# IDENTEC SOLUTIONS

**i-PORT M350
Installation and Hardware Manual**

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Printed in Germany
# Radio Frequency Compliance Statement

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

| MODEL: | i-PORT M350 |
|---|---|
| FCC ID: | OO4-ILR-IPORTM350 |
| CANADA: | IC: 3538A-IPM350 |
| EUROPE: | |

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.

## European Notification according R&TTE Directive

This equipment complies to Art. 6.4 of R&TTE Directive (1999/5/EC). It is tested for compliance with the following standards:
EN 300 220-1 V1.3.1 (2000-09), EN 300 220-3 V1.3.1 (2000-09), ETSI EN 301 489 V1.4.1 (2002-08), ETSI EN 301 489 V1.4.1 (2002-08)

## Professional Installation

Professional installation justification: To qualify for professional installation, the applicant must explain why the hardware cannot simply be purchased and installed by the average (technically inclined) person.

1) Marketing
The device cannot be sold retail, to the general public or by mail order. It must be sold to dealers.

2) Requires professional installation;
- installation must be controlled
- installed by licensed professionals (EUT sold to dealer who hire installers)
- installation requires special training (special programming, access to keypad, field strength measurements made)

3) Application
The intended use is generally not for the general public. It is generally for industry/commercial use.

## USA Notification

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.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC-NOTICE:
To comply with FCC Part 15 Rules in the United States, the system must be professionally installed to ensure compliance with the FCC Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as collocated antennas transmitting the same information) is expressly forbidden.

INDUSTRY-CANADA-NOTICE:
To comply with Industry Canada Radio Standard Specifications in Canada, the system must be professionally installed to ensure compliance with Industry Canada Radio Standard Specification certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in Canada. The use of the system in any other combination (such as collocated antennas transmitting the same information) is expressly forbidden.

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 permitted for successful communication.

This device has been designed to operate with the antennas mentioned in this document below, and having a maximum gain of 12 dBi. Antennas not included in this list or having a gain greater than 12 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms. The allowed setting for the transmit power are expressively mentioned in the appropriate chapter.

- ASTRON, Model: DH-8195, elliptical polarized antenna
- WIMO, Model: 900R, linear polarized antenna
- HyperLink Technologies, Model HG903RD-RSP, 1/2-wave whip antenna

This product contains components that are sensitive to electrostatic discharges. Please observe the special instructions for their protection. Incorrect handling can damage the unit and cause the invalidation of the warranty.

**Minimum safety precautions against electrostatic discharge:**

- Establish earth contact before you touch the unit. For example, touch the earthing screw on the unit. Even better: Use an antistatic ribbon and earth yourself permanently for the time you handle the unit.

- Avoid unnecessary contact with the unit connectors and assemblies inside the unit.

- Only open the unit if the operational settings (as described in the manual) expressly require this.

- Use antistatic tools for the setting of the unit. (Warning: Do not touch life-threatening voltages with these tools).

- Do not store unit and components without protective packaging.

- Only remove unit and components from the packaging immediately prior to installation.

**These notes are not sufficient to guarantee complete protection from electrostatic discharges! We recommend the use of suitable protective equipment.**

# Contents

# 1         Safety Instructions

The system described in this manual is for exclusive operation by trained employees. Only qualified personnel that know the potential dangers involved should perform the installation, settings, maintenance and repair of the units used.

## Operational Safety

The correct and safe use of these systems assumes that operating and service personnel follow the safety measures described in the manual alongside the generally acceptable safety procedures.
If there is a possibility that safe operation cannot be guaranteed the system must be switched off and secured against accidental use. Then the service unit responsible must be informed.

## Safety Documents

This ILR system was designed, tested and supplied in perfect condition according to document IEC348 Safety Requirements for Electronic Units of Class 1.

## Condensate / Change of Temperature

Moving the systems from a cold to a warm environment could lead to dangerous situations due to condensation. Therefore it must be ensured that the system can adjust itself to the warmer temperature.

## Do not open the housing

There is no need to open the housing in order to set any ILR unit. No unit has any internal setting elements or displays. The i-PORT M350 is not configured directly. It is managed via the master unit on the i-BUS, the i-HUB.

## Earthing

Before establishing any connections the housing of the system must be earthed.

## Connections / Power Supply

The supply circuits must comply with the conditions set out for the SELV circuits (see EN 60950).
The signal circuits must comply with the conditions set out for the SELV circuits (see EN 60950).
Use screened cables for the power supply. This is the only way to achieve the prescribed EMC.
During maintenance damage could occur if printed circuit boards or cables are connected or disconnected whilst the power supply is still on. Therefore only work on the connection and the components when they are not live.

**Fuses**

Only experts who are aware of the dangers involved may replace the fuses. It must be ensured that only fuses of the required current rating and the correct type are used for replacement. The use of repaired fuses and/or short-circuiting the fuse holders is prohibited.

**Spare Parts**

We recommend that only personnel, original products, spare and replacement parts authorized by IDENTEC SOLUTIONS be used for installation, service and repair. Otherwise IDENTEC SOLUTIONS does not accept any responsibility for materials used, work carried out or possible consequences.

**Electrostatic Discharge**

Semi-conductors of the type MOS or CMOS as well as two-pin types and precision resistance are sensitive to ESD. All components, printed circuit boards and auxiliary systems should therefore always be classed as sensitive to electrostatic discharge.
Before opening the cover the unit should be placed onto an ESD-protected surface. As with all work on modern electronic modules the use of ESD clamps and ESD mats during work on the unit is recommended.

- Sufficiently protect all printed circuit boards that were removed from the unit from damage.
- Observe all normal precautions for the use of tools.
- Use ESD-protected packaging material.

Never use measuring units with low impedance for measuring or testing systems with semi-conductor components. Never use high voltage testing units or dielectric test units to test systems with semi-conductor components.
If it is necessary to check the isolating properties of the field wiring, the assemblies (electronic units and sensors) should be disconnected.
Earth the test units.
IDENTEC SOLUTIONS does not accept returns of products where the regulations concerning the ESD precautions and protective packaging materials were not followed.

ESD – Electrostatic Discharge
EMC – Electromagnetic Compatibility
SELV – Safety Extra Low Voltage – Protective measure against dangerous body currents, formerly: protective first voltage range

# 2 Preface

## 2.1 Preparations

This installation manual must be read carefully prior to starting the installation. The described installation works assume that installation materials like cable, antenna and data tag holder etc are available

## 2.2 Scope of This Document

This document is the hardware description of the i-PORT M350 to operate i-Q, especially i-Q350 reefer tags. This document is intended only for mechanical and electrical installation of this central units.

## 2.3 Responsibility

IDENTEC SOLUTIONS is not responsible for any errors occurring in this document.

## 2.4 Updates

Updates will be provided on request. The information in this document can be changed without prior notice and IDENTEC SOLUTIONS are under no obligation.

## 2.5 Scope of Delivery—Visual Inspection

Check delivery whether it is complete and for any damages. If the delivery is not complete or damaged immediately inform the carrier. The dispatch and service organization of IDENTEC SOLUTIONS should also be informed to facilitate the repair or exchange of the system.

## 2.6 Associated Documents

**Hardware description and installation manual (this document)**
- Reg-No: IM.0740.EN, i-PORT M350 Hardware and Installation Manual, English

**Software description and Programmer's Guide**
- i-CORE Users Guide, English
- Reg-No: IM.0750.EN, i-CAL Users Guide, English

# 3 Introduction

## 3.1 Fundamentals

IDENTEC SOLUTIONS' ILR® (Intelligent Long Range®) technology is the next generation of long range RFID (Radio Frequency IDentification). The objective is wireless and automated data collection over large distances.

**HOW RFID WORKS**

Data is transmitted via high frequency radio waves between a tag and an interrogator. Information stored on the tag can be read and processed. Data can be exchanged over large distances, even in extreme environmental conditions such as dust, dirt, paint or oil.

The core element of the system is the active ILR tag, which can communicate its' unique ID at a rapid rate of transmission over very large distances (up to 500 meters/1500 feet). The reader (i-PORT M350) can decode data simultaneously from hundreds of these tags within seconds. Connection of the reader to a host computer system enables global data accessibility via a variety of software platforms (Internet).

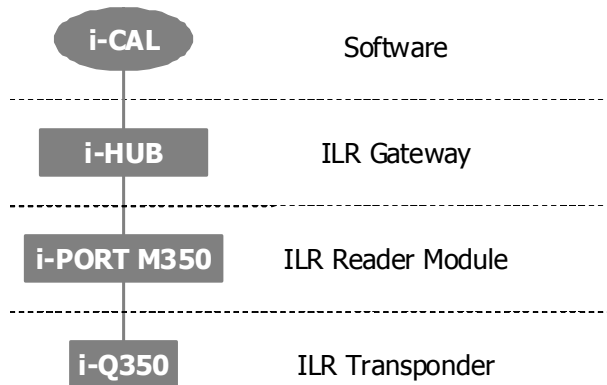**CHARACTERISTICS OF ILR GEN300**

- UHF Frequency (850 – 928 MHz)

- Large read/write range of up to 500 meters (1500 feet)

- Variable read/write range from just a few meters up to 500 meters (1500 feet)

- Long transponder battery lifetime (up to 3 years)

- Anti-collision process and multi-tag handling

**System Overview**

IDENTEC SOLUTIONS' ILR-System consists of 4 main components:

- Active tags (also called transponders) with internal power supply, which are used to identify goods or assets

- Reader (i-PORT; fixed-mounted) or handheld devices (mobile) which exchange information with the tags and host computer systems

- Various antenna types/characteristics for different applications

- A central computer system as basis for control and monitoring

## 3.2   Component Overview

```
 ┌─────────┐
 │  i-CAL  │            Software
 └────┬────┘
 - - -│- - - - - - - - - - - - - - - - - - - -
 ┌────┴────┐
 │  i-HUB  │            ILR Gateway
 └────┬────┘
 - - -│- - - - - - - - - - - - - - - - - - - -
┌─────┴──────┐
│ i-PORT M350│          ILR Reader Module
└─────┬──────┘
 - - -│- - - - - - - - - - - - - - - - - - - -
 ┌────┴────┐
 │  i-Q350 │            ILR Transponder
 └─────────┘
```

**ILR System Components**

- Tags from the i-Q350 series monitor, record and transmit stored data over large distances. The high data transmission rate ensures optimal communication.

- Data can be written to or read from the tags by means of the fixed interrogator (i-PORT) and then transmitted via LAN (or WLAN, PPP, etc.) to a host computer network. Application software as well as all IDENTEC SOLUTIONS products can be seamlessly integrated into existing software environments by means of standard interfaces (TCP/IP, FTP, HTTP, etc.)

- Data can also be written to or read from tags by a mobile handheld interrogator. Thanks to the i-CARD CF, an RFID interrogator in a Compact Flash format, a flexible and adaptable, practically hardware independent application is created. The i-CARD can be used in third-party handheld devices from a variety of manufacturers (Symbol, Latschbacher, Teklogix...)

- Handheld readers, based on the Compact Flash i-CARD CF, can also be used to receive transmissions from the tags over distances up to 30 m. After decoding this data can either be processed locally or transferred to a network via optional radio cards (WLAN, GPRS).

### 3.3   System Components—Data Tags

#### 3.3.1   i-Q350 Tags

This active tag is particularly suited for:

- Identification
- Tracking and Tracing
- Localization
- Temperature Monitoring

Using ILR technology, distances of up to 500 meters can be achieved with this tag.

Used in combination with the i-PORT, several hundred tags can be interrogated nearly simultaneously, thanks to a sophisticated anti-collision algorithm.

i-Q350 tags are available in a variety of configurations, i.e. with 32 Kbytes of memory, an optional LED for visual recognition, push-button and optional temperature logging function. Furthermore, they are available at 868 and 920 MHz (dual frequency) for use in Europe and America for transcontinental applications (dual frequency).

#### 3.3.2   i-Q350 WAM

This active tag is particularly suited for:

- Identification
- Tracking and Tracing
- Localization
- System Monitoring

Using ILR technology, distances of up to 500 meters can be achieved with this tag. An operation lifetime of up to 3 years (at 600 128-bit readings per day) can be expected due to the tag's minimal energy requirement.

Used in combination with the i-PORT, several hundred tags can be interrogated nearly simultaneously, thanks to a sophisticated anti-collision algorithm.

i-Q350 tags are available in a variety of configurations, i.e. with 32 Kbytes of memory, an optional LED for visual recognition, push-button and optional temperature logging function. Furthermore, they are available at 868 and 920 MHz (dual frequency) for use in Europe and America for transcontinental applications (dual frequency).

### 3.3.3 Polarization of Tags



Vertically Polarized          Horizontally Polarized
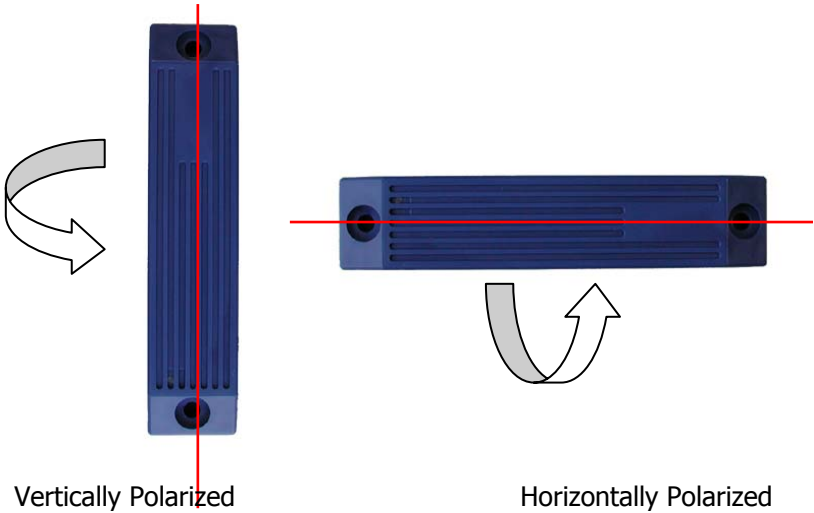
Polarization is dependent on orientation and is rotation symmetrical.

## 3.4    System Components—Readers

### 3.4.1   i-HUB

Readers from the i-HUB series are part of the newest generation of IDENTEC SOLUTIONS™ Intelligent Long Range® (ILR®) RFID readers. The i-HUB collects, filters and edits data from transponders and sends them to a Host System via GPRS or Ethernet.

Systems equipped with ILR tags and readers provide identification and real-time data collection with maximum accuracy and minimal effort in wireless applications such as:

- identification
- tracking, and localization of assets and personnel.

**Power Supply**

The i-HUB is supplied a local 24 VDC supply. Additional daisy-chained i-PORTs are also supplied via the i-BUS.
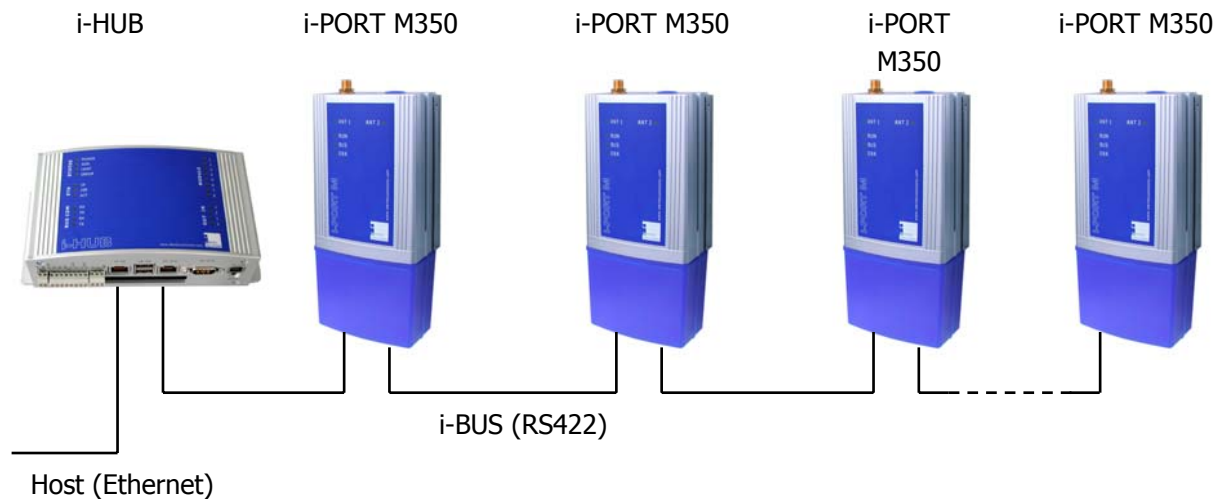
Example of i-HUB with up to 8 i-PORT M350

### 3.4.2   i-PORT M350

The i-PORT M350 is a reader for the i-Q350 series of ILR$^®$ Response Tags. Built into a compact metal housing, the i-PORT M350 reads data from and writes data to the i-Q350 tags at distances of up to 500 meters (1500 feet). Connection to the host system is established via a RS422 interface, resulting in the capability to connect up to 8 readers in a Daisy Chain using commercially available CAT 5 cables and connectors.

A simple master/slave protocol enables data exchange. Not only does the protocol contain the data received from the tag but it can also provide information about the time of data reception, field strength and information about the number of times the tag has been received by the reader.

## 3.5        System Components—Antennas

IDENTEC SOLUTIONS' antennas are distinguished by their compact design. A variety of antennas can be used, depending on application. The antennas are differentiated by characteristics such as polarization, apex angle, and gain. Optimal fit to the read zone is achieved by the right choice of antenna (characteristics) and receive sensitivity. As the antennas are passive system elements, no tuning is required, which facilitates installation and maintenance.

### 3.5.1  Elliptical Polarized Antennas

Because of the wide apex angle (120º), a large read zone is achieved, which is desirable when a large quantity of tags need to be read at one time, or when tags moving at great speeds need to be interrogated.

Since the polarization is elliptical, orientation of the tag relative to the antenna is not important; if the tag is in front of the antenna the tag may be polarized horizontally or vertically along the line of sight of the antenna. Due to its small size and weight, this antenna is very easy to integrate.

**Orientation Diagrams: Elliptical polarized antenna**

**Elevation**                    **Azimuth**
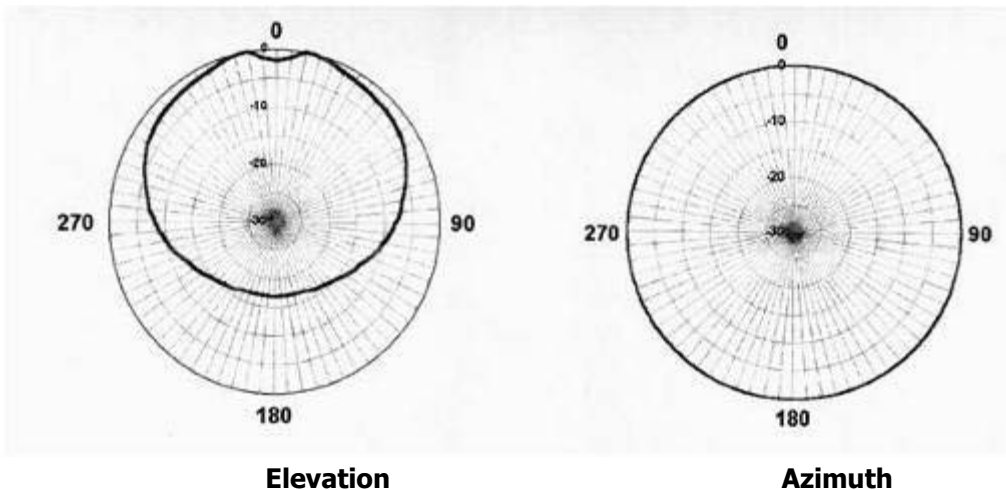
For this antenna this is the maximum transmit power setting:

* Astron DH-9185:      -8 dBm
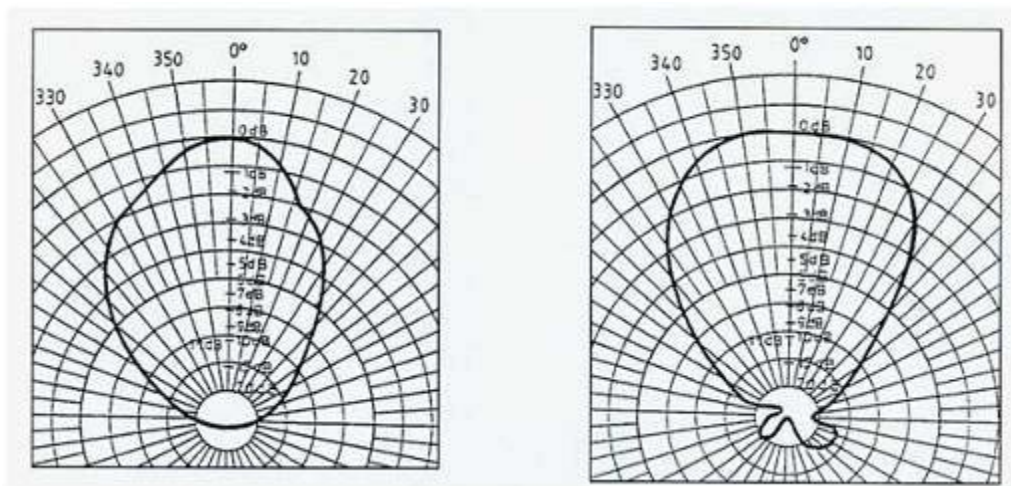
### 3.5.2 Linear Polarized Antennas

Because of the smaller apex angle (60º), this antenna is more suited to selective data collection and restriction of read zones.

Depending on the direction of mounting, the antenna's field is either vertically or horizontally polarized, requiring the tag to have the same orientation.
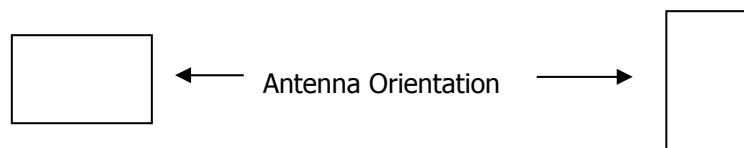
Because of the greater gain, longer read ranges can be achieved with this antenna compared to the elliptical polarized type above.

**Orientation Diagrams: Linear polarized antenna**



| Elevation | Azimuth |
|:---:|:---:|
| **Vertical Polarization** | **Horizontal Polarization** |

Antenna Orientation
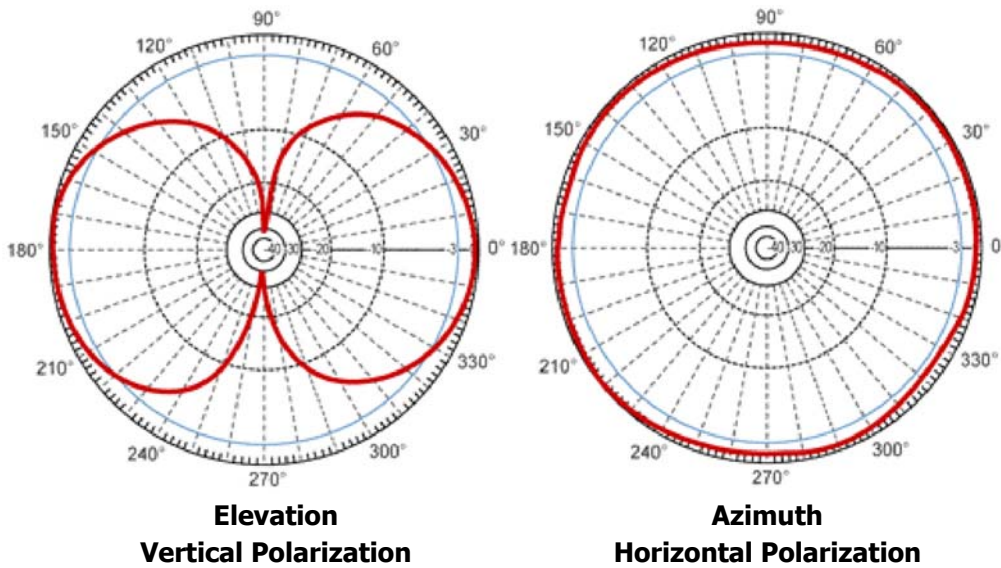
For this antenna this is the maximum transmit power setting:

- Wimo 900R:          -12 dBm

### 3.5.3   1/2-Wave Whip Antenna

**Dimensions**



**Orientation Diagrams**



| | |
|---|---|
| **Elevation** | **Azimuth** |
| **Vertical Polarization** | **Horizontal Polarization** |
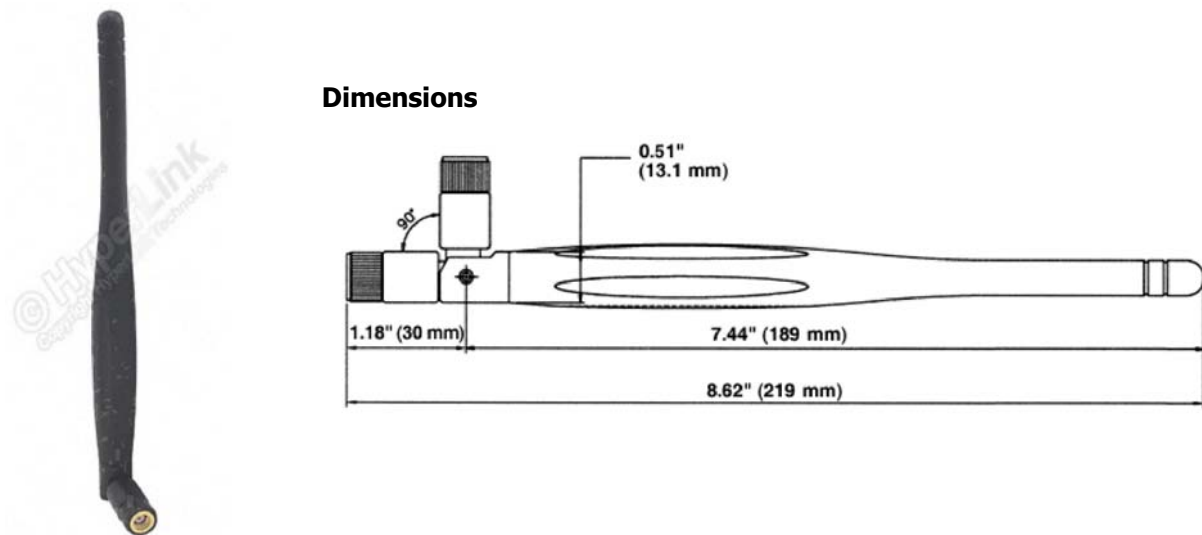
For this antenna this is the maximum transmit power setting:

- HyperLink Technologies HG903RD-RSP:        -3 dBm

# 4 Installation

## 4.1 Mechanical Installation

DIN Rail Clamp

Mounting Kit                                                    Mounting Kit with DIN Rail Clamp

The mounting kit is to be clipped on the back of the i-PORT M350,
there is 5 mm space left for the screws between the mounting kit and the reader.

It is intended to always use the mounting kit. If mounting on a DIN rail is desired, the additional
clamp is mounted on the back side of the mounting kit.

Use the two mounting holes (diameter 4,5 mm) to attach the i-PORT M350 mounting kit to a suitable
mounting surface. Once the mounting kit is fixed, clipped in the i-PORT M350 reader.

Please add to the i-PORT M350 dimensions approximately 70 mm on the antenna side and 40 mm on
the cable side to calculate the required mounting space. The i-PORT M350 weights approx. 310 g in
total including all mounting parts.

Enclosure rating is IP40 without the end cap and IP64 with. If greater enclosure rating is required, the
i-PORT M350 must be placed in an additional protective housing, in this situation the end cap could be
removed.
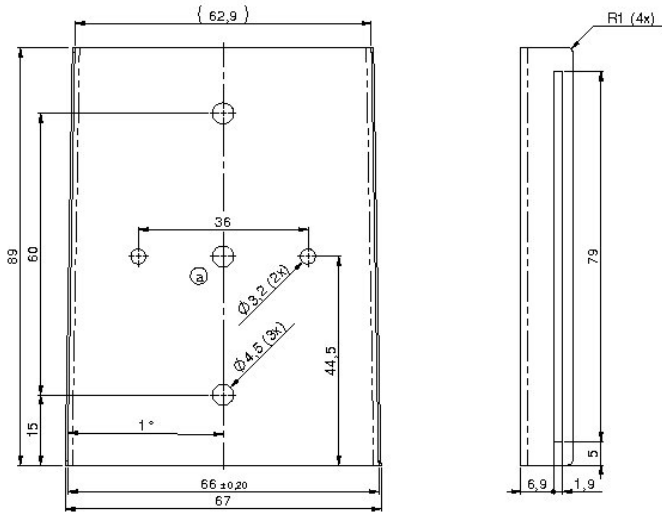
Dimensions of mounting kit
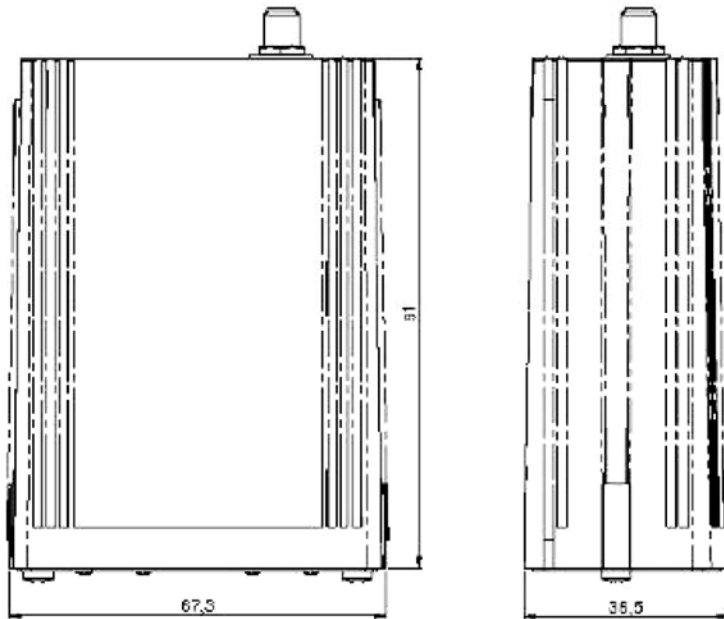


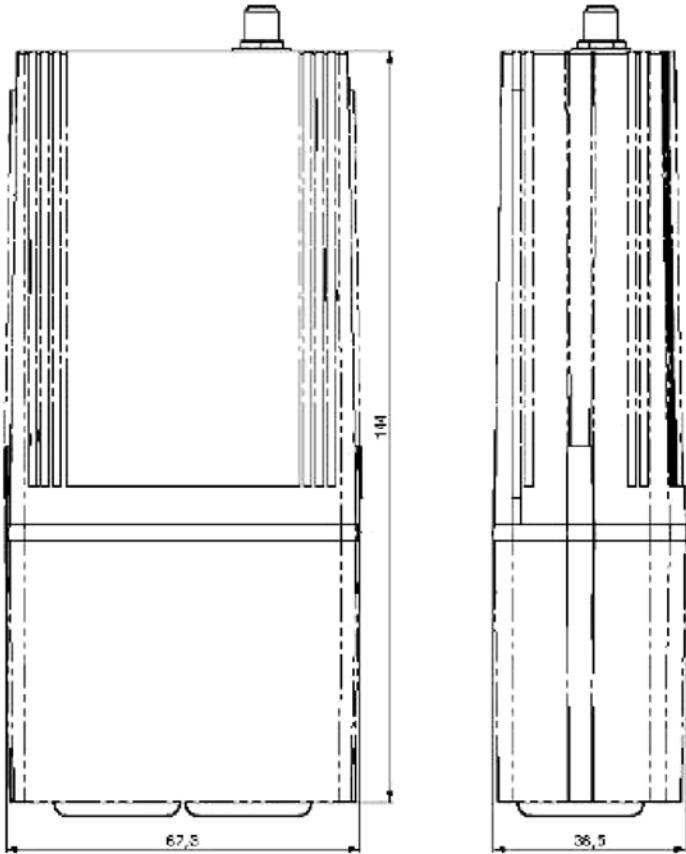Dimensions without end cap (cable inlet protection), but without mounting kit

Dimensions with end cap (cable inlet protection), but without mounting kit

## 4.2    Electrical Installation

### 4.2.1   Safety Instructions

The power supply circuit must comply with the requirements of the SELV circuits (see EN 60950).

The signal circuits must comply with the requirements of the SELV circuits (see EN 60950).

Use a ferrite rod for all cables and place it close to the units.

A screened cable must be used for the power supply. Only then is the required EMC achieved.
The device uses RS422 levels on its RX and TX Pins, although Ethernet jack/plugs mechanically fit, the device is not Ethernet compatible!

Industry standard cat 5 straight patch cables can be used to daisy chain the devices

### Glossary

SELV    Safety Extra Low Voltage – Protective measure against dangerous body currents.
Protective first voltage, circuit not floating.
EMC     Electromagnetic Compatibility
RxD     Receive Data
TxD     Transmit Data

### 4.2.2   Position of Ports
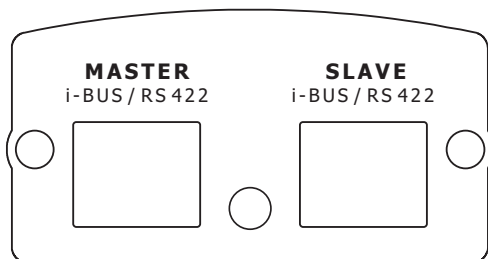
### 4.2.3   Power Supply

The i-PORT M350 are powered by the i-BUS.

**Total Power Consumption—i-HUB with i-PORT M types**

1 × i-HUB, app. 10 W
8 × i-PORTs (MB or MQ or M350 types), app. 0.5 W each
power supply for sensors supplied from +24V AUX

This gives a maximum sum of 14 W of power consumption for the i-HUB. Add the power consumption of sensors supplied to that.

### 4.2.4   Maximum Overall Cable Runs of i-BUS

This tables is valid for Cat5 cabling with gauge diameters of AWG24. The maximum distance between any two readers is limited to 300 m (approx. 1000 ft).

| # of i-PORTs | Length (m/ft) | Remark |
|---|---|---|
| 1 | 300/1000 | One 24V |
| 2 | 600/2000 | One 24V |
| 3 | 400/1300 | One 24V |
| 4 | 250/820 | One 24V |
| 5 | 200/650 | One 24V |
| 8 | 100/300 | One 24V |
| 8 | 1000/3000 | GND potential free power supplies at every i-PORT M350 |

## 4.2.5   The i-BUS Connector

**Please note**

- The i-BUS uses RS422 levels on its RX and TX Pins, although Ethernet jack/plugs mechanically fit, the device is not Ethernet compatible.
- Industry standard cat 5 straight patch cables can be used to daisy chain the devices

| | |
|---|---|
| To Master | RJ 45 connector to the Host computer or the Slave port of the previous i-PORT MB in the Daisy Chain. |
| To Slave | RJ 45 connector to the Master port of the next i-PORT MB in the Daisy Chain. Leave this connector open at the last device in the chain. |
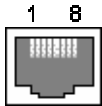
View into the connector = crimp/solder side of plug

| Pin | To Master | To Slave | T568B color | Description |
|---|---|---|---|---|
| 1 | RxD+ | TxD+ | White/orange | |
| 2 | RxD– | TxD– | Orange | |
| 3 | TxD+ | RxD+ | White/Green | |
| 4 | V+ (10 … 30V) | V+ (10 … 30V) | Blue | Power supply over bus |
| 5 | V+ (10 … 30V) | V+ (10 … 30V) | White/Blue | Power supply over bus |
| 6 | TxD– | RxD– | Green | |
| 7 | GND | GND | White/Brown | Power supply over bus |
| 8 | GND | GND | Brown | Power supply over bus |

As the TxD/RxD crossing is done by the pinout of the connectors, simple straight cabling has to be used.

**Connection parameters**

Signal levels:    RS422
Baud rate:        115200 bits per second
Data bits:        8
Stop bits:        1
Parity:           none
Mode:             half duplex

# 5 Initial Operation

## 5.1 Configuration

The i-PORT M350 is not configured directly. It is managed via the master unit on the i-BUS, the i-HUB.

## 5.2 Important settings—transmit power

Depending on the antenna type these are the maximum transmit power settings:

- Rod antenna:        -3 dBm
- A-9185:                 -8 dBm
- W-900R:               -12 dBm

## 5.3 Checking the Installation

After completing the installation the operation must be systematically checked. The installation check can be divided into three sections:

- Visual test
- Basic operational check
- Detailed operational check

If the basic check of the operational behavior is to be carried out using a (portable) PC a final check via the intended user control system should also be carried out.

# 6 Troubleshooting

## 6.1 General

This chapter covers how faults can be recognized and rectified. There are potentially four main problem sources:

- The user control system, including task requirements, communication cables, peripheral units with possible object recognition switches.

- The ILR system including peripheral units and their cables, also potential object recognition switches.

- The environment including large objects between antenna and tag, electrical disturbance sources, intervention by persons, etc.

- The quality of the technical design, including alignment between antenna, data, ratio of task requirements/available communication time etc. The information about system performance is contained in the relevant datasheets.

When planning the total system do not forget these problem sources and "Fault finding procedures on system level" should possibly be included in the host system. How this could look in detail depends on the relevant system concept and very likely varies from one system to another.

## 6.2 Status Display (LEDs)
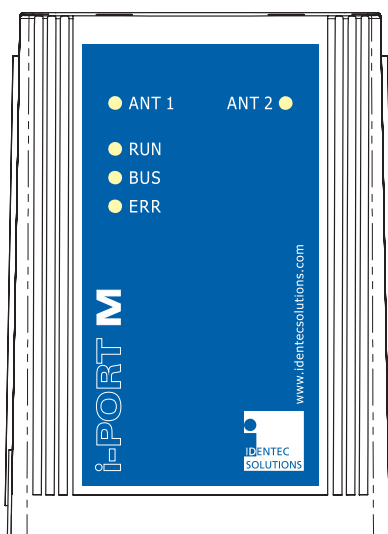
**ANT 1/ANT 2**
LED blinks green when a telegram preamble has been detected. It blinks RED when a tag telegram has been decoded correctly.

**RUN**
Device is running properly (LED blinks at approx 1Hz)

**BUS**
Blinks GREEN when data is received from the host. Blinks RED when sending data to the host

**ERR**
Blinks RED when an error occurs

# 7    Maintenance

## 7.1  General

In principle, the ILR system is maintenance-free. When correctly installed it operates for many years without any problems.

## 7.2  Precautionary Maintenance

Regular checking of all ports and cables belonging to the system is recommended. Unstable connections could lead to damage and malfunctions of the system and therefore should be repaired as soon as possible.

**A Brief Checklist**

- Are all casing intact?
- Are all cables intact?
- Are all connectors intact?
- Are all connectors securely fastened?
- Are all screws still tight?
- Is there suddenly a malfunction at a specific unit?

## 7.3  Exchanging an i-PORT within the i-BUS daisy chain

- Exchange only one unit after another, not several in one step.
- Exchange the reader with one of the same type.
- The i-PORT automatically scans the i-BUS every 10 seconds, so it will automatically recognize the exchanged device.

## 7.4  Firmware Update

The firmware is stored in a FLASH memory and can be updated if needed.

## 7.5   Spare Parts

### 7.5.1   Recommended spare parts stock

In order to keep the down time of the system during malfunctions as short as possible it is recommended to have certain spare parts in stock. At least one central unit, one antenna and one antenna cable should be available. With larger systems with more than approx. 15 i-PORTs the doubling of the recommended stock quantity should be considered.
Furthermore, it is recommended to have several spare tags in stock,
corresponding to approx. 0.5 – 1 % of the total number of tags.

### 7.5.2   Preparing the spare parts

In general all spare parts can be used immediately after delivery from IDENTEC SOLUTIONS. However, for the compact communicator there are various settings of the communication parameters. In order to keep the down times short it is recommended to set these parameters before the component is entered into the spare part stock system. In most cases all units within an identification system are used in the same way so that only one setting is required.

### 7.5.3   Examination and repair of exchanged parts

The data tags and compact communicators are complex electronic power units on which the customer can carry out only very limited repairs. Normally the repairs are carried out at IDENTEC SOLUTIONS or possibly at a distributor. Before a part is sent in for repair a short examination should be carried out.

## 7.6   Returns

Parts or main components returned for repair or exchange must be handled with great care. PC cards must be returned in the appropriate ESD-protecting packaging material.
All returns should include a completed returns form (see appendix) and be sent to the local distributor or to:

> IDENTEC SOLUTIONS AG
> Service Department
> Millenium Park 2
> 6890 Lustenau
> AUSTRIA / AUTRICHE

# 8  Technical Specifications

| | i-PORT M350 |
|---|---|
| **Compatibility** | **ILR® i-Q350 Tags** |
| **Performance** | |
| Write range | Up to 500 m (1500 ft) |
| Read range | Up to 500 m (1500 ft) |
| Read rate identification | 100 tags/s |
| Read rate 128 bit data | 35 tags/s |
| Simultaneous identification | Up to 2000 tags |
| **Communication** | |
| Frequency | 868 MHz (EU), 919/920/921 MHz (NA) |
| Certification | EN 300 220 (EU), FCC part15 (US), Industry Canada |
| Data rate up/download | 19.200 – 5000.000 kbits/s |
| Number of antennas | 1 |
| Antenna connection | SMA |
| Transmit power | ≤ 10 mW/+10 dBm, depending on national regulations, software adjustable |
| Transmission safeguard | 16 Bit CRC |
| Sensitivity | -105 dBm / depending on data rate |
| **CPU** | |
| Data memory | Up to 200 tags (IDs) |
| **Interfaces** | |
| Host interface | i- BUS (RS422), optional Ethernet, WLAN |
| Status display | 5 LEDs (ANT1, ANT2, RUN, BUS, ERR) |
| **Electrical** | |
| Power source | 10 – 30 VDC |
| Input power | < 1 W |
| Standards / Security | CE, EN 300 220 |
| **Environmental** | |
| Operating temperature | −30 °C to +70 °C (−22 °F to +158 °F) |
| Storage temperature | −40 °C to +80 °C  (−40 °F to +176 °F) |
| Humidity | 90 % non-condensing |
| **Physical** | |
| Dimensions | 97 × 67 × 97 mm; (3.8 × 2.6 × 3.8 in.) 153 × 67 × 97 mm; incl. cover (6.0 × 2.6 × 3.8 in.) |
| Case material | Plastic |
| Weight | 150 g |
| Package rating | IP40, IP64 with plastic cover |