Certus

RFID for Port of Rotterdam

Technology overview

REVISIONS

Ver.	Date	Author	Pages changed	Description of changes
1	30-01-2019	JBO	All	Initial version

TABLE OF CONTENTS

1 ABOUT THIS DOCUMENT

1.1 Scope
This document describes the proposed solution for enabling RFID at the Port of Rotterdam in collaboration with Certus.

1.2 Reader's Background
The reader must be familiar with RFID technology. This document is intended for Certus.

1.3 Document Limitations
This document does not specify other than the proposed RFID technical solution.

1.4 Legal and contractual Aspects
N/A

1.5 Document Update
Lyngsoe Systems maintains this document in accordance with Lyngsoe Systems Quality Assurance System.

3 INTRODUCTION

The RFID solution described in this document includes HW components designed for outdoor use and is IP67 compliant and can therefore endure the different harsh conditions found in outside conditions.

The solution specified is for a single site, e.g. the Port of Rotterdam and consists of a single Site Pc, a number of RFID readers and a number of RFID antennas. A conceptual drawing of the solution can be seen in below figure.

For reliable read rates the distance between the windshield tag and the antenna should not extend 5,5 meters.

An RFID reader can have either 2 or 4 antennas connected.

An on-site site survey must be conducted to verify the exact amount of HW needed and for the exact locations where the HW is to be installed.
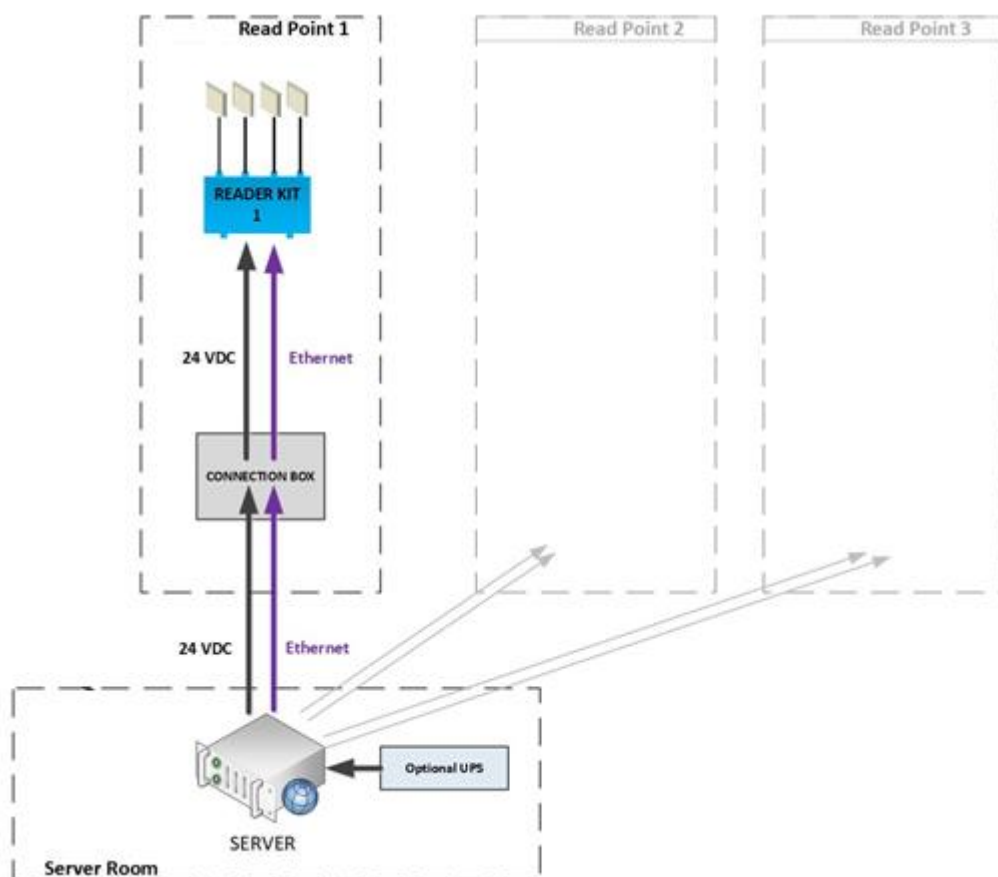

figure 1: Conceptual drawing of the proposed solution

4 COMPONENTS IN THE SOLUTION

4.1 Site Pc

Lyngsoe supplies this component.

The site Pc hosts the Lyngsoe LIVE Logistics middleware for reader management and backend support.

The reader – Site Pc communication will be over a standard Ethernet connection.

The Site Pc will have a built in UPS unit that will power its own computer as well as connected readers, if these are connected directly to the Site Pc.

Power on reader reset can be performed from the Site Pc if the readers are connected directly to the Site Pc.

The Site Pc is 3U high and can be installed in a standard 19" equipment rack.

Below picture shows 110 Vdc for the American market, for Europe this will of course be 220 Vdc.

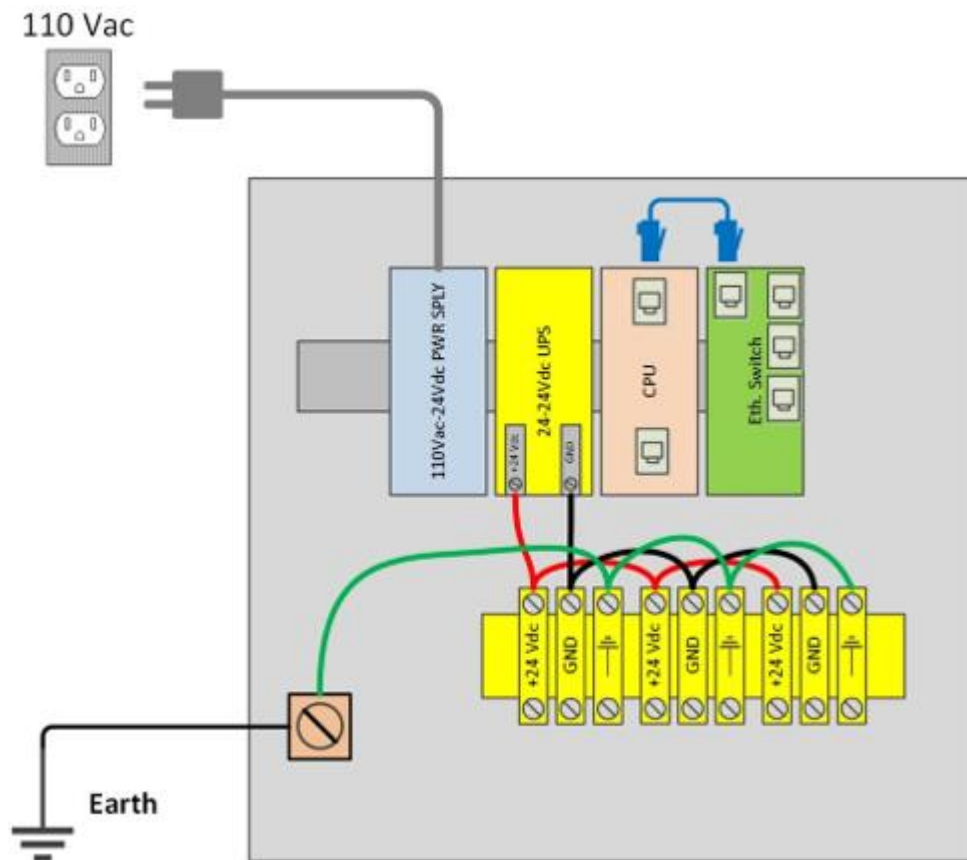figure 2:Picture of the Site Pc

figure 3: Wiring diagram of the Site Pc

4.2 RFID reader

Lyngsoe supplies this component.

A reader will read and buffer all RFID tags. The reader requires 24Vdc. The reader – Site Pc communication will be over a standard Ethernet connection.
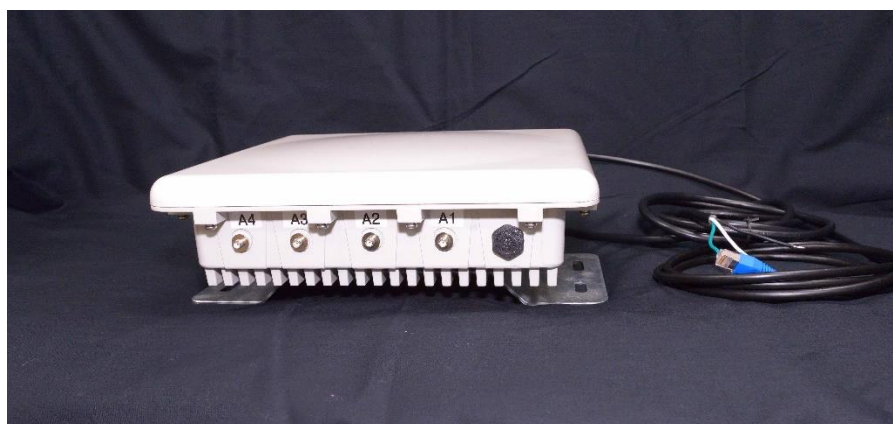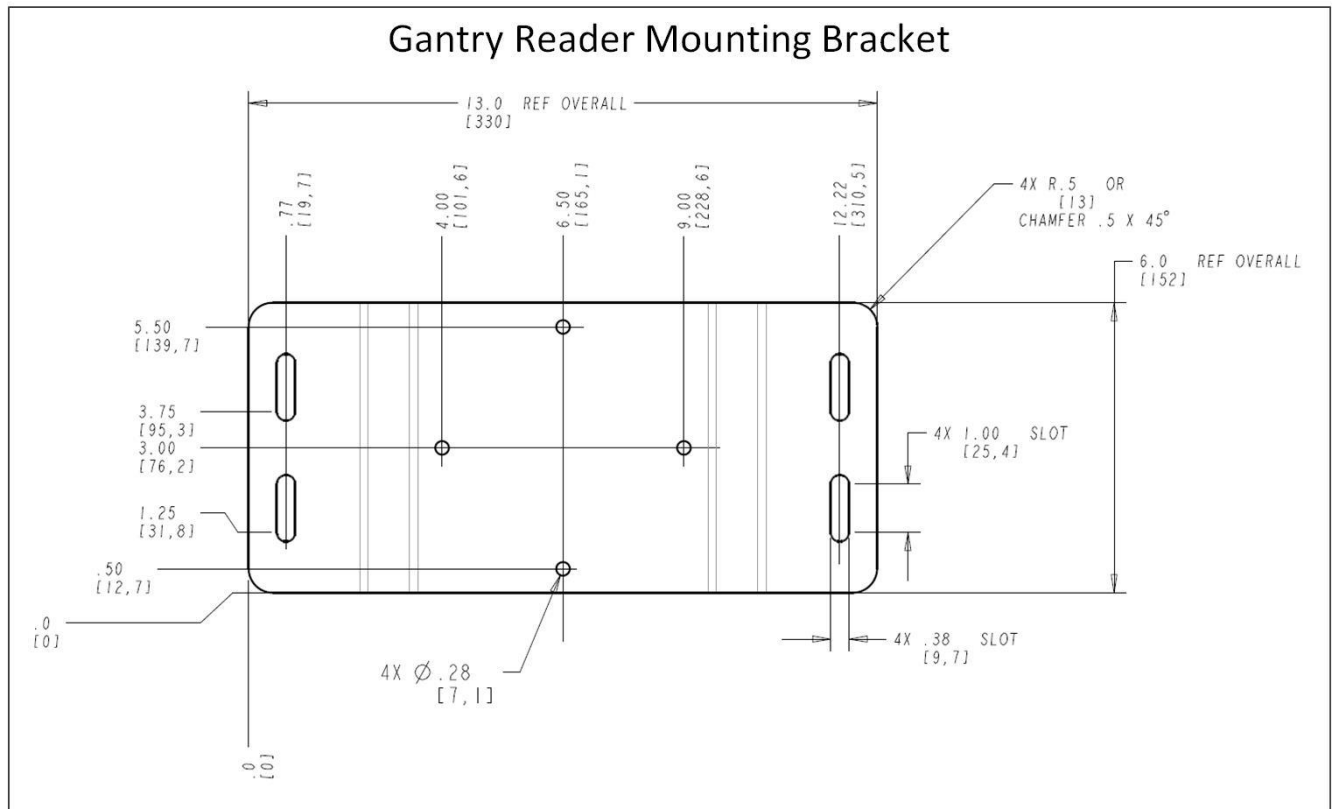

figure 4: RFID Reader

figure 5: Reader mounting bracket dimensions

4.3 Antenna

Lyngsoe supplies this component.

Antennas can be mounted to provide vertical or horizontal polarization. Antennas covering the same location MUST have vertical polarization for one and horizontal polarization for the other – please orient them in accordance with the relevant Site Survey. Antennas have markings on the back to indicate the direction of polarization.

Antenna cables including plugs are supplied by Lyngsoe. This means that the site survey must include measurements of the distances between the readers and the antennas. As a general rule the cables should not exceed 10 meters to minimize data loss.

The antenna mounting bracket can accept the bar diameter or diagonal in the range of 1"-3" or 25.4mm-76.2mm. Antennas can be mounted either on vertical or horizontal bars.
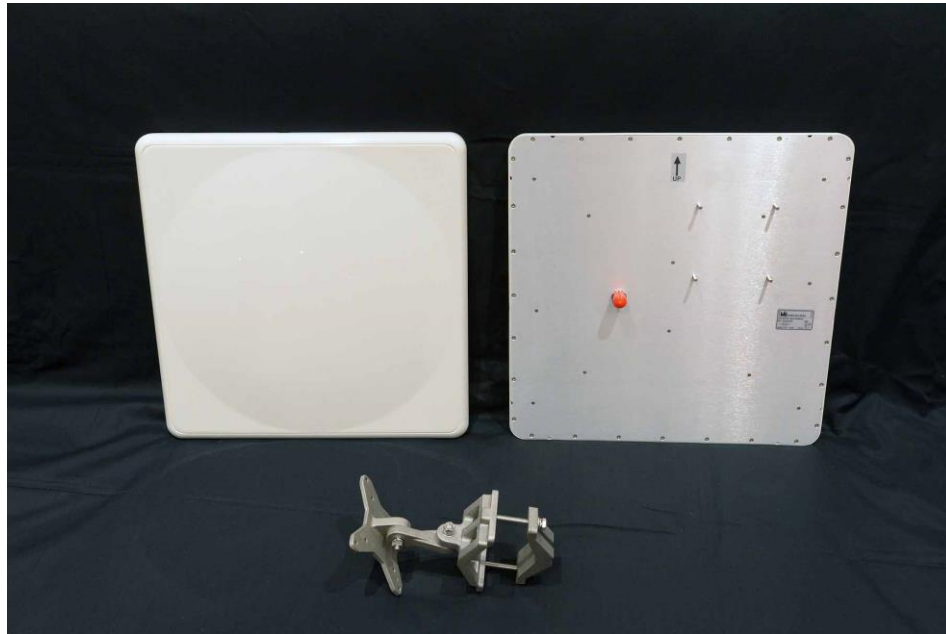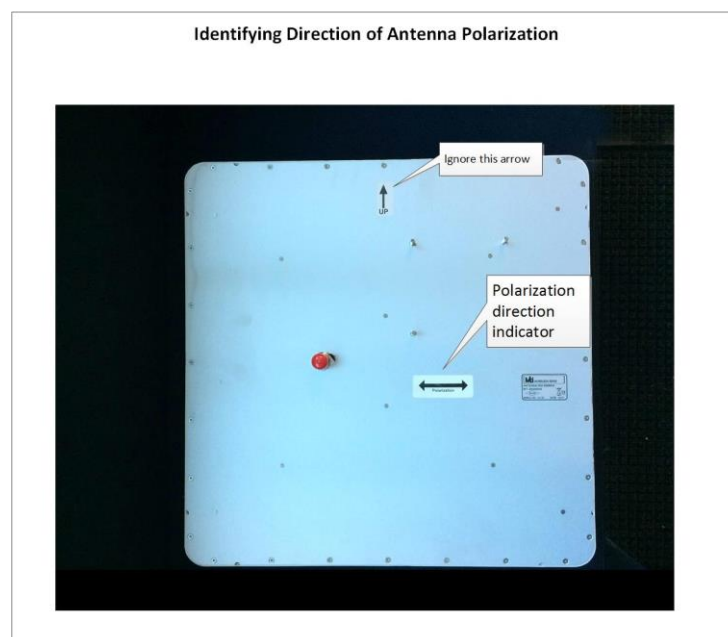
figure 6: Antenna and mount

figure 7: How to identify the direction of antenna polarization

4.4 Connection box

Lyngsoe will normally not supply this component.

Local contractor must install a UV and weather protected Connection Box to connect the Gantry Reader with the Gantry Server or the Remote Hub – refer to Site Survey.

- Connection Box must be mounted within 1m distance from the reader.
- Connection Box must provide a terminal block with screw-in connections for the 24Vdc power.
- Connection Box must provide an RJ45 jack for the data connection.
- Local contractor must run 24Vdc and Ethernet UV protected cables to the Gantry Server or the Remote Hub.
- For the 24Vdc cable the wire gauges must be selected according to the table below depending on the length of the run:

Wire Length, m	25	40	70	100
Wire gauge, AWG	16	14	12	10

Wiring of the Connection Box is described in the diagram below.

Connection Box wiring
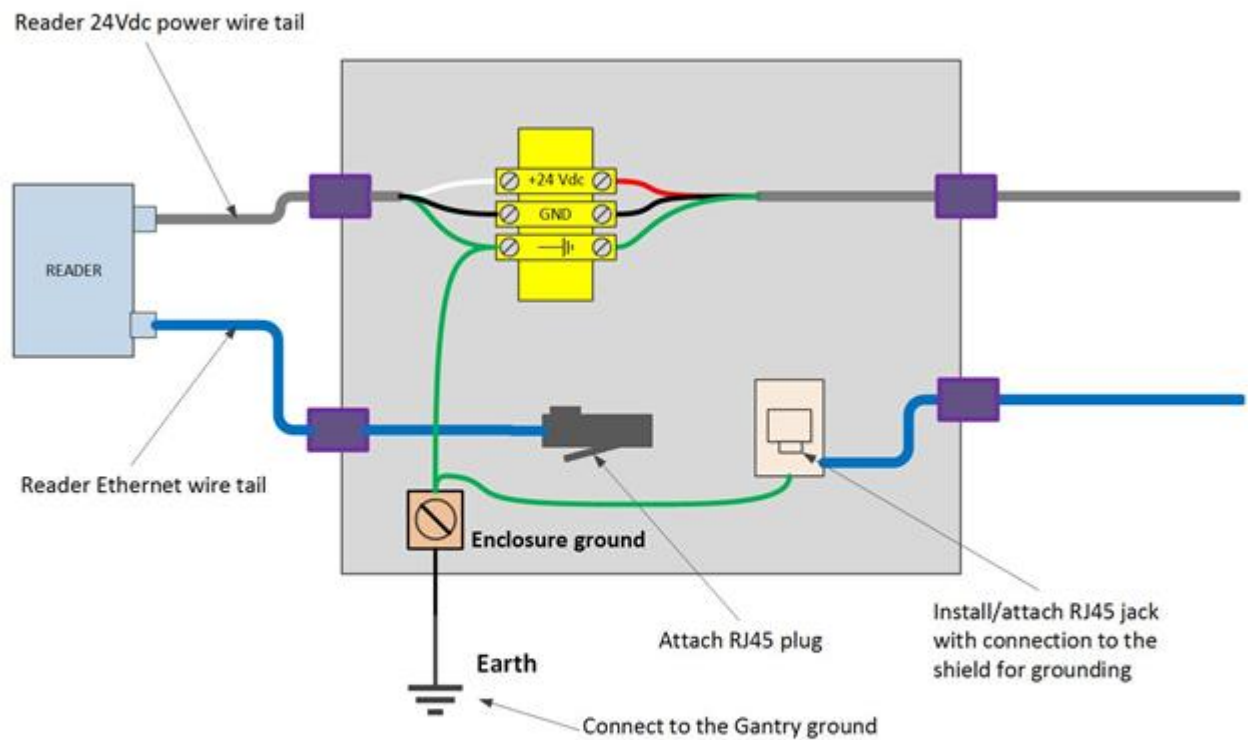
- Connection Box must be within 1m distance from the Reader
- Use UV and weather protected enclosure
- Use outdoor rated UV protected cables
- Install Connection Box within 1m from the reader

figure 8: Connection Box wiring.

5 DATA INTERFACE

The Lyngsoe LIVE Logistics™ middleware on the Site Pc supports direct delivery of the RFID registrations collected by the RFID equipment to Certus.

The default interface is a socket connection with JSON payloads. Alternatively, it can be a Web Service client using REST. Multiple other options are also possible but these 2 are the primary ones.

Parameters default included in a payload:

Location identifier	for example "RTG number 2"
Windshield Tag ID	ID of the truck, probably the registration number
Timestamp	for example 2019-01-31 15:15:00
Antenna number	Location will consist of either 2 or 4 antennas