

temperature

# JOFRA™ ETC Series

**Easy  
Temperature  
Calibrator**

**NOW**  
With Calibrator ETC-400 R  
for infrared thermometers

**This may be the fastest dry-block calibrator in the world!**

Heats up by up to 100°C / 212°F per minute and completes a full dual-point test in less than 10 minutes, including stability time; timesavings at your fingertips! The ETC-series is designed for field testing of temperature measurement devices. The small size and light weight make it a perfect instrument to verify sensors in difficult to reach places. All JOFRA ETC units and timesaving advanced JOFRA features offered in the more advanced JOFRA dry-block series.



## Temperature ranges

ETC-125 A -10 to 125°C / 14 to 257°F  
ETC-400 A 28 to 400°C / 82 to 752°F  
ETC-400 R 28 to 400°C / 82 to 752°F

## Fast calibration saves money

Heats up as quickly as 100°C / 212°F per minute and stabilizes in just 3 minutes. Completes a 2-point test in less than 10 minutes.

## Extreme flexibility

The small size makes it perfect to store in a tool box and to check temperature sensors that are difficult to access.

## Fully-featured despite the small size

The multi-information display shows actual and set temperatures, a stability indicator, and a stability countdown timer.

## Timesaving features

Fast one-key-one-function access to set the temperature and the auto-stepping function.

## Documentation made easy

RS232 communication interface and calibration software AMECAL-LIGHT are part of the ready-to-use standard delivery.

## PRODUCT DESCRIPTION

**Designed for people** who perform tests and verifications of temperature sensing devices in the field. This instrument is ideal when time is a critical factor and the highest accuracy is not a critical factor.

**Reduced size and weight** are important considerations because the unit is able to fit into a tool box or instrument carrying case and can be used for sensors that are difficult to access.

**One-key-one-function user interface** provides immediate access to setting the temperature and the auto-step timesaving function. There is no need for manipulation of sophisticated menus.

**The Stability indicator** provides audible and visual prompts when the temperature is stable. This function also includes a 3 minute countdown before the stable condition.

**Stainless steel** and rubber side panels make the instrument suitable for many years of faithful duty in an industrial environment.

**ETC-400 R for infrared thermometers**

The ETC-400 R is designed for optimum speed in connection with calibration of infrared thermometers. The 36 mm target provides the optimum size for reliable calibration of infrared thermometers in the process industry as it is designed for high accuracy and long-term stability while maintaining speed.

With regard to the coating of the target it has been especially designed for space technology applications, which secure long time performance under high temperature influence. In combination with the shape of the target it ensures the emissivity of 0.96. If higher accuracy is required, and for recalibration, a 3 mm external JOFRA STS reference probe can be placed under the surface of the target.



**Super fast heating - ETC-400 A dry-block**

The ETC-400 A is designed for optimum speed. The heating block is built around a highly efficient heating element. The insertion holes for the temperature device under test are located around this element. To reduce mass and increase effectiveness, there is no removable insertion tube; the holes are drilled directly into the block. The minimal mass offers an extremely fast heating and cooling time. The different layouts also make it possible to use an external JOFRA STS reference probe during the calibration.

Choose the combination of holes that best suits your needs from our various design combinations. If your application requires a dry-block that can handle large sensors or more than one sensor at a time, we offer several other JOFRA dry-block calibrators that can meet your needs.

**Cooling and heating - ETC-125 A dry-block**

The ETC-125 A is a simple yet effective tool for verifying temperature instruments that also require references below ambient temperatures: e.g. air-conditioning and cold counters. The predrilled holes allow the use of an insertion tube in the largest bore. This increases the flexibility to match many sensor-under-test sizes.

**Easy-to-use, intuitive operation**

All instrument controls are accessed directly from the front panel. The main functions on the ETC- series are designed with one-key-one-function logic. This means that there are no difficult multiple keystrokes to remember to access primary functions. The easy-to-read, backlit display features dedicated icons, which help in identifying instrument conditions and operational steps.



**Set temperature**

The "Up" and "Down" arrow keys allow the user to set the exact temperature desired with a resolution of 0.1°C or °F.

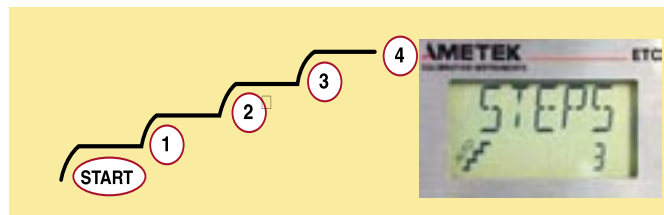
**Stability indicator**

The bold checkmark on the display indicates that the calibrator has reached the desired set temperature and is stable. The operator may change the stability criteria and establish a greater level of confidence in the calibration results as desired. A convenient countdown timer is activated three minutes before the unit reaches stability. This prompts you to be prepared to record results.

**Auto-stepping**

This feature saves time. The operator may stay in the control room, or another remote location, monitoring the output from the sensor-under-test while the ETC- series calibrator is placed in the process and automatically changes the temperature using a programmed step value and rate. Up to 9 different temperature steps may be programmed, including the hold time for each step.

This feature is also ideal for burning-in new sensors prior to installation; this minimizes initial drift and allows for initial testing. It is also useful for testing temperature data loggers.



**Maximum temperature**

From the setup menu, you can select a lower maximum temperature limit for the calibrator. This function prevents damage to the sensor-under-test caused by the application of excessive temperatures.

**Instrument setups**

The ETC- series stores the complete instrument setup, including: engineering units, stability criteria, resolution, auto-step settings, and maximum temperature.

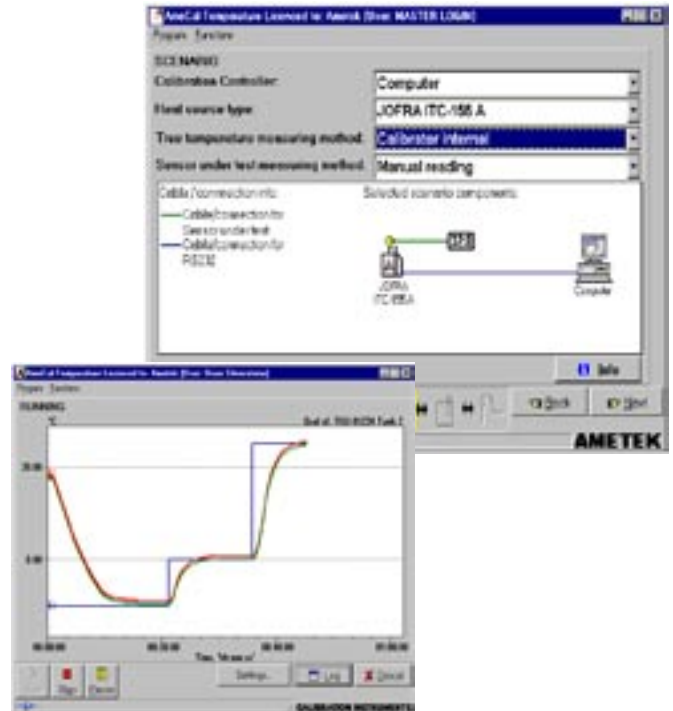
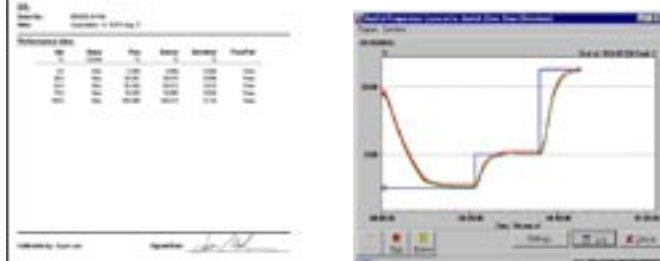
**Re-calibration/adjustments made easy**

The ETC- series has a very easy and straightforward procedure for re-calibration/adjustment. There is no need for a screwdriver or PC software. The only thing you need is a reliable reference thermometer.

Place the probe in the calibrator and follow the instructions on the display.

**Simplified calibration documentation**

All JOFRA ETC- instruments are supplied with RS232 computer interface and the calibration software AMECAL-LIGHT for on-line use. This WINDOWS®-based software allows the user to customize his or her calibration routines. The software is easy to use so you do not have to be a programmer to configure your own calibration procedures. After calibration you can print out certificates that contain all necessary information for your ISO-9000 or similar quality systems.



The software features prompts, menus, and help functions that guide you through the configuration process. The ETC calibrator can also work with the larger AMECAL-TEMPERATURE software, which supports automatic calibration for all JOFRA dry-block calibrators equipped with an RS-232 serial data interface including the JOFRA DTI-1000 digital thermometer. For semi-automatic calibrations, the software also supports liquid baths, ice points, or other dry-block heating and cooling sources. Using the software's »SCENARIO« function allows for combining instruments in virtually any configuration.



**JOFRA IR-LAB software ETC-400 R**

As an extra feature the ETC-400 R will be delivered with a small mathematical program, which will constitute a powerful tool together with the calibrator. The program enables you to calculate at which temperatures you need to calibrate, if your IR thermometer is either locked to a fixed emission factor or if you just want to calibrate your thermometer at a certain emission factor. The program facilitates the whole issue of correcting settings of emission factors and temperatures.


**SPECIFICATIONS**
**Temperature range @ ambient temp. 23°C / 73°F**

ETC-125 A	
Maximum	125°C / 257°F
Minimum @ ambient temp.	0°C / 32°F ..... -18°C / -0°F
Minimum @ ambient temp. 23°C / 73°F	..... -10°C / -14°F
Minimum @ ambient temp. 40°C / 104°F	..... 6°C / 43°F
ETC-400 A	28 to 400°C / 82 to 752°F @ 23°C
ETC-400 R	28 to 400°C / 82 to 752°F @ 23°C

**Resolution (user-selectable)**

Selectable ..... 1° or 0.1°

**Heating time**

ETC-125 A	
-10 to 23°C / 14 to 73°F	3 minutes
23 to 100°C / 73 to 212°F	11 minutes
100 to 125°C / 212 to 257°F	7 minutes
ETC-400 A / R	
28 to 200°C / 82 to 392°F	2 minutes
200 to 400°C / 392 to 752°F	3 minutes

**Cooling time**

ETC-125 A	
125 to 100°C / 257 to 212°F	1 minute
100 to 0°C / 212 to 32°F	17 minutes
0 to -10°C / 32 to 14°F	14 minutes
ETC-400 A	
400 to 200°C / 752 to 392°F	6 minutes
200 to 50°C / 392 to 122°F	15 minutes
ETC-400 R	
400 to 200°C / 752 to 392°F	9 minutes
200 to 50°C / 392 to 122°F	24 minutes

**Stability**

ETC-125 A	±0.05°C / ±0.09°F
ETC-400 A	±0.15°C / ±0.27°F
ETC-400 R	±0.3°C / ±0.54°F

Measured after the stability indicator has been on for 10 minutes.  
Measuring time is 30 minutes.

**Time to stability (approximate)**

All models ..... 3 minutes

**Accuracy**

ETC-125 A	±0.5°C / ±0.9°F <sup>1)</sup>
ETC-400 A	±0.5°C / ±0.9°F <sup>1)</sup>
ETC-400 R	±0.5°C / ±0.9°F <sup>2)</sup>
ETC-400 R incl. emissivity	..... ±0.4% rdg ±1°C / ±0.4% rdg. ±1.8°F

<sup>1)</sup> Specification when using the internal reference. (Load 4 mm OD reference probe in the center of the insert).  
<sup>2)</sup> Specification when using the internal reference. (Load 3 mm OD reference probe).

**Immersion depth**

ETC-125 A (insulation included)	110 mm / 4.3 in.
ETC-400 A	105 mm / 4.1 in.

**Mains specifications**

Voltage ETC-125 A	Multivoltage 115VAC and 230VAC
	..... 115V(90-132) and 230V(180-264)
Voltage ETC-400 A/R	..... 115V(90-127) or 230V(180-254)
Frequency ETC-125 A	47 - 63 Hz
Frequency ETC-400 A/R	45 - 65 Hz
Power consumption (max.) ETC-125 A	75 VA
Power consumption (max.) ETC-400 A/R	350 W

**AMECAL software**

Listed are the minimum hardware requirements needed for running the AMECAL-LIGHT and AMECAL-TEMPERATURE calibration software.

- AMECAL-LIGHT and AMECAL-TEMPERATURE
- INTEL™ 486 processor  
(PENTIUM™ 200 MHz recommended)
- 16 MB RAM (32 MB recommended)
- 40 MB free disk space on hard disk prior to installation
- Standard VGA (640 x 480, 16 colors) compatible screen  
(800 x 600, 256 colors recommended)
- CD-ROM drive for installation of the program
- 1 free RS232 serial port

## KEY FEATURE TABLE

### Automatic switch test

Finds switching temp. .... Open, close, hysteresis  
Slope rate, programmable ..... 0.1 to 9.9 °C/°F

### Auto stepping

Programmable..... Up to 9 steps  
Dwell time on each step ..... Programmable

### Multi-information display

Stability indicator ..... Clear checkmark  
Countdown timer before stable ..... 3 minutes  
Temperature ..... SET and READ simultaneously  
Alphanumeric messages ..... Yes  
Calibration status icons ..... Yes

### Training mode (heating/cooling block disabled)

Simulation of all functions ..... Yes  
Simulating heating and cooling ..... Approx. 100° per minute

### Service facilities

Adjustment of the unit from the keypad ..... Yes  
Self explaining guide in display ..... Yes  
Other information:  
Display serial number, software revision level, and last calibration date

### Setup facilities

Stability criteria:  
Extra time before "stable indication" is shown  
Display resolution ..... 0.1° or 1°C/°F  
Temperature units ..... °C or °F  
Slope rate ..... 0.1 to 9.9°/minute  
Maximum temperature ..... Any value within range

## PHYSICAL SPECIFICATIONS

### Instrument dimensions

ETC-125 A, ETC-400 A and ETC-400 R  
L x W x H: ..... 172 x 72 x 182 mm / 6.8 x 2.8 x 7.2 in.

### Instrument weight

ETC-125 A ..... 1.8 kg / 3.9 lb  
ETC-400 A ..... 1.6 kg / 3.5 lb  
ETC-400 R ..... 1.7 kg / 3.7 lb

### Shipping (including shipping cargo box)

Weight, ETC-125 A: ..... 3.0 kg / 6.6 lb  
Weight, ETC-400 A: ..... 2.8 kg / 6.2 lb  
Weight ETC-400 R ..... 4.5 kg / 9.9 lb  
Size, L x W x H:  
ETC-125 A / 400 A:  
..... 345 x 235 x 135 mm / 13.6 x 9.3 x 5.3 in.  
ETC-400 R ..... 425 x 320 x 165 mm / 16.7 x 12.5 x 6.5 in.

### Miscellaneous

Serial data interface ..... RS232  
Operating temperature ..... 0 to 40°C / 32 to 104°F  
Storage temperature ..... -20 to 50°C / -4 to 122°F  
Humidity ..... 0 to 90% RH  
Protection class ..... IP-10  
CE Conformity ..... EN61326-1 : 2001  
EN61010-1 : 2001

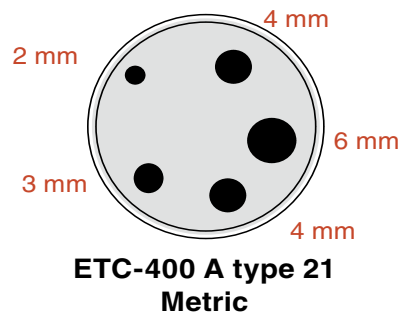
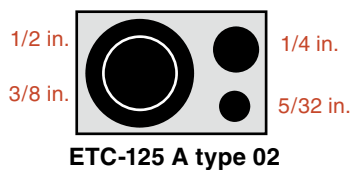
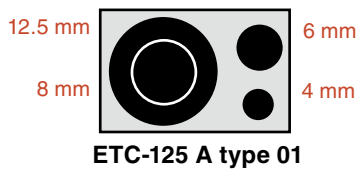
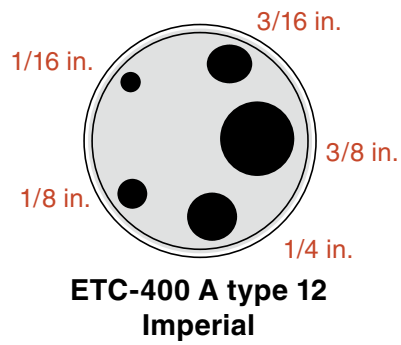
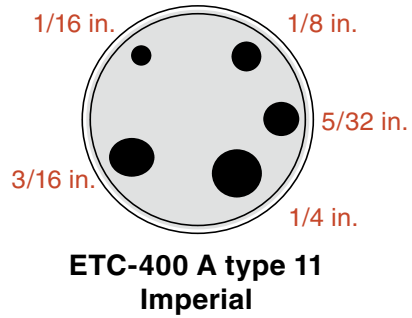


**STANDARD DELIVERY**

- JOFRA ETC- dry-block calibrator
- Traceable calibration certificate - temperature performance
- Calibration software AMECAL-LIGHT
- User and reference manual
- Mains power cable
- Shoulder strap
- RS232 cable
- 1 x predrilled insertion tube (ETC-125 A only)
- Tool for insertion tubes (ETC-125 A only)
- Carrying case (ETC-400 R only) <sup>1)</sup>
- JOFRA IR-LAB calibration software (ETC-400 R only)
- Emissivity table (ETC-400 R only)



1) The ETC-400 R is delivered with a carrying case because it is important to keep dust away from the surface of the target on the ETC-400 R. The reason being that a clean surface is important to keep the emissivity and thereby the accuracy.



ACCESSORIES	
Part No.	Description
123943	ETC- series, user and reference manual
60F135	Mains cable, 115 V, USA, type B
60F139	Mains cable, 220 V, Australia, type F
60F138	Mains cable, 220 V, Italy, type E
60F137	Mains cable, 220 V, South Africa, Type D
60F141	Mains cable, 230 V, Denmark, type G
60F140	Mains cable, 230 V, Europe, type A
60F143	Mains cable, 230 V, Israel, type I
60F142	Mains cable, 230 V, Switzerland, type H
60F136	Mains cable, 240 V, UK, type C
123958	RS232 cable 2 m / 6 ft (Stereo Jack to 9 pol D-sub)
60F172	Tool for insertion tube (ETC-125A)
123939	5 x undrilled insertion tubes for ETC-125A
123938	8 mm insertion tube for ETC-125A
124045	3/8 in. insertion tube for ETC-125A
124004	Shoulder strap with snap hooks
124094	Aluminum carrying case
124003	AMECAL-LIGHT calibration software
105813	AMECAL-TEMPERATURE calibration software
124591	JOFRA IR-LAB calibration software (ETC-400 R)
65-PT100-150 SPEC.	Pt100 sensor Ø3 x 150 mm (ETC-400 R)



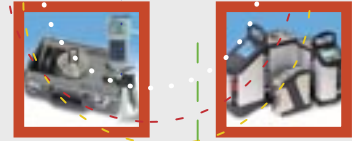
## ORDERING INFORMATION - JOFRA ETC- SERIES

## Order number Description

Order number	Description
	<b>Base model number - 1st thru 7th characters</b>
ETC-125 A	ETC-125 A, -10 to 125°C / 14 to 257°F
ETC-400 A	ETC-400 A, 28 to 400°C / 82 to 752°F
ETC-400 R	ETC-400 R, 28 to 400°C / 82 to 752°C
	<b>Power supply - 8th thru 10th characters</b>
115	ETC-400 A/R only: 115 VAC, 50/60 Hz
230	ETC-400 A/R only: 230 VAC, 50/60 Hz
MUL	ETC-125 A only: Multi voltage 115 and 230 VAC
	<b>Mains power cable type - 11th characters</b>
A	European, 230 V,
B	USA/Canada, 115 V
C	UK, 240 V
D	South Africa, 220 V
E	Italy, 220 V
F	Australia, 240 V
G	Denmark, 230 V
H	Switzerland, 220 V
I	Israel, 230 V
	<b>Holes for sensor-under-test - 12th thru 13th characters</b>
01	ETC-125 A: Metric 12.5 mm 6 mm 4 mm 8 mm.
02	ETC-125 A: Imperial 1/2 in. 3/8 in. 1/4 in. 5/32 in.
11	ETC-400 A: Imperial 1/16 in. 1/8 in. 5/32 in. 3/16 in. 1/4 in.
12	ETC-400 A: Imperial 1/16 in. 1/8 in. 3/16 in. 1/4 in. 3/8 in.
21	ETC-400 A: Metric 2 mm 3 mm 4 mm 4 mm 6 mm
51	ETC-400 R: For infrared thermometers
	<b>Traceability - 14th character</b>
C	Carrying case
H	Accredited calibration certificate (on quotation basis)
E	NPL and NIST traceable calibration certificate (standard delivery)

**ETC-400A230A21E** Sample order number (all 14 characters)  
 JOFRA ETC-400 A series dry-block, 230 VAC power, European power cord, metric drilled multihole block and standard NPL/NIST traceable certificate.

temperature  
 software  
 pressure  
 signal

**AMETEK****Calibration Instruments**

offers a complete range of calibration equipment for pressure, temperature, and signal - including software.

**Temperature standards**

Portable precision thermometer. Dry-block calibrators: 4 series, more than 20 models - featuring speed, portability, accuracy, and advanced documenting functions.

**Primary pressure standards**

Pneumatic floating-ball or hydraulic piston deadweight testers - easy-to-use with accuracies up to 0.015% of reading.

**Electronic pressure standards**

Convenient electronic systems ranging from -1 to 700 bar / 25 inHg to 10,000 psi - multiple choices of pressure ranges, pumps, and accuracies, fully temperature-compensated for problem-free and accurate field use.

**Signal calibration**

Process signal measurement and simulation for easy control loop calibration and measurement tasks - from handheld field instruments for multi or single signals to laboratory reference level bench top instruments.

**...because calibration is  
 a matter of confidence**

AMETEK is a leading global manufacturer of electrical and electromechanical products for niche markets. AMETEK's annual sales exceed \$1 billion. NYSE (AME) since 1930. Operations are in US, Europe and Asia, with about 1/3 of sales to markets outside the US.

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