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FR-Tracker

Base-Station

User Manual

000472

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Revision History

Revision	Date	Author	Revision Description
0.0.1	2013-Nov-07	Eric Pesty	

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1 Introduction

Scope

The present manual provides installation and operation instructions for the FR-Tracker Base-station (model number 000472)

1.1 System Overview

The FR-Tracker system is a multi-component system which provides wireless sensor and monitoring features. The general intent for the system is installation in petroleum shipping and refinery facilities, particularly where large form factor petroleum storage tanks are employed.

The system is scalable but is typically comprised of one Base-Station in communication with multiple Repeaters where each Repeater in turn communicates with one or more Multi-Sensor units. Multiple wireless networks are formed between various units, all of which are ultimately under control of the Base-Station. The Base-Station collects sensor and other system data on an ongoing basis and provides accessibility through wired industrial field bus and Ethernet.

The Repeater and Multi-Sensor components are powered by internal non-rechargeable long-life cells and power is enabled by simple removal of an external magnet, simplifying installation. From a wireless network perspective, the system's various networks are generally self-organizing with further optional manual optimization being supported through web interfaces with the Base-Station.

2 Regulatory information and notices

2.1 FCC Part 15

Note: 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 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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

[FCC 15.105 (b) Class B]

Caution: The FR-Tracker system is an intentional radiator of Radio Frequency (RF) energy. In order to limit RF exposure to personnel in the immediate area, the system should be located and installed such that a separation of at least 20 centimeters is maintained between the antennas and personnel in the vicinity of the devices.

Caution: Changes or modifications to this equipment, not expressly approved by Syscor Controls & Automation Inc. could void the user's authority to operate the equipment. [FCC 15.21]

2.2 FCC Part 18

Note:

(a) The radio(s) of this device operates discontinuously in the RF bands specified as IEEE802.15.4 channels and uses modulation techniques designed to minimize its interference potential. Nevertheless, from time to time brief contention periods may exist for other equipment also operating on these frequencies.
(b) This equipment requires no calibration or other maintenance in order for it to maintain its adherence to radio frequencies for which it is registered.
(c) In the unlikely event that this equipment is found to noticeably impair the operation of other equipment, reorienting the antenna(s) of this device may reduce or resolve the interference problems. The maximum transmit power of this device can also be reduced using a web browser configuration interface. Finally, the entire system within which this device communicates may be reconfigured so as to block its use of specific IEEE802.15.4 channels.

[FCC 18.213 (a) (b) (c)]

2.3 Industry Canada

This Class B digital apparatus complies with Canadian ICES-003. 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.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

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'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

2.4 Antennas

This radio transmitter 11413A-000472 has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- Omni-directional outdoor antenna, 8dBi maximum gain, 50Ω impedance. Example: Taoglas Limited part number OMB.242.08F21 or equivalent

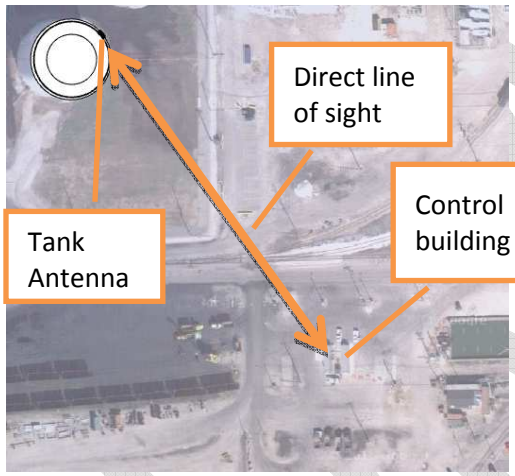
3 Base-Station installation

3.1 Location

- Distance and height of Base-Station antenna should be within the parameters indicated in the table below. Parameters a based on a tank antenna height of 60'.

Base-Station antenna minimum height based on distance:								
Base-Station distance from tank (ft)	100	200	300	400	500	600	700	800
Minimum Base-Station antenna height (ft)	49	37	26	14	3	0	0	0
Base-Station antenna minimum distance based on height:								
Base-Station antenna height (ft)	0	5	10	20	30	40	50	60
Minimum Base-Station distance from tank (ft)	527	483	439	351	263	176	88	0

- Antenna installation: mount antennas to suitable support structure; ensure antennas have line of sight to the Repeater antenna on the tank.

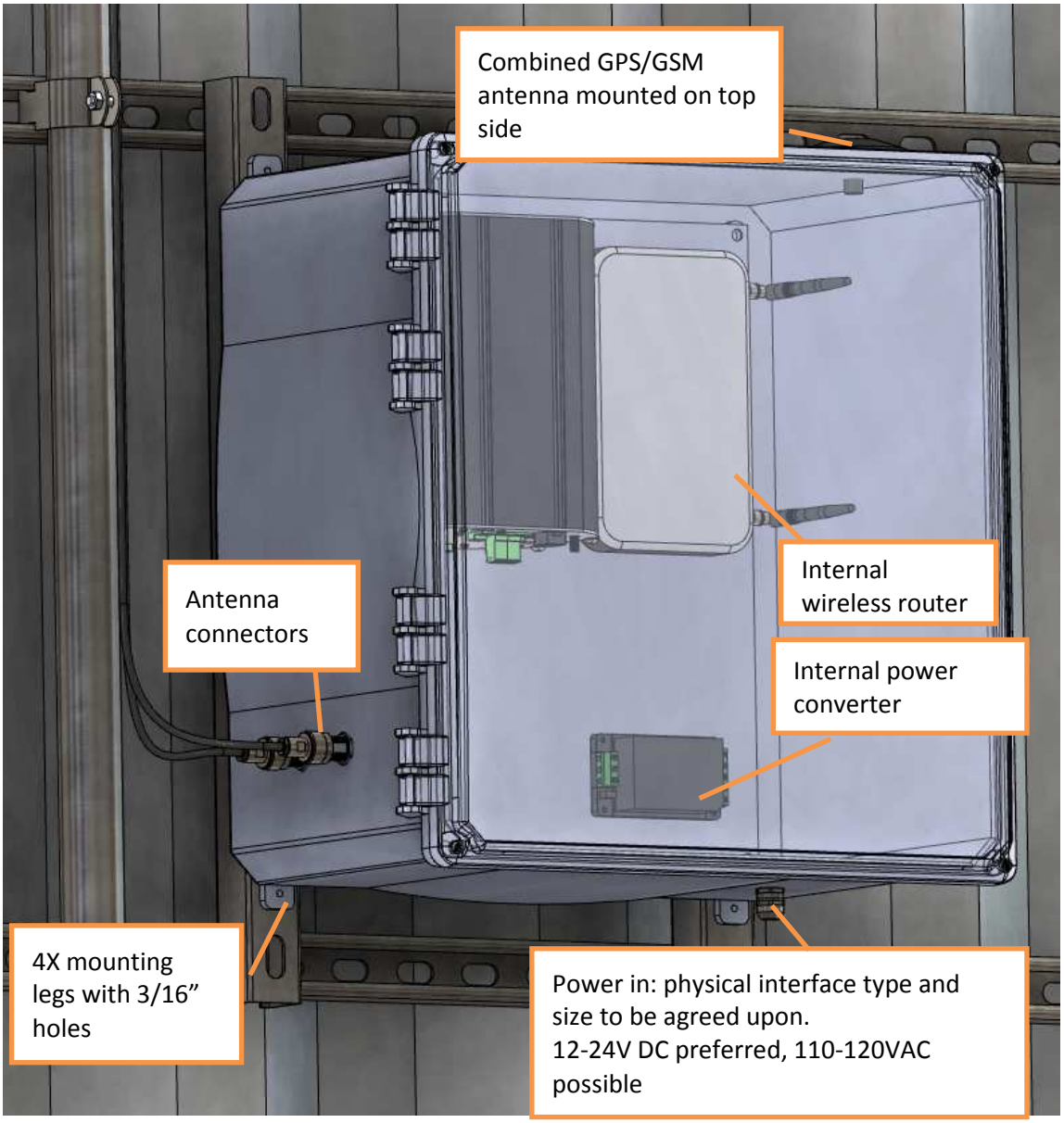


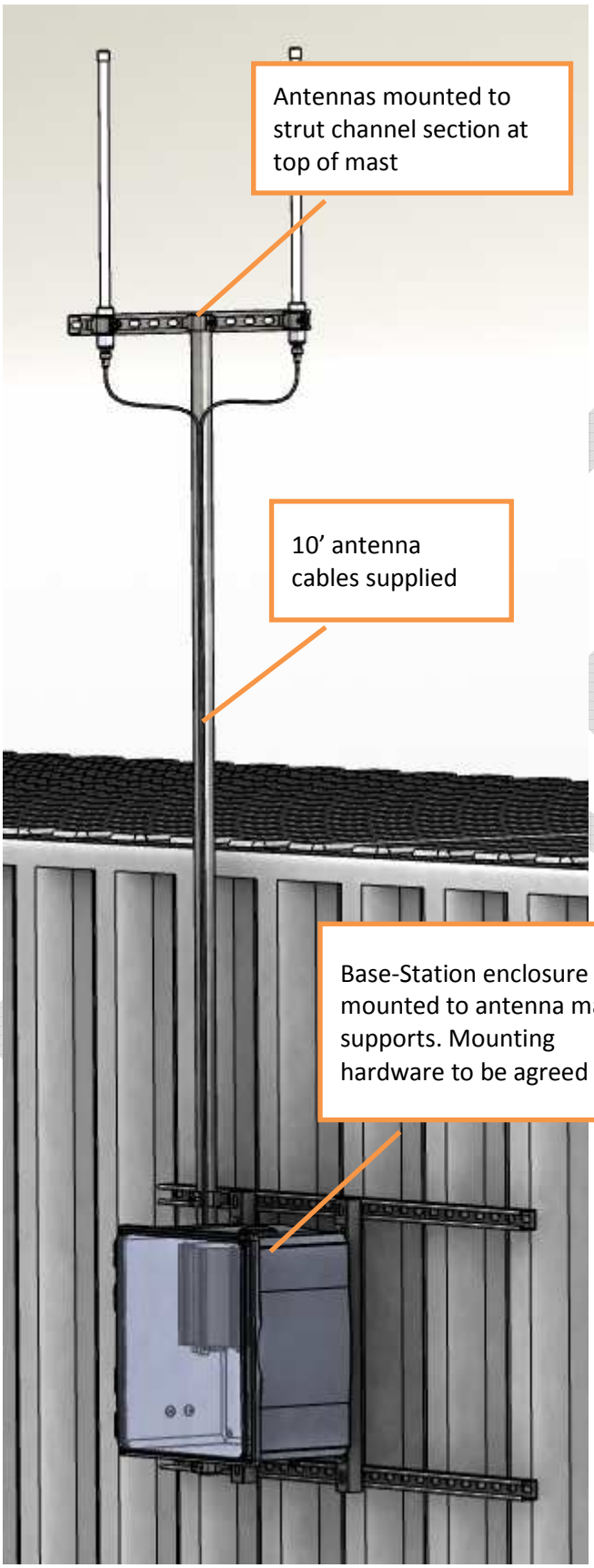
The Base-Station antennas can be located anywhere in the vicinity of the control building as it is far enough from the tank to not require a minimum antenna height.

- Base-Station enclosure: the Base-Station enclosure can be mounted to any suitable location providing a clear view of at least half the sky for GPS and GSM reception, mounting against a wall is acceptable. The distance between enclosure and the antennas should be minimized to reduce the length of cable (10' max).

3.2 Installation

- Base-Station: mount Base-Station enclosure to antenna mast supporting structure.
- Antennas: mount antennas to top of mast using supplied hardware.
- Antenna cables: connect antennas to bulkhead connectors on enclosure. Secure antenna cables along the antenna mast using zip ties.
- Power supply: bring supply power to enclosure and connect to internal power supply ensuring conformance to all applicable codes and regulations. Low voltage DC is preferable but AC line power can be used.




Antennas mounted to strut channel section at top of mast
10’ antenna cables supplied
Base-Station enclosure mounted to antenna mast supports. Mounting hardware to be agreed upon