

Wireless Space Count

Manual SENSIT DATACOLLECTOR



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1 INTRODUCTION

The Wireless Space Count system facilitates accurate measurement on occupancy of individual parking spaces in car parks, and on-street parking spaces. This information can be used to guide traffic to free parking spaces but can also be used for on-street parking enforcement and overstay detection. For on-street enforcement the number of occupied parking spaces can be compared with the number of payments realized by the pay station. For overstay detection the system alerts instantly a parking officer to the presence of nearby overstaying vehicles. Based on this information you can exactly determine which space to enforce.

1.1 PRODUCT DESCRIPTION SENSIT DATACOLLECTOR

The actual status (occupancy) of the SENSIT is collected by one or more SENSIT DATACOLLECTOR. The SENSIT DATACOLLECTOR is the interface between the SENSIT and the host system. The SENSIT DATACOLLECTOR transmits status information about the sensors to the host system through RS232 or Ethernet communication. Over RS232 the SENSIT DATACOLLECTOR communicates via a serial connection to the host. Over TCP/IP the SENSIT DATACOLLECTOR communicates directly on your LAN network. The TCP/IP communication allows you to decide on direct communication or to make use of a database application.

For a parking site you need at least one SENSIT DATACOLLECTOR and a SENSIT per parking bay. One SENSIT DATACOLLECTOR is required per 100 parking bays. All SENSIT DATACOLLECTOR must be separated as far as possible from each other, preferably with a 200+ network at every corner of the site a SENSIT DATACOLLECTOR.

Note: This manual is not intended for the end user, the SENSIT DATACOLLECTOR shall be installed by a professional. The case is preventing to remove the antenna so that the end user cannot and shall not detach it from the device.

2 INSTALLATION SENSIT DATACOLLECTOR

2.1 SAFETY PRECAUTIONS

The following safety precautions should be observed during normal use, service and repair.

- The SENSIT DATACOLLECTOR may only be installed and serviced by qualified service personnel.
- Disconnect the power supply before removing or installing any parts.
- To be sure of safety, do not modify or add anything to the SENSIT DATACOLLECTOR other than mentioned in this manual or indicated by NEDAP N.V.

2.2 DIMENSIONS AND MOUNTING

The SENSIT DATACOLLECTOR can be mounted in a central enclosure, however please ensure that the enclosure is not made of metal. The SENSIT DATACOLLECTOR is featured with RF communication with the SENSIT. The material used for the enclosure should be transparent for RF signals.

Locate an appropriate position for the SENSIT DATACOLLECTOR, preferable on a location where power and communication is available (normally around the gate). Use the four keyholes to mount the SENSIT DATACOLLECTOR in the enclosure.

See Figure 1 below for details about the dimensions (in mm) and the locations of the mounting positions.

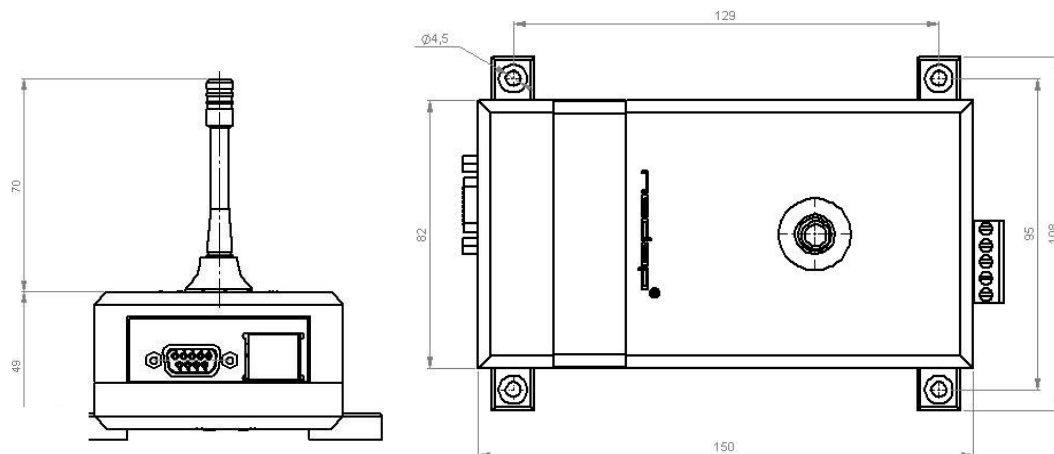


Figure 1: SENSIT DATACOLLECTOR dimensions and mounting

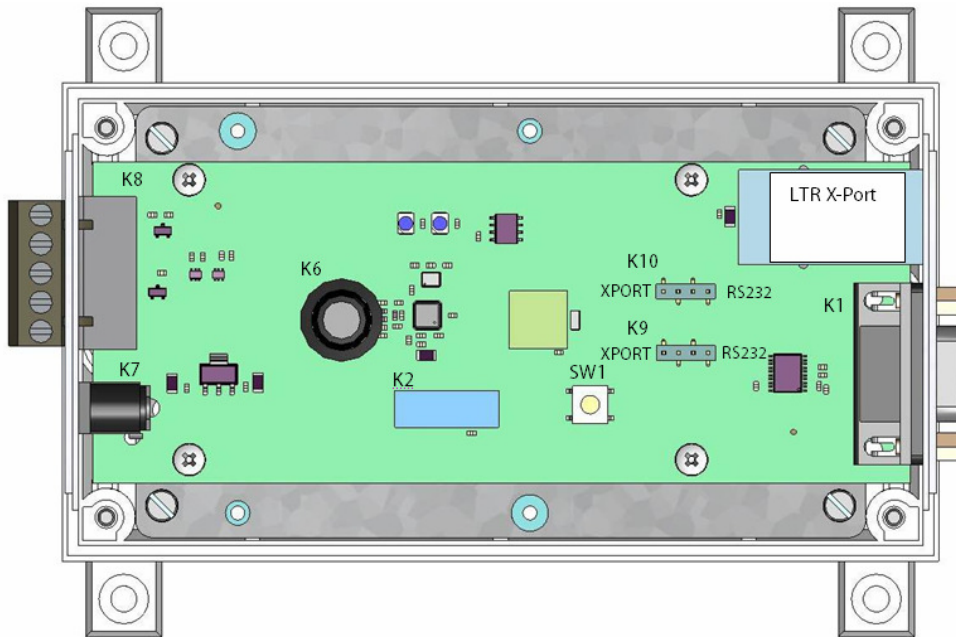


Figure 2: SENSIT DATACOLLECTOR connections

Nr	Description	Remark
XXXX	Node number	Mentioned on the outside of the housing
LTR X -Port	TCP/IP connection	RJ-45
K1	RS232 connection	9-pin male connector
K2	Processor connector	Used for factory programming
K6	External antenna connection	SMA 50 Ohm jack connector Inside of the box
K7	Power Supply connection	100-240VAC 47-63HZ 400mA Out 5V DC 3A, Power Win PW-015A-1Y050K1
K8	I ² C output relays connection	
K9/ K10	Jumper to select RS232 or TCP/IP communication	By setting the jumper you can select either RS232 or TCP/IP communication
SW1	Reset switch	We advise NOT to use this switch unless otherwise indicated by Nedap

Table 1: SENSIT DATACOLLECTOR connections

2.3 CONFIGURATION OF SENSIT DATACOLLECTOR

Once the SENSIT DATACOLLECTOR are installed ensure that one remains the master and the other SENSIT DATACOLLECTOR act as slaves. Verify communication between the server and the SENSIT DATACOLLECTOR.

The cover can be removed to set up TCP/IP or RS232 communication and view the LED indicators. Open all four screws on the bottom of the device to unlock the cover. Once the service cover is unlocked, lift it off. Ensure to push the antenna down. Unscrew the antenna from the PCB to fully remove the cover.

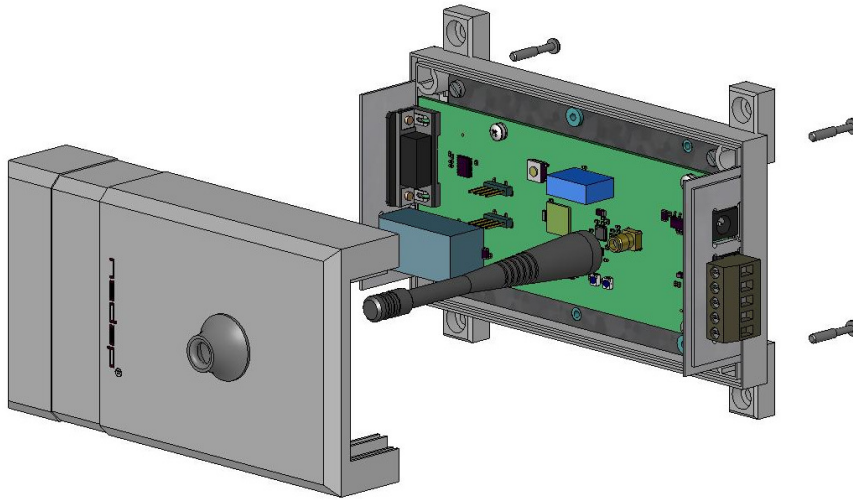


Figure 3: Opening the cover

Note: Ensure to push the antenna down before removing the cover. The antenna can be screwed off.

2.4 COMMUNICATION

The SENSIT DATACOLLECTOR has on-board TCP/IP and RS232 communication. Default the SENSIT DATACOLLECTOR is set to TCP/IP communication. The same events and commands can be received and transmitted by RS232 as well as TCP/IP.

2.4.1 TCP/IP CONNECTION

The SENSIT DATACOLLECTOR has on-board TCP/IP communication. Default the jumpers (K9 and K10) are set to XPORT.

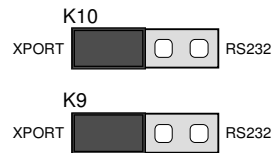


Figure 4: Jumper settings TCP/IP

Note 1: Maximum cable length is 3 meters (10 feet).

Note 2: Enable the on-board TCP/IP interface by setting Jumper K9 and K10 to XPORT. See Figure 4 for details.

2.4.1.1 XPORT configuration

SENSIT DATACOLLECTOR is featured with a Lantronix XPORT (type Xport-03) with an embedded Ethernet device server with a full TCP/IP protocol stack. You can configure the XPORT with e.g. a static IP-address using the Lantronix Device Installer. The Device Installer is a Windows-based GUI application that provides an easy way to install and configure specific Lantronix device server products. Below the link to the Device Installer download area of the Lantronix website. www.lantronix.com/device-networking/utilities-tools/device-installer.html

The Data Collection is featured with a node name e.g. "NODE1059" also mentioned on the outside of the housing. You can approach the SENSIT DATACOLLECTOR by this name with a DHCP server and DNS. When you have given the SENSIT DATACOLLECTOR a fixed IP address, you can reach the SENSIT DATACOLLECTOR via this fixed IP address. As an example; For "NODE1059 10001" you can fill in "10.66.5.222 10001".

2.4.1.2 TCPTTEST

The TCP/IP interface can be used with the TCPTtest software. See below for a screenshot of the software. The TCPTtest software can be downloaded from www.nedapavi.com/downloads/TCPTtest-install.zip.

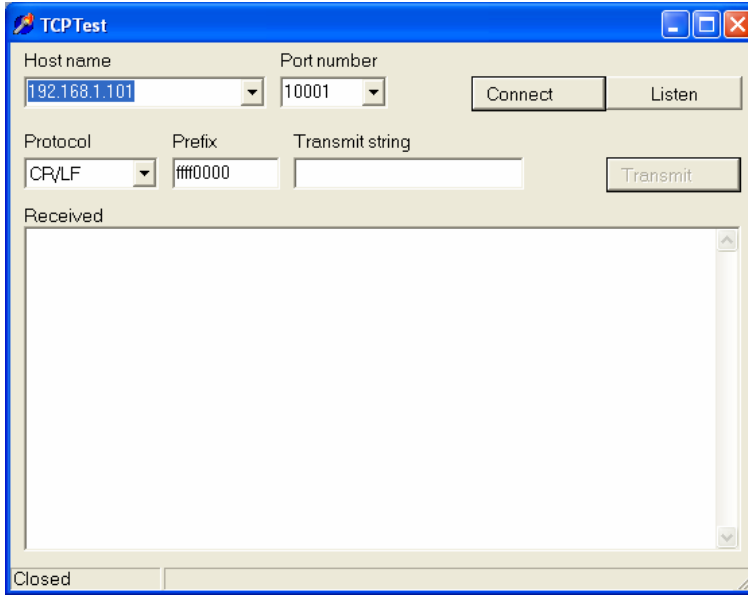


Figure 5: Screenshot TCPTtest

2.4.2 RS232 CONNECTION

The SENSIT DATACOLLECTOR has an on-board RS232 interface. The RS232 interface can be selected by setting the jumpers K9 and K10 to RS232.



Figure 6: Jumper settings RS232

Commands can be sent and events can be received via the serial RS232 connection. Any serial terminal program can be used to communicate with the SENSIT DATACOLLECTOR, such as Windows HyperTerminal or Nedap's iTerminal program.

Free iTerminal downloaded from www.nedapavi.com/downloads/iTerminal-install.zip

Free iTerminal user manual download from www.nedapavi.com/downloads/iTerminal_UserMan_E.pdf

A standard RS232 cable can be used. The minimum cable wiring details are shown below.

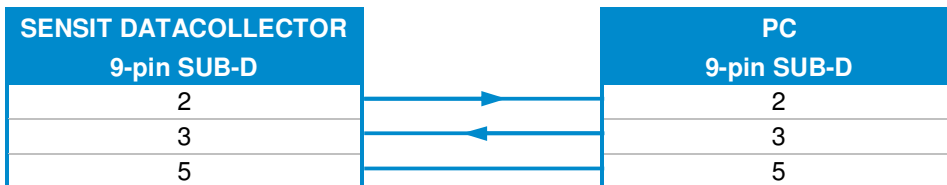


Figure 7: RS232 cable connections

Note 1: Maximum cable length of 15 meters (50 feet) or the cable length equal to a capacitance of 2500pF.

Note 2: Enable the on-board RS232 interface by setting the Jumper to RS232. See Figure 6 for details.

Note 3: The TCP/IP interface is disabled while the RS232 interface is in use !!!

2.5 POWER SUPPLY

The SENSIT DATACOLLECTOR requires 5 VDC power, maximum current consumption 300mA. Furthermore each SENSIT DATACOLLECTOR is included with an adapter requiring AC power supply in the range from 100 – 240VAC. Maximum current consumption is 0.4A @ 240VAC. Adapter needs to be:

- CSA and UL approved according to NEC Class 2
- FCC compliant to Part 15
- CE compliant according to EMC and LVD directive (EN 60950-1)

Connections:

K7 Power supply

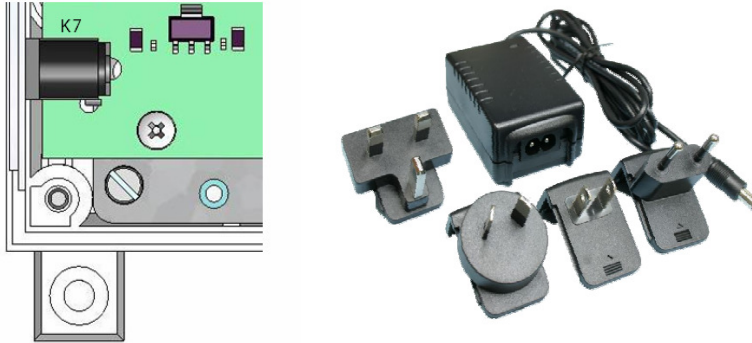


Figure 8: Power supply connection & adapter

2.6 EXTERNAL ANTENNA

The SENSIT DATACOLLECTOR is featured with an external antenna for communication with the SENSIT nodes within the network. To enable reliable identification ensure to mount the SENSIT DATACOLLECTOR in an enclosure which is transparent for RF signals. The external antenna is connected via the SMA 50 Ohm jack connector (K6) on the PCB.

Connections:

K6 SMA 50 Ohm jack connector for external antenna

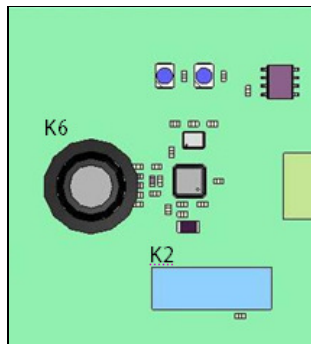


Figure 9: External antenna connection

2.7 LED INDICATIONS

The SENSIT DATACOLLECTOR is featured with two LEDs. Table 2 below describes the function of each LED.

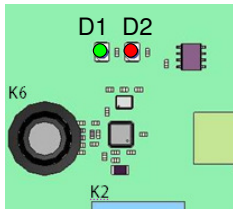


Figure 10: LED indications



LED	Description
 D1 (green)	LED indicating the presence of the SENSIT network. A blink indicates that a SENSIT is active in the network.
 D2 (red)	Each blink indicates the start of a timeslot (start) in the network

Table 2: LED indications

2.8 RESET SWITCH

The SENSIT DATACOLLECTOR is featured with a reset switch, located on the PCB board. The reset switch will reset the processor to the latest saved configuration. Normally it is not advised to use the reset switch, unless otherwise indicated by Nedap.

Connection:

SW1 Reset switch



Figure 11: Reset Switch

2.9 PROCESSOR CONNECTOR

The process connector (K2) is for factory programming of firmware into the SENSIT DATACOLLECTOR. This connector is for Nedap factory use only.

2.10 INSTALLING OF ADDITIONAL BOARDS

Possibility for future interface boards.

Make sure to follow all safety precautions outlined in chapter 2.1 and disconnect the power supply when installing or replacing an optional interface boards.

3 DATA CONFIGURATION

The Data format of messages from the SENSIT and the SENSIT DATACOLLECTOR are the same whether TCP/IP or RS232 communication is applied. The SENSIT is default already configured and for most installations this should be all right. The below mentioned command messages are therefore only required if you want to change specific settings.

3.1 DATA FORMAT

The data format is fixed:

Baud rate: 115200
 Data bits: 8
 Parity: None
 Stop bits: 1

3.2 COMMAND MESSAGE FORMAT TO THE NODE(S)

Commands messages that are sent to the SENSIT should be sent in the following format:

XXXX0000IIII[DDDD][DDDD]...

XXXX	Node ID (FFFF is broadcast)
0000	Message number; always four zeros
IIII	Instruction code
DDDD	Optional data word 16 bit

The SENSIT DATACOLLECTOR software replaces the 0000 message number with an automatic increment message number between 0080 and 00FF. When your own interface software is making the message number it is highly recommended to use the same range.

3.3 DATA MESSAGE FORMAT FROM THE NODE(S)

The data message format from the SENSIT is similar to the command message format, except YYYY are not four zeros but an internal message number. The node adds an internal message number to a created event message, in the range from 0000 to 007F.

XXXXYYYYIIII[DDDD][DDDD]...

XXXX	Node ID, FFFF is broadcast
YYYY	Internal message number
IIII	Instruction
DDDD	optional data word 16 bit

The four MSB bits of the Instruction word are the (not) acknowledge and type of data flags?

CXXX	The data field contains an ASCII string (example command 00CA)
4XXX	Data from a node (always)
5XXX	Error in instruction
6XXX	Unknown instruction

More detailed information about all the commands can be found in the Wireless Space Count Install Guide.

4 PROJECT SUPPORT

Based on our thorough project analysis including configuration and installation advice we can offer the customer the best AVI solution.

4.1 SITE SURVEY & INSTALLATION ADVICE

This will consist of an engineer visiting the site to visually inspect and analyze the location. We will then carry out calculations and provide you with detailed configuration and installation advice for the Wireless Space Count equipment for a specific project.

4.2 ON-SITE CERTIFICATION

An engineer will visit the site to inspect the installation of the equipment on reliable and accurate detection. Nedap engineers are not involved in installation (wiring) of any equipment. The installation must be completed before the engineer arrives on-site. We will ensure that the operation confirms our commissioning requirements, only on condition of prior given installation advice.

5 FCC AND IC DECLARATION

5.1 Compliance statements (part15.19)

This device complies with part 15 of the FCC Rules and to RSS210 of Industry Canada.

Operating 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.

5.2 Warning (part15.21)

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

This in particular is applicable for the antenna which is delivered with the SENSIT DATACOLLECTOR.

5.3 RF Exposure (OET Bulletin 65)

To comply with FCC RF exposure requirements for mobile transmitting devices, this transmitter should only be used or installed at locations where there is at least 20cm separation distance between the antenna and all persons.

5.4 Information to the User (Part 15.106(b))

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 frequent 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 not cause harmful interference to radio or television reception, which can be determine 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 some node
- Connect the equipment into an outlet on a circuit different from that to which the SENSIT DATACOLLECTOR is connected.
- Consult the dealer or an experienced radio/TV technician for help.

6 TECHNICAL SPECIFICATIONS

SENSIT DATACOLLECTOR (EU)		9889582
Operating frequency	868.2 MHz	
CE compliant	EN 60950-1 EN50357 and EN 50364 EN 301 4889-1 V1.6.1 and EN 301 489-3 V1.4.1 EN 61000-6.1, EN 61000-6-2 and 61000-6-3 EN 55011 Class B EN 61204-3 EN 300-220-1 ERV REC 70-03	
Dimensions	150 x 82 x 49 mm (5.9 x 3.26 x 1.9 inch)	
Weight	105 gr. (0.7 oz)	
Protection	IP44	
Colour	Grey according to RAL 7035	
Operating temperature	-20°C ... +85°C (-4°F ... +185°F)	
Storage temperature	-20°C ... +85°C (-4°F ... +185°F)	
Communication range	From sensor to SENSIT DATACOLLECTOR in principle unendless as the sensors communicate to each other. The nearest sensor should be positioned within 10 meters (33 ft) of the SENSIT DATACOLLECTOR	You can install multiple SENSIT DATACOLLECTOR in one parking facility.
Communication interfaces	RJ-45, TCP/IP or SUB-D9, RS232	
Humidity	10%...90% relative humidity, non condensing	
Outputs	I2C interface for future use	
Power input	5 VDC	Separate adapter supplied for 110-240 VAC.
Antenna connection	Antenna included	

SENSIT DATACOLLECTOR (US and Canada)		9898590
Operating frequency	902-928 MHz (FHSS)	
	FCCID: CGDSENSDATA IC: 1444A-SENSDATA	
Dimensions	150 x 82 x 49 mm (5.9 x 3.26 x 1.9 inch)	
Weight	105 gr. (0.7 oz)	
Protection	IP44	
Colour	Grey according to RAL 7035	
Operating temperature	-20°C ... +85°C (-4°F ... +185°F)	
Storage temperature	-20°C ... +85°C (-4°F ... +185°F)	
Communication range	From sensor to SENSIT DATACOLLECTOR in principle unendless as the sensors communicate to each other. The nearest sensor should be positioned within 10 meters (33 ft) of the SENSIT DATACOLLECTOR	You can install multiple SENSIT DATACOLLECTOR in one parking facility.
Communication interfaces	RJ-45, TCP/IP or SUB-D9, RS232	
Humidity	10%...90% relative humidity, non condensing	
Outputs	I2C interface for future use	
Power input	5 VDC	Separate adapter supplied for 110-240 VAC.
Antenna connection	Antenna included	

A PART NUMBERS

SENSIT DATACOLLECTOR



SENSIT DATACOLLECTOR (EU) part number: 9889582



SENSIT DATACOLLECTOR (US) part number: 9898590

For full product information visit www.nedapavi.com