JOFRA calibration
AMETEK

RTC Series

Reference Temperature Calibrator

RTC-156 & RTC-157



AMETEK®
SENSORS, TEST & CALIBRATION

Product Description

AMETEK continues to develop new techniques to improve the performance, accuracy, convenience, and functionality of the popular Jofra calibration products. By doing so, we maintain our position as the leading worldwide manufacturers of temperature dry-block calibrators.

We are proud to introduce our top model RTC (Reference Temperature Calibrator), which is no exception to the above, and even more sophisticated than any existing calibrators.

Features & Models

The RTC offers many new fantastic features such as:

- Patented DLC (Dynamic Load Compensation) system for perfect temperature uniformity in the insert.
- Unique, intelligent sensors for plug n' play connection.
- USB connector for communication.
- Easy-to-read color VGA display with a perfect overview of the actual status.
- Intuitive, fast, and user-friendly navigation.
- Lightweight and easy to carry around.
- New functional carrying case design.
- New multi-hole insert kits covering all of the most used sensor sizes.
- High profile design and well-known, long lasting Jofra quality.

The new RTC calibrator comes in three different models—A, B, and C.

- RTC-A reference temperature calibrator.
- RTC-B reference temperature calibrator with input for reference sensor, DLC sensor, and sensors-under-test.
- RTC-C reference temperature calibrator with input for reference sensor and DLC sensor.



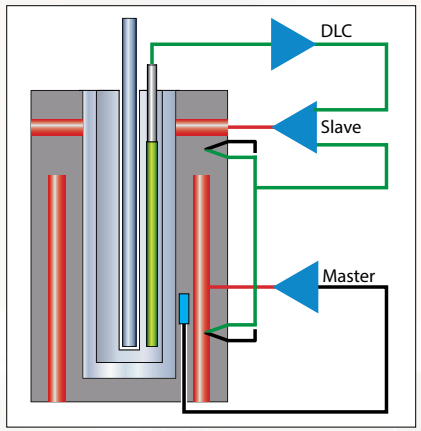




Key Features

- **High Accuracy**
  Down to ± 0.04°C using the external reference sensor. 4-wire True-Ohm Measurement technology is used.
- **Excellent Stability, 0.005°C**
- **Wide Temperature Range**
  RTC-156: From -30 to 155°C (-22 to 311°F).
  RTC-157: From -45 to 155°C (-49 to 311°F).
- **Improved Temperature Homogeneity**
  Unique, active dual-zone block ensures good temperature homogeneity in the calibration zone.
- **DLC (Dynamic Load Compensation)**
  Perfect temperature uniformity in the insert, even when calibrating large sensors or many sensors at a time. (B and C models only.)
- **Display Indicator for Temperature Uniformity**
  Shows the degree of temperature uniformity in the insert when using the new DLC technology. (B and C models only.)
- **Intelligent Reference Sensors**
  Jofra reference sensors are supplied with intelligent plugs, holding the calibration data (coefficients) of the reference sensor. This is a truly plug n' play calibration system.
- **USB Communication**
  All RTC calibrators communicate via an easy-to-use USB port.
- **EURAMET**
  Best performing dry-block with regard to the EURAMET/cg-13v.01 guideline for the testing of dry-blocks.

DLC—Dynamic Load Compensation



To bring our well documented active dual-zone technology to an even higher level, we have developed the patented DLC system.

This feature makes it possible to perform top calibration specifications without being affected by the actual load, e.g. many sensors or very big sensors.

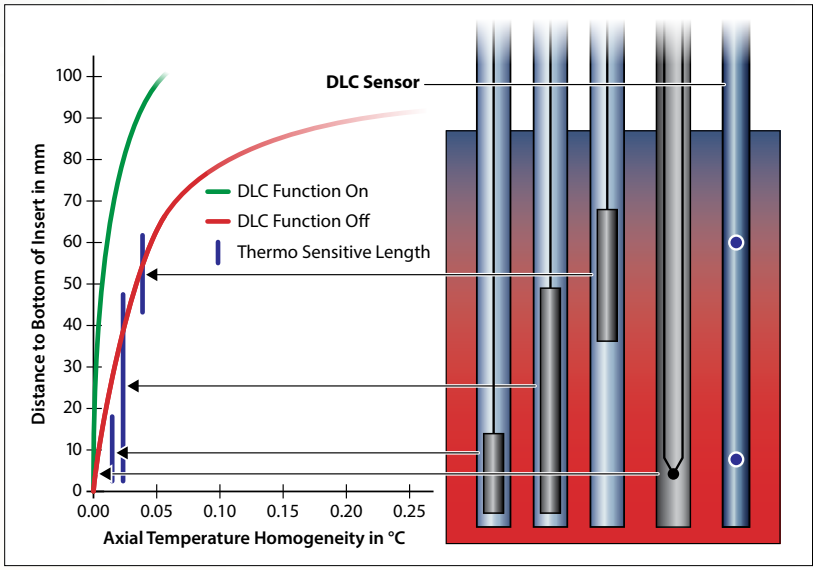
The DLC sensor improves on the RTC calibrator's already advanced dual-zone technology by controlling the homogeneity in not only the well, but inside the insert where the sensors-under-test are placed during calibration. The DLC sensor measures the temperature homogeneity in the insert and provides feedback to the active dual-zone system, which compensates the temperature difference to a minimum inside the insert. In this way, the DLC function makes the homogeneity independent of the different loads of the insert, making the RTC the best performing dry-block calibrator on the market when calibrated and tested according to the globally accepted EURAMET/cg-13v.01 guideline for calibration and testing of dryblocks.

The DLC system is comprised of a special differential temperature sensor designed especially for the RTC. The sensor is placed in the insert and connected to the calibrator. When the DLC function is enabled, the calibrator will automatically equalize the temperature homogeneity inside the insert, along with the normal temperature control and stabilization.

DLC—User Advantages

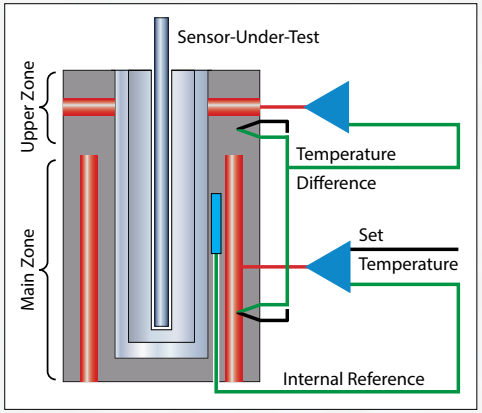
Calibrating with the DLC sensor offers the following advantages:

1. Calibration of several sensors simultaneously.
2. Calibration of thick sensors.
3. Gives TSL (Thermo Sensitive Length) independency. It is no longer necessary to know the TLS of the sensor.
4. Compensates for sensor production tolerances like the PT100 element being mounted in various positions in the sensor.
5. Trouble free calibration of sensors with PT100 elements up to 60 mm length.
6. The DLC indicator proves that the dual-zone is active and functioning well.
7. Proves that the calibrator is working perfectly. The DLC value should be very close to 0.00 when the calibrator is loaded with DLC sensor and an external reference sensor.
8. Together with the stability indication, the DLC indicates when the calibration values can be read.



Axial temperature curves for an RTC calibrator with and without the DLC functionality activated.

Unique Temperature Performance



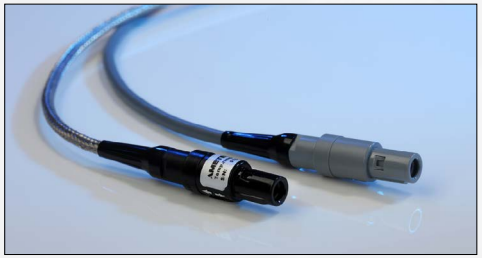
The RTC series of calibrators provide precision temperature calibration of sensors, whatever the type or format. This is accomplished through an innovative active dual-zone heating technology.

With JOFRA's active dual-zone heating technology, each heating zone is independently controlled for precision temperature calibration. The homogeneity in the lower part is close to that of a laboratory liquid bath. The lower zone ensures optimum heat dissipation throughout the entire calibration zone. The upper zone compensates for heat loss from the sensor-under-test, and from the open top. This design also eliminates the need for extra insulation of sensors-under-test and makes it possible to calibrate liquid-filled and other mechanical sensors.

USB and LAN/Ethernet Connection

A USB connection facilitates easy communication with JofraCal. The USB connection also supports easy download of future firmware upgrades. The USB connection provides fast and easy access to all laptops without the need of RS-232 to USB converters.

Future-proof through e.g. a flash capability for easy firmware upgrades as well as already integrated LAN communication, SD-card slot, and USB host connectors for future use.

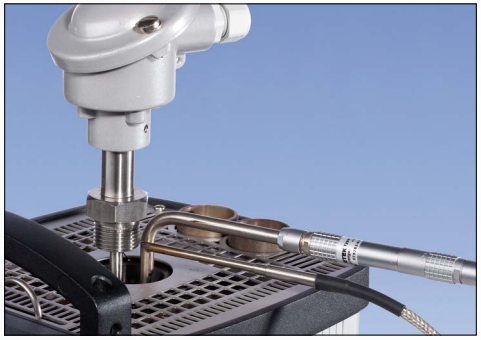


Intelligent Reference Sensors

The JOFRA STS-200 intelligent reference sensors and the DLC sensor contain individual calibration data regarding the sensor. Firstly, this means that the time-consuming coefficient downloading sequence with risk of errors is no longer necessary. Secondly, the user can change the reference sensor and be up and running immediately.

With the intelligent sensors, AMETEK has eliminated a source of error, and the system is now giving a fail-safe plug'n'play calibration system.

Unique Reference Sensors



The STS-200 reference sensors and the DLC sensors have been specially designed. They are both angled 90° and have been customized to fit the calibrator so that they are only slightly higher than the top of the RTC calibrator.

The unique design makes it possible to calibrate threaded sensors and sensors with connection heads without any problems.

Easy to Carry Only 23 lbs/10.5 kg

A calibrator is carried from one job to another. Therefore, it is essential that the weight of the calibrator is as low as possible.

We have thoroughly included the weight issue in our design and have developed design techniques that have made the RTC calibrator lightweight and easy to carry around without compromising its quality, durability, and functionality.

The purpose of minimizing the weight of the RTC calibrator is to protect, especially frequent users from overload.

Same Size Inserts

The RTC-156/157 calibrators use the same insert dimensions (30x150mm) as some of our existing calibrators. This makes it possible to reuse inserts from other calibrators.

Fast Temperature Calibration -24° C @ 15 min

Time is money! This is why all the RTC calibrators have an increased heating and cooling speed compared to all other calibrators. Heating and cooling speeds have been increased by up to 20%. The implication is savings in both production downtime and general calibration costs.

Multi-Hole Insert Kits



Two special multi-hole insert kits have been developed to comply with the calibration of almost any sensor diameter without having to buy numerous inserts.

The first kit is a metric insert kit consisting of only four inserts covering all diameters from 3 to 13mm. The other is an imperial insert kit consisting of only three inserts covering six different sizes from ⅛" to ½".

All inserts have holes for both STS reference sensors and DLC sensors.

With this insert kit in the carrying case, the user is now able to calibrate all commonly known sensor sizes. These insert kits are part of the JOFRA lightweight strategy.

Special Designed Carrying Case

AMETEK has designed an all-in-one-handle carrying case that makes it possible to store both the STS reference sensors and DLC sensors in the carrying case with optimum physical protection. There is room for inserts and insulation plugs to cover all dimensions and compartments for the integrated support rod set, wires, manuals, certificates, plugs, insert tools etc.

All compartments are specially designed to hold one of the above mentioned items. This makes it very easy to keep track of any accessories.

For optimum protection of the calibrator and the accessories, the compartments are designed to hold the accessories fixed during transportation.

Wide Temperature Range -45°C

The RTC Series can perform calibration over a very wide temperature range starting from -45°C and up to 155°C (-49 to 311°F). This makes it possible to perform calibration jobs over a range of 200° C (360° F) with only one calibrator.

Easy to Read Color Display and User-Friendly Navigation



The 5.7" full color VGA display is very easy to read. The main temperatures, like SET, READ, TRUE and SUT (Sensor under test), are always displayed at all stages of the programming or calibration procedure.

The navigation is menu-driven and very logical to use, and the display shows any important information needed for the current function in use. The communication windows pop up and are followed by discrete sound messages. The display is very bright, and the main information can easily be read from a distance. The advanced simplicity RTC user interface is available in English, German, Chinese, and Japanese.

The large display contains more detailed information at a glance, such as:

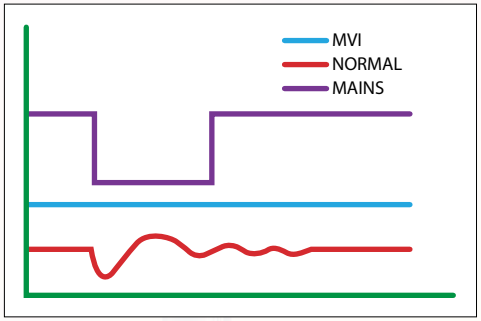
- Stability status.
- Load compensation status.
- Real time clock.
- Serial number of reference sensor.
- Sensor-under-test status.

Integrated Support Rod



The integrated support rod is part of the reduced weight philosophy. It is lightweight and very easy to mount on the RTC. Two fixing holes are integrated in the calibrator where the support rods can be mounted.

MVI—Secure Temperature Stability



MVI stands for "Mains power Variance Immunity". Unstable mains power is a major contributor to on-site calibration inaccuracies. Traditional temperature calibrators often become unstable in production environments where large electrical motors, heating elements, and other devices are periodically cycled on or off. The cycling of supply power can cause the temperature regulator to perform inconsistently, leading to both inaccurate readings and unstable temperatures.

The JOFRA RTC calibrators all employ the MVI functionality, thus avoiding such stability problems. The MVI functionality is obtained by running the calibrator on stabilized DC voltage.

Highest Accuracy (models B & C only)

The RTC series calibrators may be supplied with a built-in reference thermometer to be used with an external reference sensor. This feature allows the instrument to perform calibrations on-site, while maintaining high accuracy.

A special 90° angled external reference sensor has been designed to accommodate the calibration of sensors with a transmitter head, top connector, or similar arrangement. The user can decide whether to read the built-in reference sensor or the more accurate angled reference sensor from the large, easy-to-read LCD display of the calibrator. The external sensor and the internal sensor readings are independent of one another.

SET-Follows-TRUE (models B & C only)

Available on B and C models only, the "SET-Follows-TRUE" makes the instrument tune in until the temperature reading of the external reference "TRUE" meets the desired "SET" temperature. This feature is important when it is critical that the temperature of the calibration zone matches the desired temperature when measured with accurate external reference sensors.

Reading of Sensor-Under-Test (model B only)



Model B of the RTC is equipped with a built-in accurate measuring circuit for sensor-under-test (input), which enables measurement of virtually any type of temperature sensors including: Resistance thermometers (RTD), thermocouples (TC), transmitters, milliamps (mA), voltage (V) and thermostats.

The RTC calibrators can be user-programmed from the keyboard for fully automatic sensor calibrations. Once the unit is programmed, the instrument is self-operating and performs the configured calibration routine. All calibration data is stored and can be read on the display.

Switch Test (model B only)

Users may perform a thermoswitch test and find "Open", "Closed" and the hysteresis (deadband) automatically. The instrument retains the last twenty test results.

Auto-Stepping



Up to 20 different temperature steps may be programmed including the hold time for each step. Upon completion of an auto-step routine, the user can easily read the results for the sensor-under-test on the RTC display. Results from twenty auto-step calibrations are stored.

The "Set temperature" feature allows the user to set the exact desired temperature with a resolution of 0.001°.

Enhanced Stability

A stability indicator shows when the RTC calibrator has reached the desired temperature and is stable. The user may change the stability criteria for the external reference and the sensor-under-test quickly and simply. The stability criterion is the user's security of a correct calibration. A count-down timer is displayed next to the temperature read-out.

Instrument Setups

The RTC series allows the user to store up to ten (10) complete instrument setups. You may store all sorts of information including temperature units, stability criteria, use of external reference sensors, resolutions, sensors-under-test (SUT), conversions to temperature, display contrasts, etc. The setup may be recalled at any time.

Maximum and Minimum Temperature

From the setup menu, the user can select the maximum and minimum temperature limit for the calibrator. This function prevents damage to the sensor-under-test caused by excessive temperatures, and it helps reducing sensor drift from exposures of too high temperatures. This feature can be locked with an access code.

Silent Operation

The RTC calibrator can be programmed to run in silent operation. This function is an advantage if calibrating in a laboratory or in an office. If used in silent operation, the calibrator is not using its full speed potential.

As Found/As Left (model B only)

When running a calibration initiated from a work order, the user can select the calibration as an As Found or an As Left calibration.

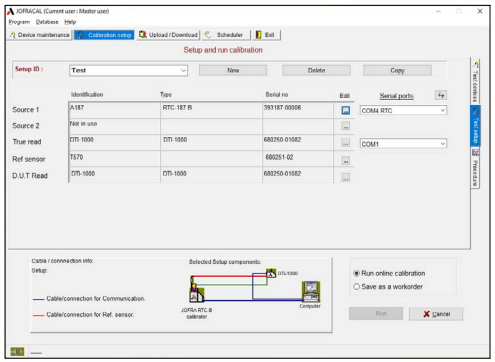
Sync Output

A synchronization output signals when the instrument is stable and may be used with ancillary devices such as video recorders, digital cameras or as an input to a data logging device. The SYNC output may be useful for automating and documenting your calibrations when calibrating external reading devices.

Calibration of Indication Devices

When calibrating an indicating device in the work order mode, users may key in the results during or after the test. Using the "Calibration info" function, the user may view the complete calibration task, including the "Scenario" before the calibration takes place.

JofraCal Calibration Software



JofraCal is a highly versatile calibration software that is supplied together with the RTC calibrators. The software ensures easy calibration of all kinds of temperature sensors, such as RTD´s, thermocouples, transmitters, and thermoswithes. Furthermore, it can be used for pressure calibration i.e. pressure gauges and pressure switches. JofraCal integrates with Jofra calibration instruments. As for temperature calibrators, it is the whole range of temperature calibrators. Regarding pressure calibrators, it integrates with the Crystal XP2i and nVision. JofraCal also has full integration with the series of signal calibrators.

JofraCal may also be used for manual calibrations, as it can be set up to accept manual entry of calibration data together with other liquid baths, ice points, or dry-block heat sources.

The calibration data collected can be stored on a PC for later recall or analysis. The RTC calibrator stores the calibration procedure and may be taken out to the process site without bringing a personal computer.

This allows the RTC calibrator to:

- Operate as a stand-alone instrument, using advanced calibration routines without the assistance of a personal computer on site. The work order functionality
- Prevent unauthorized changes to a calibration routine. Personnel who are not authorized to alter a calibration routine cannot do so

Once all calibrations are completed, the data may be uploaded to JOFRACAL for the printing of certificates. The data collected may be stored on the personal computer for later recall or analysis.

JOFRACAL offers extended output formats of the captured calibration data such as PDF file format and ASCII/ semicolon separated text format for further processing and calculation of data in spreadsheets and word processors.

JofraCal Hardware Requirements

- INTEL™ 486 processor.
- (PENTIUM™ 800 MHz recommended).
- 32 MB RAM (64 MB recommended).
- 80 MB free disk space on hard disk prior to installation.
- Standard VGA (800 x 600, 16 colors) compatible screen.
- (1024 x 786, 256 colors recommended).

Calibration of Up To 24 Sensors with the Jofra ASM Scanner



Using the JOFRA RTC series together with the ASM, Advanced Signal Multi-scanner, offers a great time-saving automatic solution to calibrate multiple temperature sensors at the same time. The ASM series is an eight channel scanner controlled by the JOFRACAL software on a PC. Up to 3 ASM units can be stacked to calibrate up to 24 sensors at a time. It can handle signals from 2-, 3- and 4 wire RTD's, thermocouples, transmitters, temperature switches, and voltage.

Specifications

Functional Specifications

Unless noted, specifications apply to both RTC-156 and RTC-157

Temperature Range

RTC-156

@ ambient temp. 0°C / 32°F..... **-46 to 155°C/-51 to 311°F**
@ ambient temp. 23°C / 73°F ..... **-30 to 155°C/-22 to 311°F**
@ ambient temp. 40°C / 104°F .....**-15 to 155°C/5 to 311°F**

RTC-157

@ ambient temp. 0°C / 32°F..... **-57 to 155°C/-71 to 311°F**
@ ambient temp. 23°C / 73°F ..... **-45 to 155°C/-49 to 311°F**
@ ambient temp. 40°C / 104°F ..... **-31 to 155°C/-24 to 311°F**

Patented heating technology: Patent No. EP2074374/US8342742

Accuracy with External STS Ref. Sensor (models B and C)

±0.04°C/±0.07°F

12-month period. Relative to reference standard. Specifications by use of the external JOFRA STS-200 reference sensor

Accuracy with Internal Ref. Sensor (models A, B, and C)

± 0.10°C / ± 0.18°F

Stability

± 0.005°C / ± 0.009°F

Measured after the stability indicator has been on for 15 minutes. Measuring time is 30 minutes.

Radial Homogeneity (difference between holes)

0.01°C / 0.02°F

Resolution (user selectable)

All Temperatures.....**1° or 0.1° or 0.01° or 0.001°**

Temperature Unit in Display

User Selectable ..... **°C, °F, or K**

Heating Time

RTC-156

-30 to 23°C / -22 to 73°F ..... **4 minutes**
23 to 155°C / 73 to 311°F ..... **15 minutes**

RTC-157

-45 to 23°C / -49 to 73°F ..... **7 minutes**
23 to 155°C / 73 to 311°F ..... **17 minutes**

Cooling Time

RTC-156

155 to 100°C / 311 to 212°F..... **4 minutes**
100 to 23°C / 212 to 73°F ..... **8 minutes**
23 to -24°C / 73 to -11°F ..... **15 minutes**
-24 to -30°C / -11 to -22°F..... **10 minutes**

RTC-157

155 to 100°C / 311 to 212°F..... **5 minutes**
100 to 23°C / 212 to 73°F ..... **10 minutes**
23 to -30°C / 73 to -22°F ..... **17 minutes**
-30 to -45°C / -22 to -49°F..... **25 minutes**

Time to Stability (approx.)

10 minutes

Immersion Depth

160mm / 6.3 in

Input Specifications

All input specifications apply to the dry-block of the calibrator running at the respective temperature (stable plus an additional 20 minute period).

All input specifications are valid for the RTC-156 and RTC-157.

RTD Reference Input (models B and C)

Type ..... **4-wire RTD with true ohm measurements** (1)
F.S. (Full Scale)..... **400 ohm**
Accuracy (12 months)..... **±(0.0012% rdg. + 0.0005% F.S.)**

Refer to the table in the next column.

	Temperature		12 Months	
RTD Type	°C	°F	°C	°F
PT100 Reference	-50	-58	± 0.008	± 0.015
	0	32	± 0.008	± 0.015
	155	311	± 0.011	± 0.019

(1) True ohm measurement is an effective method to eliminate errors from induced thermoelectrical voltage.

DLC Sensor Input (models B and C)

	Temperature		12 Months	
TC diff	°C	°F	°C	°F
DLC 155	-50	-58	± 0.014	± 0.025
	0	32	± 0.010	± 0.018
	155	311	± 0.010	± 0.018

RTD Sensor Under Test Input (model B)

F.S. (range) ..... **400 ohm**
Accuracy (12 months)..... **±(0.002% Rdg.+0.002% F.S)**
F.S. (range) ..... **4000 ohm**
Accuracy (12 months)..... **±(0.005% Rdg. + 0.005% F.S.)**
2-wire..... **add 50 mOhm**

	Temperature		12 Months	
RTD Type	°C	°F	°C	°F
PT1000	-50	-58	± 0.064	± 0.115
	0	32	± 0.073	± 0.131
	155	311	± 0.076	± 0.136
PT500	-50	-58	± 0.115	± 0.191
	0	32	± 0.127	± 0.228
	155	311	± 0.142	± 0.255
PT100	-50	-58	± 0.026	± 0.046
	0	32	± 0.026	± 0.046
	155	311	± 0.030	± 0.054

Specifications

Thermocouple Input

Range ..... **± 78 mV**
F.S. (Full Scale) ..... **78 mV**
Accuracy (12 months) ..... **±(0.005% Rdg. + 0.005% F.S.)**

	Temperature		12 Months*	
TC Type	°C	°F	°C	°F
E	-50	-58	± 0.09	± 0.17
	0	32	± 0.06	± 0.11
	155	311	± 0.06	± 0.11
J	-50	-58	± 0.10	± 0.18
	0	32	± 0.08	± 0.14
	155	311	± 0.09	± 0.16
K	-50	-58	± 0.14	± 0.24
	0	32	± 0.10	± 0.19
	155	311	± 0.11	± 0.20
T	-50	-58	± 0.15	± 0.26
	0	32	± 0.10	± 0.18
	155	311	± 0.08	± 0.15
R	-50	-58	± 1.30	± 2.35
	0	32	± 0.78	± 1.40
	155	311	± 0.47	± 0.84
S	-50	-58	± 0.98	± 1.76
	0	32	± 0.78	± 1.40
	155	311	± 0.49	± 0.89
N	-50	-58	± 0.20	± 0.35
	0	32	± 0.15	± 0.27
	155	311	± 0.13	± 0.23
XK (only in Russian versions)	-50	-58	± 0.09	± 0.15
	0	32	± 0.06	± 0.11
	155	311	± 0.06	± 0.11
U	-50	-58	± 0.13	± 0.24
	0	32	± 0.10	± 0.18
	155	311	± 0.08	± 0.14

* Excludes CJC accuracy ± 0.3° C / ± 0.54° F.

Transmitter Supply

Output Voltage ..... **24VDC ±10%**
Output Current ..... **Maximum 28 mA**

Transmitter Input mA (model B)

Range ..... **0 to 24 mA**
Accuracy (12 months) ..... **±(0.005% Rdg. +0.010% F.S.)**

Voltage Input VDC (model B)

Range ..... **0 to 12 VDC**
Accuracy (12 months) ..... **±(0.005% Rdg. +0.010% F.S.)**

Switch Input (model B)

Switch Dry Contacts
Test Voltage ..... **Maximum 5 VDC**
Test Current ..... **Maximum 2.5 mA**

Mains Specifications

Voltage ..... **115V (90-127) / 230V (180-254)**
Frequency, non US Deliveries ..... **50/60 Hz (47-63 Hz)**
Frequency, US Deliveries ..... **60 Hz (57-63 Hz)**
Power Consumption (max.) ..... **400 W**

Communications Interface

Serial Data Interface ..... **USB 2.0 Device Port**
Serial Data Interface ..... **USB 2.0 host Double Port***
LAN ..... **Ethernet MAC 10/100 Base-T***
SD ..... **SD slot***

* For future expansion.

Miscellaneous

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**

Physical Specifications

Unless noted, specifications apply to both RTC-156 and RTC-157

Weight and Instrument Size

Weight ..... **10.5 kg / 23.2 lb**
(LxWxH) ..... **362 x 171 x 363 mm / 14.3 x 6.7 x 14.3 in**

Shipping (without carrying case)

Weight ..... **14.8 kg / 32.6 lb**
(LxWxH) ..... **570 x 235 x 440 mm / 22.4 x 9.37 x 17.3 in**

Shipping (including optional carrying case)

Weight ..... **20.5 kg / 45.1 lb**
(LxWxH) ..... **650 x 380 x 500 mm / 25.5 x 14.9 x 19.7 in**

Shipping (carrying case only)

Weight ..... **8.0 kg / 13.2 lb**
(LxWxH) ..... **650 x 380 x 500 mm / 25.5 x 14.9 x 19.7 in**

Inserts

Insert Dimensions

Outer Diameter ..... **29.7 mm / 1.17 in**
Inner Diameter (multi hole) ..... **25.6 mm / 1.01 in**
Inner Diameter (single hole) ..... **22.0 mm / 0.87 in**
Length ..... **150 mm / 5.91 in**

Weight of Non-Drilled Insert (approx.)

290 g / 10.2 oz

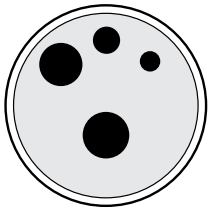
Use of other inserts may reduce the performance of the calibrator. To get the best results out of the calibrator, the insert dimensions, tolerance, and material is critical. We highly advise using JOFRA inserts, as they guarantee trouble free operation.

Specifications

Predrilled Inserts

All predrilled inserts have holes for: 4 mm reference sensor • ¼" reference sensor • 3 mm hole for DLC sensor. All inserts are supplied with an insulation plug drilled with the necessary holes.

Sensor Diameter	Instrument	
	Insert Code*	RTC-156/157 (A/B/C)
3 mm	003	127312
4 mm	004	127313
5 mm	005	127314
6 mm	006	127315
7 mm	007	127316
8 mm	008	127317
9 mm	009	127318
10 mm	010	127319
11 mm	011	127320
12 mm	012	127321
13 mm	013	127322
14 mm	014	127323
15 mm	015	127324
16 mm	016	127325
Package of Above Inserts	SMM	127336



Sensor Diameter	Instrument	
	Insert Code*	RTC-156/157 (A/B/C)
1/8 in	125	127302
3/16 in	187	127303
1/4 in	250	127304
5/16 in	312	127305
3/8 in	375	127306
7/16 in	437	127307
1/2 in	500	127308
9/16 in	562	127309
5/8 in	625	127310
Package of Above Inserts	SIM	127335

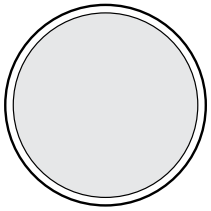
* Use the insert code, when ordering a JOFRA standard insert together with the RTC calibrator.

Undrilled Inserts

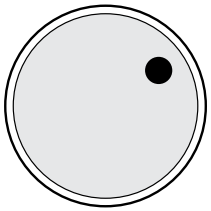
All undrilled inserts include insulation plugs.

Inserts	Instrument	
	Insert Code*	RTC-156 (A/B/C)
5-pack, undrilled inserts with no holes	UN1	127299
5-pack, undrilled inserts with hole for DLC sensor	UN2	127300
5-pack, undrilled inserts with 2 holes for STS reference sensors (4mm & ¼") and 1 hole for DLC sensor	UN3	127301
Undrilled insulation plug	—	122781

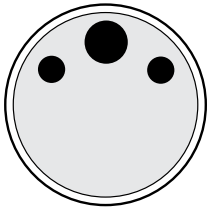
* Use the insert code, when ordering a JOFRA standard undrilled insert together with the RTC calibrator.



UN1



UN2



UN3

Application Kit for Calibration of Sanitary Sensors



Figure 1

Figure 1 shows a custom-made insert and our STS-102 A cable reference sensor placed in an RTC-156 calibrator. Figure 2 shows the sanitary sensor when fitted into the insert, ready for calibration. Note that the design makes room for the reference sensor cable.



Figure 2

A complete STS-102 application kit for the RTC-156 (models B and C) includes STS102A030EH, recalibration tube, 5-pack undrilled flange insertion tubes with cable groove, and carrying case.
Order No. 127279

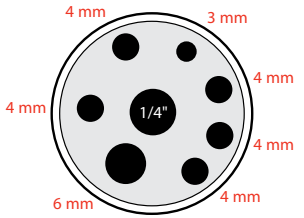
Specifications

Multi-Hole Inserts—Metric (mm)

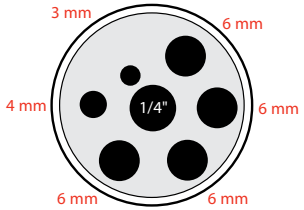
All inserts are supplied with an insulation plug drilled with the necessary holes.

Insert Type	Instrument	
	Insert Code*	RTC-156/157 (A/B/C)
Multi-hole Type 1	M01	127329
Multi-hole Type 2	M02	127330
Multi-hole Type 3	M03	127331
Multi-hole Type 4	M04	127332
Multi-hole Type 7	M07	127241
Multi-hole Type 8	M08	127242
Multi-hole Type 9	M09	127243
Set of 4 Metric Multi Inserts, 3 to 16 mm. *(Includes 127332, 127241, 127242, and 127243)*	SM	127326

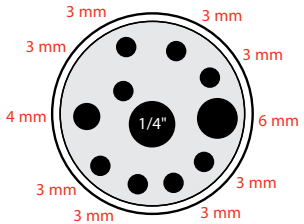
* Use the insert code, when ordering a JOFRA standard multi-hole insert together with the RTC calibrator.



Multi-hole M01

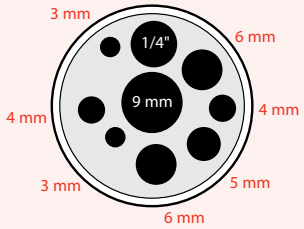


Multi-hole M02

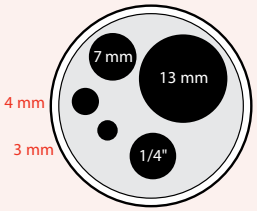


Multi-hole M03

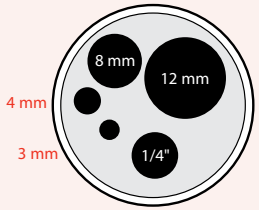
Insert Code SM



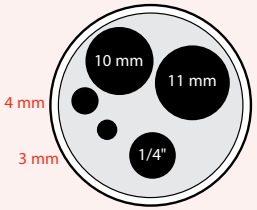
Multi-hole M04



Multi-hole M07



Multi-hole M08



Multi-hole M09

Multi-Hole Inserts—Imperial (in)

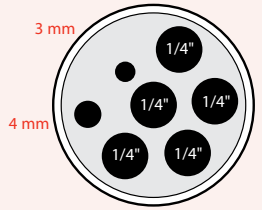
All inserts are supplied with an insulation plug drilled with the necessary holes.

Insert Type	Instrument	
	Insert Code*	RTC-156/157 (A/B/C)
Multi-hole Type 5	M05	127327
Multi-hole Type 6	M06	127328
Multi-hole Type 10	M010	127247
Set of 3 Imperial Inserts, 1/8 to 1/2 in. *(Includes 127308, 127328, and 127247)*	SI	127311

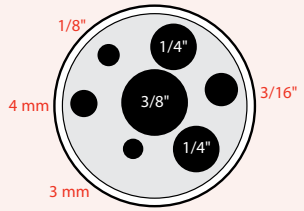
* Use the insert code, when ordering a JOFRA standard multi-hole insert together with the RTC calibrator.



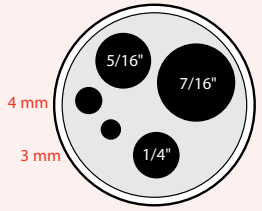
Insert Code SI



Multi-hole M05



Multi-hole M06



Multi-hole M10

Options & Accessories

Standard Delivery

Models A, B, and C Include:

- RTC dry-block calibrator (user specified)
- Mains power cable (user specified)
- Accredited certificate - temperature performance
- Tool for insertion tubes
- JOFRACAL
- USB cable
- Set of rubber cones for insulation plugs
- Manual

Model B Instruments Also Include:

- Test cables (2 x red, 2 x black)
- Accredited certificate - input performance for reference sensor and DLC sensor
- Accredited certificate - input performance for sensor-under-test inputs

Model C Instruments Also Include:

- Accredited certificate - input performance for reference sensor and DLC sensor

Accessories

Extra fixture for sensor grip	**125066**
Extra sensor grip	**125067**
Mini-Jack connector for stable relay output	**122771**
Thermocouple Male Plug — Type J — Black	**120516**
Thermocouple Male Plug — Type K — Yellow	**120517**
Thermocouple Male Plug — Type N — Orange	**120514**
Thermocouple Male Plug — Type T — Blue	**120515**
Thermocouple Male Plug — Type R / S — Green	**120518**
Thermocouple Male Plug — Type Cu-Cu — White	**120519**

Options

Carrying Case—Option CT

With our new special designed carrying case it is now possible to store all your sensors in the case with an optimum physical protection. With improved integrated trolley system for easy and safe transportation.





Support Rod Set—Option SR

Support rod for sensors to be mounted on all Jofra RTC dry-block calibrators. Holds the sensor-under-test in its position, while calibrating.
Includes 2 sensor grips and 2 fixtures for sensor grips.



Functional Comparison

	Model A	Model B	Model C
Dual-zone heating/cooling block	■	■	■
MVI — Mains Variance Immunity (or similar)	■	■	■
Stability indicator	■	■	■
Automatic step function	■	■	■
USB communication	■	■	■
Display resolution 0.001°	■	■	■
Programmable max. temperature	■	■	■
SYNC output (for external recording device)	■	■	■
Calibration of short sensors in special insert		■	■
External precision reference sensor input		■	■
External precision DLC reference sensor input		■	■
"SET" follows "TRUE"		■	■
Load compensation functionality		■	■
Input for RTD, TC, V, mA		■	
4-20 mA transmitter input incl. 24 VDC supply		■	
All inputs scalable to temperature		■	
Automatic switch test (open, close, and hysteresis)		■	
Download of calibration work orders from PC		■	
Upload of calibration results (as found & as left)		■	



Model A



Model B



Model C

Ordering Information

Base Model Number	
RTC156	RTC-156 series, -30 to 155°C (-22 to 311°F)
RTC157	RTC-157 series, -45 to 155°C (-49 to 311°F)

Model Version	
A	Basic model, without input
B	Full model, incl. DLC sensor input, Reference sensor input, Sensor-under-test input
C	Middle model, incl. DLC sensor input, Reference sensor input

Power Supply (US deliveries 60 Hz only)	
115	115 VAC
230	230 VAC

Mains Power Cable	
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

Insert Type and Size	
NON	No insert selected (standard)
UNX	1 x Undrilled Insert (Please see Insert selection for code)
XXX	1 x Single hole insert (Please see Insert selection for code)
MXX	1 x Multi hole insert (Please see Insert selection for code)
SIX	Set of 3 Imperial multi hole inserts. Covering holes from 1/8" to 1/2"
SMX	Set of 4 Metric multi hole inserts. Covering holes from 3 mm to 13 mm
SIM	Set of 9 Imperial inserts. Covering holes from 1/8" to 5/8"
SMM	Set of 14 Metric inserts. Covering holes from 3 mm to 16 mm

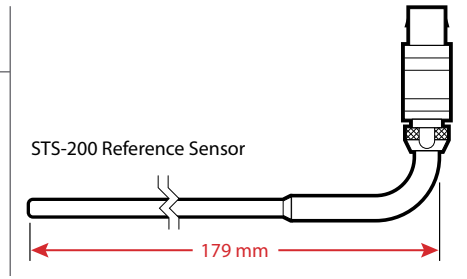
Dynamic Load Compensation (B and C models only—optional)	
DLC	DLC sensor

STS Reference Sensor (B and C models only—optional)	
R1	STS-102 Ref. sensor. Dia. 4 mm. Length 30 mm (STS102A030EH)
R2	STS-200 Ref. sensor. Dia. 4 mm. Length 179 mm (STS200A915EH)
R3	STS-200 Ref. sensor. Dia. 1/4" mm. Length 179 mm (STS200B915EH)

Calibration Certificate	
H	Accredited Certificate — ISO17025
EA	Full EURAMET Accredited Certificate — ISO17025
HS	System Calibration — Accredited Certificate — ISO17025 (B & C model only)
EAS	System Calibration — Full EURAMET Accredited Certificate — ISO17025 (B & C model only)
EASD	System Calibration — Full EURAMET Accredited Certificate with DLC — ISO17025 (B & C model only)

Base Model Number	
CT	Solid Protective Carrying case with trolley
SR	Support rod set
TR	Solid Protective Carrying case with trolley & Support rod set

RTC156 B 230 A SMM DLC R2 EA CT



Sample Order Number

RTC156B230ASMMDLCR2EACT

JOFRA RTC-156 B with 230VAC, EU power cord, set of metric inserts, DLC, 4 mm diameter STS-200 reference sensor, full EA temperature calibration certificate, and carrying case with trolley.

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