

Ellab Temperature Indicator



*FDA compliant
alternative to
mercury-in-
glass thermo-
meters for
retort moni-
toring - and
much more*

ETI

Ellab Temperature Indicator



The ETI is a high quality, digital temperature indicator that is used as a reference instrument for indicating the process temperature and/or pressure conditions in retorts. The indicator complies with FDA 21 CFR, Part 113 regulations and is highly appropriate for thermal processing of low-acid canned foods, making it an attractive alternative to mercury-in-glass (MIG) thermometers.

The ETI consists of two separate parts; the Main Unit, which contains the display and microcontroller, and the sensor, which houses two separate Pt-1000-based circuits as well as the calibration constants for each sensor. This means that whenever the ETI requires recalibration, the sensor is the only part that needs to be removed and calibrated. This makes it easy to install a newly calibrated sensor on-site and keep the ETI running while the recalibration takes place.

Configurations

The ETI is available in three different configurations:

ETI Indicator – the simplest configuration, which is purely used for temperature measurements and monitoring.

ETI Recorder - designed for temperature sensors and allows for PC connection or an additional remote display. With the PC option, temperature data can be collected, saved and analyzed within the ValSuite™/ ETISuite™ software. Automatic alarms can also be activated and operated through the output signal.

ETI Recorder Plus – has the same temperature, PC connection and remote display features as above, but with an additional option to connect a pressure sensor.

FDA Compliance

In order to ensure compliance with FDA 21 CFR, Part 113 regulations, the ETI offers the following features:

- **Documented accuracy** – The ETI accuracy is tested against an accurately calibrated reference device and delivered with a NIST traceable (or equivalent) calibration certificate.
- **Electromagnetic interference and environmental conditions** – The ETI is designed according to IEC 61326, which prevents electromagnetic interference from affecting the accuracy. Furthermore, the IP 67 classification of the ETI ensures that it is appropriate for an industrial environment.
- **The temperature must be easily readable** – The ETI has an accuracy of ± 0.1 °C and the display will indicate the temperature with a resolution of 0.1 °C.
- **Easy-to-read installation and positioning** – The display can be connected by using a cable, which allows it to be placed further away from the probe. An extra display can be connected to the ETI and mounted up to 1,200 m away.
- **Accuracy loss detection** – The ETI uses a dual probe sensor, which has two independent Pt-1000 sensing elements and A/D converters. The primary sensor is checked against the redundant sensor, and if a deviation between the sensors exceeds 0.3 °C, an error message is displayed and the ETI is disabled.
- **Unique ID on temperature probe** – The ETI sensor has a unique ID and contains the calibration certificate, which thereby ensures full traceability.

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The ETI is an excellent choice for retort monitoring as well as other applications. By recognizing that product safety, quality and efficiency are of paramount importance, Ellab has implemented the following features to the ETI:

- Automatic warning before calibration due date
- Automatic warning upon loss of accuracy or probe malfunction
- Unique calibration concept with interchangeable probes that secures a constant production flow and prevents downtime
- Internal rechargeable 8-hour battery
- Send temperature/time data through the RS485 port to a remote computer
- The ETI is delivered with optional user-friendly software that enables users to reset the clock
- The software also collects temperature/time data from the ETI with the option of generating PDF reports
- A cable for horizontal probe installations is available
- Multiple probe lengths and sensor fittings for length adjustments
- The main unit is equipped and ready for easy mounting on DIN rails, PLC cabinets or similar devices
- Output channel for automatic alarms (PLC)



Technical (main) specifications

Main Unit / Remote Display	
Weight	400g
Dimension w x h x d	100 x 65 x 36 mm
Material	Anodized Aluminum
Supply Voltage	7 - 30VDC
Max. Power Consumption	300 mA (12V)
Relay for Alarm Signaling	Max. 30VDC/AC, 300mA
Operating Range	0 to 70 °C
Memory Capacity	60,000 Samples (temp. + pressure)
Sample Rate	1 Second
International Protection Rating	IP67
Communication Interface	RS485
Backup Battery	Runs 8h, recharges app. 1,000 times
Screen	White Backlight, 128x64 pixels

Temperature Sensor	
Weight	50g
Material	Stainless Steel, 316L
Measuring Range (sensor tip)	-100 to +150 °C
Calibrated Range	0 to 140 °C
Sensing Elements	Pt-1000 (Dual Probe Sensor)
Storage of Calibration Data	in Sensor
Position of Measuring Point	5 mm from tip
Accuracy	0.1 °C (-24.9 to +140°C) 0.3 °C (-25 to +90 °C)
Resolution	0.1 °C
International Protection Rating	IP67
Recommended Calibration Interval	12 months

Pressure Sensor	
Weight	280g
Material	Stainless Steel, 316L
Measuring Range	0-4 bar ABS
Operating Range (temperature)	20 to 150°C
Accuracy	0.15% FS (20 ... 120°C)
Resolution	1 mbar
International Protection Rating	IP67

Sensors



Temperature Sensor

The temperature sensor can be connected and disconnected while the Main Unit remains fully powered and functional. When a sensor is connected, the ETI will briefly display the sensor serial number and status before measuring the temperature. The sensor can be connected to the Main Unit directly or by using an extension cable up to 20 meters long. Each sensor features an EEPROM, which contains calibration constants and other essential information, like sensor ID, production date, calibration date and recalibration due date.

In order to ensure that sensors are correctly mounted in the retort, Ellab offers fittings that enable operators to adjust the sensor insertion lengths. In addition to this, feed-through fittings are also available in $\frac{1}{2}$ " and $\frac{3}{4}$ " diameters, as well as a thermowell that protects sensors from heavy stress caused by steam injection. These wells are also available in $\frac{1}{2}$ " and $\frac{3}{4}$ " diameters.

Pressure Sensor

To make the ETI unit more versatile for monitoring purposes, it can also be equipped with a pressure sensor. The pressure sensor is attached to the ETI through a cable, which allows the sensor to be positioned remotely. When a sensor is connected, the ETI will start measuring the pressure, and its serial number and status will be displayed for a few seconds.



Options

Remote Display

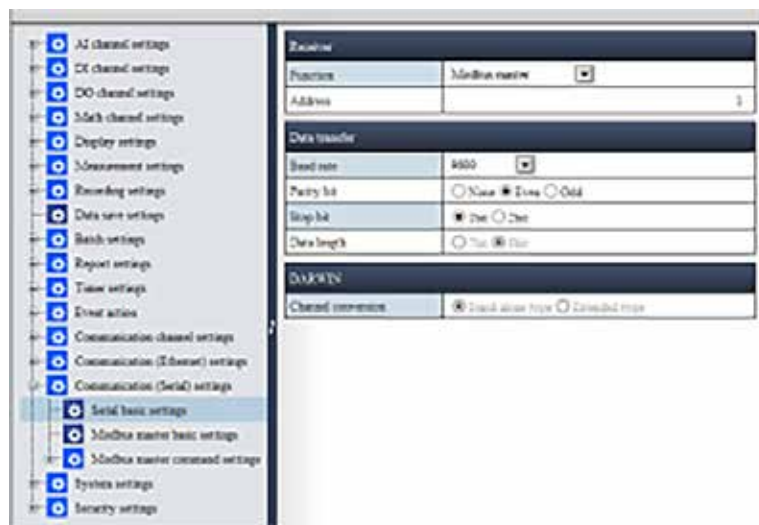
A Remote Display can be connected to the ETI's RS485 interface. The Remote Display is connected to the Main Unit by using a cable up to 1,200 meters long. The Remote Display is powered by the Main Unit or vice versa. If the Remote Display is to remain functional during potential power failures, a backup battery must be installed in both units.

Panel Mounting

Ellab offers a solution that enables mounting the ETI Main Unit in a panel or on a DIN rail.

ETI Modbus

More advanced ETI operation enables connection to a PLC by using Modbus communication. The temperature, pressure and time measurements are communicated directly to the PLC, allowing full control of the process and machine (retort). One or several ETI units can even be monitored at once if the PLC is connected to a SCADA system. This ensures an accurate overview of the measurements received from all the installed ETI units.



PC Connection

The ETI devices use RS485 to communicate with a PC, there are, however, some PCs that do not come with a RS485 communication option, in this case Ellab recommends using a MOXA UPort RS485 USB-to-Serial Adaptor.



*Many options
to suit different
installations*

Software ValSuite™ or ETISuite™



The ETI can be operated through the ValSuite software or the optional ETISuite software that enables the collection of data through the RS485 port to a computer. Furthermore, the software offers features that allow users to make fully documented and detailed calibrations and reports.

By using the software, it is possible to monitor the status of the ETI by enabling users to log temperature/pressure values or, alternatively, use the PC to program the ETI to log data independently.

Reports

With both ValSuite and ETISuite, it is possible to generate various types of reports to analyze the gathered data.

Most notably, is the Statistics Report followed by a Limit Report. To sort through data, one can utilize Time Markers and Value Markers, or use Comments and Word Documents for situations that require further details or descriptions. The optional report options, as well as other add-ons, can easily be selected and implemented from the software menu.



Calibration



User Calibration

The ValSuite and ETISuite software also offer a complete user calibration routine, providing fully traceable documentation.

Factory Calibration

Only the sensor is required when the ETI is due for recalibration, which means that the ETI can remain mounted and be equipped with another sensor during calibration periods. Upon sending the sensor to be factory calibrated, a certificate will be issued that includes all the information required to comply with FDA regulations and ensure the reliability, as well as accuracy, of the ETI. The calibration data is easily visible on the digital display, which automatically indicates a warning 28 days before the calibration date is due.

ETI Key Advantages - Summary

- FDA compliant alternative to MIG thermometers
- Eliminates the risk of mercury contamination
- Data logging with optional Excel exporting option
- Digital display for accurate temperature readings
- Remote display for more convenient and accessible positioning
- Automatically highlighted calibration and error warnings
- Monitor the performance from a remote office
- Rugged and IP 67 classified design
- Fittings and sensor lengths are easily adjustable
- Dual probe sensor
- Interchangeable sensors
- NIST traceable (or equivalent) calibration certificate
- In-house user calibrations with ETISuite or ValSuite software
- Calibrated Interchangeable Sensors helps avoid production down time
- Rechargeable backup battery
- Output channel for automatic alarms

	Temperature Read-out	Retrievable Memory	PC Connection	Remote Display	Pressure Read-out
ETI Indicator	✓				
ETI Recorder	✓	✓	✓	✓	
ETI Recorder Plus	✓	✓	✓	✓	✓

Ellab



Since the late 1940's Ellab A/S has been a leading manufacturer of process validation and monitoring systems used in the food, medical device and pharmaceutical industries.

Calibration Certifications and Service

Ellab maintains a complete calibration facility for annual certifications and service. Ellab A/S temperature, resistance, pressure and humidity calibration laboratory is accredited according to ISO 17025 by DANAK, under registration no. 520. Service and maintenance contracts are available.

Rental & Demos

Demo systems are available for trial and rental. Please contact your local Ellab representative for further details.

Training

Ellab Academy offers regular training courses for end-users. On-site individual training and equipment installations are also available through Ellab. Our Validation Consultants are available to assist you with any IQ, OQ, and PQ procedures.



Validation Solutions

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