i-B2 S/NA User's Guide
Version 1.0

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Radio Frequency Compliance Statement

IDENTEC SOLUTIONS AG. is the responsible party for the compliance of the following devices:

MODEL:	i-B2 S	i-CARD CF	i-D TAGS	i-Qxx TAGS
FCC ID:	OO4-ILR-IB2NA	OO4-ILR-ICARDCF	OO4-ILR-ID2	OO4-ILR-IQ8T or OO4-ILR-IQR
CANADA:	Pending	Pending	3538A 12112	35381021756A or 35381021825
EUROPE:	CE	CE	CE 0678(!)	CE 0682(!)

The user(s) of these products are cautioned to only use accessories and peripherals approved, in advance, by IDENTEC SOLUTIONS. The use of accessories and peripherals, other than those approved by IDENTEC SOLUTIONS, or unauthorized changes to approved products, may void the compliance of these products and may result in the loss of the user(s) authority to operate the equipment.

Operation is subject to the following conditions: (1) these devices may not cause harmful interference, and (2) these devices must accept any interference, including interference that may cause undesired operation of the device.

FCC Compliance (i-B2 S/NA)

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.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Compliance (i-B2 S/NA)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada.

European Notification according R&TTE Directive (i-B2 S/EU)

This equipment complies to Art. 6.4 of R&TTE Directive (1999/5/EC) and can be used in the following European countries:

Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Italy, Ireland, Luxembourg, Netherlands , Norway, Portugal, Switzerland, Sweden, Spain, United Kingdom, Czech Republic, Cyprus, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Slovenia.

Table of Contents

1.0 Overview

This guide explains how to install and operate the beacon tag i-B2 S.

2.0 Functionality

The i-B2 S/NA is a high performance maintenance free beacon tag to be used with IDENTEC SOLUTIONS' Intelligent Long Range (ILR®) beacon readers. Its' robust and slim housing allows easy mounting on most of the assets to be tracked.

Beacon tags of IDENTEC SOLUTIONS' i-B series transmit a unique ID together with user definable data in regular intervals (ping rate). Combined with fixed readers read ranges of typically 100 m can easily be reached. With mobile readers based on i-CARD R2 (PC card Type 2) or i-CARD CF B (CF Type 2) reading distances up to 30 m are realistic.

2.1 Telegram content

The tag transmits telegrams via the air interface to the reader. After decoding the following information is supplied to the host:

- Unique Tag ID (UID)
  Length 32 bits, LSB first. Can not be set or altered by the user.
- User data
  Length 9 bytes. Is reported by the reader in exactly the same format as programmed on the tag. Can be written to the tag via a proximity 13.56 MHz link using IDENTEC SOLUTIONS' i-B2 programmer.
- Flag byte
  Length 8 bits. Meaning of the single bits depend on implemented tag functionality, in the standard version these 8 bits are user definable.
- Age Counter
  Length 2 x 8 bits. These 2 bytes are 2 cut outs from the tag internal tag age counter which is incremented by 1 with each transmission.
  The low byte is incremented by 1 and can therefore be used to detect missing telegram reception. The high byte counts millions of telegrams and indicate battery usage. Comparing the actual value to a predefined maximum remaining lifetime can be calculated.

2.2 Programming

With IDENTEC SOLUTIONS' i-B2 programmer following data can be written to the i-B2 S tag:

- User Data (9 bytes)
- Flag byte (8 bis)
- Ping rate in steps of 0.5 seconds

In addition the tag can be switched between active and inactive state if needed, i.e. if permanent transmission is not allowed.

Appendix A: Technical Specifications

Performance

Read range to i-PORT R2	Up to 100 m (300 ft) (free air)
Read range to i-CARD R2	Up to 100 m (300 ft) (free air)
Operating frequency	868 MHz (EC) or 915 MHz (NA)
Operation	Transmits in regular intervals a pre-programmed data string
Repetition rate (ping rate)	0.5 – 60 seconds in 0.5 second steps
Transmit power	<1 mW
Certification	CE (EN 300 220-1, -3; ETSI EN 301 489-1, -3), *FCC part 15 (US), Industry Canada → pending*

Electrical

Power source	Lithium battery (not replaceable)
Expected battery life	See table

Data

Programmability	One time
Programming and activation	Wireless by proximity device over a distance of maximum 5 cm
Reprogrammable	Yes
Deactivation	Yes
Lockable	Yes
Memory capacity	4 bytes ID + 9 bytes user data

Environmental

Operating temperature	-30°C to +70°C (-22ºF to +158ºF) *1 -50°C to +85°C (-58°F to +185°F) *1
Shock	50 G, 3 times DIN IEC 68-2-27 Multiple drops to concrete from 1 m (3 ft)
Vibration	3 G, 20 sine wave cycles, 5 Hz to 150 Hz, DIN IEC 68-2-6 5 G, noise 5 Hz to 1000 Hz, 30 minutes DIN IEC 68-2-64

Physical

Dimensions	131 mm x 28 mm x 21 mm (5.2 in. x 1.1 in. x 0.85 in.)
Case Material	Plastic (Luran® S)
Mass	50 grams (1.75 ounces)
Enclosure rating	IP 65 — Protected against dust and low-pressure jets of water
Colour	dark blue

*1: Depending on battery type

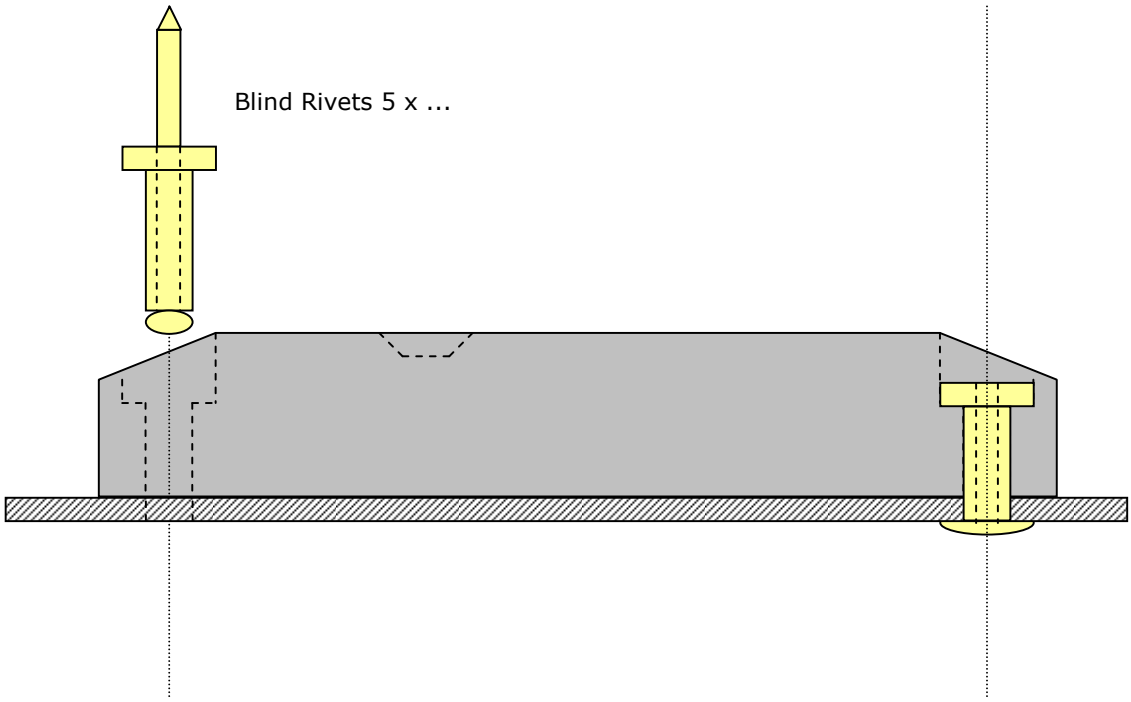
Appendix B: Battery lifetime

Life time of the whole tag depends on battery lifetime and therefore primarily on ping rate and battery capacity. The i-B2 S can be equipped with either a 560 mAh or a 2,100 mAh battery. Following table shows these influences:

	Battery 560 mAh		Battery 2,100 mAh	
Ping rate (sec)	Lifetime (years)	Max. Age Counter	Lifetime (years)	Max. Age Counter
0.5	1.25	74	4.90	147
1.0	2.43	73	9.56	144
2.0	4.65	69	>10	137
5.0	10.00	61	>10	120
10.0	>10	51	>10	100

Appendix C: Tag mounting

C.1 Rivets



Important Information:

(1) A temperature of at least +10°C (+50°F) must be maintained during riveting to prevent the casing from cracking.

(2) Always position the blind-rivet gun straight down on the rivet site and all the way to the rivet socket.

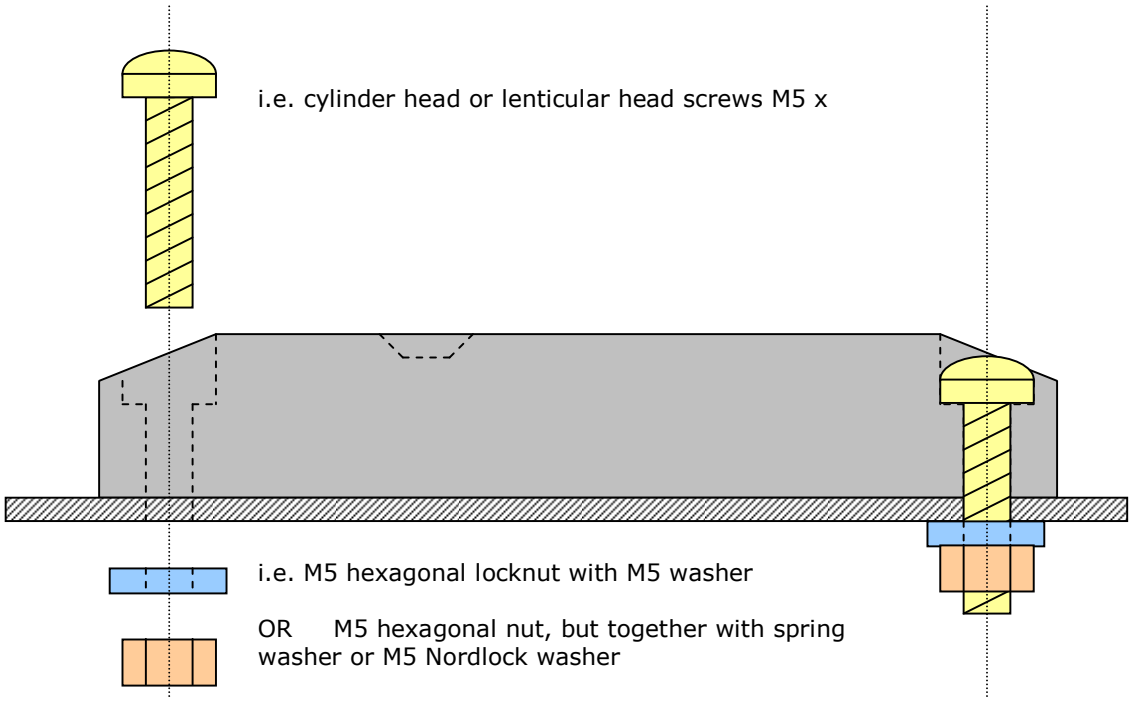
(3) On occasion, a tag casing has been damaged through improper handling of the blind-rivet gun (slanted positioning of the gun to access the rivet socket). If there is a chance this might occur, it is better to use a blind rivet with a large head[1] or insert an M5 washer. This has the effect of distributing the pressure over a larger surface area during riveting. The use of the washer has the added effect of positioning the rivet slightly higher in the depression, so that one can better access the rivet socket with the rivet gun.

(4) Metal surfaces in direct proximity to the tag can reduce the tag's range of function. Tags should therefore not be mounted in metal recesses or corners.

(5) After mounting, the tag's function should be tested, i.e. with a handheld.

[1] Refer to UN9924

C.2 Screws



Important Information:

(1) Only screws with cylindrical heads are suitable for mounting the tag. We do not advise using counter-sunk screws. If for some reason this should be necessary, then only together with a suitable counter-sunk cushioning disc[2].

(2) Secure the screws so they cannot work themselves loose i.e. by using self-locking nuts or spring washers or Nordlock washers[3].

(3) If the tag is mounted out-of-doors or in a damp environment, all mounting parts need to be made of stainless steel or other non-rusting material.

(4) A temperature of at least +10°C (+50°F) must be maintained during mounting to prevent the casing from cracking.

(5) Depending on the type and strength category of the M5 screw used, the maximum tightening torque must be between 2 and 10 Nm. If the torque is any greater, the screw may overtighten, or the casing might break.

(6) Metal surfaces in direct proximity to the tag can reduce the tag's range of function. Tags should therefore not be mounted in metal recesses or corners.

(7) After mounting, the tag's function should be tested, i.e. with a handheld.

[2] refer to UN 1277
[3] refer to UN 7014

C.3 Taping (on metal surfaces)

The following double-sided tapes from 3M are currently being used/recommended:

- On level, flat surface: 3M acrylic foam tape #5952 F (Temperature: 120°C [248°F], short-term at 150°C [300°F])
- On uneven, slightly curved surface: 3M acrylic foam tape #4959 F (Temperature 150°C [300°F], short-term at 204°C [368°F])

Dimensions

- On the roll: 50m (164 feet)
- Width: 19mm (3/4 inch)
- Thickness: 1.1mm (0.043 inches) for #5952 or 3.0mm (1/8 inch) for#4959
- Length: max. 130mm (5 1/8 inches) – cut to length

Procedure

- Preparation of surfaces:
  - Plastic casing: preliminary cleaning, 3M Primer 26 GZH, 2 minutes waiting period
  - Metal surface: preliminary cleaning, 3M Primer 86 A, 15 minutes waiting period
- First attach tape to tag bottom and press on with the roll
- Then attach the tag to the prepared metal surface

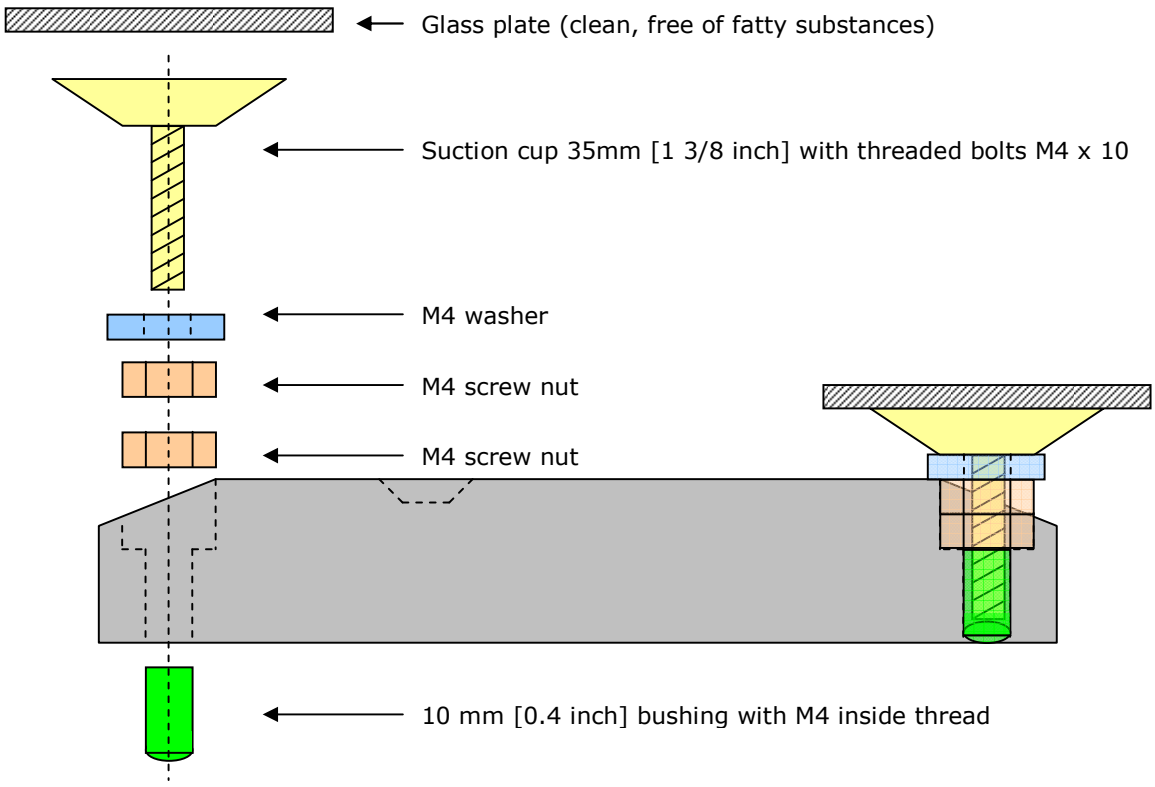
Important Information:

(1) Before using the tape, cleaning agents and primers as listed, need to check if these are compatible with the customer's operating conditions. The customer's approval must be obtained.

(2) Metal surfaces in direct proximity to the tag can reduce the tag's range of function. Tags should therefore not be mounted in metal recesses or corners.

(3) After mounting, the tag's function should be tested, i.e. with a handheld.

C.4 Mounting with Suction Cups



*) Supplier: i.e. Vakuplastic Kunststoff GmbH & Co. KG, Berlin → Vendor part number: 1.1.3510