-PT, 1 temperature and 2 pressure channels	3-Point-ISO [1]	1020-3503
EBI 40-TC-01 / 6-Channel	3-Point-ISO [1]	1020-3540
EBI 40-TC-02 / 12-Channel	3-Point-ISO [1]	1020-3541
EBI 20-T/-TE, EBI 25, EBI 300, EBI 310	3-Point-ISO [1]	1020-3580
EBI 20-TH / EBI 25-TH	2-Point-ISO [1]	1020-3582
EBI 30-pH	3-Point-ISO [1]	1020-3530
Extra calibration point	Additional calibration point ISO	1020-3599

DAkkS Calibration

[2] *According to DAkkS (Traceability to German Standard) including certificate*

Type	Description	Part No.
EBI 10-T, 1 temperature channel	3-Point-DAkkS [2]	1020-3610
EBI 10-T, 2 temperature channels	3-Point-DAkkS [2]	1020-3611
EBI 10-TP, 1 temperature and 1 pressure channel	3-Point-DAkkS [2]	1020-3620
EBI 10-TP, 2 temperature and 1 pressure channel	3-Point-DAkkS [2]	1020-3621
EBI 10-TP, 3 temperature and 1 pressure channel	3-Point-DAkkS [2]	1020-3622
EBI 11-T, 1-channel	3-Point-DAkkS [2]	1020-3650
EBI 125-A, 1-channel	3-Point-DAkkS [2]	1020-3600
EBI 125-A, 2-channel	3-Point-DAkkS [2]	1020-3601
EBI 125-A-PT, 1 temperature and 1 pressure channel	3-Point-DAkkS [2]	1020-3602
EBI 125-A-PT, 2 temperature and 1 pressure channel	3-Point-DAkkS [2]	1020-3603
EBI 20-T/-TE, 1 temperature channel	3-Point-DAkkS [2]	1020-3680
EBI 20-TH, 1 temperature and 1 humidity channel	3-Point-DAkkS [2]	1020-3682
EBI 100-T, 1 temperature channel	3-Point-DAkkS [2]	1020-3650
EBI 100-T, 2 temperature channels	3-Point-DAkkS [2]	1020-3651
Extra calibration point	Additional calibration point DAkkS	1020-3799

AC 100 Calibration Set

Temperature bath for the calibration of data loggers and handhelds

Technical Data

Temperature operation range	+50 °C ... +200 °C
Accuracy	±0.05 °C
Setting accuracy	0.01 °C
Resolution	0.01 °C
Warm-up time	10 °C / Min
Cooling-off time	3 °C / Min
Stabilizing time	20 Min.
Filling capacity of bath	400 ml
Supply voltage	230 V / 50 Hz, other supply voltage on request
Weight	Approximately 10 kg
Carrying case	Black

Type	Description	Part No.
AC 100	Mobile calibration bath	1340-6030
AC 110	Replacement calibration oil	1340-6031

TFX 430-set Precision Thermometer

Reference Device

Technical Data

Measurement range	-100 °C ... +500 °C
Accuracy	±0.05 °C (-50 °C ... +199.99 °C) remaining measurement range: ±0.2 °C
Resolution	0.01 °C (-100,00 °C ... +199.99 °C) 0.1 °C remaining measurement range
Operating temperature	-20 °C ... +50 °C
Storage temperature	-30 °C ... +70 °C
Measuring probe	Pt 100
Sampling rate	1 sec to 15 sec, adjustable
Battery	Lithium Battery 3 V / 1 Ah, Type CR 2477
Battery lifetime	Approximately 5 years
Deactivation	Automatically after 2 hous, deactivatable
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Protection class	IP 67
Weight	Approximately 90 g

Type	Description	Part No.
TFX 430-Set	Precision Thermometer Pt 100 set (Thermometer TFX 430, blunt probe TPX 130, extension cable AX 110, DAkkS-Calibration, aluminium case AG 130)	1340-5432

Calibration conditions for different calibrations

Temperature Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Temperature measurementdevices with air and submersible sensors, Temperature data logger	>-80 °C ... +250 °C (-112 °F ... 482 °F) >+250 °C ... +1000 °C (+482 °F ... 1832 °F)	Temperature-regulated Liquid baths, Calibration source	0.1 K 0.2 K
DAkkS / DKD	Temperature measurement devices resistance thermometers, electronic thermometers and data loggers	0 °C (+32 °F) 0.01 °C (32.018 °F) -85 °C ... -35 °C (-121 °F ... -31 °F) -35 °C ... +250 °C (-31 °F ... 482 °F) +250 °C ... +300 °C (482 °F ... 572 °F) >+300 °C ... +1100 °C (>572 °F ... 2012 °F)	Ice point Water triple point Liquid bath Water bath Oil bath Tube furnace	0.010 K 0.005 K 0.080 K 0.050 K 0.080 K 1.5 K
Calibration	ebro Thermometer TFX 422 TFF 200	-40 °C ... +200 °C (-40 °F ... 392 °F)	Temperature-regulated Liquid baths	0.1 K

Surface Temperature Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Temperature measurement devices with surface probe	+40 °C ... +250 °C (104 °F ... 482 °F)	Surface calibrator	0.9 K
ISO	Non-contact IR Temperature measurement devices	-35 °C ... +190 °C (-31 °F ... 374 °F)	Black emitter	0.5 K

Humidity Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Measurement devices for relative humidity	10 % ... 30 % 30 % ... 60 % 60 % ... 95 % Temperature range: +5 °C ... +70 °C (41 °F ... 158 °F)	Two pressure humidity generator Temperature range: +5 °C to +70 °C (+41 °F to +158 °F)	0.8 % 1.2 %
DAkkS / DKD	Measurement devices for relative humidity	10 % ... 30 % 30 % ... 60 % 60 % ... 95 % Temperature range: +5 °C ... +70 °C (41 °F ... 158 °F)	Two pressure humidity generator Temperature range: +5 °C to +70 °C (+41 °F to +158 °F)	0.3 % 0.6 % 0.9 %

Pressure Calibrations

Calibration type	Calibration object	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Absolute pressure	0 mbar ... 10,000 mbar	Pressure calibrator	1 mbar + 0.5 x 10^{-4}pabs
DAkkS / DKD	Absolute pressure	0mbar ... 35,000 mbar	In gases	0.1 mbar + 1.5 x 10^{-4}pabs

ISO Standard Calibration Points for ebro Products

Measurement device	Calibration points		
EBI 1 Logger 85, -85A and EBI 10	-20 °C (-4 °F)	0 °C (32 °F)	+60 °C (140 °F)
EBI 1 Logger 125, -125A, EBI 10 and EBI 11	0 °C (32 °F)	+60 °C (140 °F)	+134 °C (273 °F)
EBI 2 Logger / EBI 310	-20 °C (-4 °F)	0 °C (32 °F)	+60 °C (140 °F)
EBI 20 / EBI 300	-20 °C (-4 °F)	0 °C (32 °F)	
Thermometers with penetration probe	0 °C (32 °F)	+60 °C (140 °F)	+120 °C (248 °F)
Thermometers with surface probe	+50 °C (122 °F)	+100 °C (212 °F)	+200 °C (392 °F)
Thermometers without probe	-100 °C (-148 °F)	0 °C (32 °F)	+200 °C / +1000 °C (392 °F / 1.832 °F)
EBI 2 Humidity Logger	32.8 % -20 °C (-4 °F)	52.9 % 0 °C (32 °F)	75.4 % +60 °C (140 °F)

Calibration in Accordance with EN 13486

Factory Calibration

Most ebro measuring equipment is supplied with a factory calibration certificate. The functionality and the tolerances indicated in the technical specifications are thus ensured. Factory calibration is completed with DAkkS-calibrated factory normal.

- Calibration completed using special equipment.
- All factory certificates issued by trained personnel.
- The factory calibration certificate confirms the suitability of the device for official calibration.
- This calibration is completed for all new devices and standard replacement devices.

Calibration as per ISO 9000 ff

Modern quality assurance systems like ISO 9000 ff, QS 9000, GxP and FDA require regular testing and measuring equipment checks, which also includes the calibration of these devices. ebro ISO-calibration is an economical, fast and precise option for the fulfilment of these requirements.

- Calibration is done by calibration experts in a special laboratory.
- The results are documented in detail, including traceability information, in a so-called ISO calibration certificate.
- Manufacturer-independent calibration, devices from other manufacturers can be calibrated.
- Calibration also includes device adjustment, if necessary (only for ebro devices).

We recommend that calibration be completed once per year for thermometers and humidity meters and once every six months for humidity meters.

Precision measurement and testing equipment such as thermometers and data loggers should be checked and calibrated regularly.

Certified according to EN ISO 9001 : 2008

DAkkS calibration

DAkkS calibration is often needed for working standard measuring equipment, measuring equipment used by certified experts and for certain measurement procedures in pharmaceuticals and medicine – in other words everywhere where an especially high degree of safety is required. This calibration is done by special DAkkS laboratories that are monitored by the Physikalisch Technische Bundesanstalt (PTB).

- Calibration is completed by accredited laboratories.
- Calibration is internationally recognized.
- DAkkS calibration is carried out by specially certified persons only.
- DAkkS calibration is documented in detail, including traceability.
- Manufacturer-independent calibration, devices from other manufacturers can be calibrated.

We recommend that calibration be completed once per year for thermometers and once every six months for pressure and humidity meters.

Calibration

Values measured by a device that has been officially calibrated are legally binding Therefore such a device is ideal for use by government inspection authorities such as food inspectors or certified court experts.

- Official calibration is completed by government gauging offices only.
- Measuring equipment must have a special type approval from the Physikalisch Technische Bundesanstalt (PTB) in order to be eligible for official calibration.
- The official calibration certificate indicates the display correction, calibration tolerances and duration of validity.
- The TFX 422 thermometer from ebro is officially calibrated (or suitable for official calibration).

The following is applicable to:

ISO calibrations

The price for the calibration according to ISO 9000 ff. including certificate and 3 specified standard calibration points. Freely selectable calibration points between -85 °C and +250 °C (-121 °F ... +482 °F) are available for a small fee.
The calibration of temperature / humidity loggers includes 2 to 3 humidity calibration points in the price. In addition a temperature calibaration in the range of -40 °C ... +75 °C (-40 °F ... 167 °F) can be completed.

DAkkS calibrations

The price for the DAkkS calibration including certificate includes 3 freely selectable calibration points in the range of -85 °C ... +300 °C (-121 °F ... +572 °F) or 10% ... 95% for humidity calibration. Additional calibration points are available for a small fee.

More Information

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A guide to temperature limits

These temperature values insure optimum freshness:

Food	Transport and Storage Temperature
Fresh milk products	≤ +6 °C
Milk at a Dairy	≤ +6 °C
Pasteurized milk, repackaged milk	≤ +8 °C
Butter	≤ +10 °C (≤ +6 °C for transport)
Dessert	≤ +7 °C
Cheese (except hard cheese)	≤ +10 °C
Ice cream, prepackaged	≤ -18 °C (≤ -20 °C for transport)
Ice cream, scooped and served	≤ -10 °C
Eggs (if eggs to be stored over 18 days)	from +5°C to +8 °C
Egg products (deep frozen)	≤ -18 °C
Egg products (frozen)	≤ -12 °C
Egg products (fresh)	≤ +4 °C
Raw egg-containing food products (e.g. fresh mayonnaise)	≤ +7 °C
Bakery products with partially baked filling	≤ +7 °C
Fresh meat products, fresh meat (including big game)	≤ +7 °C
Fresh poultry (rabbit and small game)	≤ +4 °C
Exception: flightless birds (as approved)	≤ +7 °C
Meat preparation	≤ +4 °C
Meat preparation (production and sales on site)	≤ +7 °C
Cold cut plates	≤ +7 °C
Ground meat	≤ +2 °C
Ground meat (production and sales on site): 24 hours delivery	≤ +7 °C (≤ +2 °C for transport)
Offal / Organ meats	≤ +3 °C
Meat, poultry, fish (frozen)	≤ -12 °C
Meat, poultry, fish (deep frozen)	≤ -18 °C
Fish, fish products	in melting ice or ≤ +2 °C
Smoked fish	≤ +7 °C
Fishery products (marinaded, soured, smoked)	≤ +7 °C (≤ +6 °C for transport)
Fishery products (fresh) plus crawfish and mollusk products	in melting ice or ≤ +2 °C
Delicatessen	≤ +7 °C
Raw fruit and vegetables	≤ +7 °C
Salads, fresh and / or crushed, delicatessen salads	≤ +7 °C

Retained samples for testing

Save for a minimum of 10 days	≤ -18 °C

Hot Meals

Heated (core temperature)	≥ +70 °C
Food counter	≥ +65 °C

Cold Meals

Storage temperature until serving	≤ +7 °C

Disinfection facilities

Water	≥ +82 °C

German Food Inspectors recommend ebro instruments

- Thermometers
- Temperature Data Loggers
- Food Oil Quality Meter

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Hersteller-Erklärungen
DECLARATIONS OF CONFORMITY

Hiermit erklären wir,
Hereby we declare

dass sich das Gerät
that the following product

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Fax: +49 841 95478-80

Geräteart: *Product type:*	**Datenlogger** ***Data logger***
Typebezeichnung: *Type designation:*	EBI 10-Txxx / -TPxxx, EBI 100-Txxx / -TPxxx, EBI 16, EBI 11-Txxx / -Pxxx / -TPxxx, EBI 25-T / -TE / -TX / -TH, EBI 20-T1 / -TE1 / -TF / -TH1, EBI 300, EBI 310, EBI 330, EBI 40-TC

in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 37/2005 EG zur Überwachung der Temperaturen von tief gefrorenen Lebensmitteln in Beförderungsmitteln sowie Einlagerungs- und Lagereinrichtungen befindet.
Zur Beurteilung der Konformität wurden folgende harmonisierte Normen herangezogen:
- **Prüfung, Leistung, Gebrauchstauglichkeit: EN 12830**
- **Regelmäßige Prüfung und Kalibrierung: EN 13486**

is in compliance with the essential requirements and other relevant provisions of Directive 37/2005 EC.
The following harmonized standards have been used:
- **Tests, performance, suitability: EN 12830**
- **Periodic verification and calibration: EN 13486**

André Brauers, Geschäftsbereichsleiter / *Business Manager*

Hiermit erklären wir,
Hereby we declare

dass sich das Gerät
that the following product

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85055 Ingolstadt, Germany
Phone: +49 841 95478-0
Fax: +49 841 95478-80

Geräteart: *Product type:*	**Thermometer** ***Thermometer***
Typebezeichnung: *Type designation:*	TLC 700, TLC 730, TLC 1598, TDC 150, TFX 410, TFX 410-1, TFX 420, TFX 422, TTX 100, TTX 110, TTX 120, TFE 510, TBI 40

in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Bestimmungen der Richtlinie 37/2005 EG zur Überwachung der Temperaturen von tief gefrorenen Lebensmitteln in Beförderungsmitteln sowie Einlagerungs- und Lagereinrichtungen befindet.
Zur Beurteilung der Konformität wurden folgende harmonisierte Normen herangezogen:
- **Prüfung, Leistung, Gebrauchstauglichkeit: EN 13485**
- **Regelmäßige Prüfung und Kalibrierung: EN 13486**

is in compliance with the essential requirements and other relevant provisions of Directive 37/2005 EC.
The following harmonized standards have been used:
- **Tests, performance, suitability: EN 13485**
- **Periodic verification and calibration: EN 13486**

André Brauers, Geschäftsbereichsleiter / *Business Manager*

Conditions of Delivery and Payment

1. General
   - 1.1 These Conditions of Delivery and Payment shall apply as binding conditions to the business relationship as a whole, to the present agreement, to all deliveries arising from future business transactions between the parties and to other performance.
   - 1.2 Other conditions applied by Customer and not expressly acknowledged by us in writing shall remain non-binding for us, even if not expressly refused by us.
   - 1.3 All other agreements, changes or supplements to agreements and ancillary agreements must be confirmed by us in writing. Statements by our staff and representatives shall be deemed effective in law only when confirmed by us in writing.
2. Offer and Order Confirmation
   - 2.1 Our offers are subject to confirmation. The scope of our obligation to perform shall be determined solely by our written order confirmation.
   - 2.2 Any documents forming the basis of an offer or order confirmation, such as sketches, drawings, cost estimates and other documentation, shall be utilized by Customer for the agreed purpose only and shall not be reproduced or made available to third parties by Customer without our express permission. Said documents shall be returned to us at our request.
3. Delivery and Delay
   - 3.1 Punctual adherence to delivery deadlines assumes the timely supply of documentation and other necessary information to us by Customer and furthermore assumes that payment obligations on behalf of Customer do not fall into default.
   - 3.2 In the case of our inability to comply with binding delivery dates for reasons of force majeure or other unavoidable circumstances such as war, industrial action, lockout or delay in the provision to us of parts, goods or services ordered from third parties, Customer shall be entitled to specify an appropriate extension of the delivery period with a minimum of four weeks, after the expiry of which Customer shall be entitled to withdraw from the contractual agreement in the form of a registered letter.
   - 3.3 Should our delivery of the goods or services be rendered impossible under the circumstances given for reasons beyond our control, we shall be deemed exempt from our obligation to deliver. This shall also apply if said circumstances affect our operations to such an extent that our fulfilment of the agreement is hindered.
   - 3.4 Customer shall be entitled to claim compensation against us, whether for withdrawal from the agreement or delay in delivery, in the circumstances given above. This shall not apply in cases where gross negligence or intention is imputed to us.
   - 3.5 We shall be entitled to execute part-deliveries.
4. Acceptance and Transfer of Risk
   - 4.1 Unless fixed acceptance periods are agreed, Customer shall undertake to accept the delivery item within eight days of

notification of its completion.

   - 4.2 If Customer has submitted an order on call, he shall undertake to call up the delivery item – or all items, in the case of multiple orders – within a period of twelve months from the date of ordering. If Customer fails to call up the order within this period we shall be entitled to undertake unsolicited dispatch and invoicing of the goods, or to withdraw from the contract and demand the return of any bulk discount already granted on the basis of the on-call order for earlier orders.
   - 4.3 Risk shall be transferred to Customer on acceptance of the delivery item, in the case of groundless refusal on the part of Customer to accept the delivery item, or in the case of inaction on the part of Customer after the expiry of the time limit given in 4.1 and 4.2 above or a specifically agreed time limit for acceptance. If dispatch of the delivery item to Customer or a third party is agreed, risk shall be transferred when the delivery item is passed to the carriage agent (mail, rail, carrier etc.). In all cases risk is transferred with the commencement of use of the delivery item. If we accept goods returned for reasons over which we have no control, risk shall lie with Customer until the delivery item arrives at our premises.
5. Prices and Conditions of Payment
   - 5.1 Unless otherwise specified, prices given by us are ex works exclusive of statutory Value Added Tax and packing costs. Packing of our choice will be invoiced.
   - 5.2 Our invoices are due net cash 30 days after invoice date. Invoices for repairs are due immediately, strictly in full.
   - 5.3 Prices are valid for a period of four months after receipt of our order confirmation. If longer delivery times have been agreed and prices of raw materials, wages and salaries, freight or public duties increase after conclusion of the agreement, shall be entitled to increase prices by an appropriate amount. 5.4 If Customer exceeds the time limit for payments, he shall be deemed to be in default from receipt of our first reminder. We reserve the right to charge default interest to the amount of 3% above the German Central Bank discount rate applicable at the time.
   - 5.5 We are under no obligation to accept bills of exchange, which in all cases shall be deemed to be accepted only when the amount has been credited to our account. We accept no liability for the timely presentation, protest, notification or returning of the bill in the case of non-redemption. In case of default we shall reserve the right to exercise the claims specified in 5.4.
   - 5.6 If Customer fails to meet his obligations of payment to a significant extent, ceases to render payment instalments or fails to redeem a cheque or bill of exchange, or if any serious deterioration in Customer's business status comes to our knowledge, we shall be entitled to demand payment in advance and call in all deliveries outstanding.
   - 5.7 In the case of requests for modification or alteration issued on the part of Customer after order confirmation, we shall invoice Customer for any resulting additional costs.
6. Retention of Title
   - 6.1 The goods delivered shall remain our property until all accounts arising from our business transactions with Customer have been settled in full. Retention of title shall be upheld if individual claims against Customer are included in an open account. A Customer indicating his status as reseller when ordering shall be entitled to resell the reserved goods as part of normal business transactions; however, pledging or cession by security shall not be permitted. In the case of resale of the reserved goods on credit, Customer shall undertake to secure our rights. 6.2 Claims arising from resale of the reserved goods shall be transferred to us by Customer at the time of conclusion of the agreement concerning resale of our delivery; we accept said transfer.
7. Warranty
   - 7.1 Defects in the delivery items about which we are informed after the transfer of risk shall be repaired by us at our own option or replaced by us. We shall also be entitled to replace the goods if repair proves unsuccessful. Written notification of defects must be received by us within fourteen days of transfer of the delivery items to the Customer in the case of visible defects, or immediately after discovery in the case of hidden defects.
   - 7.2 Any alterations or modifications to the goods undertaken by the recipient of the goods shall render null and void all obligation on our part to replace the goods. Defective items shall be returned freight and carriage free and shall be retained for our inspection. If the complaint proves justified we shall, at our own option, replace the goods free of charge and carriage free after return of the defective goods, or repair the defective goods. Claims concerning rescission of the contract, price reduction or compensation shall be excluded.
   - 7.3 We accept no liability for damages arising for the following reasons: Faulty operation by Customer or a third party, inappropriate or im-proper use, non-observance of our operating instructions, chemical, electrochemical or electrical influence, alterations or maintenance work not approved by us.
   - 7.4 Further claims on the part of Orderer shall be excluded, particularly claims concerning the reimbursement of damages not arising from the delivery item itself. This shall not apply in cases where intention or gross negligence are imputed to us.
8. Place of Fulfilment, Place of Jurisdiction
   - 8.1 The place of fulfilment for delivery and payment shall be Weilheim. The place of jurisdiction for all disputes, including those involving bills of exchange or cheque processes, shall be Weilheim.
   - 8.2 If a condition of these Terms and Conditions is or becomes invalid, the validity of all other conditions remains unaffected.

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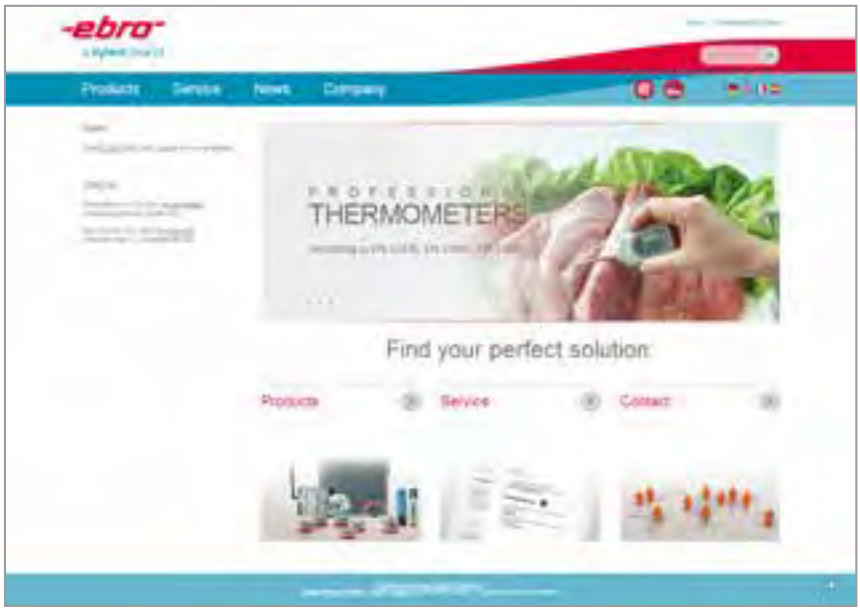
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Our Services for You

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

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