



TROI™

BT-1HT

TECHNOLOGIES ROI, LLC

BT-1 *High Temperature*



1 PRODUCT DESCRIPTION

The patent-pending **TROI BT-1HT** provides identification and tracking capabilities never-before available in rugged or hazardous use-areas.

Not only can the tag be mounted to any metallic surface by either welding or bolting the tag, but it can withstand unprecedented temperature (consistent temperatures of 300 degrees Centigrade), pressure and environmental conditions.

1.1 SPECIFICATION DATA

Device type	Class 1 Generation 2 passive UHF RFID transponder
Air interface protocol	EPCGlobal Class1Gen2; ISO 18000-6C (-63)
Operational frequency	865-869 MHz (EU) 902-928 MHz (US)
IC options	Standard: Alien Higgs 3 Optional: NXP UCODE G2XM, Impinj Monza4QT)
EPC memory	Standard: 128 bit Optional: Up to 240 bit
EPC memory content	Unique 96-bit number encoded
Extended memory	512 bit
TID	Factory-programmed, non-changeable, unique 64-bit ID.
Read range	Real-world: 1 – 2 meters, depending on attachment Lab environment: 6 meters +
Applicable surface materials	Any material. Metal surfaces; ferrous and non-ferrous.
Encapsulation material	Proprietary extreme high temp resin with ceramic filler.
Weight	36 grams
Standard compliancy	ISO 17665 – Sterilization of Health Care Products – Moist Steam ISO 11135 - Sterilization of Health Care Products – Ethylene Oxide ATEX-compliant
Product is RoHS compliant	Yes



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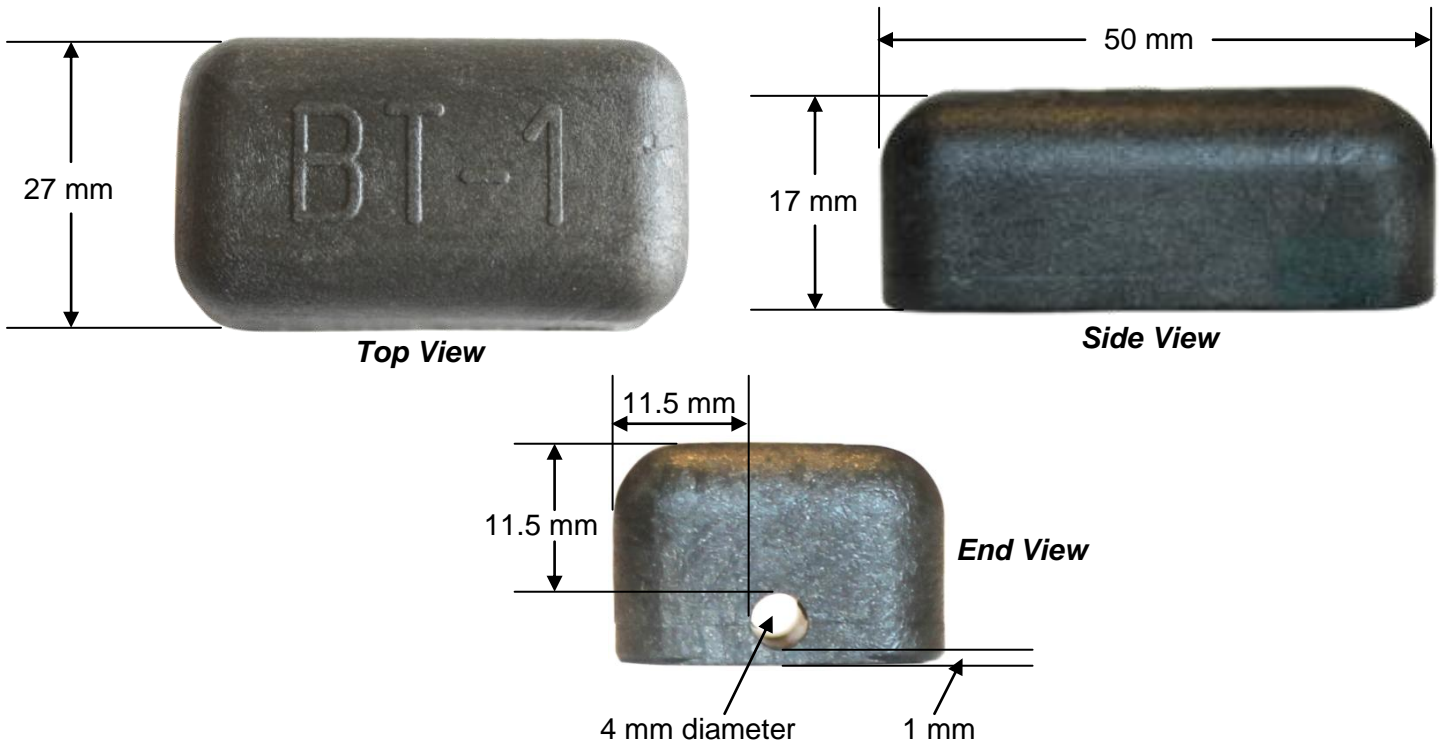
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1.2 DIMENSIONS

17mm High x 27mm Wide x 50mm Long



1.3 ELECTRICAL PERFORMANCE

Max read range on metal with 4W ERP	
BT-1 (915 MHz)	7.2 m (23.4 ft)

The read range listed above was obtained from a lab test environment. Actual test results may be different. Testing in actual use environments is strongly recommended.



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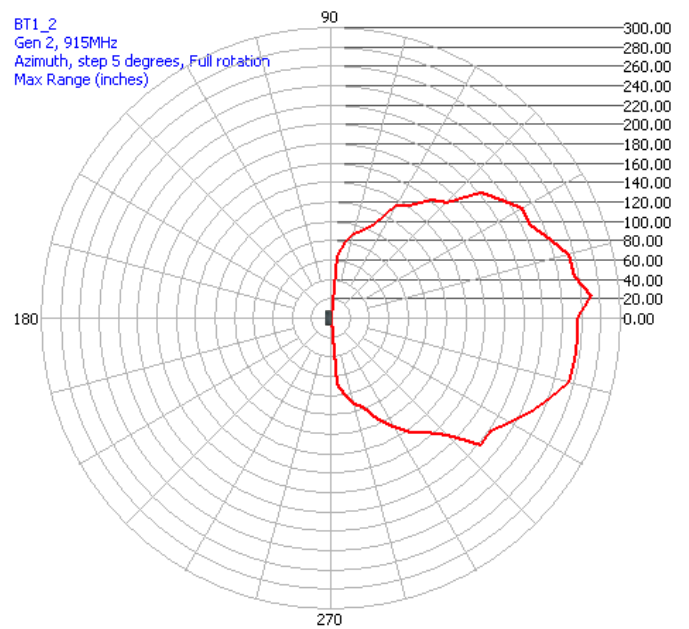
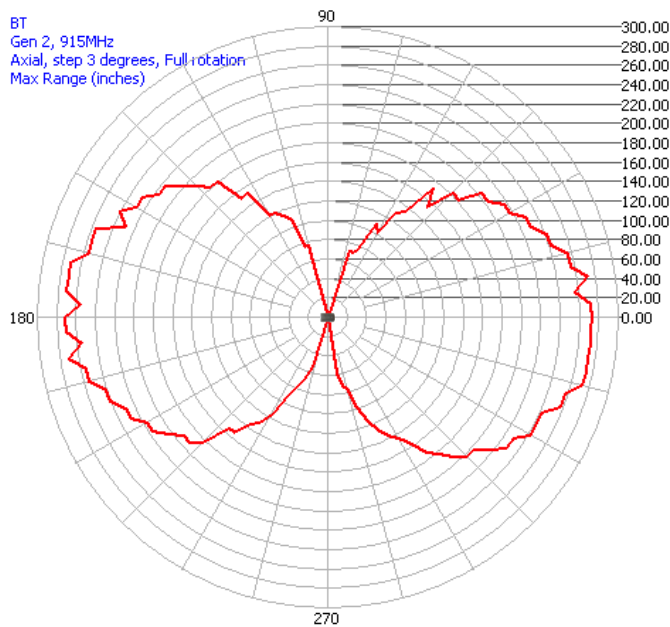
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1.4 RADIATION PATTERN

Axial radiation pattern; obtained in anechoic test laboratory.

Actual in-use radiation pattern may vary.

Testing in actual use environments is strongly recommended.



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1.5 ENVIRONMENTAL CONDITIONS

Operating temperature	-50°C to +300°C / -50°F to +600 °F* for no longer than 24 continuous hours.
Peak temperature	+350°C / +700°F @ 30 minutes duration
Temperature Cycling Test Performed to Confirm Design	6 Hours at 300 deg C; 18 hour cool-down; 30-day test cycle, non-limiting.
IP classification	IP68: Complete protection against dust Protection against continuous immersion in water (the RFID tag will not function while it is immersed in water)
Weather ability	Excellent, including UV-resistance and sea water immersion
Pressure resistance	Embedded RFID tag tested to 30,000psi for 30 days
Chemical resistance	<u>Generally good against:</u> - Most solvents - Most acids and bases

* **NOTE:** The RFID tag will not be functional if it is left at the maximum indicated temperatures such that the internal soak temperature exceeds +80 deg C. The RFID tag itself will function between -50 deg C and +80 deg C.

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1.6 MOUNTING METHODS

1.6.1 BT-1 Mounting Options

- Welding
- Bolting

See Section 2.2 Tag Attaching Methods for further details and pictures

1.7 SUPPORTED SERVICES

Several options are available:

- Pre-encoding data onto the RFID tag
- Laser engraving human-readable data onto the surface of the tag

For further details, or to discuss your specific need, please contact *TROI LLC*.

2 INSTALLATION INSTRUCTIONS

2.1 TAG PLACEMENT

The **BT-1HT** tag should be mounted flush to the metal surface with the through-hole mounted closest to the metal surface. See the picture in Section 2.2.2.1 for details.

When selecting the mounting location, ensure the following:

- Select an even metal surface so that the entire flat bottom of the **BT-1HT** is in contact with the metal surface.
- Place the tag in the middle of the largest metal surface available.
- NOTE: It is recommended that the tag be taped to the metal surface, before welding or bolting the tag, to check fit, orientation and performance.

The **BT-1HT**'s performance depends on the shape of the metal object and the tags placement on that surface. The above recommendations are valid for flat surfaces. Testing is recommended to verify performance in each use-case.

2.2 TAG ATTACHING METHODS

2.2.1 Bolting the tag to the metal surface

Bolting achieves effective mounting and retention in various use conditions.

The **BT-1HT** can be mechanically attached using;

- Screws (size M4)



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- Pop rivets (size 4 mm)

NOTE: The hardware used to mount the **BT-1HT** to metal must be able to withstand the elevated temperatures that the tag will be subjected to during its use.

2.2.1.1 Procedure

When bolting the tag to a metal surface, the tag should be flush with that metal surface for best RFID and mechanical performance.

2.2.2 Welding the tag to the metal surface

Welding achieves the most effective mounting and retention method.

2.2.2.1 Procedure

Insert a metal rod that is less than 4 mm in diameter through the hole in the tag. Weld this tag to the metal surface with the tag mounted flush to the metal surface. See the pictures, below.

Side shot of correctly welded tag. Tag is mounted flush to the surface of the metal.



Overhead shot of correctly welded tag.





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3 MECHANICAL MOUNTING OPTIONS OFFERED BY TROI LLC

Let us know if you have a mechanical modification you'd like to make to the tag that could make it a better "fit" for your business, and we will be pleased to discuss it with you.

The following options are currently available:

3.1 HANGING TAG



3.2 LOOP TAG





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3.3 TAG WITH MOUNTING RINGS



4 IN-USE PICTURES

The following pictures show real-world use of the **BT-1HT** tag.

4.1 MOUNTED IN A METAL SMELTING LADLE

The photo below depicts the actual tag mounted in the Ladle shown in the thermal photos, below. This picture was taken after the temperature test was run.





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4.1.1 Thermal photos of the BT-1HT mounted to a Ladle – at metal-melting temperature.

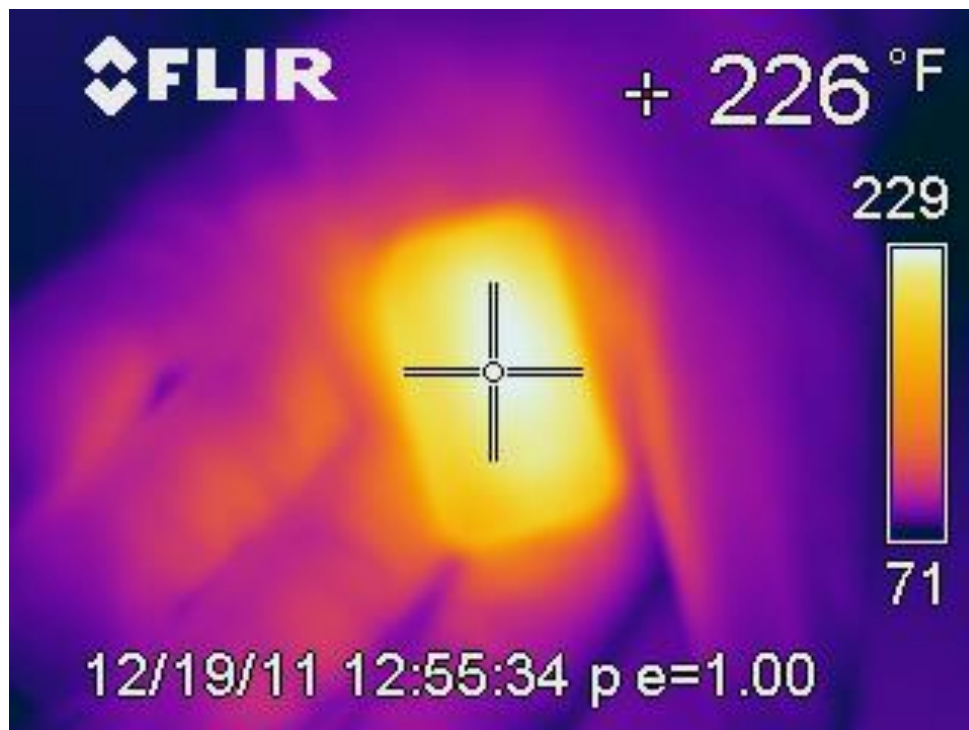
The cross-hairs in the close-up photo on the right (542 deg F) point to where the tag is mounted on the ladle.



4.1.2 Thermal photo of BT-1HT after being removed from the Ladle

This picture was taken about a minute after the tag was removed from the Ladle.

Notice the rapid cool-down – the tag is already at 226 degrees F; down from at least 543 degrees F one minute ago.





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5 CONTACT TROI LLC

For additional information and technical support contact TROI LLC.

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ADVISORY

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