



RFOT

Wireless Meat Temperature Data Logger

Product User Guide



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Quick Start Steps

1. Install the MadgeTech 4 Software and USB Drivers onto a Windows PC.
2. Connect the RFC1000 wireless transceiver (sold separately) to the Windows PC with the provided USB cable.
3. The RFOT is shipped with wireless transmission in an active, low power state. During normal use, inserting a USB (micro B type) cable into the RFOT will pass control to the MT4 software and disable the wireless transmission. When the USB cable is unplugged, wireless transmission resumes with settings that were chosen in MT4.
4. Launch the MadgeTech 4 Software. All active MadgeTech data loggers that are within range will automatically appear in the Connected Devices window.
5. Select the data logger within the Connected Devices window and click the **Claim** icon.
6. Select the start method, reading rate and any other parameters appropriate for the desired data logging application. Once configured, deploy the data logger by clicking **Start**.
7. To download data, select the device in the list, click the **Stop** icon, and then click the **Download** icon. A graph will automatically display the data.

Product Overview

The MadgeTech RFOT is a two-way wireless meat cooking and cooling data logger. The RFOT's rugged design, equipped with a flexible piercing probe allows it to be used in harsh environments. The RFOT is perfectly suited for use in smokehouses, ovens and other cooking processes up to 212 °F (100 °C) as well as refrigerators and freezers down to -4 °F (-20 °C). The RFOT is completely splash-proof, and can withstand wash down cycles. The RFOT records and wirelessly transmits internal product temperature readings back to a central PC for instant real-time monitoring, even when a smokehouse or freezer door is closed. The RFOT allows the user to also set-up real-time wireless alarming within the software, so that the user is notified by email or text if an alarm condition has been met or exceeded. The RFOT assists in complying with HACCP requirements as well as USDA regulations.

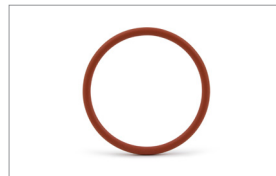
Options & Accessories



RFOT-FR, RFOT-4, RFOT-4TD,
RFOT-7 and RFOT-12



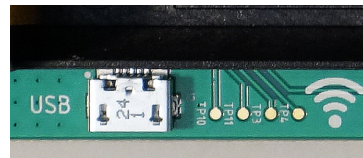
TLH-5903
PN: 901748-00
3.6V Lithium Battery



RFOT O-Ring Kit
PN: 902149-00
Includes 1-Square and
1-Round O-Ring

Activating & Deploying the Data Logger

1. Connect the RFC1000 wireless transceiver (sold separately) to the Windows PC with the provided USB cable.
2. Additional RFC1000's can be used as repeaters to transmit over greater distances or to maintain signal if walls, corners, or other obstacles impede line of sight. Plug each one into an electrical outlet in the desired locations.
3. Launch the MadgeTech 4 Software.
4. The RFOT is shipped with wireless transmission in an active, low power state. Inserting a USB (micro B type) cable into the RFOT enables direct USB communication and disables wireless transmission. Direct USB communication allows for changing the wireless channel in the device's Properties, if necessary.
5. When the USB cable is unplugged, wireless transmission is enabled.
6. All active data loggers will be listed within the Connected Devices panel. Select a logger, and click the **Claim** icon to pair the logger to the RFC1000 connected to the PC.
7. Choose the start method, either **Real Time Start** to view data as it is collected, or **Custom Start** for standalone logging to memory. By default, a report is generated automatically when starting a logger using Real Time Start. With Custom Start, data is recorded to memory and can be viewed by selecting **Stop** to end the cycle, and **Download** to retrieve the data from the logger's internal memory.



Mounting Instructions

For best performance, the RFOT should always be hung by the hook in an upright position. This will allow for the best path for the wireless signal.

Transmission Distance

Typical transmission distance from an RFC1000 to an RFOT:

- » Unobstructed line of sight (outdoors): 2,000 feet max
- » Typical urban environment (indoors): 500 feet max

Obstacles

Obstacles will decrease the line-of-sight from an RFC1000 to another RFC1000 as well as from an RFC1000 to an RFOT. Obstacles that interfere with or decrease the wireless signal could include but are not limited to smokehouse doors, freezer/refrigerator doors, building structures such as walls and metal beams and internal traffic such as forklifts and metal racks or carts. Additional RFC1000's can be placed near obstacles to lengthen and strengthen the wireless signal.

Deflection

When a wireless signal "hits" an object such as a metal wall, the wireless signal will not just stop but rather it could turn a corner, bend or slow down. When installing the RFC1000's obstacles and possible deflection should also be considered.



Channel Programming

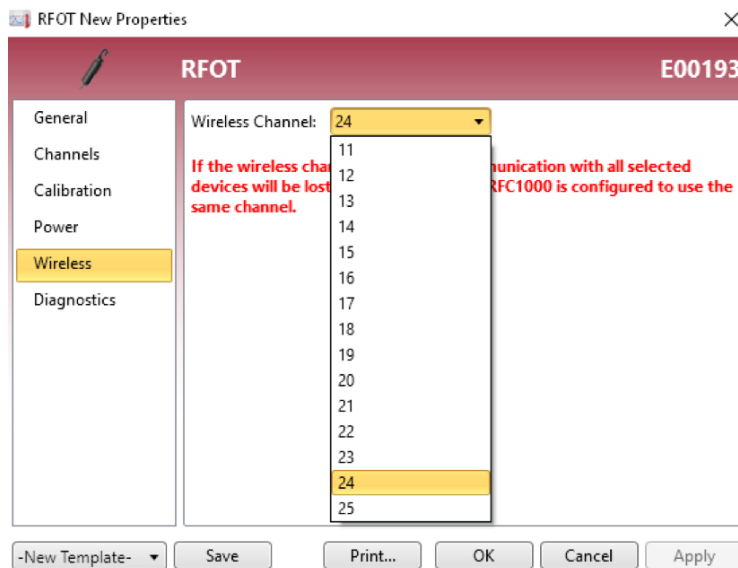
Different wireless channels may be used to create multiple networks in one area, or to avoid wireless interference from other devices. Any MadgeTech data logger or RFC1000 wireless transceiver that is on the same network is required to use the same channel. If all of the devices are not on the same channel, the devices will not communicate with one another. MadgeTech wireless data loggers and RFC1000 wireless transceivers are programmed by default on channel 25.

CHANNEL NOTE: MadgeTech wireless data loggers and wireless transceivers purchased prior to April 15, 2016 are programmed by default to channel 11. Please refer to the Product User Guide provided with these devices for instructions to change the channel selection if needed.

Changing the channel settings of the RFOT

Connect the RFOT to MT4 with a USB cable. Select a device from the connected devices window, then click the properties icon at the top of screen, or, right click on a device in the connected devices window and select properties. On the properties screen, select Wireless and in the Wireless Channel box, click the down arrow, then the desired channel. Click OK to confirm the choice.

Be sure that the channel chosen matches the channel settings of the RFC1000 wireless transceiver which this device will communicate through.

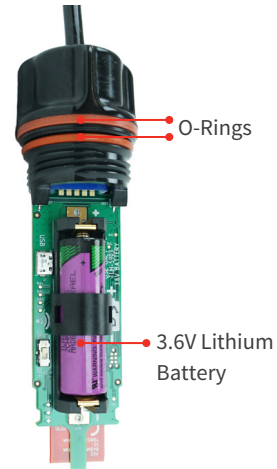


Product Maintenance

Battery Replacement

Materials: TLH-5903 Replacement Battery

1. Unscrew the end cap and gently separating the end from the body of the data logger.
2. Remove the battery retention clip by sliding a small screwdriver blade or paper clip between the clip and battery holder and prying away from the holder.
3. Grasp the black base of the unit with cord hanging downward and both edges of the circuit board, all with one hand. Pull the old battery out with the other hand.
4. Install a new battery, observing the polarity markings on the circuit board and battery holder. Position the battery retention clip over the new battery and install by pressing downward until a click is heard from each side.
5. Install the new battery as shown by the diagram on the bottom of the battery holder.
6. Screw the body of the logger back together making sure the O-Rings are not visible.



O-Ring Replacement

Materials: RFOT-O-Ring

1. Unscrew the end cap from the RFOT to expose the O-Ring.
2. Use a small pointed tool (knife or pick) to pry the old O-Ring out of its groove.
3. Make sure that the O-Ring groove is free of any dirt or debris.
4. Partially screw the mating parts back together leaving the O-Ring groove exposed.
5. Apply a thin coat of silicone based lubricant to the O-Ring.
6. Stretch the O-Ring over the cap and into its groove.

WARNING: Avoid stretching the O-Ring over the threads. Sharp threads can cut the new O-Ring.

O-Ring Maintenance

O-Ring maintenance is a key factor when properly caring for the RFOT. The O-Rings ensure a tight seal and prevent liquid from entering the inside of the device. Please refer to the application note “*O-Rings 101: Protecting Your Data*”, found on the MadgeTech website, for information on how to prevent O-Ring failure.

Recalibration

Recalibration is recommended annually for any MadgeTech data logger. A reminder is automatically displayed in the MadgeTech 4 Software when the device is due.

Troubleshooting

Why is the wireless data logger not appearing in the MadgeTech 4 Software?

If the data logger doesn't appear in the Connected Devices panel, or an error message is received while using the data logger, try the following:

- » Ensure the data logger and RFC1000 are on the same wireless channel. If the devices are not on the same channel, the devices will not communicate with one another. Please refer to the Channel Programming section for information on changing the device channel.
- » Check that the RFC1000 is properly connected. For more information, see *Troubleshooting wireless transceiver problems* (below).
- » Ensure that the battery is not discharged. For best voltage accuracy, use a voltage meter connected to the battery of the device. If possible, replace battery.
- » Ensure that the **MadgeTech 4 Software** is being used, and that no other MadgeTech Software (such as **MadgeTech 2**, or **MadgeNET**) is open and running in the background. **MadgeTech 2** and **MadgeNET** are not compatible with the RFOT.
- » Ensure that the **Connected Devices** panel is large enough to display devices. This can be verified by positioning the cursor on the edge of the **Connected Devices** panel until the resize cursor appears, then dragging the edge of the panel to resize it.

Compliance Information

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Temperature

Probe Temperature Range	-50 °C to +200 °C (-58 °F to +392 °F)
Resolution	0.01 °C (0.018 °F)
Calibrated Accuracy	±0.1 °C at 0 °C to 100 °C (±0.18 °F at 32 °F to 212 °F) ±0.5 °C (±0.9 °F) outside of that range

Wireless

RF Frequency	2.45 GHz IEEE 802.15.4 ultra-low power wireless transceiver with fully bi-directional communication
Band	ISM band 2.405-2.475 GHz. Operation (channels 11 through 25) @ 250 kbps
Maximum Output Power	+0 dBm typical (RFOT), 20 dBm maximum (RFC1000)
Receiver Sensitivity	-95 dBm typical (RFOT), -104 dBm typical (RFC1000)
Wireless Interface	RFC1000, RFC1000-CE, RFC1000-IP69K or RFC1000 Cloud Relay
Transmission Distance	Unobstructed line of sight (outdoors): 2,000 feet max Typical urban environment (indoors): 500 feet max

BATTERY WARNING: DISCARD USED BATTERY PROMPTLY. KEEP OUT OF REACH OF CHILDREN. DO NOT DISPOSE OF IN FIRE, RECHARGE, PUT IN BACKWARDS, DISASSEMBLE, OR MIX WITH OTHER BATTERY TYPES. MAY EXPLODE, FLAME, OR LEAK AND CAUSE PERSONAL INJURY.

Countries approved for use, purchase and distribution:

Australia, Austria, Belgium, Bulgaria, Canada, Chile, China, Columbia, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Honduras, Hungary, Iceland, Ireland, Israel, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malaysia, Malta, Mexico, New Zealand, Norway, Peru, Poland, Portugal, Romania, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Thailand, The Netherlands, Turkey, United Kingdom, United States, Venezuela, Vietnam

General Specifications

Reading Rate	1 reading every 2 seconds up to 1 reading every 24 hours
Memory	21,504 readings; software configurable memory wrap
Memory Wrap Around	Yes
Start Modes	Immediate start / delay start
Calibration	Digital calibration through software
Calibration Date	Automatically recorded within device
Battery Type	3.6V lithium battery included; user replaceable
Battery Life	2 years typical at 15 second reading rate
IP Rating	IP67
Data Format	Date and time stamped °C, °F, K, °R
Time Accuracy	±10 second/month (at 25 °C)
Computer Interface	USB 115,200 baud
PC Compatibility	Windows XP SP3 or later
MadgeTech Cloud Services Compatible	Yes
Operating Environment	-20 °C to +100 °C (-4 °F to +212 °F), 0 %RH to 100 %RH non-condensing
Dimensions	Body: 7.8 in x 1.62 in dia. (198 mm x 41 mm dia.) Hook: 0.625 in (16 mm) Cable Length: 30 in (760 mm)
Probe Lengths	• RFOT-FR: 1.75 in (45 mm), Tip Diameter: 0.063 in (1.6 mm) Tip Length: 1.25 in (32 mm) • RFOT-4-TD: 4.00 in (102 mm), Tip Diameter: 0.125 in (3.2 mm), Tip Length: 3.50 in (89 mm) • RFOT-4: 4.00 in (102 mm), Tip Diameter: 0.188 in (4.8 mm), Tip Length: Full • RFOT-7: 7.00 in (177 mm), Tip Diameter: 0.188 in (4.8 mm), Tip Length: Full • RFOT-12: 12.00 in (305 mm), Tip Diameter: 0.188 in (4.8 mm), Tip Length: Full
Weight	8.8 oz (250 g)
Material	Body: Radel R-5100 Cable Jacket: Silicone Polyurethane
Approvals	US (FCC), CA (IC), CE