

# INSTALLATION MANUAL

LF RFID INTERROGATOR MODULE HTRM1100

VERSION 1.2  
FEBRUARY 2021

frequent

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The content of this document and comments made in the operating instructions may be altered without previous notice.

With this edition of the instruction manual all previous editions become void. This document and its content have been composed to the best of our knowledge.

But anyways, frequent does not guarantee the correctness of the details given in these instructions and may not be held liable for damages caused by incorrect installation.

Despite all our efforts, we know, that errors may not be completely avoided, so we would be grateful for your useful tips to improve this document.

The installation instructions given in this manual are based on normal, indoor environment and advantageous boundary conditions. frequent does not give any guarantee promise for perfect function of the equipment in a harsh surrounding.

It is forbidden to copy or reproduce of these instructions, even if only partial, as well as translation into other languages is forbidden unless a written consent has been granted by frequent. This also applies to the complete or partial storage of these operating instructions on modern input- and output media for further processing in data processing systems.

***Please read the safety instructions thoroughly before putting the appliance into operation!***

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# 1 REVISION HISTORY

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| Revision | Date           | Description                                    |
|----------|----------------|------------------------------------------------|
| 1.0      | April 2019     | Initial Version                                |
| 1.1      | September 2019 | 7 Product Specification updated                |
| 1.2      | February 2021  | FCC labelling and Antenna installation updated |

## 2 INTRODUCTION

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**The RFID reader module HTRM1100 is an OEM device and must be professionally installed.**

**The final device user manual must not include installation instructions of the HTRM1100 module and antenna.**

This Installation Manual provides information to install the frequent RFID-reader module and the antenna.

Please refer to the other documents, tutorials and help files provided by frequent in order to achieve the best performance available with this frequent product.

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## 3 PRODUCT OVERVIEW

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- frequent's reader module HTRM1100 is intended to read and write information from and to individual, grouped or stacked RFID-transponders.
- The communication protocol used by the reader to address these transponders can be compliant to several standards: ISO11784/85, ISO 14223, ISO18000-2
- Hitagµ, HitagS, Hitag1, Hitag2, EM4205, EM4305, Unique
- The HTRM1100 shows three antenna output connectors
- It successively can operate up to 3 antennas. The output power is 10 Watt at its maximum.
- Available interfaces to the host are RS232 and optional RS485.

## 4 IMPORTANT SAFETY INSTRUCTIONS

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- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- This RFID reader module is considered a component which will be installed into a final device.
- Do not use this device near water.
- Clean only with dry cloth.
- Do not install near any heat sources such as radiators, registers, stoves, or other apparatus that produces heat.

- Only use attachments and accessories specified by frequent.
- Use FCC/CE certified power supply only.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way.
- The device may only be used for the intended purpose designed for by the manufacturer.
- Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.
- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.
- Repairs may only be executed by the manufacturer.
- Installation, operation, and maintenance procedures should only be carried out by qualified personnel.
- Use of the device and its installation must be in accordance with national legal requirements and local electrical codes.
- When working on devices the valid safety regulations must be observed.
- Special advice for carriers of cardiac pacemakers: Although this device doesn't exceed the valid limits for electromagnetic fields you should keep a minimum distance of 25 cm between the device and your cardiac pacemaker and not stay in an immediate proximity of the device respective the antenna for some time.
- **Warning:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
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## 5 FCC INTEGRATION INSTRUCTIONS

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### 5.1 GENERAL

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Some items which must be fulfilled in order to be compliant with general FCC rules.

### 5.2 LIST OF APPLICABLE FCC RULES

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Following FCC rules are applicable to the HTRM1100 module and must be kept: FCC Part 15, Subpart C: §15.203, §15.205, §15.207, §15.215

### 5.3 SPECIFIC OPERATIONAL USE CONDITIONS

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Keep the limitations on antennas given in section 6.56.5.

## 5.4 LIMITED MODULE PROCEDURES

As the HTRM1100 is not a “Limited module” the “Limited module procedures” are not applicable.

## 5.5 TRACE ANTENNA DESIGNS

Since it is not intended to use trace antennas with the HTRM1100, this item is not applicable.

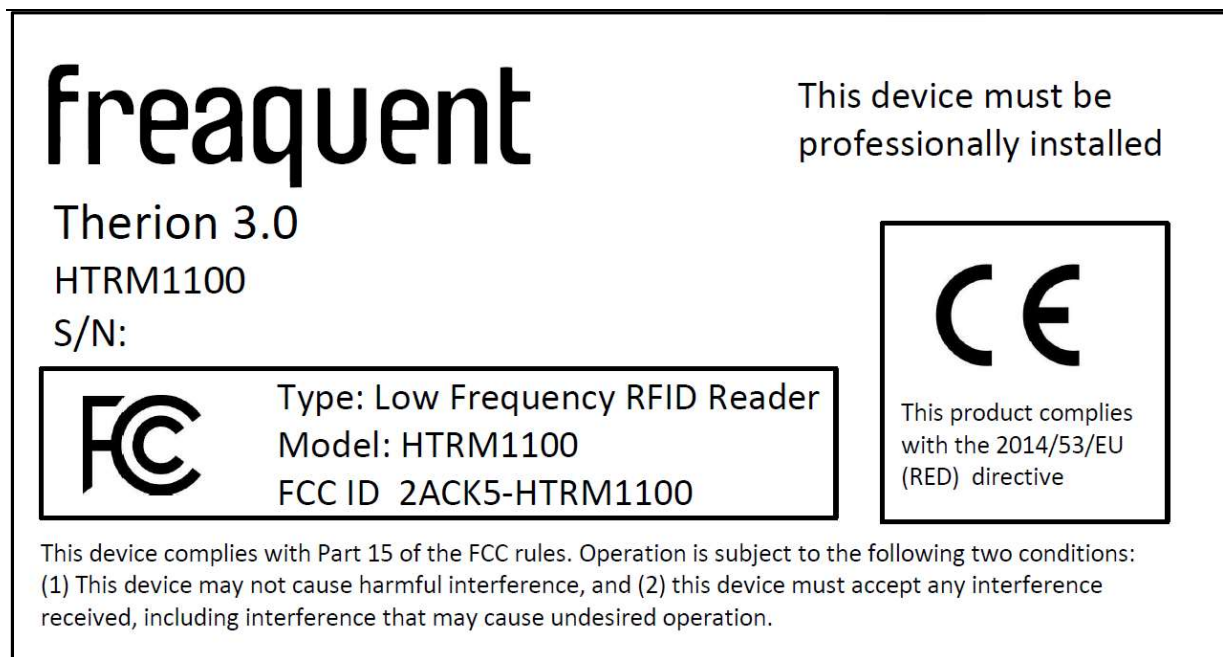
## 5.6 RF EXPOSURE CONSIDERATIONS

SAR testing is not required for transmitters where a distance to the human body of less than 20 cm is not expected. Therefore the module and its antennas are not suitable for applications where the antenna is generally closer than 20cm to a human body.

## 5.7 ANTENNAS

In order not to break FCC rules only use antennas specified in Chapter 6.5.

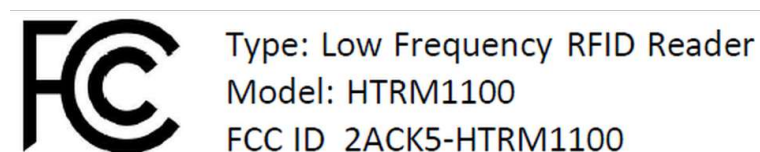
## 5.8 FCC LABELLING



*Figure 1: FCC Label of the Module*

**Figure 1** shows the FCC label which is permanently attached to the shielding tin of the module.

**Note:** The final device must have a label on the outside that provides information about the integration of the module and the following information:



Above information must also be included in the final device manual.

## 5.9 INFORMATION ON TEST MODES AND ADDITIONAL TESTING REQUIREMENTS

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FCC document “996369 D04 Module Integration Guide v02” give some suggestions for common technology types on how the host product manufacturer may operate their product during investigative measurements. The HTRM1100 is not operating in these common technology types and these investigative measurements are not applicable.

## 5.10 PART 15 SUBPART B DISCLAIMER

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The HTRM1100 module is approved for FCC Part 15 Subpart C only. The manufacturer of the host product is responsible for compliance with all other FCC regulations that apply to the host and are not covered by the HTRM1100 certification. In particular, this applies to FCC Part 15 Subpart B.

# 6 IMPORTANT MOUNTING INFORMATION

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## 6.1 INSTALLATION ENVIRONMENT

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- This frequent reader module is considered a component which will be installed into a final equipment.
- Install this frequent reader module only in an environment whose compliance with the conditions, specified in **7 HTRM1100 Product Specification** in, is assured.
- The environment must not contain corrosive, flammable or explosive materials or be subject to rapid changes in temperature, to direct vibration or shock.

## 6.2 NOTIFICATION

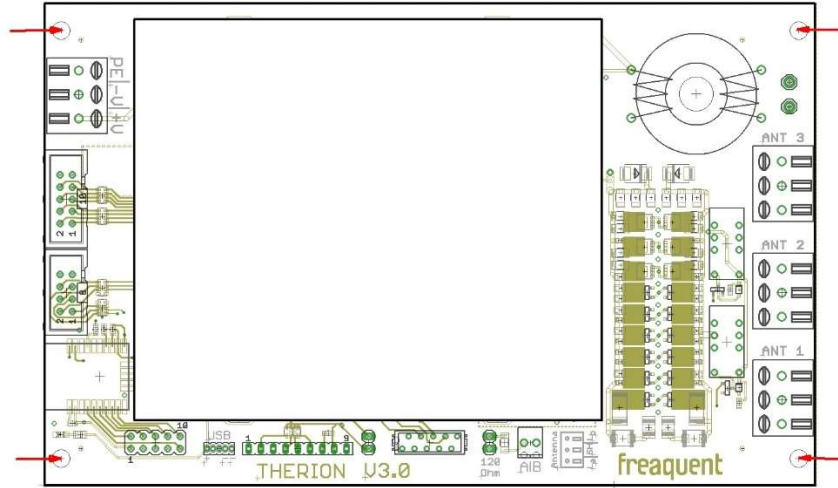
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- frequent's RFID readers communicate with data carriers (RFID inlets, labels and tags) using a 134.2 KHz carrier frequency (LF band). Some industrial machines and electronic devices can generate unwanted noise which may degrade communication. Make sure that other equipment is properly installed, grounded and at a reasonable distance from the reader and/or the reader antennas.
- The wireless communication of the reader can be degraded by high-voltage and high-current lines and other sources of strong electromagnetic fields. Installation in such locations should be avoided.

## 6.3 INSTALLATION

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The module must be mounted into a cabinet or housing. The enclosure must be at least IP22 rated when used indoors and IP44 rated when the unit is intended to be operated outdoors. If screwing is necessary in order to fix the module 4 spacers of thread size M3mm (UNC 4–40 or 6–32) must be used.



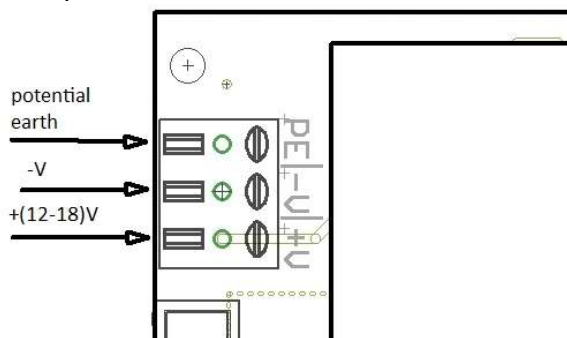
*Figure 2: Mounting holes of the module*

Use spacer bolts of minimum length 7mm (9/32 in) for mounting. If screwing leads to a conducting connection to a metal mounting plate, the plate must be grounded to potential earth.

## 6.4 POWER SUPPLY

The frequent reader module works with supplies from 12V to 18V DC. The module needs to be grounded. Only use supplies in accordance with **7 HTRM1100 Product Specification**. The power rating of the supply must be  $P=25W$  at the minimum. Only use FCC certified supplies. Note: The communication range of the system depends as well on the supply voltage. Maximum reading distance is achieved with the maximum supply voltage of 18 VDC.

Connect the supply as shown in **Figure 3**. If V– of the used supply is electrically identical with the potential earth, the connection of potential earth can be omitted.



*Figure 3: Connecting power supply to HTRM1100*

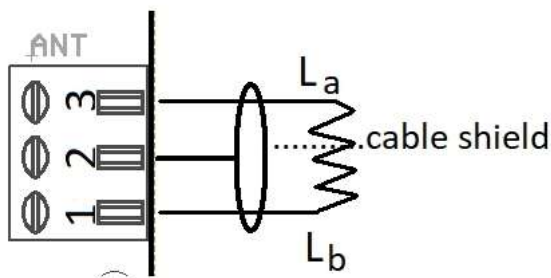
The terminal block fits wires from 0.5 mm<sup>2</sup> – 3.3 mm<sup>2</sup> (20 AWG – 12 AWG).

## 6.5 ANTENNAS

In order to comply with part 15 of the FCC and the CE regulations only magnetic loops with an enclosed area of not more than 0.375 sqm ( $A \leq 0.375\text{m}^2$ ) and not less than 0.004 sqm ( $A \geq 0.004\text{m}^2$ ) must be used and connected to the module. Only antennas which are manufactured or certified by frequent must be used.

The reader module HTRM1100 disposes automatic tuning of antennas. An antenna for the HTRM1100 is a simple magnetic loop within a certain inductance. The antenna cable inductance must be added to the loop inductance and the sum of the inductances must be in the range given in: **7 HTRM1100 Product Specification**. If the sum of inductance is within this range the module automatically tunes the output circuitry to series resonance with a resonance frequency close to the working frequency.

Connect the loop to the outer clamps (1 and 3) of the antenna terminal. The middle clamp (2) of the antenna connector is foreseen to connect the cable shield wire to ground. For the case the cable shows no shield wire, clamp 2 is not in use. Please refer to **Figure 4**.



*Figure 4: Connecting an antenna*

The antenna cable wire cross section must be in the range 0.75 mm<sup>2</sup> – 3.3 mm<sup>2</sup> (18AWG–12AWG).

## 7 HTRM1100 PRODUCT SPECIFICATION

| Electrical Specifications              |                                                |
|----------------------------------------|------------------------------------------------|
| Operating Frequency                    | 134,2 kHz                                      |
| Compliances                            | ISO11784/85, ISO 14223, ISO18000.2             |
| Uplink Data Rate                       | 5,6 kHz pulse width modulation                 |
| Downlink Data Rate                     | 2, 4, or 8 kHz                                 |
| Number of Antenna ports                | 3                                              |
| Range of Antenna Inductance tunable    | 21µH – 40µH                                    |
| Minimum Dimensions of the Antenna-loop | 45mm x 100mm                                   |
| Maximum Dimensions of the Antenna-loop | 550mm x 750mm                                  |
| Operating Range                        | Up to 1 m, depending on Tag type               |
| Output Power                           | 10W                                            |
| Output Current                         | 5 Ampere peak maximum                          |
| Modulation Index                       | 100%                                           |
| Inputs                                 | 3                                              |
| Outputs                                | 11                                             |
| Power Supply                           | 12V-18V DC                                     |
| Power Consumption                      | Up to 20W                                      |
| Mechanical Specifications              |                                                |
| Dimensions (W x D x H)                 | 160 mm x 100 mm x 20mm                         |
| Weight                                 | 165g                                           |
| Interface                              |                                                |
| RS-232                                 | 9600 up to 115 200 Baud Rate                   |
| RS-485                                 | Assembling option                              |
| Conformity                             |                                                |
| <b>Europe</b>                          | <b>CE Marking</b>                              |
| Postal                                 | EN 300 330                                     |
| EMC                                    | EN 301 489                                     |
| Low Voltage                            | EN 60950                                       |
| Human Exposure                         | EN 50364                                       |
| <b>USA</b>                             | <b>Compliant with Part 15 of the FCC rules</b> |
|                                        | FCC ID: 2ACK5-HTRM1100                         |
| Temperature Range                      |                                                |
| Operation Temperature                  | 0°C to 55°C                                    |
| Storage Temperature                    | -25°C to 85°C                                  |
| Relative Humidity                      | 10% to 80% (non-condensing)                    |

## 8 COMPLIANCE INFORMATION STATEMENT

**Model:** HTRM1100, **Type:** LF RFID Interrogator

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <p><b>E-Certification:</b></p> <p>When properly used this radio equipment conforms to the essential requirements of Article 3 and the other relevant provisions of the R&amp;TTE Directive 1999/5/EC of March 99.</p> <p><b>Equipment Classification according to ETSI EN 300 330 and ETSI EN 301 489: Class 2</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <h3>FCC ID: 2ACK5-HTRM1100</h3>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:</p> <ul style="list-style-type: none"> <li>• This device may not cause harmful interference, and</li> <li>• This device must accept any interference received, including interference that may cause undesired operation.</li> <li>• The device must be professionally installed.</li> </ul> <p>Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Note:</b> This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:</p> <ul style="list-style-type: none"> <li>• Reorient or relocate the receiving antenna.</li> <li>• Increase the separation between the equipment and receiver.</li> <li>• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.</li> <li>• Consult the dealer or an experienced radio/TV technician for help.</li> </ul> <p><b>Caution:</b> Any changes or modifications not expressly approved by frequent could void the user's authority to operate the equipment.</p> |