OVERVIEW

Characteristics:
Power supply: .... 12 VDC (12 min – 15 max)
Consumption: .... 250 to 900mA depending on calibration
Communication: .... ISO2 or Wiegand, Open collector TTL lines.
Pin out: .... 6 points connector

Reading distance:
Credit card tags (CCT type): max. 70 cm (*)
High distance tags (TVL type): max. 100 cm (*)
(*) Performance for a non perturbed environment.

Mechanic:
Antenna: Inox tube. Dimension 83 x 53 cm
Mast: Inox – square section 40 x 40 mm – height : 150 cm
Base: 20 x 20 cm, 4 oblong holes ø9 x 18 mm for fixation.
Electronic case: IP67 waterproof aluminum case. 171 x 121 x 55 mm.

Features

- Manual calibration to get the best possible performances according to the reader environment.
- Possible to add an extra LED and buzzer to give detection / reading information.

Recommendations / Limits

- If 2 (or more) readers are installed too close, it can cause a coupling. The readers will not be able to read tags or a tag will be read by each reader at the same time.
- Do not install the reader near to a closed conductor circuit.
- Do not install the reader on a metallic support
- Do not install the reader close to a metallic ground. In this case, respect the minimum distance, between the antenna and the ground, which are 20 cm with the side of the antenna and 50 cm with the back of the antenna.
- Do not forget to connect the 0V to a clean ground.
(See the installation examples at the end of this document)

Unfavorable cases

Avoid installing the reader close to perturbing electromagnetic field like:

- Informatics data transmission cables
- Energy transmission cables
- Screen display
- Equipment with no EMC conformity
- Power supply units

Wiring / Calibration

Wiring

Connect the power supply (0V, +12V) and the data lines to the host.
The maximum distance between the host and the reader is 100m.

Recommended cables:

1 pair   6/10° until 30 meters (98,43 ft).
2 pairs 6/10° until 60 meters (196.86 ft).
3 pairs 6/10° until 100 meters (328.10 ft).
OR
1 pair   9/10° until 50 meters (165.05 ft).
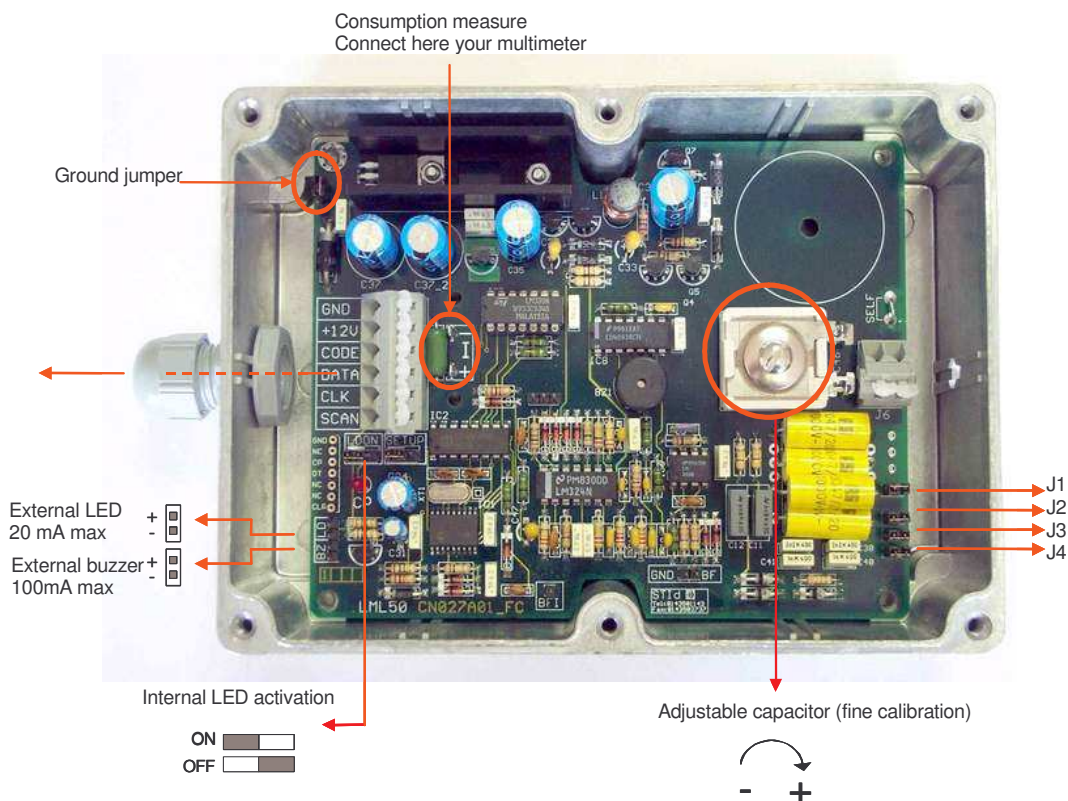2 pairs 9/10° until 100 meters (328.10 ft).

Caution: If the HOST does not have pull up resistor on its input, it is necessary to add them on the reader.

Pull-up resistors wiring
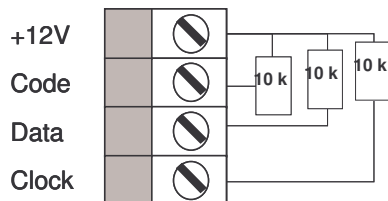
ISO2 (2x)	Wiegand (3x)
0V	0V
+12V	+12V
Code	Data 0
Data	Data 1
Clock	Clock
Scan (non connected)	Scan (non connected)

Main board view

Consumption measure
Connect here your multimeter

Ground jumper

External LED
20 mA max

External buzzer
100mA max

Internal LED activation

ON

OFF

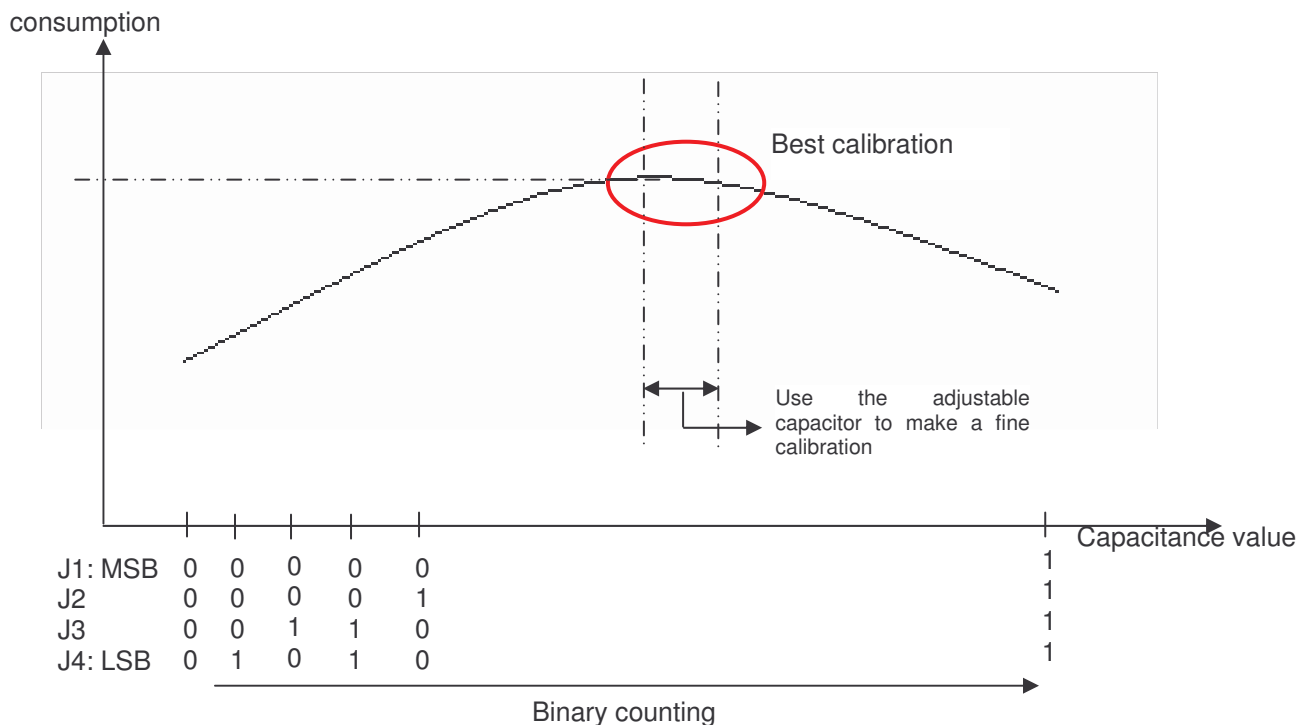Adjustable capacitor (fine calibration)

-   +

First use

- Fit the reader at the desired place
- First connect the power supply
- Present a tag to the reader
- Check the good detection (if the distance is not correct, modify the calibration)
  To control the detection, use the LED on the main board.
- Connect the data lines

Calibration

The reader is calibrated before delivering, but it is possible that the reader need to be re-calibrated to adjust to its environment.

- Connect a voltmeter (DC) to check the consumption (see the main board view for the voltmeter connection). Consumption = measure x 10
- Usually, you get the best possible performances when the reader's consumption is maximum (usually maximum is around 500 mA (measure 50mV)).
- To correctly calibrate the reader you need to find the right capacitance value (jumper J1, J2, J3, J4 and adjustable capacitor). For more details, check the scheme and the algorithm above.
- The ground jumper can be used to reduce perturbations.

consumption

Best calibration

Use the adjustable capacitor to make a fine calibration

Capacitance value

J1 : MSB	0	0	0	0	0	1
J2	0	0	0	0	1	1
J3	0	0	1	1	0	1
J4 : LSB	0	1	0	1	0	1

Binary counting

J1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
J2	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
J3	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
J4	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Decimal value	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Calibration algorithm

The goal of this algorithm is to find the best jumper setting by a dichotomy method.
- If the consumption increase when capacitance value is increased, the maximum consumption value has been already reached. So you have to decrease the total capacitance value by modifying the jumper setting.
- If the consumption decrease when capacitance value is increased, the maximum consumption value has not been already reached. So you have to increase the total capacitance value by modifying the jumper setting

```
                ┌─────────────────────────────────────┐
                │  Turn clcokwise the adjustable       │
                │  capacitor                           │
                │  (You add capacitor)                 │
                └─────────────────────────────────────┘
                              │
                              ▼
                     ◇ Does Reader           NO
                       consumption     ─────────────────────┐
                       increases ?     Maximum has been      │
                                       reached               │
                         │ YES                               │
                         │ Maximum has not been reached      │
                         ▼                                   ▼
          ┌──────────────────────────┐      ┌──────────────────────────┐
          │ Increase the jumper       │      │ Decrease the jumper       │
          │ setting.                  │      │ setting.                  │
          │ You add capacitance.      │      │ You remove capacitance.   │
          └──────────────────────────┘      └──────────────────────────┘
                         │                               │
                         ▼                               ▼
          ┌────────────────────────────────────────────────────┐
          │ Replace the adjustable capacitor to its middle      │
          │ position                                            │
          └────────────────────────────────────────────────────┘
```
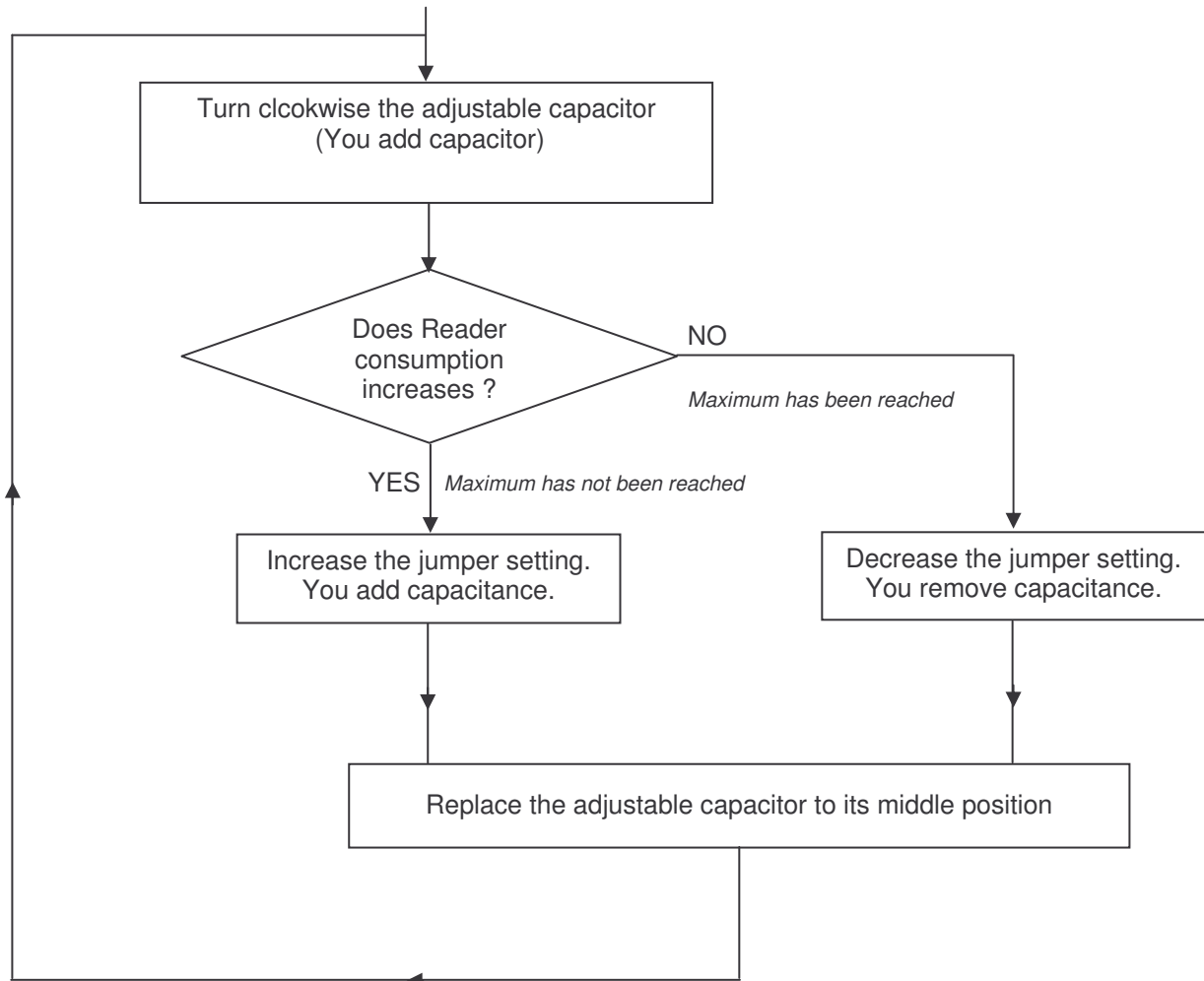
During the algorithm process, if you go back to the last jumper setting, it is because you are near the best calibration setting. Try, with the adjustable capacitor, to find the maximum consumption (try it with the 2 different jumper setting).

Optimization

If you do not have the best performances, some simple tips could help you to get them.

- Verify the wiring
- Analyze the environment to find possible causes of perturbation
- Verify that the 0V is connected to a **clean** ground
- Measure the power supply. In some cases, the power supply doesn't succeed to drive enough current and its voltage drop. If you have less than 12V, the performance can be reduced a lot
- Measure the consumption. If you don't have around 500 mA, you need to calibrate the reader to its environment (see the calibration section).
- Try to move the reader and/or change its orientation.

TIPS: You can use a 12V battery to power the reader and it will be easier to move it.

CAUTION: All detection tests need to be done with the embedded 'CP' LED.

If you move the reader and get better performance on a new place, it means the initial place was not compliant for long range 125 kHz readers.
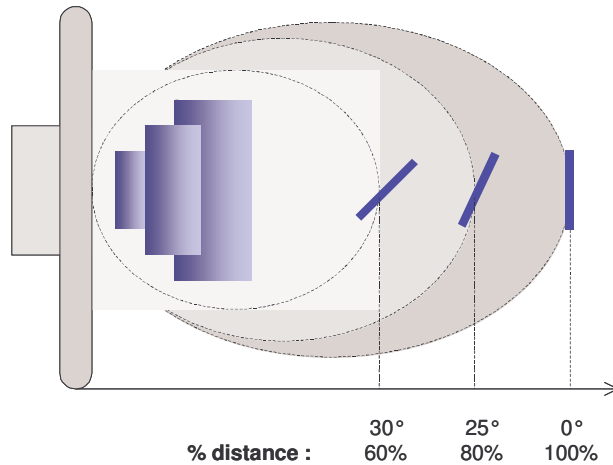
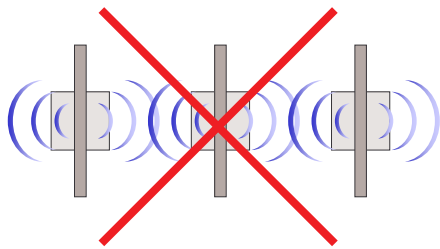## Ground fixation
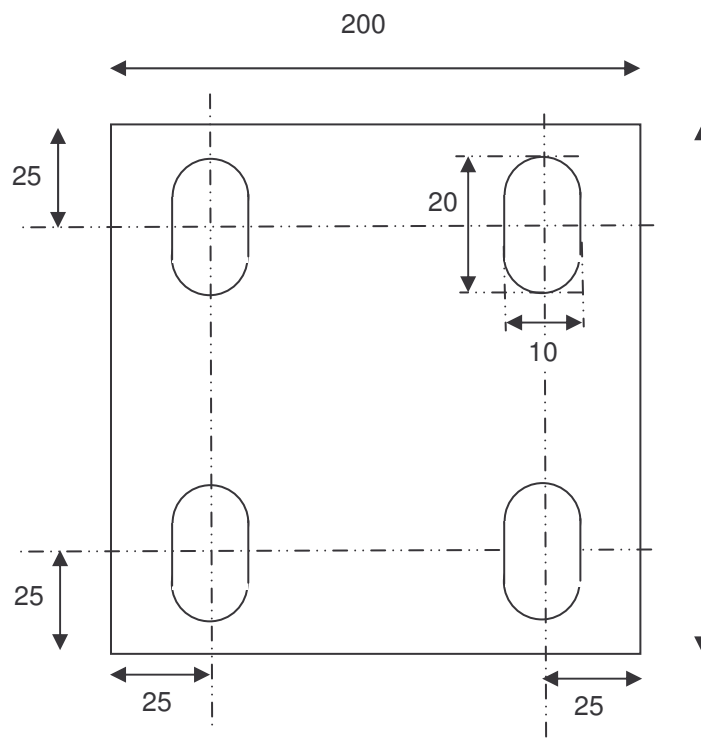
Tag using

Present the tag in front of the reader, perpendicularly, and approach it slowly until the tag is detected.
It is not necessary to agitate the tag.

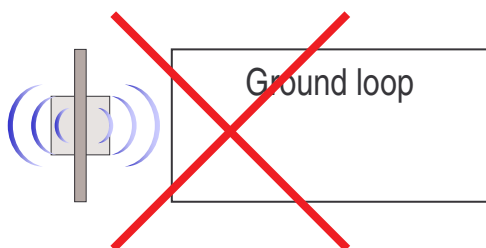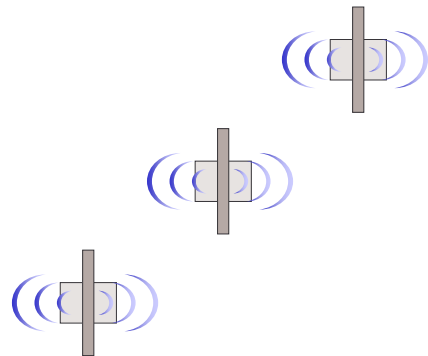**Caution:** **If the tag is inclined, the reading distance will be reduced.**

	30°	25°	0°
% distance :	60%	80%	100%

Readers installation examples

NO

YES

Ground loop

Ground loop