Instruments for Food Technology

QUALITY ASSURANCE | TRANSPORT | STORAGE

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EBI 300

Temperature Data Logger for Transport and Storage of Food

- For temperature monitoring related to HACCP / IFS issues or other perishable goods
- Transportation of fresh, cool and deep cool products
- Monitoring of fridges and deep freezers
- See page 60 for details

Food technology

We are pleased to present our new catalogue, 'Instruments for Food Technology'. This catalogue details our current products and services and highlights our new instruments to help you ensure the safe manufacture, storage and transportation of common foodstuffs.

A Note on European Food Standards

Transition period for temperature measurement instruments has ended

According to Regulation (EG) 37 / 2005, temperature measuring instruments for deep-frozen foods in transport, storage and distribution must meet the regulations listed below.

European Standards for Temperature Measurements:

EN 13485 — **Thermometers for measuring the air and product temperature for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream.**
This European Standard sets the technical and functional characteristics for all types of thermometers (electronic, mechanical, etc.) for equipping the means used for the transport, storage and distribution of chilled, frozen, deep frozen / quick-frozen food and ice cream and for measuring the internal temperature of the products. It specifies the test methods which allow the verification of the equipment's conformity to suitability and performance requirements. It applies to the whole temperature indicator / sensor(s). The temperature sensor(s) may be integrated into the thermometer or remote from it (external temperature sensor(s)).

EN 12830 — **Temperature recorders for the transport, storage and distribution of chilled, frozen, deep-frozen/quick-frozen food and ice cream. Tests, performance and suitability.**
This European standard specifies the technical and functional characteristics of air temperature recorders for equipping the means used for the transport, storage and distribution of chilled, frozen and deep-frozen / quick-frozen food and ice cream. It specifies the test methods which allow the determination of the equipment's conformity to suitability and performance requirements. It applies to the whole temperature recorder / sensors(s).

EN 13486 — **Temperature recorders and thermometers for the transport, storage and distribution of chilled, frozen, deep-frozen / quick-frozen food and ice cream. Periodic verification.**
This standard sets the verification procedure for temperature recorders and thermometers for measuring the air and the products intended to equip the means used for the transport, storage and distribution of chilled, frozen, deep-frozen / quick-frozen food and ice-cream and which comply with standards EN 12830 and EN 13485 (measurement classes and ranges).

Navigating Products and Applications

Icons explain the applications

We have included icons (pictograms for butcher shop, bakery, beverage industry, gastronomy, food industry and trade) to the product pictures. So you can see at a glance, for which application the product is suitable.

- **TRADE**
- **GASTRONOMY**
- **BUTCHERY**
- **BEVERAGE INDUSTRY**
- **BAKERY**
- **FOOD INDUSTRY**

Contents ebro® Instruments for Food Technology

ebro® has handheld instruments for all measurement tasks:

- Core thermometers for bakeries, butcheries and for the food industry
- Officially calibrated thermometers for food inspectors
- Fold-back thermometers for quick measurements in refrigerated display cases
- Instruments for measuring the quality of deep-frying oil
- Infrared thermometers for non-contact surface measurement
- Humidity measuring instruments for production and storage
- Instrument for measuring salt content
- Instrument for measuring pH-value

ebro® handheld instruments: precise, waterproof and robust


TPE 510
ON / OFF
-ebro-
SSX 210
TFH 620
ON / OFF
HOLD MIN MAX
DP
CLR
TTX 100
ON / HOLD
-ebro-
TLC1598
FOM 310
24%
ON / HOLD
-ebro-
TLC 730
HOLD
MODE
-ebro-

Precision Core Thermometer

TFX 410 / TFX 410-1 / TFX 420

DIN EN 13485

Technical Data

Type	TFX 410 / TFX 410-1 / TFX 420
Measurement range: **TFX 410**	-50 °C ... +300 °C (-58 °F ... 572 °F)
Measurement range: **TFX 410-1**	-50 °C ... +300 °C (-58 °F ... 572 °F)
Measurement range: **TFX 420**	-50 °C ... +400 °C (-58 °F ... 752 °F)
Accuracy	±0.3 °C (±0.5 °F)
Resolution	0.1 °C (0.2 °F)
Sensor	PT 1000 (different probe types available)
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
Battery	3.0 V lithium, exchangeable
Battery lifetime	approx. 5 years
Dimensions (L x W x H)	54 x 22 x 109 mm (without probe)
Housing material	ABS
Weight	approx. 90 g
Protection class	IP 67
Additional functions: **TFX 420**	Hold, MIN / MAX
Certificate	3-point factory calibration
Automatic shut off	after 2 hours, optional

TFX 410 / TFX 410-1 / TFX 420

Applications

- Food products industry
- Incoming goods inspection
- Cold stores
- Butchers
- Kitchen / Restaurant
- Bakeries
- Catering
- Laboratory

Attributes

- High accuracy
- Precise PT 1000 probes
- Robust and impact resistant
- Factory calibration certificate
- According to EN 13485
- Dishwasher-safe
- Long battery lifetime
- Replaceable battery

Description	Type	Part No.
Thermometer with fixed probe TPX 410, pointed, 60 cm silicone cable	TFX 410	1340-5410
Thermometer without probe	TFX 410-1	1340-5415
Thermometer with pointed probe, 60 cm silicone cable (red) and grip, L = 120 mm, Ø 3 mm	TFX 410-1 + TPX 400	1340-5416
Thermometer with pointed probe, 60 cm silicone cable (red) and grip, L = 120 mm, Ø 3 mm	TFX 420 + TPX 400	1340-5426
Thermometer without probe	TFX 420	1340-5425
Pointed probe with 60 cm silicone cable (red) and grip, L = 120 mm, Ø 3 mm	TPX 400	1341-5416

Remarks

Spare parts and accessories see pages 10-11.

Verified / Verifiable Thermometer
TFX 422

DIN EN 13485

Technical Data

Type	TFX 422
Measurement range	-50 °C ... +200 °C (-58 °F ... 392 °F)
Accuracy	±0.3 °C (±0.4 °F)
Resolution	0.1 °C (0.2 °F)
Sensor	Pt 1000 (length = 120 mm, Ø 3 mm)
Operating temperature	-25 °C ... +50 °C (-13 °F ... 122 °F)
Storage temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
Cable length	60 cm, silicone
Response time (t_{99})	approximately 8 s (moving water)
Battery	lithium battery 3 V / 1 Ah, Type CR 2477
Battery lifetime	approximately 5 years
Automatic shut off	after 2 hours, optional
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Protection class	IP 67
Weight	approximately 90 g

TFX 422

Applications

- For food inspectors and veterinarians
- Food products industry
- Trade
- Bakeries
- Butchers
- Kitchen / Restaurant
- Temperature monitoring

Attributes

- Tested and recommended by the German Federal Association of Food Inspectors and Consumer Protection
- PTB approved
- Robust and impact resistant
- High accuracy
- Waterproof IP 67
- Approximately 5 years battery lifetime
- Also available with calibration certificate
- According to EN 13485

Description	Type	Part No.
Thermometer*, verified (incl. calibration certificate), with 0.6 m cable	TFX 422-verified	1340-5423
Thermometer*, verifiable, with 0.6 m cable	TFX 422-verifiable	1340-5422
Thermometer*, verified, (incl. calibration certificate), with 1.5 m cable	TFX 422-150-verified	1340-5424
Thermometer*, verifiable, with 1.5 m cable	TFX 422-150-verifiable	1340-5421

* Includes probe

Remarks

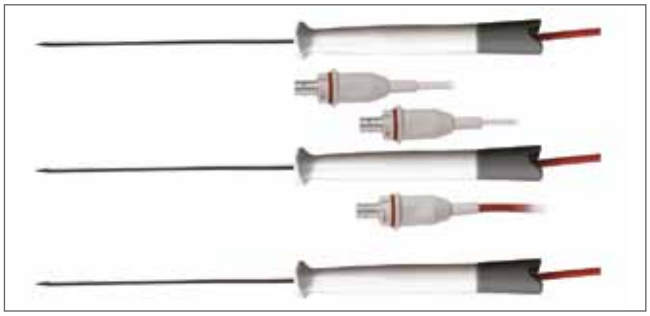
Spare parts and accessories see pages 10 - 11.

The high precision TFX 422 thermometer is PTB (German National Metrology Laboratory) approved.

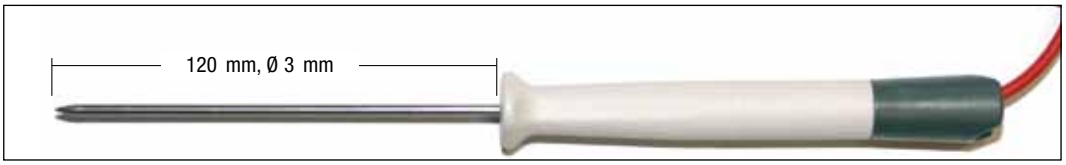
When calibrated by an official German calibration laboratory, it is certified to remain within calibration specifications for two years.

ebro standard calibration is also available.

Probes, Replacement Parts and Accessories
for TFX 410 / 410-1 / 420

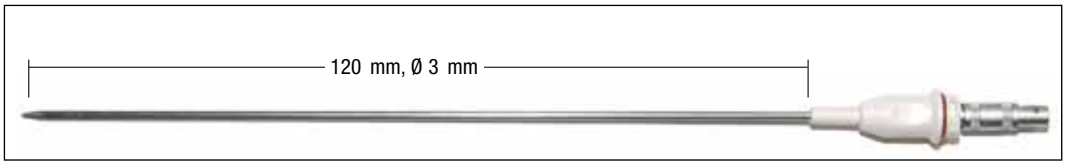


TPX 400



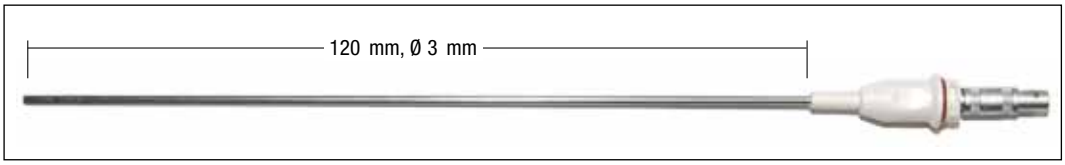
Pointed probe with 60 cm silicone cable (red), needle length: 120 mm, Ø 3 mm, temperature resistant (grip and cable): MAX. 220 °C (428 °F)

TPX 200



Pointed probe, needle length: 120 mm, Ø 3 mm, without cable

TPX 100



Blunt probe, needle length: 120 mm, Ø 3 mm, without cable

PT 1000 Probes (with Lemosa size 0) for TFX 410 / 410-1 / 420

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

Probes, Replacement Parts, and Accessories
for TFX 410 / 410-1 / 420

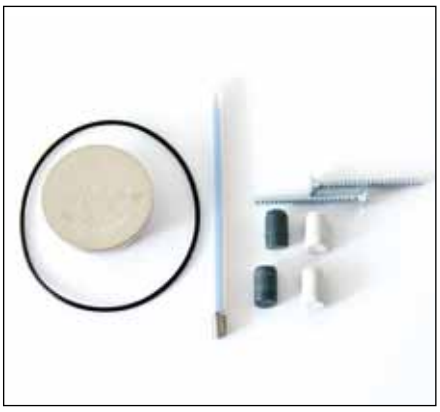
Replacement parts for TFX Thermometers

Description	Type	Part No.
Battery exchange-set (battery: 3 V lithium CR 247) includes battery, needle, screws, plug, O-ring, directions	AG 170	1100-0106

Accessories for TFX Thermometers

AG 140
- Protective cover, red

AG 160
- Stainless steel bracket



AG 170
- Battery exchange set

Accessories for TFX Thermometers

Description	Type	Part No.
Extension cable 1m for TFX devices (Lemosa size 0)	AX 100	1340-5015
Aluminum-case	AG 130	1341-3854
Protective cover, red	AG 140	1340-5005
Stainless steel bracket	AG 160	1340-0595
Stainless steel bracket for TFX devices with AG 140	AG 161	1340-0596

Core Thermometer with fast response time

TFE 510

DIN EN 13485

Technical Data

Type	TFE 510
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	Thermal element, 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})	3 s
Battery	lithium 3.0 V
Battery lifetime	approx. 5 years
Dimensions (L x W x H)	109 x 54 x 22 mm
Housing material	ABS
Weight	approx. 90 g
Protection class	IP 67
Sampling rate	0.5 s ... 15 s
Certificate	3-point factory calibration
Automativ shut off	after 2 hours, optional

TFE 510

Applications

- Cold store
- Food products industry
- Incoming goods inspection
- Butchers
- Food products laboratories
- Catering
- Food inspections

Attributes

- High accuracy
- Very fast
- According to EN 13485
- Robust and impact resistant
- Battery lifetime approx. 5 years
- Battery charge indicator
- Waterproof IP 67
- °C / °F switchable
- Factory calibration certificate

Description	Type	Part No.
Thermometer without probe	TFE 510	1340-5510
Thermometer with probe, with blue silicone cable, 0.6 m	TFE 510 + TPE 400	1340-5516
Probe with blue silicone cable, 0.6 m, for TFE 510	TPE 400	1341-5516

Precision Thermometer Pt 1000

TLC 1598

DIN EN 13485

Technical Data

Type	TLC 1598
Measurement range	-50 °C ... +200 °C (-58 °F ... 392 °F)
Resolution	0.1 °C (0.2 °F)
Accuracy	±0.3 °C (±0.5 °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	approx. 4 years
Dimensions (L x W x H)	44 x 18 x 158 mm
Housing material	ABS
Weight	approx. 70 g
Protection class	IP 54
Certificate	3-point factory calibration

TLC 1598

Applications

- Fast, exact temperature monitoring for incoming goods inspections
- Catering / Serving
- Food products industry
- Trade
- Cool house
- Temperature monitoring
- Food products laboratories

Attributes

- High accuracy
- Robust and impact resistant
- Battery lifetime approx. 4 years
- Fold-back probe
- Short response time
- Factory calibration certificate

Description	Type	Part No.
Precision thermometer	TLC 1598	1340-1620
Accessories		
Nylon case	AG 121	1341-0624

The TDC 200

For use everywhere where freshness counts

- Fast temperature checks in cooling / refrigerator chambers
- Alarm upon exceeding / shortfall of limit value
- Large display with visible alarm
- Easy to operate
- Robust probe resists damage that normal probes cannot

Core Thermometer
TDC 200

DIN EN 13485

Technical Data

Type	TDC 200
Measurement range	-50 °C ... +300 °C (-58 °F ... 572 °F)
Resolution	0.1 °C (0.2 °F)
Accuracy	±0.3 °C (-20 °C … +100 °C) ±0.5 °F (-4 °F ... +212 °F)
Sensor	Pt 1000
Sampling rate	2 measurements per second
Operating temperature	-20 °C … +50 °C (-4 °F ... 122 °F)
Storage temperature	-40 °C … +70 °C (-40 °F ... 158 °F)
Temperature sensor	100 mm, Ø 3 mm - 6 mm
Battery	2 x AAA
Battery lifetime	typical 80 h
Housing material	ABS
Weight	ca. 110 g
Protection class	IP 65
Certificate	2-point factory calibration

TDC 200

Applications

- According to DIN EN 13485
- Fast temperature control
- Cooling / Refrigerator chamber
- Incoming goods
- Transport / Storage

Attributes

- With belt case
- Replaceable Battery
- Operable with one hand
- Large display, illuminated
- Hold function
- Exchangeable probe
- Robust probe
- Acoustic and visual alarm
- Adjustable limit values

Description	Type	Part No.
Core thermometer	TDC 200	1340-5130
Accessories		
Spare probe	TPC 200	1341-5130
Belt case	AC 200	1340-5042

Core Thermometer (Thermocouple Type T)

TTX 100

DIN EN 13485

Technical Data

Type	TTX 100
Measurement range Type T	-50 °C ... +350 °C (-58 °F ... 662 °F)
Accuracy Type T (at +25 °C / 77 °F)	±0.8 °C (±1.4 °F) or ± 0.8 %, whichever is larger
Resolution	0.1 °C of -60 °C ... +199.9 °C (0.2 °F of -76 °F ... 391 °F) and 1 °C (1.8 °F) for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C (-4 °F ... 122 °F)
Storage temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
Response time	5 s
Dimensions (L x W x H)	90 x 42 x 17 mm
Battery	CR 2032, exchangeable
Battery lifetime	approximately 100 h of uninterrupted use
Temperature probe	permanently attached to the device, silicone cable 0.6 m long, probe with grip, needle ø 3 mm, L = 105 mm, pointed
Protection class	IP 55
Certificate	Factory calibration certificate

TTX 100

Applications

- Trade
- Bakeries
- Butchers
- Kitchens
- Food products laboratories

Attributes

- According to EN 13485
- With cable, fixed connection
- Automatic shut off
- Fast measurement
- HACCP conform
- Robust and impact resistant
- Replaceable battery
- Factory calibration certificate

Description	Type	Part No.
Core thermometer (thermocouple type T)	TTX 100	1340-5100
Wall mount – stainless steel	TTX-WM	1340-5040

Core Thermometer (Thermocouple Type T)
TTX 110

DIN EN 13485

Technical Data

Type	TTX 110
Measurement range Type T	-50 °C ... +350 °C (-58 °F ... 662 °F)
Accuracy Type T (at +25 °C / 77 °F)	±0.8 °C (±1.4 °F) or ±0.8 %, whichever is larger
Resolution	0.1 °C of -60 °C ... +199.9 °C (0.2 °F of -76 °F ... 391 °F) and 1 °C (1.8 °F) for the remaining measurement range
Housing material	ABS
Operating temperature	-20 °C ... +50 °C (-4 °F ... 122 °F)
Storage temperature	-30 °C ... +70 °C (-22 °F ... 158 °F)
Response time (t_{99})	5 s
Dimensions (L x W x H)	90 x 42 x 17 mm
Battery	CR 2032, exchangeable
Battery lifetime	approximately 100 h of uninterrupted use
Temperature probe	temperature probe has fixed connection to the device, needle Ø 3 mm, L = 90 mm, pointed
Protection class	IP 55
Certificate	Factory calibration certificate

TTX 110

Applications

- Trade
- Kitchens
- Butchers
- Bakeries
- Food products laboratories

Attributes

- According to EN 13485
- Fixed probe
- Automatic shut off
- Fast measurement, high accuracy
- HACCP
- Including wall bracket, belt bracket
- Robust and impact resistant
- Replaceable battery
- Factory calibration certificate

Description	Type	Part No.
Core thermometer (thermocouple type T) with fixed probe including wall mount and belt case	TTX 110	1340-5110

Low-Cost Thermometer
TDC 150

Technical Data

Type	TDC 150
Measurement range	-50 °C ... +150 °C (-58 °F ... 302 °F)
Resolution	0.1 °C in range -20 °C ... +150 °C (0.2 °F in range -4 °C ... 302 °F)
Accuracy	±1 °C in range -30 °C ... +150 °C (±1.8 °F in range -22 °F ... 302 °F)
Sensor	NTC
Needle type probe	stainless steel, Ø 3.5 mm, L = 125 mm, pointed
Response time (t_{99})	10 s (water)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-10 °C ... +60 °C (14 °F ... 140 °F)
Display	LCD 7 mm
Battery	1.5 V, LR44, G13
Battery lifetime	approximately 5000 h
Dimensions (L x W x H)	24 x 26 x 85 mm
Housing material	ABS
Weight	approximately 36 g
Protection class	IP 65
Certificate	Factory calibration certificate

TDC 150

Applications

- Temperature checks for meat, cold cuts, fruit, fish, baked goods and pasta
- Bakeries
- Butchers
- Kitchens

Attributes

- Fixed probe, pointed
- Robust and impact resistant
- Replaceable battery
- Switchable between °C / °F
- Needle guard

Description	Type	Part No.
Thermometer, inclusive needle guard	TDC 150	1340-1611

Low-Cost Thermometer
TDC 110

Technical Data

Type	TDC 110
Measurement range	-50 °C ... +150 °C (-40 °F ... 302 °F)
Resolution	0.1 °C (0.2 °F)
Accuracy	±1 °C (-10 °C ... +120 °C), ±1.8 °F (14 °F ... 248 °F) ±2 °C for the remaining measurement range
Sensor	NTC
Needle type probe	stainless steel, Ø 4 mm, L = 120 mm, pointed
Response time (t_{99})	19 s (water)
Operating temperature	0 °C ... +50 °C (32 °F ... 122 °F)
Storage temperature	-10 °C ... +60 °C (14 °F ... 140 °F)
Display	7 mm LCD
Battery	1,5 V, G 10-A
Dimensions	50 x 40 mm
Weight	approximately 13 g

TDC 110

Applications

- Temperature checks for meat, cold cuts, fruit, fish, baked goods and pasta
- Kitchens
- Bakeries
- Butchers

Attributes

- Fixed probe, pointed
- Exchangeable battery
- °C / °F switchable
- Needle guard
- Automatic shut off after approximately 10 min.
- ON / OFF

Description	Type	Part No.
Thermometer, including needle guard and spare battery	TDC 110	1340-5121

The TLC 730

For use everywhere where freshness counts

- Instrument with penetration probe and infrared temperature sensor
- Fast temperature checks at incoming goods
- Alarm upon exceeding / shortfall of limit value
- Recommended by the German Federal Association of Food Inspectors

Dual Infrared / Fold Back Thermometer

TLC 730

DIN EN 13485

Technical Data

Type	TLC 730
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 remaining measurement range - the larger value is applicable
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 Mignon AAA, exchangeable by user
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
Certificate	4-point factory calibration

TLC 730

Applications

- Transport / Storage
- Incoming goods inspection
- Cooling / Refrigerator chamber
- Trade
- Restaurant / Catering

Attributes

- Surface measurement with infrared
- Dual laser (detachable)
- Switchable between °C / °F
- Core measuring with penetration probe
- Including drill for the measurement of frozen food
- Factory calibration certificate
- Visible and audible alarm by exeeding / shortfall of limit value

Description	Type	Part No.
Dual Infrared / Fold-Back Thermometer	TLC 730	1340-5730
Nylon case	AG 121	1341-0624

The new TFI 250

For use everywhere where freshness counts

- **Fast, non contact surface measurement at incoming goods inspection**
- **Laser pointer for determination of measurement spot**

Infrared Thermometer
TFI 250

Technical Data

Type	TFI 220
Measurement range	-60 °C ... +550 °C (-76 °F... 1,022 °F)
Accuracy	±2 °C or 2 %
Resolution	±1,5 °C
Operating temperature	0 °C … +50 °C (+32 °F ... 122 °F)
Response time	1 s
Emissivity factor	0.95 fixed (0.1 ... 1.0 possible)
Optics	12:1
Battery	2xAAA
Battery life time	approximately 14 h 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

TFI 250



Applications

- Non contact temperature measurement via infrared
- Incoming goods inspection
- Kitchens
- Food distribution
- Refrigerator chambers

Attributes

- Fast measurement
- Pilot laser
- Optics D:S = 12:1
- Exchangeable battery
- Factory calibration certificate
- Two fixed emissivity factors for goods and storage

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

Remarks

New instruments available from the 2nd quarter of 2012

The new TFI 54

For use everywhere, where freshness counts

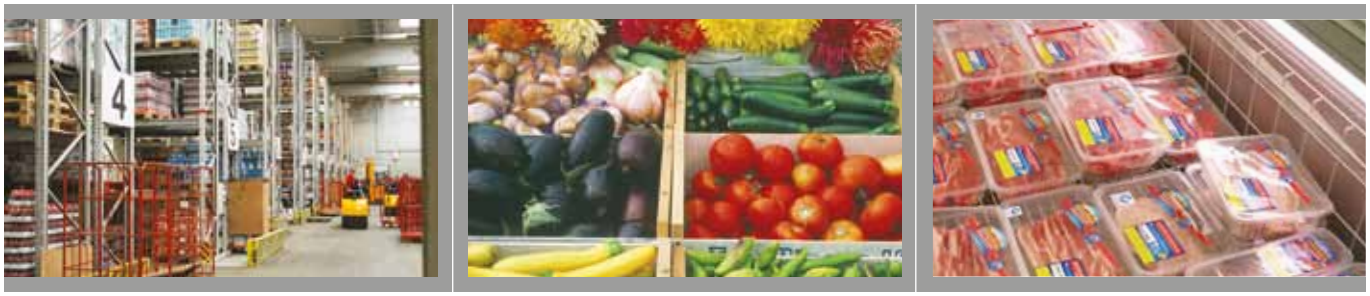
- **Fast and contactless surface measurement at incoming goods inspection**
- **Laser pointer for determination of measurement spot**
- **Emissivity programmed for goods and packaging as standard**
- **Water-resistant**

Infrared Thermometer
TFI 54

Technical Data

Typ	TFI 54
Measurement range	-60 °C ... +550 °C (-76 °F ... +1,022 °F)
Accuracy	±2 °C or 2 % (larger value is applicable)
Resolution	±1,5 °C (±2.7 °F)
Operating temperature	0 °C … +50 °C (+32 °F ... +122 °F)
Response time	1 s
Emissivity factor	0.95 fixed (0.1 ... 1.0 possible)
Optics	12:1
Battery	2 x AAA
Battery life time	approximately 14 h 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

TFI 54



Applications

- Non contact temperature measurement via infrared
- Incoming goods inspection
- Kitchen
- Food distribution
- Refrigerator chambers

Attributes

- Fast measurement
- Laser pointer
- Waterproof
- Optics D:S = 12:1
- Exchangeable battery
- Factory calibration certificate
- Robust housing material

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

Remarks

New instruments available from the 2nd quarter of 2012

Infrared Thermometer with Probe Connection

TFI 550

Technical Data

Type	TFI 550
Measurement range	-60 °C ... +550 °C (-76 °F ... 1,022 °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-measurement spot ratio	30:1
NiCrNi probe measurement	
Measurement range	-64 °C ... +1400 °C (-83 °F ... 2,552 °F)
Accuracy	±1 % of measurement / ±1 °C (±1.8 °F), whichever is larger
Battery lifetime	typically 180 h
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 (including battery)
Certificate	6-point factory calibration

TFI 550

Applications

- Fast refrigerated goods checks
- Climate control systems
- Incoming goods inspection
- Process monitoring
- Storage
- Food products industry

Attributes

- Infrared for non contact surface temperature measurement
- Optics D:S = 30:1
- Double laser pointer
- NiCrNi connection for core temperature measurement with penetration probe
- Alarm when MIN / MAX exceeded
- Factory calibration certificate

Description	Type	Part No.
Infrared thermometer with NiCrNi connection	TFI 550	1340-1786
Penetration probe with cable, SMP	TPN 211	1343-1005
Surface / paddle probe with 1 m cable, SMP	TPN 341	1343-1015

Remarks

For all NiCrNi-probes with SMP connector.

pH-Meter Set ST 1000

consisting of pHT 810, electrode and accessories

Technical Data

Type	pHT 810
pH-Measurement range	0 pH ... 14 pH
pH-Accuracy	±0.03 pH
pH-Resolution	0.01 pH
Memory	Hold, MIN / MAX
Input socket	BNC
Battery lifetime	up to 5 years
Display	LCD, 12 mm
Operating temperature	-10 °C ... +50 °C (14 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
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 in pH-meter set)

pHT 810

Applications

- Measurement of pH-value
- Butchers
- Meat, cold cuts, cheese
- Dairy
- Fluids
- Beverage production

Attributes

- Handy and robust
- Current value memory
- Battery lifetime approximately 5 years
- Simple calibration with keypad
- Fully automatic pH-calibration
- Replaceable electrode
- Factory calibration certificate

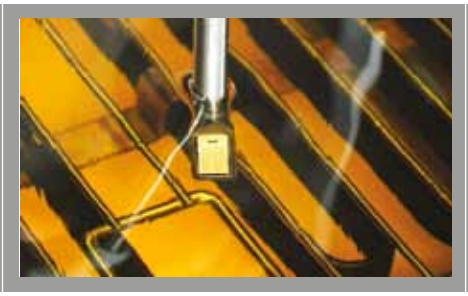
Description	Type	Part No.
pH meter (without electrode)	pHT 810	1340-5810
pH-set for food industries, butcheries, dairies included: pHT 810, penetration electrode AT 206, punching pin, buffer solution pH4, pH7, protein cleaner, KCl-solution, case	ST 1000	1339-0620
Replacement electrodes		
Penetration electrode with cable 1 m and BNC plug for measurement in meat, sausage, cheese and other semi-solid food products and housing materials	AT 206	1339-0629
Accessories		
Buffer solution pH 4	AT 400	1341-3836
Buffer solution pH 7	AT 401	1341-3838
KCl-solution	AT 405	1341-3839
Electrode cleaner	AT 410	1341-3840
Protective cover for pH meter	AG 140	1340-5005
Plastic case	AT 100	1340-5091

Food Oil Monitor
FOM 310

Technical Data

Type	FOM 310
Measurement range oil	0 % ... 40 % polar compounds
Accuracy	typically ±2 %
Resolution	0.5 %
Measurement range temperature	0 °C ... +200 °C (32 °F ... 392 °F)
Measurement range oil	+50 °C ... +200 °C (122 °F ... 392 °F)
Accuracy	±1 °C (±1.8 °F)
Resolution	1 °C (1.8 °F)
Ooperating temperature	-20 °C ... +50 °C (-4 °F ... 122 °F)
Storage temperature	-25 °C ... +60 °C (-13 °F ... 140 °F)
Battery	3 V lithium, exchangeable
Battery lifetime	approximately 1000 h of continuous use
Dimensions (L x W x H)	125 x 54 x 22 mm (without probe)
Housing material	ABS (food safe)
Weight	approximately 200 g
Protection class	waterproof IP 67
Certificate	2-point factory calibration

FOM 310



Applications

- Change frying oil at the right time
- Measurement of hot oil directly in fryer
- Restaurants / Canteens
- Limit health risks caused by spent oil
- Fast, safe on-site measurement
- Setting the right frying point

Attributes

- Exact determination frying oil quality
- 0 % to 40 % polar compounds
- Results within 10 s (simultaneous display of temperature and polar compounds)
- Limit indication by flashing light (red / yellow / green)
- Waterproof
- Robust and impact resistant
- Adjustable to several oil types

Description	Type	Part No.
Food oil monitor set (including food oil monitor, protective cover, case)	FOM 310-Set	1340-1522

Food Oil Monitor
Accessories for FOM 310

Accessories

AM 130
- Case (without measurement device)

AG 160
- Stainless steel bracket (without measurement device)

AM 140
- Protective cover

Description	Type	Part No.
Carrying case	AM 130	1340-1594
Protective cover for FOM 310 with strap, red	AM 140	1340-5007
Stainless steel bracket	AG 160	1340-0595
Stainless steel bracket (FOM 310 with AG 140)	AG 161	1340-0596

Hygrothermometer for Humidity and Temperature Measurement
TFH 620

TFH 620

Technical Data

Type	TFH 620
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
Housing material	ABS
Weight	approximately 90 g
Display	LCD
Humidity sensor	capacitive sensor
Temperature sensor	Pt 1000
Sensor position	external, removable probe
Number of channels	2
Battery	lithium battery 3.0 V / 1000 mAh
Battery lifetime	up to 5 years
Sampling rate	1 s - 15 s
Certifiacte	Factory calibration certificate

Applications

- Humidity and temperature measurement for sensitive food products
- Computer rooms
- Storage monitoring
- Incoming goods inspection
- Environment monitoring
- Food products industry
- Maturing room

Attributes

- Reliable and precise
- Robust and impact resistant
- °C / °F switchable
- Hold, MIN / MAX
- Factory calibration certificate
- Battery charge indicator

Description	Type	Part No.
Hygrothermometer with air probe	TFH 620 + T pH 100	1340-5621
Calibration Case for TFH 620	AH 600	1340-5097

Hygrothermometer for Humidity and Temperature Measurement
TFH 610

TFH 610

Technical Data

Type	TFH 610
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
Housing material	ABS
Weight	approximately 90 g
Display	LCD
Sensor humidity	capacitive
Sensor temperature	thermistor
Sensor position	internal
Probe connection	fixed connection
Number of measurement channels	2
Battery	lithium battery 3.0 V, 1000 mAh
Battery lifetime	up to 5 years
Sampling rate	1 s - 15 s

Applications

- Production
- Storage
- Trade
- Computer rooms
- Environmental control
- Food products industry
- Laboratory
- Maturing room

Attributes

- Robust and impact resistant
- High accuracy
- Factory calibration certificate
- °C / °F switchable
- Battery indicator
- Automatic shut off

Description	Type	Part No.
Hygrothermometer (including probe)	TFH 610	1340-5610

Food Inspection Case
EB 4400

Food Inspection Case EB 4400

The new standard Food Inspection Case contains:

- **Frying oil quality measurement device FOM 310**
- **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**
- **Temperature data logger set EBI 20-T1-set** (logger, interface, evaluation software)
- **Torch / flashlight**
- **Knife, tweezers, scissors, magnifying glass**

The **FOM 310 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.
The measurement range is 50 °C ... +220 °C (122 °F ... 428 °F), polar compounds are 0 % ... 40 % (see p. 28).

The **TFX 422 thermometer** is particularly suitable for measuring core temperatures and measuring the temperature of deep-frozen food products.
The measurement range is -50 °C ... +200 °C (-58 °F ... 392 °F) (see p. 9).

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. 27).

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. 21).

The **temperature data logger EBI 20-T1** monitors temperature during transport and storage. The set consists of logger, interface and evaluation software. The logger has an excellent price / performance ratio.
The measurement range is -30 °C ... +60 °C (-22 °F ... 140 °F) (see p. 58).

Details on contents

The high precision TFX 422 thermometer is PTB (German National Metrology Laboratory) approved.

When calibrated by an official German calibration laboratory, it is certified to remain within calibration specifications for two years.

ebro standard calibration is also available.

Description	Type	Part No.
Food Inspection Case	EB 4400	1341-4400

Salt Meter
SSX 210-Set

Technical Data

Type	SSX 210
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 - 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

SSX 210

Applications

- Measurement of the relative salt content of food products
- Meat, sausages, ham, cheese, salads
- Allows consistent taste

Attributes

- Easy operation
- Handy and robust
- Relative degree of saltinity

Details on contents

The **SSX 210 salt meter** is used to measure the salt content in semi-solid food products, such as meat, cold cuts, cheese, salads etc.
To achieve this, the electrical conductivity is measured, since this is dependent on the salt content. It is important that the medium to be measured also has a water component. This means that salt measurements cannot be completed in pure oil (does not contain water).

Every dish requires a specific salt content to ensure proper taste. The taste of each dish is different, however, which means that the user must prepare his or her own salt content table. If, for example, it is determined that the optimal seasoning of country ham yields a value of 86, all further hams can be cured and seasoned until they reach this value.

Example	Display
yellow sausage	40
country ham	86
cheese fondue	19

These values cannot be taken directly, as the salt content depends on the ingredients and recipes.
Please also note that not only the salt content is measured when vinegar and acids are used, as these substances also increase the electric conductivity.

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

The EBI 100 data logger makes it possible:

Monitoring of hot processes up to +150 °C (+302 °F) in many food production applications:

- Monitoring of pasteurization systems
- Determining of F-value in the food industry
- Bottle cleaning, temperature and pressure measurement in the beverage industry
- Determining of the PU-value while beverage production
- Temperature process monitoring while production

Measurement range temperature
-40 °C ... +150 °C (-40 °F ... +302 °F)

Resolution
± 0.3 °C (±0.5°F)

Memory
27,000 measurements


-ebro+
Winlog.pro

Temperature logger
EBI 100-T100

Illustration: with eyelet

Technical Data

Type	EBI 100-T100
Measurement range	-40 °C … +150 °C (-40 °F ... + 302 °F)
Accuracy	±0.3 °C (± 0.5 °F)
Resolution	0.1 °C (0.2. °F)
Measurement channels	1 temperature channel
Operating temperature	-40 °C … +150 °C (-40 °F ... +302 °F)
Sensor	Pt 1000
Memory	27.000 measurements
Measurement mode	- Endless - Start / stop time - Measure upon start time - Start immediately until end of memory
Sampling rate	adjustable from 1 s to 24 hours
Battery	Lithium battery ½ AA, exchangeable
Dimensions (Ø x H)	48 x 24 mm *
Housing material	Stainless steel (V4a), PEEK
Weight	ca. 70 g *
Protection class	IP 68

*Size and weight are shown for EBI 100 body only

EBI 100-T100

Applications

- Determination of F-value in canned goods production
- Monitoring of pasteurisation process
- Temperature-process monitoring in production

Attributes

- Temperature resistant up to +150 °C (302 °F)
- Completely water and steamproof
- Different models available
- Factory calibration certificate
- Programming and evaluation with PC
- Battery exchangeable

Description	Type	Part No.
Temperature logger	EBI 100-T100	1340-6500

Remarks

Spare parts and accessories see page 52.

Temperature logger for F-Value-Calculation
EBI 100-T210 / 211

EBI 100-T210 / 211

Technical Data

Type	EBI 100-T210 / 211
Measurement range	-40 °C … +150 °C (-40 °F ... + 302 °F)
Accuracy	±0.3 °C (±0.5 °F)
Resolution	0.1 °C (0.2 °F)
Measurement channels	1 temperature channel external, radial
Operating temperature	-40 °C … +150 °C (-40 °F ... + 302 °F)
Sensor	Pt 1000
Memory	27,000 measurements
Measurement mode	- Endless - Start / stop time - Measure upon start time - Start immediately until end of memory
Sampling rate	adjustable from 1 s to 24 hours
Battery	Lithium cell ½ AA, exchangeable
Dimensions (Ø x H)	48 x 24 mm *
Housing material	Stainless steel (V4a), PEEK
Protection class	IP 68
Weight	ca. 70 g *

*Size and weight are shown for EBI 100 body only

Applications

- Determination of F-value in canned goods production
- Monitoring of pasteurisation process
- Temperature-process monitoring in production

Attributes

- Temperature resistant up to +150 °C (302 °F)
- Battery exchangeable
- Completely water and steamproof
- Different types
- Factory calibration certificate
- Programming and evaluation with PC

Description	Type	Part No.
Temperature logger Ø3 mm, L = 50 mm	EBI 100-T210	1340-6502
Temperature logger Ø3 mm, L = 75 mm	EBI 100-T211	1340-6503

Remarks

Spare parts and accessories see page 52.

Temperature Logger for F-Value-Calculation

EBI 100-T23X

Technical Data

Type	EBI 100-T23X
Measurement range	-40 °C … +150 °C (-40 °F ... + 302 °F)
Accuracy	±0.3 °C (±0.5 °F)
Resolution	0.1 °C (0.2 °F)
	1 temperature channel, external, axial
Operating temperature	-40 °C … +150 °C (-40 °F ... + 302 °F)
Sensor	Pt 1000
Memory	27.000 measurements
Measurement mode	- Endless
	- Start / stop time
	- Measure upon start time
	- Start immediately until end of memory
Sampling rate	adjustable from 1 s to 24 hours
Battery	Lithium battery ½ AA, exchangeable
Dimensions (Ø x H)	48 x 24 mm *
Housing material	Stainless steel (V4a), PEEK
Protection class	IP 68
Weight	ca. 70 g *

*Size and weight are shown for EBI 100 body only

EBI 100-T23X

Applications

- Determination of F-value in canned goods production
- Monitoring of pasteurisation process
- Temperature-process monitoring in production

Attributes

- Temperature resistant up to +150 °C (302 °F)
- Completely water and steamproof
- Different models available
- Factory calibration certificate
- Programming and evaluation with PC

Description	Type	Part No.
Temperature logger Ø3 mm, L = 50 mm	EBI 100-T230	1340-6506
Temperature logger Ø3 mm, L = 75 mm	EBI 100-T231	1340-6507
Temperature logger Ø3 mm, L = 100 mm	EBI 100-T232	1340-6508
Temperature logger Ø3 mm, L = 150 mm	EBI 100-T233	1340-6509

Remarks

Spare parts and accessories see page 52.

Temperature Logger for the Beverage Industry
EBI 100-T26x

EBI 100-T26x

Technical Data

Type	EBI 100-T26x
Measurement range	-40 °C … +150 °C (-40 °F ... + 302 °F)
Accuracy	±0.3 °C (±0.5 °F)
Sensor	1 temperature channel, external, axial
Channels	1 channel
Resolution	0.1 °C
Sampling rate	adjustable from 1 s to 24 hours
Memory	27,000 measurements
Measurement mode	- Endless - Start / stop time - Measure upon start time - Start immediately until end of memory
Battery	Lithium battery ½ AA, exchangeable
Dimensions (Ø x H)	48 x 24 mm *
Weight	70 g *
Housing material	Stainless steel (V4A) / PEEK
Protection class	IP 68 / NEMA 6

*Size and weight are shown for EBI 100 body only

Applications

- For measurements in the beverage industry
- Bottle cleaning
- Core temperature measurement (PU-value)

Attributes

- Temperature resistant up to +150 °C (302 °F)
- Factory calibration certificate
- Battery exchangeable
- 1 channel-(PU-value)
- Completely water and steamproof (Protection class IP 68 / NEMA 6P)

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

Remarks

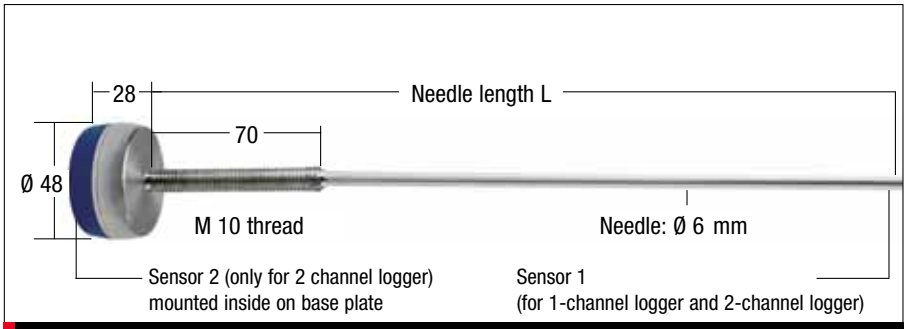
Spare parts and accessories see page 40 and 52.

Temperature Logger for the Beverage Industry

EBI 100-T26x / -T36x for PU-value Measurement

in bottles

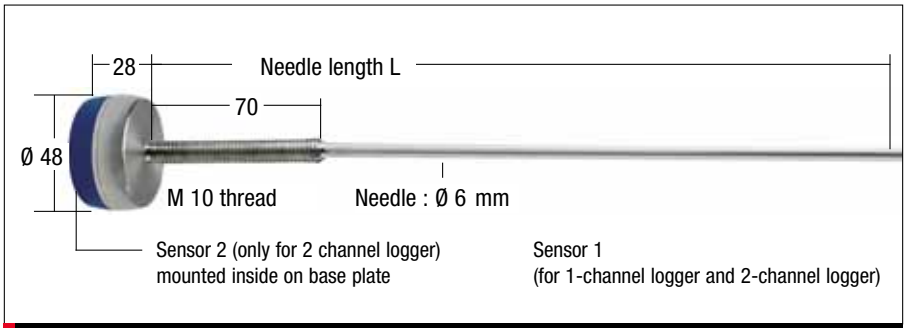
Adapter EBI FL-S



EBI 100-T26x / -T36x

in cans

Adapter EBI DA



EBI 100-T26x / -T36x

EBI FL-1T

- Also suitable for cans. Please indicate bottle type and bottle size when ordering.

GDB dummy bottle

- Other bottle sizes (NRW, etc.) on request

Data Logger for dummy bottle

- **EBI 100-T100** Data Logger (-40 °C ... +150 °C / -40 °F ... 302 °F)

Description	Type	Part No.
Temperature logger (-85 °C ... +150 °C / -121 °F ... 302 °F)	EBI 10-T100	1340-6100
Bottle adapter, silicone	EBI FL-S	1340-1961
Can adapter	EBI DA	1340-1963
Bottle adapter	EBI FL-1T	1340-2185
Dummy bottle 1,5 l		on request
Dummy bottle 1,0 l		on request
Dummy bottle 0,7 l	GDB	1340-2250
Dummy bottle 0,5 l	NRW	1340-2252

EBI 100 Data Logger Sets
EBI 100

EBI 100 Food-Set / SL 4010 *for food industry*

The Temperature Monitoring System for the Food Industry

This set contains:

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

Description	Type	Part No.
EBI 100-FOOD Set	SL 4010	1340-6575

EBI 100 Pasteur-Set / SL 4110 *for pasteurisation*

The Temperature Monitoring System for Pasteurisation

This set contains:

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

Description	Type	Part No.
EBI 100-PASTEUR Set	SL 4110	1340-6576

EBI 100 Clean-Set / SL 4210 *for bottle cleaning*

The Temperature Monitoring System for Bottle Cleaning

This set contains:

1 x EBI 100-T100 Temperature Data Logger
1 x GDB Dummy Bottle
1 x EBI IF 100-1 Interface
1 x Winlog.pro Software
1 x EBI TAK ALU Aluminum-case

Description	Type	Part No.
EBI 100 Clean-Set	SL 4210	1340-6577

General Technical Specifications: Valid for all types

Type	EBI 10
Channels	1 ... 4
Sensor temperature	PT 1000
Pressure (optional)	Piezo resistive pressure sensor (temperature compensated)
Resolution	Temperature: 0,025 °C
Pressure	(optional) 1 mbar
Measurement range temperature logger	-85 °C ... +150 °C (needle lenght up to 75 mm) -85 °C ... +400 °C (needle lenght 100 mm)
Measurement range pressure	0 °C ... +150 °C
Pressure temperature logger	1 mbar ... 4000 mbar
Accuracy Temperature	±0.5 °C (-85 °C ... -40 °C) (-121 °F ... -40 °F) ±0.2 °C (-40 °C ... 0 °C) (-40 °F ... 32 °F) ±0.1 °C (0 °C ... +140 °C) (32 °F ... 284 °F) ±0.2 °C(+140 °C ... +250 °C) (284 °F ... 482 °F) ±0.5 °C (+250 °C ... +400 °C) (482 °F ... 752 °F)
Accuracy Pressure	± 15 mbar
Sampling rate adjustable	250 ms, 500 ms, 1 s ... 24 h
Memory	100,000 measurements (total)
Measurement mode	· Endless · Start / stop time · Measure upon start time · Event steered measurement · Start immediately until end of memory
Eyelet	Optional, included in all types EBI 10
Operating temperature	-85 °C ... +150 °C
Battery	3.6 V, exchangeable
Dimensions (Ø x H)	48 x 24 mm
Weight	70 g
Housing material	Stainless steel (V4A) / PEEK

The wireless EBI 10 logger makes it possible:

With the wireless EBI 10 data logger, faulty processes can be detected immediately and stopped, if necessary, saving much time and effort. The user can follow the process continuously in realtime on his PC screen. Wireless real-time monitoring of hot processes up to +400 °C (752 °F) is especially suitable for many food applications:

· Monitoring of pasteurisation equipment
· F-value-calculation in food products industry
· Bottle cleaning, temperature and pressure measurement in the beverage industry
· Determination of PU-value in beverage production
· Temperature-process monitoring in the production

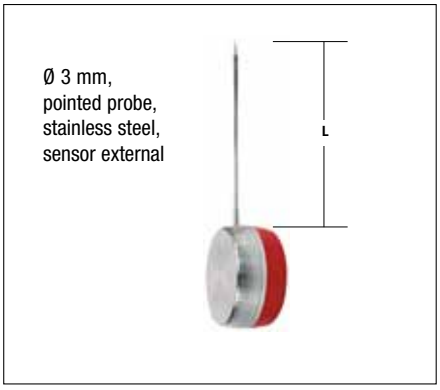
Temperature Logger for the F-Value-Calculation

EBI 10 Logger and Probe Versions

Logger Versions

Temperature logger EBI 10-T100

- **Measurement range:** -85 °C … +150 °C (-121 °F ... +302 °F)
- **Sensor:** 1 Temperature, internal

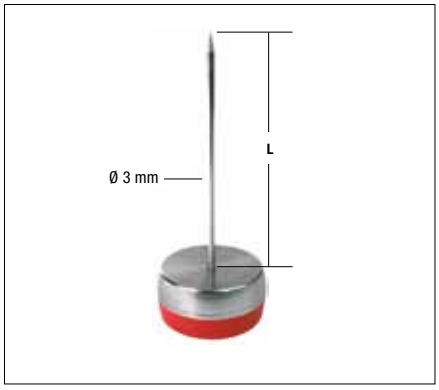


Temperature logger EBI 10-T210 / T211

- **Measurement range:** -85 °C … +150 °C (-121 °F ... +302 °F)

** For measurements above 150 °C (302 °F), EBI-TIB must be used.*

- **Sensor:** 1 Temperature, external
- **Probe lengths:** 50 mm and 75 mm



Temperature logger EBI 10-T23x

- **Measurement range:** -85 °C … +400 °C (-121 °F ... +752 °F)

** For measurements above 150 °C (302 °F), EBI-ID-114x116 must be used.*

- **Sensor:** 1 Temperature, external, axial
- **Probe lengths:** 50 mm, 75 mm, 100 mm and 150 mm

Bottle logger EBI 10-T26x

- **Measurement range:** -85 °C … +150 °C (-121 °F ... +302 °F)
- **Sensor:** 1 temperature, external, axial

Temperature / Pressure logger EBI 10-TP 200

- **Measurement range**
  Temperature: 0°C … +150°C (32 °F ... +302 °F)
  Pressure: 1 mbar … 4,000 mbar
- **Sensor**
  1Temperature, external, axial, Ø 2 mm, L = 40 mm
  1 pressure / M10 inner threat

Interface EBI IF 100 for EBI 10

- USB connection
- Coloured LEDs signal programming, read-out and error
- Inclusive antenna AL 111
- Works with: Winlog.pro and Winlog.light

Description	Type	Part No.
Temperature logger -85 °C … +150 °C (-121 °F ... +302 °F)	EBI 10-T100	1340-6100
Temperature logger, Ø 3 mm, L = 50 mm	EBI 10-T210	1340-6102
Temperature logger, Ø 3 mm, L = 75 mm	EBI 10-T211	1340-6103
Temperature logger, Ø 3 mm, L = 50 mm	EBI 10-T230	1340-6106
Temperature logger, Ø 3 mm, L = 75 mm	EBI 10-T231	1340-6107
Temperature logger, Ø 3 mm, L = 100 mm	EBI 10-T232	1340-6108
Temperature logger, Ø 3 mm, L = 150 mm	EBI 10-T233	1340-6109
Temperature logger, L = 135 mm, 1 Channel	EBI 10-T261	1340-6118
Temperature logger, L = 190 mm, 1 Channel	EBI 10-T262	1340-6119
Temperature logger, L = 245 mm, 1 Channel	EBI 10-T263	1340-6120
Temperature logger, L = 300 mm, 1 Channel	EBI 10-T265	1340-6122
Temperature / Pressure logger Ø 3 mm, L = 40 mm	EBI 10-TP200	1340-6152
1-port Interface for EBI 10	EBI IF 100	1340-6001

The new EBI 11

The solution when space is tight

- F-Value Calculation in the Food Industry
- PU-Value Calculation in the Beverage Industry
- Temperature resistant up to +150 °C (302 °F)

Mini-Temperature Logger
EBI 11

Technical Data

Type	EBI 11
Channels	1 temperature
Measurement range	-30 °C ... +150 °C (-22 °F ... 302 °F)
Accuracy	±0.1 °C (±0.2 °F)
Resolution	0.01 °C (0.02 °F)
Sampling rate	adjustable from 1 s to 24 h
Memory	15,000 measurements
Operating temperature	-30 °C ... +150 °C (32 °F ... 302 °F)
Storage temperature	-30 °C ... +150 °C (-22 °F ... 302 °F)
Measurement probe	1 temperature, external, axial, Ø 3 mm, probe length 20 mm
Sensor	Pt 1000
Memory mode	- Endless - Start / stop time - Measure upon start time - Start immediately until end of memory
Battery	exchangeable
Battery lifetime	1 s sampling rate: 25 days 1 min sampling rate: 42 weeks 15 min sampling rate: 50 weeks
Dimensions (Ø x H)	16.5 x 22 mm (without probe)
Housing material	V4A
Protection class	IP 68

EBI 11

Applications

- Determination of F-value in food / beverage production
- Especially for small packaging
- PU-value calculation

Attributes

- Space-saving, especially suitable for close quarters
- M5 external screw thread for adaption
- Temperature resistant up to +150° C (302 °F)
- High accuracy
- Factory calibration certificate
- Programming and evaluation with PC

Description	Type	Part No.
Mini-temperature logger, 1-channel, external, Ø 3 mm, probe length = 20 mm	EBI 11-T230	1340-6290
Mini-temperature logger, 1-channel, external, Ø 3 mm, probe length = 50 mm	EBI 11-T231	1340-6292
Mini-temperature logger, 1-channel, external, Ø 3 mm, probe length = 100 mm	EBI 11-T233	1340-6293

A guide to temerature limits

These temperature values insure optimum freshness:

Food

	Incoming goods / Storage	
Fresh meat (including big game)	≤ +7°C	≤ +7 °C / 44 °F
Fresh poultry, rabbits, small game	≤ +4 °C	≤ +4 °C / 39 °F

Cold Meals

Storage temperature until serving ≤ +7 °C / 44 °F

Hot meals

Heated (core temperature) ≤ +70 °C / 158 °F

Offal	≤ +3 °C	≤ +3 °C / 37 °F
Ground meat (from EU-plants)	≤ +4 °C	≤ +4 °C / 39 °F
Ground meat[1] - for immediate resale	≤ +4 °C	≤ +4 °C / 39 °F
Meat preparations (production / sales on site)		≤ +7 °C / 44 °F
Fresh meat / sausages	≤ +7 °C	≤ +7 °C / 44 °F
Speciality foods / delicatessen salads	≤ +7 °C	≤ +7 °C / 44 °F
Fresh fish[2]	≤ +2 °C	≤ +2 °C / 35 °F
Smoked fish	≤ +7° C	≤ +7 °C / 44 °F
Meat / Fish, deep frozen	≤ -18 °C	≤-18 °C / 0 °F
Deep-frozen foods	≤ -18 °C	≤-18 °C / 0 °F
Ice cream, re-packed for resale	≤ -18 °C	≤-18 °C / 0 °F
Ice cream scooped and served	≤ -18 °C / 0 °F	≤ -8 °C / 17 °F
Diary products recommended	≤ +7° C	≤ +7 °C / 44 °F
Bakery products, with part-baked filling	≤ +7°C	≤ +7 °C / 44 °F
Eggs (temperature if eggs to be stored over 18 days)		≤ +8 °C / 46 °F

[1] Production / storage at ≤ +4 °C / 39 °F e.g. butchers
[2] Incoming goods or storage under melting ice is possible

Food counter	≤ +65 °C / 149 °F

Retain samples for testing

Save for a minimum of 9 days	≤-18 °C / 0 °F

Do not compromise with temperature measurements! German food inspectors recommend ebro ®

-ebro- **Electronic GmbH** • Peringerstraße 10 • D-85055 Ingolstadt
Tel. +49 (0) 841-9 54 78-0 • Fax +49 (0) 841-9 54 78-80
www.ebro.com • E-Mail: ebro@xyleminc.com

Mini Temperature / Pressure Logger
EBI 11-TP110

EBI 11-P110

Technical Data

Type	EBI 11-TP110
Measurement range	1 mbar ... 4,000 mbar
Accuracy	Pressure: ±10 mbar Temperature: ±0.1 °C (± 0.2 °F)
Resolution	Pressure: 1 mbar
Channels	1 Temperature 1 Pressure internal
Sampling rate	Adjustable from 1 s to 24 h
Memory	2 x 7,500 measurements
Operating temperature	0 °C ... +150 °C (32 °F ... +302 °F)
Sensor	Pt 1000
Sensor Pressure	piezo-resistive
Measurement mode	- Endless - Start / stop time - Measure upon start time
Battery	- Start immediately until end of memory
Battery lifetime	1 s sampling rate: 4 days 1 min sampling rate: 15 weeks 15 min sampling rate: 30 weeks
Dimensions (Ø x H)	16.5 mm x 46 mm
Housing material	V4A
Protection class	IP 68

Applications

- Pressure control at canned goods production
- Monitoring of pasteurisation equipment
- Pressure-process monitoring in production

Attributes

- Temperature resistant up to +150 °C (+302 °F)
- M5 external screw thread for adaption
- Battery exchangeable
- Factory calibration certificate
- Programming and evaluation with PC

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

EBI 11 Mini Temperature Logger Sets
SL 4001 and SL 4101

EBI 11 Food Set for pasteurisation and sterilisation

The Temperature Monitoring System with EBI 11 Mini Data Logger

This set contains:

1 x Mini Temperature Data logger EBI 11-T23x:
Needle length: 20 mm, 50 mm or 100 mm
(Special needle lengths on request)
1 x AL 114 can adapter set
1 x EBI IF 100 Interface
1 x Winlog.pro Software
1 x Aluminum-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*

Description	Type	Part No.
EBI 11 Food Set	SL 4001	1340-6091

EBI 11 Mini Temperature Logger Set for pasteurisation and bottle cleaning

The Temperature Monitoring System with EBI 11 Mini Data Logger

This set contains:

1 x Mini Temperature Data logger EBI 11-T23x:
Needle length: 20 mm, 50 mm or 100 mm
(Special needle lengths on request)
1 x AL 115 Bottle adapter set
1 x EBI IF 100 Interface
1 x Winlog.pro Software
1 x Aluminum-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*

Description	Type	Part No.
EBI 11 Mini-Temperature Logger Set for pasteurisation and bottle cleaning	SL 4101	1340-6093

Mini Temperature Logger

Accessories for EBI 11 Temperature Logger

AL 115 bottle adapter-Set

- Bottle adapter for **EBI 11**

AL 114 Adapter-Set

- Can adapter for **EBI 11**

AL 114 Adapter-Set

- Bag adapter for **EBI 11**

Interface EBI IF 100-1 for EBI 11

- USB-adapter
- Coloured LED signaling programming, analysis and incorrect development
- for: **Winlog.pro / Winlog.light**

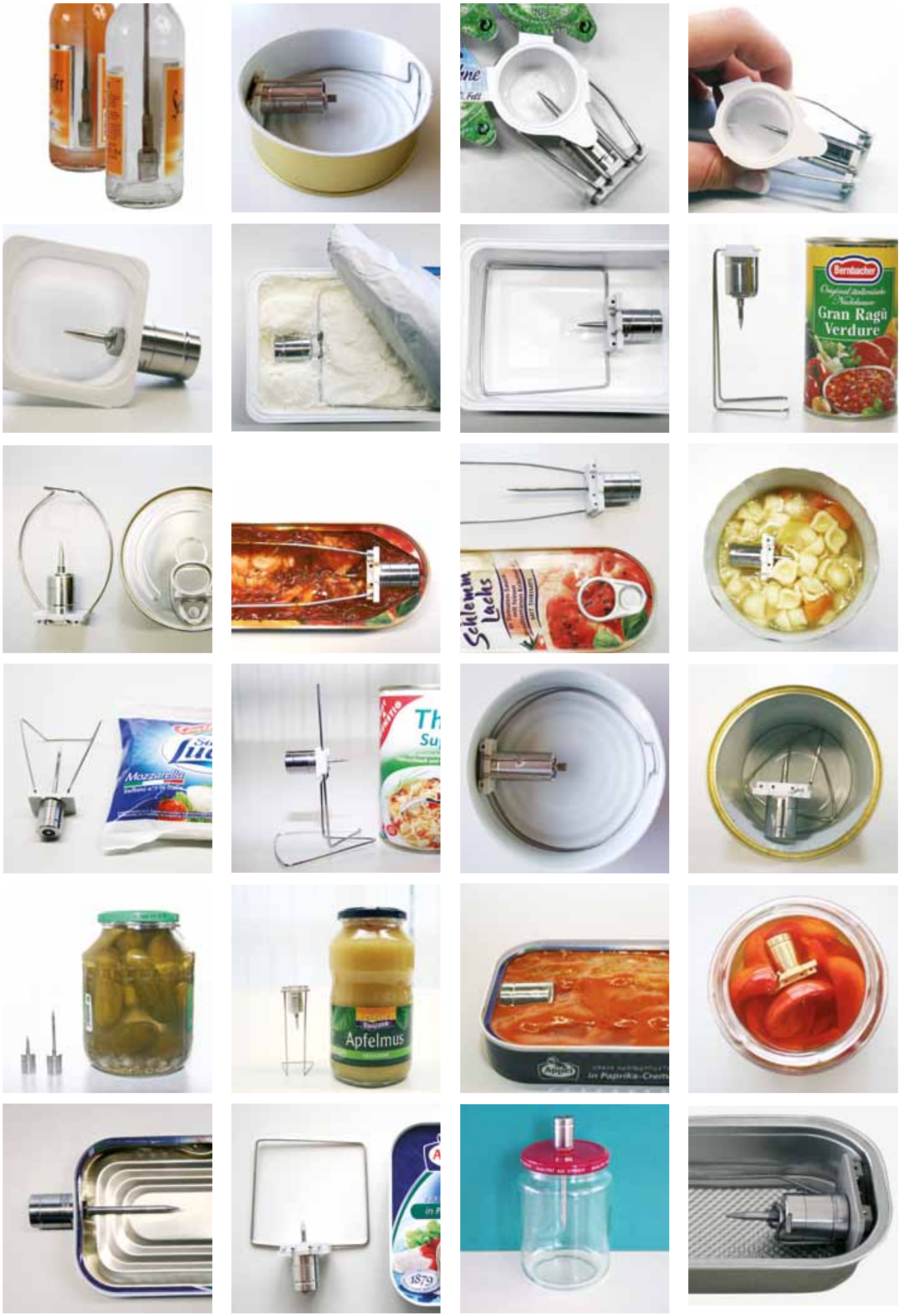
4-port interface IF 300 for EBI 11

- USB-adapter
- Coloured LED signaling programming, analysis and incorrect development
- Use with **Winlog.pro / Winlog.light**

Battery change set AL 113 for EBI 11

- Batteries, o-rings, lubricant, tools

Description	Type	Part No.
Can adapter-Set for EBI 11	AL 114	1340-6298
Bottle adapter-Set for EBI 11	AL 115	1340-6299
1-port Interface for EBI 11	EBI IF 100-1	1340-6004
4-port Interface for EBI 11	EBI IF 300	1340-6003
Battery change-Set for EBI 11 (consists of: 6 batteries, 3 o-rings and lubricant)	AL 113	1100-0120


Gran Ragù
Verdure
Schlemm
Lachs
Apfelmus

Accessories for EBI 100 and EBI 10

Accessories

Silicone protection case AL 100

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

Silicone protection case AL 101

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

EBI TIB

- Usable from +150 °C ... +400 °C (302 °F ... 752 °F)
- Thermal protection of data loggers
- For EBI 10 with radial probes
- Stainless steel, 160 x 160 x 82 mm

4-port Interface EBI IF 200

- USB connection
- Colored LEDs signal the status (program, read out, error)
- Including **AL 111** antenna
- Use with **Winlog.light / Winlog.pro**

AL 103

Battery exchange set AL 103

- Included: lubricated o-Ring, batteries, exchanging instruments, screwdriver, screw, operating instructions

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.

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)

Description	Type	Part No.
Thermo-silicone protection case (for EBI 10 - temperature)	AL 100	1340-6020
Silicone protection case (for EBI 10 - temperature and pressure)	AL 101	1340-6021
Thermal insulation case	EBI TIB	1340-1894
4-port interface for EBI 10	EBI IF 200	1340-6002
Antenna, suitable for all interfaces	AL 111	1340-6006
Battery exchange set for EBI 10 and EBI 100	AL 103	1100-0117
Battery exchange set for EBI 10 and EBI 100 (batteries, gaskets, fat) without fig.	AL 104	1100-0118
Grommets for sensor fixing up to 140 °C / 284 °F (100 pieces)	EBI NI-140	1340-1988
Compression fitting	EBI KV-3	1340-2005

Declarations of Conformity

Hiermit erklären wir,
Hereby we declare

dass sich das Gerät
that the following product

Geräteart / *Product type:*	**Datenlogger / *Data logger***
Typebezeichnung / Type designation:	EBI 2T- series 500, EBI 2T-112, EBI 2 Bus-Logger 712-724, EBI 2T series 300, EBI 85-A, EBI 125-A, EBI 100, EBI 20-T, TE, EBI Type designation: 25 T, TE, EBI 10, EBI 11 and EBI 300

ebro Electronic GmbH
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Tel. +49 (0) 841 / 95478-0
Fax: +49 (0) 841 / 95478-80

in Übereinstimmung mit den grundlegenden Anforderungen und den übrigen einschlägigen Besti mmungen 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***

Hiermit erklären wir,
Hereby we declare

dass sich das Gerät
that the following product

Geräteart / *Product type:*	**Thermometer / *Thermometer***
Typebezeichnung / Type designation:	TLC 730, TLC 1598, TFX 410, TFX 410-1, TFX 420, TFX 422, TFX 430, TTX 110, TTX 100, TFE 510

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The following harmonized standards have been used:
- ***Tests, performance, suitability: EN 12830***
- ***Periodic verification and calibration: EN 13486***

ebro® Data Logger Family EBI 20-T1 with 40,000 measurement memory capacity:

For the continuous documentation and monitoring of temperature, and humidity in storage, refrigeration and deep-freeze rooms and for the transportation of food products.

40,000
Measurement
Memory Capacity

The EBI 20-T1 Family
with memory capacity

- 40,000 measurements memory capacity
- 416 days continuous recording a measurement rate of 15 min
- Calibration certificate included

Temperature Data Logger
EBI 20-T1

DIN EN 12830

Technical Data

Type	EBI 20-T1
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
Resolution	0.1 °C (0.2 °F)
Memory	1 channel, 40,000 measurements
Sensor	NTC
Operating temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Sampling rate	1 min to 24 h
Memory 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	> 24 months, Sampling rate 15 min. at +25 °C (77 °F)
Protection class	IP 67
Housing material	ABS
Dimensions (L x W x H)	69 x 48 x 22 mm
Weight	45 g
Certificate	Factory calibration certificate

EBI 20-T1

Applications

- Reliable temperature recording
- Transport
- Storage monitoring
- Refrigerating and deep-freeze rooms
- Refrigerated display cases

Attributes

- Excellent price / performance ratio
- Waterproof
- Annual memory
- Visual alarm
- MIN / MAX values on display
- According to DIN EN 12830
- Replaceable battery
- Logger available as set with evaluation software and interface
- Factory calibration certificate

Description	Type	Part No.
Temperature logger	EBI 20 T1	1601-0042
Starter set (logger, evaluation software, interface)	EBI 20-T1-Set	1601-0046
Interface for EBI 20	EBI 20-IF	1601-0020
EBI 20 wall bracket	EBI 20-WM	1601-0030
EBI 20 truck wall bracket	EBI 20-WM-1	1601-0033

Temperature Logger with external probe
EBI 20-TE1

DIN EN 12830

Technical Data

Type	EBI 20-TE1
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
Resolution	0.1 °C (0.2 °F)
Memory	1 channel, 40,000 measurements
Sensor	NTC
Operating temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Sampling rate	1 min to 24 h
Memory mode	· endless measurement · start immediately until end of memory · start / stop measurement · start with key press
Battery	3V lithium (CR2450), user replaceable
Battery lifetime	> 24 months, Sampling rate 15 min. at +25 °C (77 °F)
Protection class	IP 67
Housing material	ABS
Dimensions (L x W x H)	69 x 48 x 22 mm
Weight	45 g
Certificate	Factory calibration certificate

EBI 20-TE1

Applications

- Reliable temperature recording
- Core temperature measurement
- Annual memory
- Transport
- Storage monitoring
- Refrigerating and deep-freeze rooms
- Refrigerated display cases

Attributes

- External probe for measuring core temperature
- Excellent price / performance ratio
- Automatic recording of temperature data
- Stores 40,000 measurements
- According to DIN EN 12830
- Programming and evaluation with PC
- Waterproof
- Factory calibration certificate

Description	Type	Part No.
Temperature logger with external probe	EBI 20-TE1	1601-0043
Temperature logger set* (logger, evaluation software, interface)	EBI 20-TE1-Set	1601-0047
Interface for EBI 20	EBI 20-IF	1601-0020
EBI 20 wall bracket	EBI 20-WM	1601-0030
EBI 20 truck wall bracket	EBI 20-WM-1	1601-0033

Temperature Logger with external probe up to 100 °C (212 °F)

EBI 20-TF

EBI 20-TF

Technical Data

Type	EBI 20-TF
Measurement range	0 °C ... +100 °C (+32 °F ... 212 °F)
Accuracy	±0.5 °C at +50 °C ... +100 °C (±1.1 °F at 122 °F ... 212 °F) ±1 °C (±1.8 °F) for the remaining measurement range
Resolution	0.1 °C (0.2 °F)
Memory	1 channel, 8,000 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	1 s - 24 h adjustable
Measurement mode	· endless measurement · start immediately until end of memory · start / stop measurement · start with key press
Battery	CR2450, user replaceable
Battery lifetime	> 24 months at measurement rate 15 min. at +25 °C (77 °F)
Housing material	ABS
Protection class	IP 67
Dimensions (L x W x H)	69 x 48 x 22 mm
Weight	45 g
Certificate	Factory calibration certificate

Applications

- Reliable temperature recording
- Core temperature measurement
- Hot serving counters
- "Meals on Wheels"
- Catering in hospital / retirement home
- According to DIN EN 12830

Attributes

- External probe for measuring core temperature
- Excellent price / performance ratio
- Automatic recording of temperature data
- Stores 8,000 measurements
- Programming and evaluation with PC
- Waterproof
- Factory calibration certificate

Description	Type	Part No.
Food temperature logger with external probe	EBI 20-TF	1601-0010
Interface for EBI 20	EBI 20-IF	1601-0020
EBI 20 wall bracket	EBI 20-WM	1601-0030
EBI 20 truck wall bracket	EBI 20-WM-1	1601-0033

Temperature / Humidity Logger
EBI 20-TH1

Technical Data

Type	EBI 20-TH1
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% rH ... 90% rH)
Resolution temperature	0.1 °C (0.2 °F)
Resolution humidity	0.1 % rH
Memory	40,000 measurements
Channels	channel 1: temperature channel 2: relative humidity
Sensor	NTC, capacitive humidity sensor
Operating temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Sampling rate	1 min ... 24 h
Memory mode	· endless measurement · start immediately until end of memory · start / stop measurement · start with key press
Battery	3V lithium (CR2450), user replaceable
Battery lifetime	> 24 months, measurement rate 15 min. at +25 °C (77 °F)
Protection class	IP 52
Housing material	ABS
Dimensions (L x W x H)	69 x 48 x 22 mm
Certificate	Factory calibration certificate

EBI 20-TH1

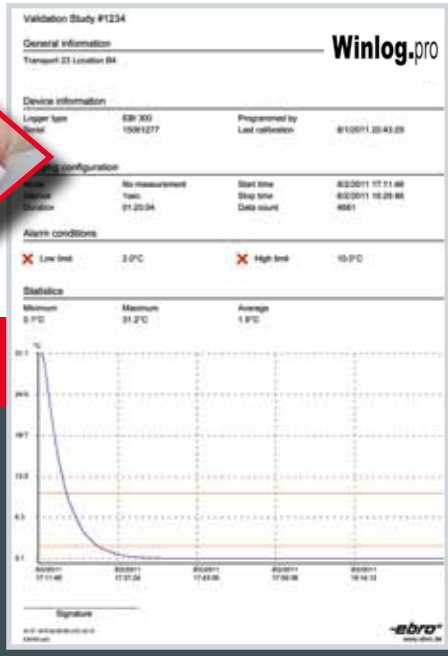
Applications

- Safe temperature and humidity recording
- Transport
- Storage monitoring
- Refrigerating and deep-freeze rooms
- Laboratory

Attributes

- Excellent price / performance ratio
- Programming and evaluation with PC
- Automatic recording of temperature and humidity
- Stores 40,000 measurements

Description	Type	Part No.
Temperature / humidity logger	EBI 20-TH1	1601-0044
Temperature / humidity logger set (logger, evaluation software, interface)	EBI 20-TH1-Set	1601-0048
Interface for EBI 20	EBI 20-IF	1601-0020
EBI 20 wall bracket	EBI 20-WM	1601-0030
EBI 20 truck wall bracket	EBI 20-WM-1	1601-0033



Cold Chain Monitoring with EBI 300 USB Data Logger

Print directly

Mail to receiver

PDF creation

Easy temperature monitoring for transport or storage applications

Start

Program, set optional limits, and press start…the EBI 300 is ready to monitor time and temperature. Once you remove your goods from storage or they reach their destination, you can see immediately if a temperature limit was exceeded with the help of a flashing red LED.

Connect

Connect the logger to any PC after transport or removing the monitored goods from storage. The logger will automatically generate a standard PDF without any additional software.

Check

Inspect time and temperature data for over limit conditions using any PDF reader software. The PDF can be stored, printed or emailed to any place you need. Custom data views can be created and calibration can be done using ebro's software Winlog.pro, Winlog.light or Winlog.basic.

More information at **www.ebi300.com**

Temperature Data Logger
EBI 300

Technical Data

Type	EBI 300
Measurement range	-30 °C ... +60 °C (-35 °C ... +75 °C with external probe) -22 °F ... +140 °F (-31 °F ... +167 °F)
Accuracy	±0.5 °C (-20 °C ... +40 °C) ±0.9 °F (-4 °F ... +104 °F)
Resolution	0.1 °C (0.2 °F)
Sensor	NTC
Memory	40,000 measurements
Battery lifetime	2 years
Sampling rate	1 min ... 24 h
Maximum Start Delay	72 h
Housing Material	Polycarbonate
Display	actual time and temperature, MIN / MAX
Measurement mode	· endless measurement · start immediately until end of memory · start / stop measurement · start with key press
Alarm	2 threshholds
Dfimensfions (L x W x H)	78 x 33 x 14 mm
Weight	35 g (with battery)
Protection Class	IP 65

EBI 300

Applications

- Transport
- Storage
- Specimen transport monitoring
- Storage monitoring
- Refrigerating and deep-freeze rooms
- Laboratory

Attributes

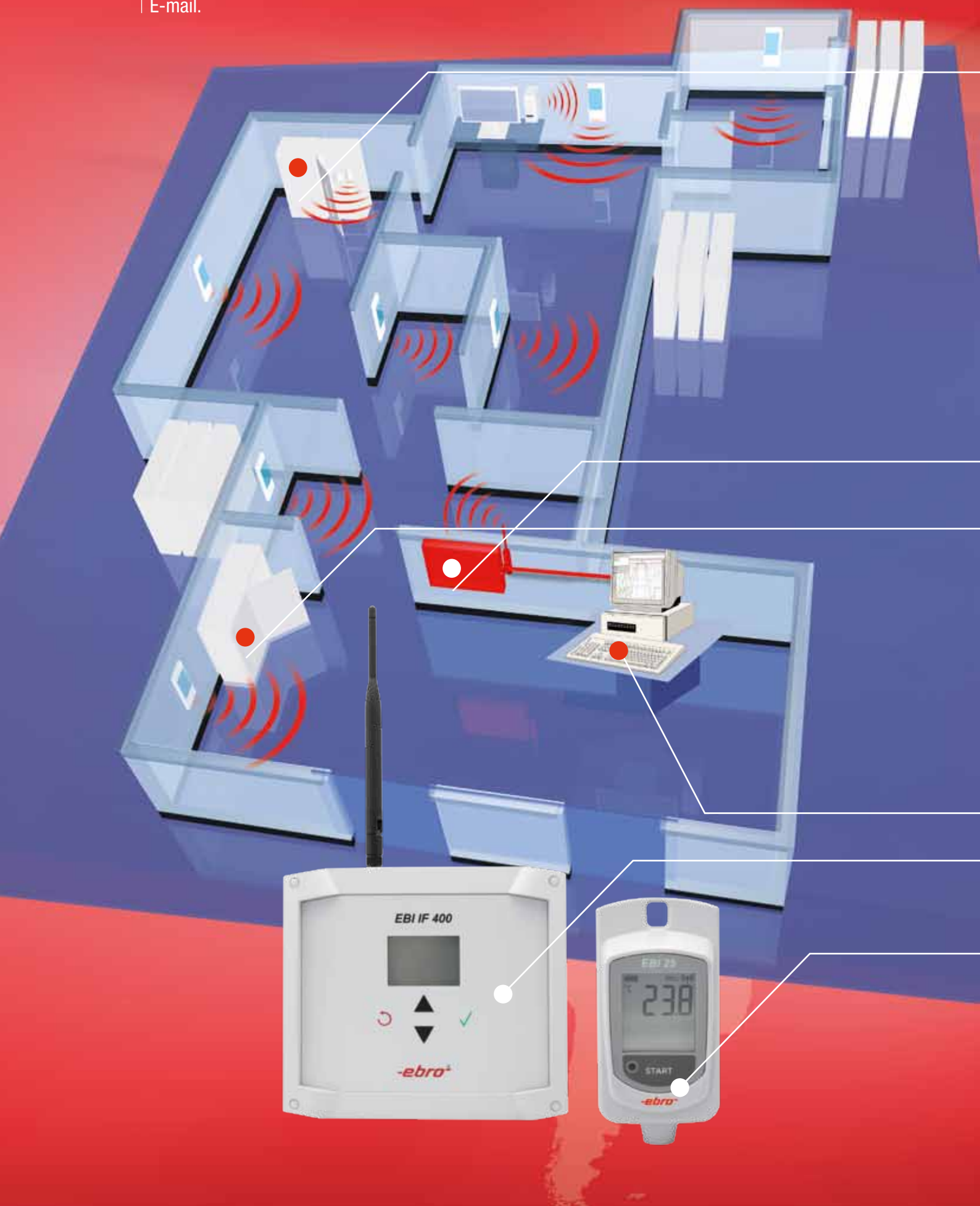
- Automatic creation of time and temperature PDF report
- IP 65 waterproof housing
- Food safe housing
- Evaluation without software
- Programmable via www.ebi300.com
- Conform with DIN EN 12830, ATP and VO (EG) 37/2005

Description	Type	Part No.
USB Data Logger with calibration certificate	EBI 300	1340-6330
External probe for EBI 300	TPC 300	3141-6331
Wall bracket for EBI 300	EBI 300 WM	1340-6340

Remarks

More information at www.ebi300.com

The innovative **EBI 25** Wireless Sensor System monitors temperatures without wiring and transmits the temperature / humidity values in real-time to an interface and then to the designated server or PC. As soon as the system detects a temperature / humidity limit violation, it sends an alarm message via SMS or E-mail.



Food Monitoring

Refrigerator Monitoring

Deep-freeze Monitoring

Storage Monitoring

Stationery

Mobile

Network

EBI 25-T / EBI 25-TE / EBI 25-TH

- High accurancy temperature or temperature / humidity measurement
- Memory secures data in case of possible PC failure
- Very long range of up to 500 m in free field
- Very long battery life-time
- Easy installation

Receiver unit IF 400

- Alarm message possible independent from the PC
- Direct connection to the PC or to the network

Winlog.web Software

- Internet-compliant
- Data can be accessed worldwide from every PC with an internet connection
- Password protected
- Mapping function
- Overview of current temperature values

Get the whole picture with EBI 25

Which supermarket manager or storage manager wouldn't like to be able to monitor the refrigerators in his market branches continuously from home or on the go to see if everything is in order?

The new **ebro® EBI 25** wireless monitoring system makes it possible. It monitors temperatures in freezers, refrigerators and refrigerated display cases and reports temperature violations immediately via special software as an alarm via SMS or E-Mail.

Using Winlog.web, you have secure access to your data via web browser. Monitor your goods anytime, anywhere.

Wireless Temperature Logger
EBI 25-T

DIN EN 12830

Technical Data

Type	EBI 25-T
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
Resolution	0.1 °C (0.2 °F)
Memory	1 channel, 288 measurements
Sensor	NTC
Operating temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Sampling rate	1 min to 24 h adjustable
Measurement mode	endless measurement
Radio frequency	868 MHz
Battery	3.6 V lithium battery, user changeable
Battery lifetime	< 2 years (depending on transceiver interval)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Housing material	ABS
Protection class	IP 67
Dimensions (L x W x H)	95 x 48 x 27 mm
Weight	approximately 65 g

EBI 25-T

Applications

- Logging and recording of temperatures
- Deep-freezers
- Refrigerators and refrigerated display cases
- Transport
- Storage monitoring

Attributes

- 868 MHz wireless interface
- Waterproof
- Battery exchangeable
- Monitoring of temperature thresholds with alarm function via SMS / E-mail
- Also available with external probe
- With calibration certificate

Description	Type	Part No.
Wireless temperature logger (internal probe)	EBI 25-T	1340-6200
Wireless temperature logger set (3 loggers, evaluation software, interface)	EBI 25-T-SET	1340-6220
Interface incl. antenna for EBI 25	EBI IF 400	1340-6210
Bracket for EBI 25	AG 152	1340-6215
Evaluation software (single-user version)	Winlog.wave	1340-2391
Evaluation software (web-based server version)	Winlog.web	1340-2390

Wireless Temperature Logger with external probe

EBI 25-TE

DIN EN 12830

EBI 25-TE

Technical Data

Type	EBI 25-TE
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)
Resolution	0.1 °C (0.2 °F)
Memory	1 channel, 288 measurements
Sensor	NTC
Operating temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Sampling rate	1 min. to 24 h adjustable
Measurement mode	endless measurement
Radio frequency	868 MHz
Battery	3.6 V lithium battery, exchangeable by user
Battery lifetime	< 2 years (depending on transceiver interval)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Protection class	IP 67
Dimensions (L x W x H)	95 x 48 x 27 mm

Applications

- Logging and recording of temperatures
- Storage monitoring
- Deep-freezers
- Refrigerators and refrigerated display cases

Attributes

- Wireless interface 868 MHz
- Battery exchangeable
- Monitoring of temperature thresholds with alarm function via SMS / E-mail
- Waterproof
- With calibration certificate

Description	Type	Part No.
Wireless temperature logger (external probe)	EBI 25-TE	1340-6201
Wireless temperature logger set	EBI 25-TE-SET	1340-6221
Interface incl. antenna for EBI 25	EBI IF 400	1340-6210
Bracket for EBI 25	AG 152	1340-6215
Evaluation software (single-user version)	Winlog.wave	1340-2391
Evaluation software (web-based server version)	Winlog.web	1340-2390

Wireless Temperature / Humidity Logger
EBI 25-TH

EBI 25-TH

Technical Data

Type	EBI 25-TH
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 %)
Resolution: Temperature	0.1 °C (0.2 °F)
Resolution:Hhumidity	0.1% rH
Memory	288 measurements per channel
Sensor	NTC for temperature / capacity humidity sensor
Operating temperature	-30 °C ... +60 °C (-22 °F ... 140 °F)
Sampling rate	1 min. to 60 min. adjustable
Measurement mode	endless measurement
Radio frequency	868 MHz
Battery	3.6 V lithium battery, exchangeable by user
Battery lifetime	< 2 years (depending on transceiver interval)
Storage temperature	-40 °C ... +70 °C (-40 °F ... 158 °F)
Housing material	ABS
Dimensions (L x W x H)	124 x 48 x 27 mm
Protection class	IP 20
Weight	approximately 65 g

Applications

- Logging and recording of temperatures
- Storage monitoring
- Deep-freezers
- Refrigerators and refrigerated display cases

Attributes

- Wireless interface 868 MHz
- Battery exchangeable
- With calibration certificate
- Monitoring of temperature thresholds with alarm function via SMS / E-mail

Description	Type	Part No.
Wireless temperature / humidity logger (external probe)	EBI 25-TH	1340-6202
Interface including antenna for EBI 25	EBI IF 400	1340-6210
Bracket for EBI 25	AG 152	1340-6215
Evaluation software (single-user version)	Winlog.wave	1340-2391
Evaluation software (web-based server version)	Winlog.web	1340-2390

The Multi-Channel Temperature Logger EBI 40:

Records temperatures during production development and process monitoring in baking stations, feed ovens and bakery ovens.

Current measurements can be read on the graphical display and the thermal insulation case of the EBI 40 allows high temperature usage.

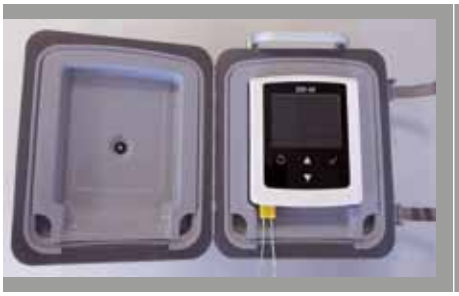
Up to 12 temperature channels per temperature logger possible.

Multi-Channel Temperature Logger
EBI 40

Technical Data

Type	EBI 40
Measurement range	-200 °C ... 1,200 °C (-328 °F ... 2,192 °F)
Accuracy	±0.5 °C (at 25 °C without sensor) ±0.9 °F (at 77 °F without sensor)
Resolution	0.1 °C (0.2 °F)
Channels	6 or 12 temperature channels
Logging cycle	adjustable from 0.1s to 24h
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	240,000 measurements (total)
Measuring mode	· Endless measurement immediatley · Measure immediatley until end of memory · Start / stop measurement
Display	TFT-display 3,5“ (324 x 240 Pixel)
Keys	4 keys (ESC, OK, Up, Down)
Dimensions (L x W x H)	140 x 118 x 35 mm
Housing material	ABS + PC
Protection class	IP 30

EBI 40



Applications

- Baking stations
- Feed ovens
- Baking ovens
- Process monitoring
- Product development

Attributes

- Connections for up to 12 temperature sensors
- Current values visible in TFT-display
- USB interface for PC and USB flash drive
- Battery lifetime max 100 h
- Maximum insulation by thermal insulation case
- Power supply via USB or battery
- Automatic display deactivation
- Calculation of temperature profiles
- Calibration certificate
- Configuration / readout with software Winlog.pro and Winlog.light

Description	Type	Part No.
Multi-channel temperature logger (6 probes)	EBI 40 TC-01	1340-6400
Multi-channel temperature logger (12 probes)	EBI 40 TC-02	1340-6401
Thermal insulation case	EBI TIB 400	1340-6430
Flexible thermo wire probe	TPN 601	1343-0646

The ebro® EBI 2 data logger family: Robust, versatile, user-friendly

Wherever measurement data needs to be available immediately, the device of choice is a data logger from the **EBI 2** family. Values such as temperature and humidity are shown immediately on the large, easily readable display.

EBI 2 data loggers are used for a wide variety of applications:

Cost effective refrigeration area loggers for butchers, shops and gastronomy, temperature and humidity loggers for the monitoring of humidity sensitive food products, special butchery loggers for refrigeration areas and refrigerated display cases.

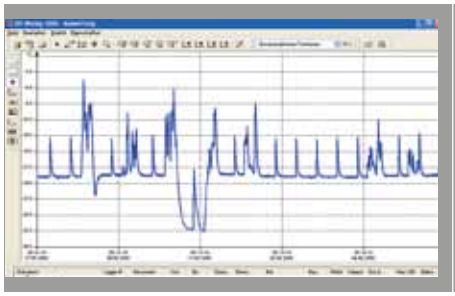
Precision Temperature Logger Pt 1000

EBI 2T-Series 300

Technical Data

Type	EBI 2T-311 / EBI 2T-312 / EBI 2T-313
Number of channels	1, 2 or 4
Memory	up to 60,000 measurements (EBI 2T-311: 40,000 measurements; EBI 2T-312 / -313: 60,000 measurements)
Measurement range	-50 °C ... +150 °C (-58 °F ... 302 °F) -50 °C ... +400 °C (-58 °F ... 752 °F) at additional charge
Accuracy	±0.4 °F (0.7 °F) ±1 digit
Resolution	0.1 °C (0.2 °F)
Display function	Housing material temperature -20 °C ... +50 °C (-4 °F ... 122 °F)
Sampling rate	adjustable from 1 s to 8 h
Measurement mode	· endless · start / stop
Battery	3.6 V lithium
Battery lifetime	approximately 5 to 8 years
Dimensions (L x W x H)	96 x 48 x 28 mm
Weight	100 g
Protection class	IP 40
Certificate	3-point factory calibration

EBI 2T-Series



Applications

- Temperature recording
- Refrigeration and deep-freeze rooms
- Refrigerated counters
- Laboratory

Attributes

- High accuracy
- Different probes available
- Programming and evaluation with PC
- Current values shown on display
- Factory calibration certificate

Description	Type	Part No.
Temperature logger for 1 external probe	EBI 2T-311	1641-1214
Temperature logger for 2 external probe	EBI 2T-312	1641-1424
Temperature logger for 4 external probe	EBI 2T-313	1641-1834
Interface set (without software)	EBI KSY-RS 232	1340-2084
Evaluation software	Winlog.light	1340-2354
Universal software	Winlog.pro	1340-2355

Remarks

Software, interfaces and probes see pages 72-73.

Temperature Logger

Accessories for EBI 2T-Series-300

Accessories

Pt 1000 probe class B-1 / 3 DIN

Stainless steel needle Ø 3 mm
Lemosa plug size 0

Probe with free cable end	L1 (m)	L2 (mm)	TYPE	Part No.
Teflon cable +200 °C (392 °F)	1.0	135	EBI FUE-T-1.0	1710-0006
Teflon cable +200 °C (392 °F)	2.5	135	EBI FUE-T-2.5	1710-0007
PUR cable +90 °C (194 °F)	1.0	135	EBI FUE-1.0	1710-0000
PUR cable +90 °C (194 °F)	2.5	135	EBI FUE-2.5	1710-0001

Stainless steel needle Ø 3 mm
Temperature range: -40 °C ... +400 °C
(-40 °F ... 752°F)
Silicone cable +220 °C (+428 °F), plastic grip
110 mm

Probe with free cable end	L1 (m)	L2 (mm)	TYPE	Part No.
	2.5	120	EBI FUE-SKW	1730-0041

Pt 1000 probe class B-1 / 3 DIN

Stainless steel needle Ø 3 mm, blunt
Lemosa plug size 0

Probe with Lemosa plug	L1 (m)	L2 (mm)	TYPE	Part No.
Teflon cable +200 °C (392 °F)	1.0	135	EBI FUE-T-1.0-L-F	1710-0019
Teflon cable +200 °C (392 °F)	2.5	135	EBI FUE-T-2.5-L-F	1710-0018

Stainless steel needle Ø 3 mm
Temperature range: -50 °C ... +400 °C
(-58 °F ... 752 °F)
Silicone cable +220 °C (+428 °F),
plastic grip 110 mm,
Lemosa plug size 0

Probe with Lemosa plug size 0	L1 (m)	L2 (mm)	TYPE	Part No.
	2.5	120	EBI FUE-SKW-L	1730-0042

Adapters for connection to data logger

Lemosa plug size 0, 2-pin Lemosa plug size 0
PUR cable MAX. +90 °C (194 °F)

Probe with Lemosa plug	TYPE	Part No.
	EBI 2-AK-02 M	1344-0240

Description	Type	Part No.
Probe with free cable end, 1 m Teflon	EBI FUE-T-1,0	1710-0006
Probe with free cable end, 2.5 m Teflon	EBI FUE-T-2,5	1710-0007
Probe with free cable end, 1 m PUR	EBI FUE-1,0	1710-0000
Probe with free cable end, 2.5 m PUR	EBI FUE-2,5	1710-0001
Probe for 1- or 2-channel logger, 2.5 m with grip	EBI FUE-SKW	1730-0041
Probe with Lemo plug, 1 m Teflon	EBI FUE-T-1,0-L-F	1710-0019
Probe with Lemo plug, 2.5 m Teflon	EBI FUE-T-2,5-L-F	1710-0018
Probe with Lemo plug, 2.5 m with grip	EBI FUE-SKW-L	1730-0042
Adapter for logger connection, 0.2 m*	EBI 2-AK-02M	1344-0240
**needed for pluggable probes*		

Temperature Logger
Accessories for EBI 2T-Series-300

Software

EBI 2-AUF 2
- Wall bracket, plastic with lock

EBI 2 AUF-3
- Wall bracket, V2A with lock

EBI KSY-USB
- USB adapter

EBI KSY-RS 232
- Interface for all **EBI 2** loggers, USB adapter optional

Winlog.pro
- Universal software

Winlog.light
- Evaluation software

Description	Type	Part No.
Evaluation systems		
Interface set for EBI 2 (without software)	EBI KSY-RS 232	1340-2084
USB adapter	EBI KSY-USB	1900-0100
Accessories		
Wall bracket, plastic, with lock	EBI 2-AUF2	1740-0005
Wall bracket, V2A with lock	EBI 2-AUF3	1740-0010
System case	EBI TAK ALU	1248-0020
Evaluation software	Winlog.light	1340-2354
Universal software	Winlog.pro	1340-2355

Precision Humidity / Temperature Logger
EBI 2-TH-611 / -611-Ex / -612

Technical Data

Type	EBI 2-TH-611 / -611-Ex / -612	
	Humidity (channel 1)	**Temperature (channel 2)**
Measurement range	0% rH ... 100% rH	-40 °C ... +75 °C (-40 °F ... 167 °F)
Accuracy	±2 % rH ±1 Digit (-10 °C ... +50 °C / 14 °F ... 122 °F and 5 % rH ... 95 % rH)	±0.3 °C (±0.5 °F) ±1 digit
Resolution	0.1 % rH	0.1 °C (0.2 °F)
Memory	30,000 measurements	30,000 measurements
Display function	-20 °C ... +75 °C (-4 °F ... 167 °F)	-20 °C ... +75 °C (-4 °F ... 167 °F)
Operating temperature	-40 °C ... +75 °C (-40 °F ... 167 °F)	-40 °C ... +75 °C (-4 °F ... 167 °F)
Storage temperature	-40 °C ... +75 °C (-40 °F ... 167 °F)	-40 °C ... +75 °C (-4 °F ... 167 °F)
Sampling rate	adjustable from 1 s to 8 h	adjustable from 1 s to 8 h
Measurement mode	endless, start / stop, start with set measurement rate	endless, start / stop, start with set measurement rate
Battery	3.6 V lithium	3.6 V lithium
Battery lifetime	approx. 3 to 5 years	approx. 3 to 5 years
Dimensions (L x W x H)	96 mm x 48 mm x 28 mm	96 mm x 48 mm x 28 mm
Weight	100 g	100 g
Certificate	3-point factory calibration	3-point factory calibration

EBI 2-TH-611 / -611-Ex / -612

Applications

- Temperature and humidity monitoring
- Transport monitoring
- Climate monitoring

Attributes

- High accuracy
- Also available with external probe
- Programming and evaluation with PC
- Current values shown on display
- Factory calibration certificate

Description	Type	Part No.
Humidity / temperature logger with internal sensor	EBI 2-TH-611	1613-1303
Humidity / temperature logger with internal sensor	EBI 2-TH-611-Ex	1613-1304
Humidity / temperature logger with external sensor *	EBI 2-TH-612	1613-1305

*see page 77 for external probes

Precision Humidity / Temperature Logger
Accessories for EBI 2-TH-611 / 612

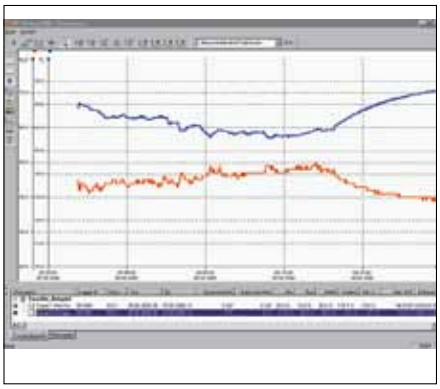
External probe for EBI 2-TH-612

Air probe incl. sinter filter **EBI FUE-L**

Penetration probe **EBI FUE-E**

Accessories

Wall bracket



Software

Calibration case EBI 2-TH-CAL

Description	Type	Part No.
Humidity / temperature logger, internal	EBI 2-TH-611	1613-1303
Humidity / temperature logger, external	EBI 2-TH-612	1613-1305
Probe for EBI 2-TH-612		
Air probe for EBI 2-TH-612	EBI FUE-L	1713-0070
Penetration probe for EBI 2-TH-612	EBI FUE-E	1713-0075
Accessories		
Calibration case	EBI 2-TH-CAL	1613-1325
Wall distance bracket with lock	EBI 2-WD	1740-0015
System case	EBI TAK ALU	1248-0020
Software		
Evaluation software	Winlog.light	1340-2354
Universal software	Winlog.pro	1340-2355
Interface set for EBI 2 (without software)	EBI KSY-RS 232	1340-2084
USB adapter	EBI KSY-USB	1900-0100

No matter which requirements you have on software: ebro® offers exactly the software you need.

- **Winlog.basic**
- **Winlog.light**
- **Winlog.pro**
- **Winlog.wave**
- **Winlog.web**


-ebro-
www.ebro.com
Winlog.basic
Winlog.light
Winlog.pro
Winlog.wave
Winlog.web

Evaluation Software for all ebro® Data Loggers

Winlog.basic, Winlog.light and Winlog.pro

Winlog.basic

The easy to use, free software for programming and evaluation of EBI 20 and EBI 300 data logger families:

- User-friendly: Self explanatory and easy to operate
- Programming and readout of data logger measurement
- Graphic and numeric presentation of data
- Protocol print out (with printer and computer)
- Pan and zoom views of displayed data
- Data export into Microsoft® Excel and Adobe® PDF
- Optional 21 CFR part 11 functionality

Winlog.light

The standard software for all ebro® data loggers. Evaluation made easy:

- Includes all features of Winlog.basic
- Supports all ebro® data logger types
- Data import of other ebro® software files
- Multiple report types available
- Shows statistics for measured data (i.e. MIN / MAX, average, standard deviation)
- Generates logger configurations

Winlog.pro

The professional software for all ebro® data loggers includes calculations and real-time monitoring for loggers with wireless communications:

- Includes all features of Winlog.basic and Winlog.light
- Real-time monitoring for loggers with wireless communication
- Formula editor for calculation F_0-value, absolute humidity, PU-value etc.
- Display of absolute or relative timeline
- Definition of ranges possible (with own statistics and calculations)
- Calibration tool for ebro® loggers included
- Import of photos and graphics in reports possible

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
> 5 GB free hard disc space
> USB (Universal Serial Bus)

Software requirements:
Operating System Microsoft ® Windows XP, Windows 7 or Windows Vista

Description	Type	Part No.
Evaluation software	Winlog.basic	1340-2375
Evaluation software	Winlog.light	1340-2354
Universal software	Winlog.pro	1340-2355

Evaluation Software for Data Logger EBI 25

Winlog.wave and Winlog.web

Winlog.wave

The local PC based measurement data evaluation software for programming, monitoring and evaluation:

- User-friendly: Self explanatory and easy to operate
- Real-time monitoring for EBI 25 data logger family
- Flexible and convenient alarm management
- Individually programmable reports with automatic evaluation
- Clear presentation of measured data with freely definable monitoring lists
- Graphical display of monitored area and measurement points
- Data security ensured by user administration

Winlog.web

The web-based measurement data evaluation software for programming, control monitoring and evaluation of technical processes:

- Includes all features of Winlog.wave in a web based platform
- Intranet and internet capable
- Event-triggered monitoring possible
- Ability integrate non-ebro® instruments using several communication protocols
- Optional 21 CFR part 11 functionality

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
> 5 GB free hard disc space
> USB (Universal Serial Bus)

Software requirements:
Operating System Microsoft® Windows® XP, Windows 7 or Windows Vista
Further requirements:
Mozilla Firefox 3.0, Microsoft Internet Explorer 7

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

New EC Regulation on Temperature Monitoring

Mandatory from January 1st 2010

Since January 1st 2006, Regulation (EC) No. 37 / 2005 of the Commission of the European Community on temperature monitoring of deep-frozen food in transport, warehousing and loading equipment has taken effect.

The regulation requires that transport and storage facilities be equipped with suitable devices for measuring and recording air temperature. The recorded measured data must be dated and stored for a minimum of one year, depending on the nature and perishability of the deep frozen food. Additionally, all devices used for measuring and monitoring these temperatures must conform to the standards EN 12830, EN 13485 and EN 13486.

To facilitate the implementation of these measures by business and industry, the judiciary has allowed for a transition period ending December 31st 2009.

Beginning January 1st 2010, all of the above-mentioned measuring devices must conform to these regulations.

International Food Standard

An increasingly competitive food industry and continuously rising demands regarding food safety are leading in turn to higher demands on manufacturers and sellers of food products. Because of the increased costs that individual operators have to carry due to these measures, a viable solution had to be brought forward.

IFS was defined by food retail representatives from many European countries. The goal was to find a standard for both the verification and certification of food safety systems and for the quality definition of food products. The IFS is considered to be a uniform international safety standard and is an effective way of implementing existing norms and laws on food security. In plain language this means that all required quality assurance activities are concentrated in one standard.
Although the IFS is not a law, it must be observed that more and more retailers such as Aldi and Edeka in Germany or COOP in Italy demand an IFS certificate for all deliveries. The individual trading companies thus have the assurance that their suppliers are working in accordance with these common targets and that production of safe food is guaranteed.
The IFS is also enjoying growing recognition at an international level because it is relevant for all establishments within the food chain. The audits can be carried out by different certification bodies that possess the necessary approvals. When obtaining accreditation according to EN 45011, this would be for example, TÜV.

As not only individual companies are expected to meet growing demands and expectations, the IFS subjects itself to regular audits. This resulted in the founding of the IFS 5. Its goal is to make the standard easier to understand and more transparent, despite the rising requirements and expectations. Significant changes are, amongst others:

- Reduction of requirements by more than 25 % (no duplication)
- One request level (no subdivision)
- Clear and simple phrases
- Inclusion of new legislation

In order to attain the IFS, an audit is carried out in the operation. During this audit, QM and HACCP records and the processes themselves are reviewed. In the end, a scoring system leads to success or failure. The result of this audit is crucial for determining the frequency of monitoring audits.

The 10 non-acceptable criteria defined in the IFS are important in determining if the audit is passed or failed. These criteria are, among others, "Monitoring of CCPs", "Personal Hygiene", "Specification for Raw Material", "Observance of Customer Specifications" or "Traceablility". In 40 % of the non-acceptable criteria, temperature control plays a very important role, because even an infraction such as irregular temperature checks can lead to an audit failure.

HACCP = Hazard Analysis of Critical Control Points

FOOD HYGIENE

The new hygiene package

in force since 1-1-2006

EC-regulation 852 / 2004 on hygiene of foodstuffs

EC-regulation 853 / 2004 with specific foodstuff regulations for food products of animal origin

EC-regulation 854 / 2004 with special regulations for the official monitoring of products of animal origin intended for human consumption

European law applies since 1-1-2006. The so-called hygiene package replaces corresponding national rules such as the German food hygiene regulations (Lebensmittelhygieneverordnung LMHV). What is new in this regulation?

- Food safety is monitored at the EU-level. Corresponding national regulations are no longer in force.
- The documentation of food hygiene is mandatory. It should, however, be appropriate to the nature and size of the business.
- Raw materials must be stored separately from processed products.
- The temperature monitoring of food products requiring refrigeration is stipulated as a binding requirement.
- Every business that handles food products must instate a hygiene management system in accordance with HACCP.

HACCP = Hazard Analysis of Critical Control Points

HACCP basic principles:
- Carry out hazard assessment
- Identify critical control -points (CCP)
- Specify threshold values for the CCPs
- Specify monitoring procedures of the CCPs
- Specify response measures in case threshold values are exceeded
- Regular verification of the HACCP-system
- Documentation of processes and records

The **HACCP**-concept should protect the consumer against unacceptable residual health risks.
Depending on the nature and size of the business, such a hygiene management system can be more or less comprehensive.

The following problem areas are to be examined critically:
- Building conditions
- Water supply
- Cleaning and disinfection
- Serving counter
- Circumstances of delivery
- Personal hygiene
- Preventing customer contact
- Sanitary facilities
- Handling of waste
- Cutting and handling devices
- Pest control
- Clothing, head coverings
- Health of employees

In the context of the hazard assessment, the following temperatures are to be taken into account:
- Delivery temperatures
- Ambient temperatures
- Transport temperatures
- Serving temperatures
- Storage temperatures
- Portioning temperatures
- Heating and warm storage temperatures
- Regeneration temperatures

Other monitoring procedures include:
- Measurement of pressure and humidity
- Measurement of salt content
- Determination of pH-value or the shares of preservatives contained in food products
- Determination of polar compounds in frying oil

Changes in DIN 10508
Temperatures for Food Products

During production, handling, transport and the introduction of food products into the market, temperature control and maintaining specific temperatures play a decisive role in controlling the undersirable propagation of microorganisms.

In the past, various regulations with corresponding temperature requirements for food products have been issued; however, these were not coordinated. The DIN 10508 was first published in October 2002 and now revised with respect to the new food hygiene law as well as practical experience.
The temperature specifications of this standard aimed at facilitating uniform procedure (Regulations according to the ATP agreement are considered).

Changes with respect to DIN 10508:2002-10:
1) The temperature specifications have been revised and updated according to the new food hygiene law (see tables).
2) The standard was updated to the latest status.

APPLICATION AREA
This standard specifies temperatures that apply for deep-frozen, frozen, refrigerated and for food products that are kept warm as well as for ice cream.

These temperatures are partially established in statutory regulations, or they are recommended by the NAL study group on food hygiene. These recommendations are not legally binding. They can be consulted for self monitoring as well as for official monitoring.

Requirements
- Easily perishable food products of animal or plant origin should, unless not specified by other regulations, be stored below +7 °C (44 °F).
- For packaged food products requiring refrigeration, a temperature of MAX. +7 °C (44 °F) should be assumed during transport and storage.
- In order to prevent germs form proliferating, the cocking down phase of hot food products (from +65 °C down to 10 °C) shall be carried out within 3 hours.

NOTE
Refrigeration alone can only slow down, but not prevent the multiplication of spoiling agents or disease agents. The multiplication of microorganisms also depends on the duration of storage as well as on additional internal and external factors.

Table 1: maximum temperatures for deep-frozen and frozen food products

Food industry products	Temperature °C / °F	
Deep-frozen food products (except for ice cream)	-18 °C (0 °F)	
Poultry, deep-frozen	-18 °C (0 °F)	
Frozen food products	-12 °C (10 °F)	
Meat, frozen	-12 °C (10 °F)	
Poultry, frozen	-12 °C (10 °F)	
Egg products, deep-frozen	-18 °C (0 °F)	
Egg products, frozen	-12 °C (10 °F)	
Egg products, refrigerated	+4 °C (39 °F)	Storage time at +4° (39 °F) up to the time of processing may not exceed 48 hours

Table 2: maximum temperatures for ice cream

Food industry products	Temperature °C / °F
Ice cream in finished packs	-18 °C (0 °F)

HACCP = Hazard Analysis of Critical Control Points

Table: Maximum temperatures for food products requiring refrigeration

Food industry products	Temperature °C / °F
Butter	+10 °C (50 °F)
Cream cheese (cream cheese products)	+10 °C (50 °F)
Soft cheese and sliced cheese except for hard cheese	+10 °C (50 °F)
other milk products, requiring refrigeration	+10 °C (50 °F)
Milk in the production operation	
- in case of daily transfer	+6 °C (42 °F)
- in case of non-daily transfer	+6 °C (42 °F)
Milk ready for consumption, pasteurized	+8 °C (46 °F)
Attested milk	+8 °C (46 °F)
Storage after filling	+8 °C (46 °F)
Meat, fresh	+8 °C (46 °F)
Butchery side products, fresh	+3 °C (37 °F)
Poultry, fresh	+4 °C (39 °F)
Ground meat, processed meat, processed poultry	
From operations not at the location of distribution	+4 °C (39 °F) for ground meat**
	+4 °C (39 °F) for processed meat
	+8 °C (46 °F) for deep-frozen goods
From operations at the location of distribution, loose or self-packed	
- for immediate distribution	+7 °C (44 °F) ambient temperature
- distribution on the day of production or given special documentation filling within 24h	+7 °C (44 °F)
	+4 °C (39 °F) ambient temperature
Meat products, easily perishable	+7 °C (44 °F)
Meat-based instant meals	+10 °C (50 °F)
Fishery products, fresh, as well as crab and shellfish products, boiled	in melting ice or +2
Fishery products, processed (marinated, soured, smoked)	+7 °C (44 °F)
Chicken eggs (from 18th day after laying date)	+5 °C to +8 °C (41 °F to 46 °F)
Food products containing raw eggs (such as fresh egg mayonnaise)	+7 °C (44 °F)
Egg products previously treated, refrigerated	+4 °C (39 °F)
Other easily perishable food products such as:	
- baked goods with fillings that are not heated through	+7 °C (44 °F)
- fresh, chopped-up salads	+7 °C (44 °F)
- delicacy salads	+7 °C (44 °F)

Special characteristics of ground meat
** In order to maintain the traditional marketing forms for ground meat, it can be refrigerated immediatley after processing to a core temperature of no more than +4 °C (39 °F). This temperature is also to be adhered to during storage and transport. This ground meat may only be brought into circulation on the day of the production.
The ambient and core temperature of +4° (39 °F) also applies for pre-packaged ground meat with a consumPT ion date after the packaging is opened.

Note
Although some easily perishable food products are explicity listed by name in the above table, many other products, for example from the area of processed meat and fishery products, also fall into this category, but these could not be listed individually because of their diversity. These products are to be classified in the group of other easily perishable food products.

Table: Minimum temperature for food products to be kept warm *

Food industry products	Temperature °C / °F
Food products ready for consumption that need to be kept warm	+65 °C (150 °F)

Easily perishable food products that are ready for consumption and that need to be kept warm should be kept at a product temperature of at least +65 °C (150 °F). The duration of the warming should be limited to about 3 h.

**Finished cooked dishes for immediate consumption are often found in cafeterias, canteens and primarily in fast-food gastronomy.*

F-Value Calculation

General information regarding the F-value

Heat treatment of meat has two essential objectives:

1. Preserving desired characteristics such as aroma, colour, taste and structure.

2. Killing off bacteria and microorganisms sufficiently to achieve the desired preservability.

Today, the effect of killing off certain microorganisms is expressed both for pasteurization and for sterilization using the F-value.
For the cooking of meat products, the F-value is applied with the reference temperature (+70 °C / 158 °F) and the Z-value (+10 °C / 50 °F).

Pasteurization

Meat products which can also be preserved through refrigeration have been exposed to heat treatment known as "pasteurization".
Preservation varies from a few days to a few months, and is highly dependent on the storage temperature.
Pasteurized products are also known as "semi-conserved" products. In case of refrigeration below +4 °C (39 °F), the product lifetime being targeted is 6 months.
Investigations have shown that sufficient coagulation (stiffening) is already achieved at a cooking or core temperature of +60 °C (140 °F).
Although the product is already cooked, this does not mean that it is already sufficiently well-preserved. For this, a minimum F-value is required. To pasteurize effectively (killing off the so-called vegetative organisms), temperatures of between +60 °C (140 °F) and +90 °C (194 °F) are required.

Sterilization

Products which are to be stored for longer periods without refrigeration require heat treatment known as "sterilization". Apart from the vegetative organisms referred to above, it is also necessary to kill off heat-resis-tant bacteria as well. However, that process only starts at temperatures frigher than+90 °C (194 °F).
These high cooking temperature result in a relatively high degree of danrage (damage to the structure and the appearance of deposits of jelly and fat, as well as quality loss in terms of colour, aroma and taste).
The key to proper sterilization is adequate killing-off of bacteria.

Microorganisms

Microorganisms are killed by using heat. To be able to judge whether the present microorganisms have been killed off sufficiently, in most cases heat-resistant microorganisms are taken as the measure. When processing meat, the organisms concerned are the D-streptococci. The D-streptococci begin to be killed off at a temperature of +55 °C (131 °F). The other microorgaanisms exhibit lower temperature resistance. The microorganisms are not killed off all at once; instead, there is a relatively exponential pattern.
When one talks about killing off microrganisms, then one is talking about the microorganisms in the thermal centre.The heat being fed in from the boiling vessel, boiling chamber or autoclave reaches this center last.
The thermal center is not necessarily the geometric centre, but is dependent on the shape or on the packaging. The type of heat source also determines the position of the thermal centre. Working hygienically means lowering the required F-value.
To pasteurize meat products with normal best before dates, F-values between 20 and 80 are required. The precise value depends on the initial bacterial level, the pH-value, the AW-value and the desired best before date. If hygiene is not taken so seriously (which is surely the exception), then this has effects on the bacteriological quality of the meat.
Working hygienically also means that fewer microorganisms need to be killed off. The consequence of this, in turn, is that the F-value can also be lower.
Generally, for pasteurization the F-value is at values of up to 40. Cooking and measuring the core temperature is not an adequate check. Previously, it was assumed that at a core temperature of +68 °C (145 °F) meat products were cooked sufficiently. However, this traditional view is demonstrably not necessarily correct.
A "Knackwurst" type sausage, for example, which was treated with a final core temperature of +68 °C (154 °F), is absolutely not safe to be preserved. This is also true for pork sausage. A cooked ham weighing 4.5 to 5.5 kg with a final core temperature of +68 °C is cooked to the -point of being unuseable. If these products were cooked with a F-value of 60, the final core temperature for the «Knackwurst» would be around +75 °C (167 °F), for the pork sausage around +73 °C (163 °F), and for the ham around +63 °C (145 °F). From this, it is clearly apparent that the best before period is not only dependent on the final core temperature, but is even more dependent on the relationship between the core temperature and the cooking time.

The measurement of the F-value is simple.

With the EBI 10, EBI 11 and EBI 100 ebro® temperature loggers, measuring the F-value is very simple. Before the treatment, the probe is inserted in the thermal centre of the product.
The core temperature alone doesn´t indicate much about the quality of the heat treatment. For a high-quality, safe product, it is absolutely necessary to carry out the heat treatment while monitoring the F-value. Working with the F-value optimizes the treatment of meat products.

The **advantages** are a clear profit for the producer:
· safely sustainable product
· better and more flavorful product
· better utilization of energy
· less damage due to cooking

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 once every six months for pressure and humidity meters.

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).

Following is normally applicable to ISO calibrations

The price for the calibration accroding to ISO 9000 ff. including certificate and 3 specified standard calibration points. Every deviating calibration point results in an surcharge.

Delivery time: approximately 1 week after reception of goods.

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.

Following is normally applicable to DKD calibrations

The price for the DAkkS calibration including certificate includes 3 optional calibration points in the range of -80 °C ... +300 °C (-112 °F ... 572 °F) or 10% rH ... 95% rH for humidity calibration. Every deviating calibration point results in an surcharge. Delivery time: approx. 1-2 weeks after reception of goods.

-ebro-

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

Certified according to

EN ISO 9001 : 2000
DIN EN ISO / IEC 17025

Measurement sizes
and Calibration Areas

Temperature Calibration

Calibration type	Calibration object	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Temperature measurement devices 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	Temperature measurement devices with air and submersible sensors, Temperature data logger	-80 °C ... -35 °C (-112 °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)	Liquid bath Water bath Oil bath Tube furnace	0.090 K 0.050 K 0.080 K 1,5 K
Calibration	**ebro®**-Thermometer TFX 422		Temperature-regulated	0.1 K
		-40 °C ... +200 °C (-40 °F ... 392 °F)	Liquid baths	

Surface Temperature Calibration

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)	Reference emitter	0.5 K

Humidity Calibration

Calibration type	Calibration object	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Capacitive sensors for relative humidity	10 % rH ... 30 % rH 30 % rH ... 60 % rH 60 % rH ... 95 % rH	Saturated salt solution Humidity generator Saturated salt solution	2 % rH
DAkkS	Capacitive sensors for relative humidity	10 % rH ... 30 % rH 30 % rH ... 60 % rH 60 % rH ... 95 % rH	Temperature range: +5 °C ... +70 °C (41 °F ... 158 °F)	0.3 % rH 0.6 % rH 0.9 % rH

Pressure Calibration

Calibration type	Measurand	Measurement range	Measurement conditions	Measurement uncertainty
ISO	Absolute pressure	0 mbar ... 10,000 mbar	Pressure calibrator	1 mbar+ $0.5 \times 10^{-4} p_{abs}$
DAkkS	Absolute pressure	0 mbar ... 35,000 mbar	In gases	0.1 mbar + $1.5 \times 10^{-4} p_{abs}$

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	-20 °C (-4 °F)	0 °C (32 °F)	+60 °C (140 °F)
EBI 20	-20 °C (-4 °F)	0 °C (32 °F)	
Thermometer with penetration probe	0 °C (32 °F)	+60 °C (140 °F)	+120 °C (248 °F)
Thermometer with surface probe	+50 °C (122 °F)	+100 °C (212 °F)	+200 °C (392 °F)
Thermometer 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 % rH -20 °C (-4 °F)	52.9 % rH 0 °C (32 °F)	75.4 % rH +60 °C (140 °F)
Pressure Logger 5 bar	0 mbar +20 °C (68 °F)	2500 mbar 0 °C (32 °F)	5000 mbar +60 °C (140 °F)
Pressure Logger 2 bar	0 mbar +20 °C (68 °F)	1000 mbar 0 °C (32 °F)	2000 mbar +60 °C (140 °F)

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