Manual

for

Automatic Speed Safety System

With

SENSYS 240

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REVISION SUMMARY

Updates will be issued when needed and noted on this page in the following issues of this document.

Rev	Date	Issued by	Description
A	2000-01-14	SVNI	First edition.
B	2000-01-26	SVNI	Chapter 8 LCO operation and chapter 8.1 Calibration have been updated.

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1 SCOPE

1.1 Identification

Product Nr.	Name
10-0008	SENSYS 240

1.2 Introduction

This document defines how the sensor SENSYS 240 will be used.

2 REFERENCED DOCUMENTS

No.	Identification	Issue	Name or Description
[Ref A]	16-0019	A	Requirement Specification for Automatic Speed Safety System

3 DEFINITIONS, ACRONYMS AND ABBREVIATIONS

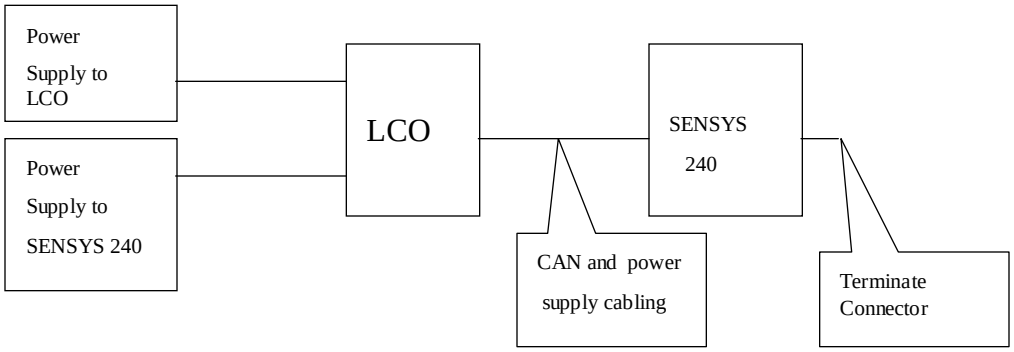
Definition, Acronym or Abbreviation	Explanation
ASSS	Automatic Speed Safety System
LCO	Link Controller Operator
MCU	Micro Controller Unit
SENSYS 240	Sensor for 24 GHz, CAN interface.

4 EQUIPMENT

The system has the following equipments:

- SENSYS 240
- Combined Power and CAN Cabling
- Link Controller Operator (LCO)
- Power supply to the SENSYS 240 is 10.8 – 16.3 V DC and 1.3 Ampere.
- Power supply to the LCO is 12V DC and 2.5 Ampere.

5 CONNNECTION



The picture above shows how the different equipments are physical connected.

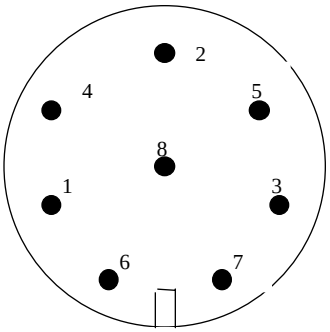
5.1 SENSYS 240

The SENSYS 240 has two connectors. Both Connectors have CAN and Power supply interface.

The below defines the pinout for each SENSYS 240 connector:

Pin number:

1. Power Supply. (+12V.)
2. CAN low signal.
3. Ground, Power Supply.
4. Power Supply. (+12V.)
5. Ground, Power Supply.
8. CAN High signal.



Note. Each SENSYS 240 Connector must be connected to Power and CAN Cabling or a terminate connector.

6 SYSTEM OPERATION

The below defines the system operations:

The LCO will continuously verify that the sensor works. This will be done with a Heartbeat message which will be transmitted to the sensor each 10 seconds interval.

Information of sensor problem will be stored in the log file and on the LCO data screen.

The sensor will also perform a calibration, if the internally sensor temperature increases over the accepted level. The sensor will then report to the LCO about the calibration result. After calibration the sensor will go in standby mode, if the temperature is still high.

The sensor will also perform a calibration, if the internally system voltage decreases to a not accepted level. The sensor will then report to the LCO about the calibration result. After calibration the sensor will go in standby mode, if the internally voltage is still low.

The LCO can also perform an ordered sensor calibration. The sensor then performs a calibration and reports the result to the LCO.

7 SENSYS 240 OPERATION

7.1 Sensor start-up

After power on the sensor start with red LED indication.

The sensor will then start with start-up tests.

The start-up will verify the following:

1. The MCU Flash memory and SW checksum.
2. The MCU RAM memory.

3. That the hardware version is accepted.
4. That the internal serial number HW works.
5. That the internal real time clock works.
6. That the in voltage is accepted to the sensor.
7. That the internal voltage is accepted to the DSP board.
8. That the internal voltage is accepted to the MicroWave unit.
9. That the internal temperature is accepted.
10. That the internal system voltage is accepted.
11. That the internal DSP HW works.
12. That the internal MCU-DSP FIFO works.

If the above start-up test passing, then the sensor application will start and the LED will change colour to green. Otherwise the application will not start and the LED will still be red.

If the above start-up test failed a Reset command from LCO is necessary to perform a new start-up test (not enough with a power off/on sequence).

The start-up test will also verify the following warning tests:

1. The internal EEPROM checksum.
2. That the internal backup voltage is accepted.

The result of the warning test will be reported to the LCO via the Heartbeat message.

7.2 Continuos Sensor test

The Sensor will continuos verify the following:

1. That the internal temperature is accepted.
2. That the internal system voltage is accepted.

If any of the above tests fails, the sensor will automatically perform a calibration and report the result to the LCO. After that and if the alarm is still activated the sensor will turn off.

If the sensor has turned off and the alarm has been released the sensor will restart again according to the *Sensor start-up* chapter above.

8 LCO OPERATION

Make sure that the files LCO.EXE, LCO.DAT and LCO.STP are located in the same directory. Start the application by double-clicking LCO.EXE. A window similar to the one in Figure 1 will

appear. The tree view to the left contains all the devices that the application is responsible for. The two first levels are currently unchangeable, whereas Sites, Sensors, Cameras and Traffic Lights are possible to add, configure and delete. One site (Office) containing one sensor (Sensor 1) is defined in the delivered set-up files, in accordance with Figure 1.

The application does not send anything to any device until a measurement is started by right-clicking on a site and selecting "Start Measurement…". If that is done, LCO will try to connect to the devices in the site and then start sending heartbeat requests to them every 10 seconds.

8.1 Calibration

Calibration requests are sent to every sensor in a measuring site with the periodicity supplied in the "Options | Preferences…" dialog. In order to manually request the sensor to perform a calibration the following steps should be performed:

1. Select the site in the tree view and click the right mouse button. A pop-up menu appears.
2. Select "Start measurement..", supply user names in the "Start measurement" dialog and press "OK". A log window appears.
3. Select the sensor in the tree view and click the right mouse button. A pop-up menu appears.
4. Select Properties… from the pop-up menu. The "Sensor Properties" dialog appears.
5. Select the Calibration tab. The dialog should look as in Figure 2.
6. Press the Calibrate button.

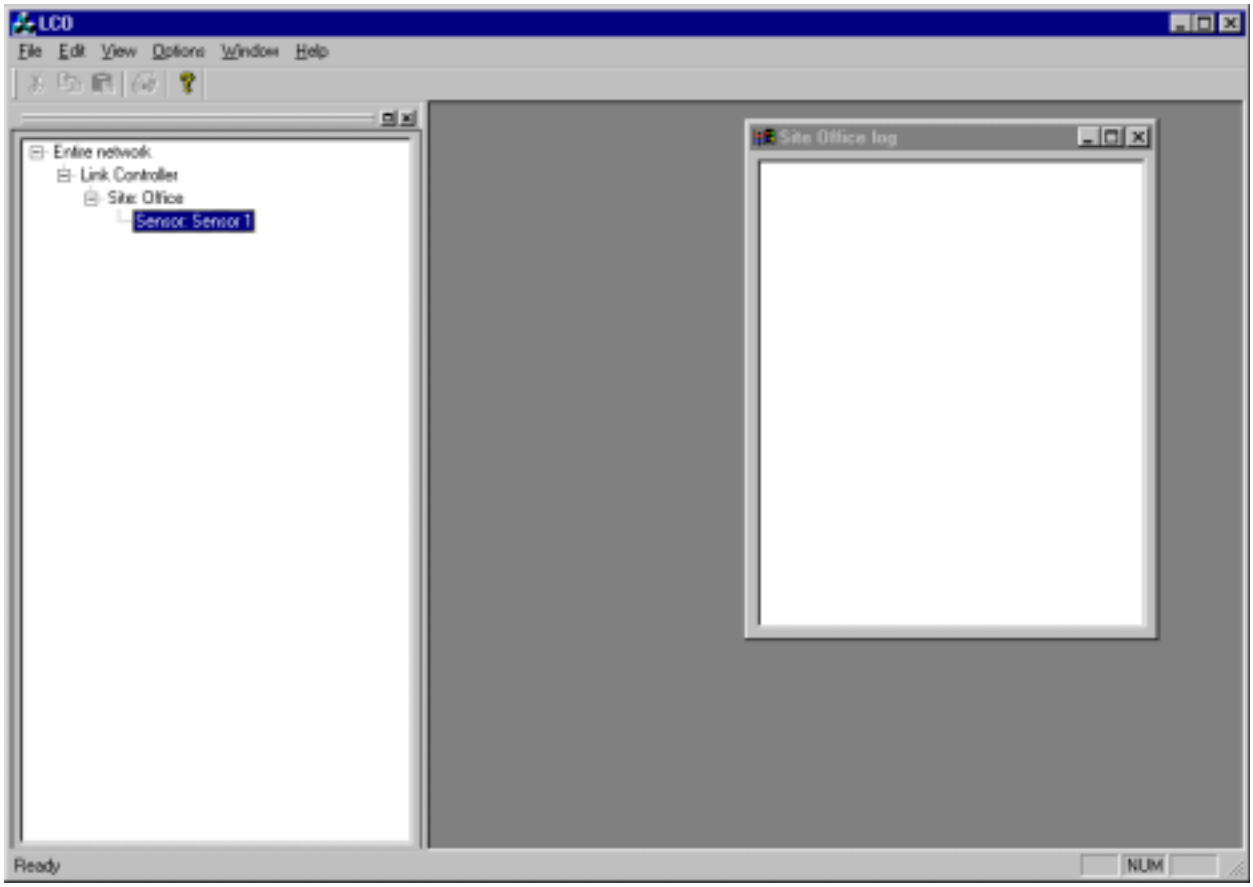


Figure 1

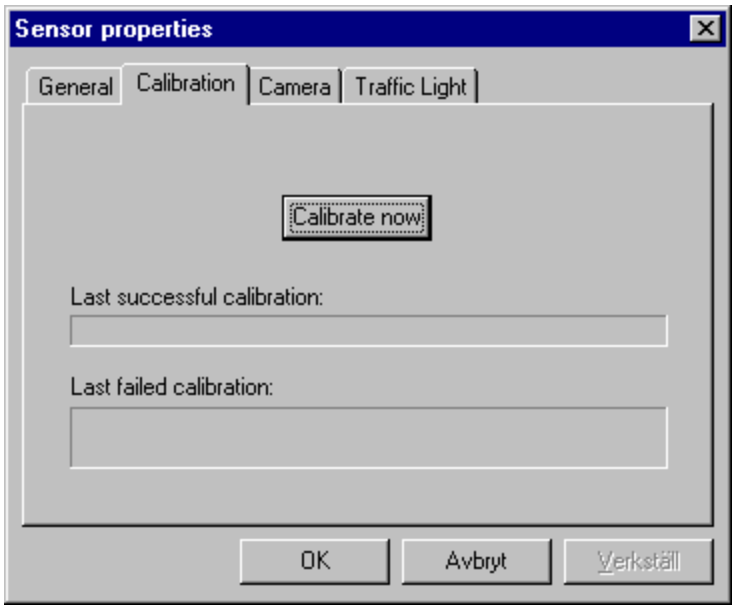


Figure 2

If the sensor responds, the response will be logged in the log window as well as in the log file. The dialog tab will also indicate the parameters of the last received successful and failed calibrations. Figure 3 shows a dialog where this information is included.

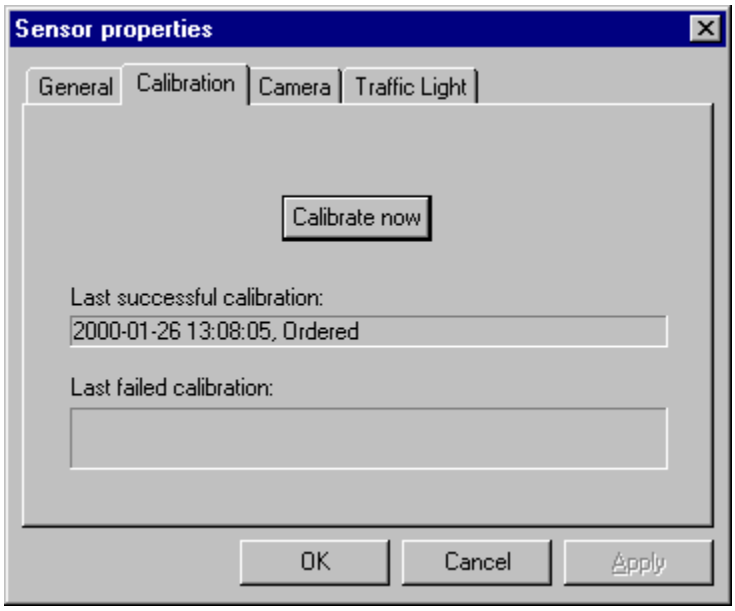
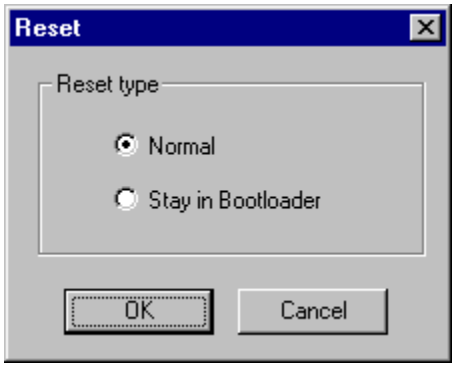


Figure 3

8.2 Resetting the sensor

In order to reset the sensor the following steps should be performed:

1. Select the sensor in the tree view and click the right mouse button. A pop-up menu appears.
2. Select Reset… from the pop-up menu. The "Reset" dialog appears as shown in Figure 4.
3. Choose the appropriate type of reset, here always the normal reset and then select OK.



Figur 6

8.3 Logs

The log window shows information about certain events for the site. Figure 5 shows some possible logs.

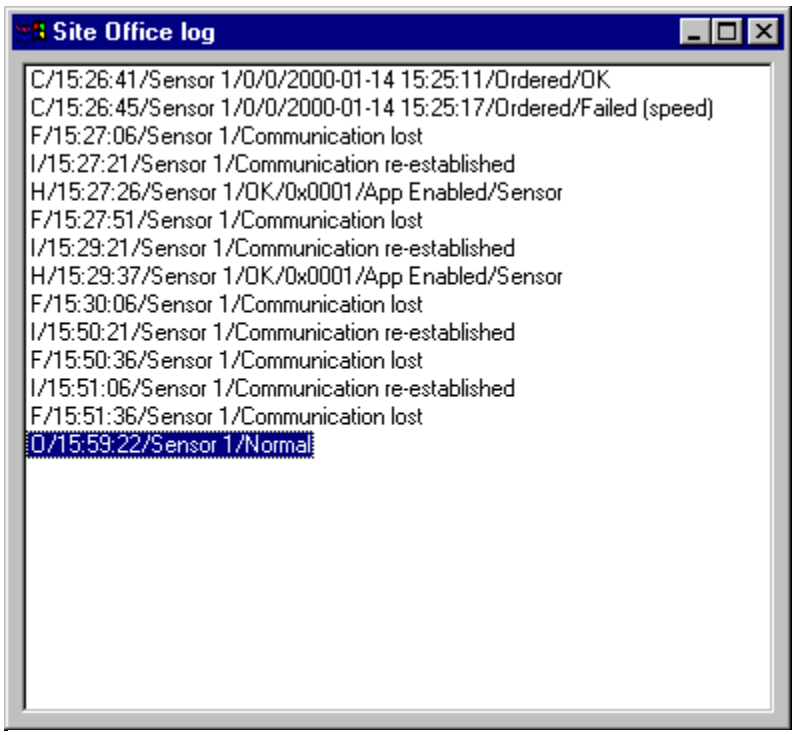


Figure 7

8.3.1 Log window format

Below defines the different window log messages.

CalibrationCfm	
Field 1	C = Calibration Confirm
Field 2	LCO time
Field 3	Sensor name
Field 4	Sensor number
Field 5	General result code
Field 6	Sensor time
Field 7	Calibration reason
Field 8	Calibration result

HeartBeat Error	
Field 1	H = HeartBeat Error
Field 2	LCO time
Field 3	Device name
Field 4	General result code
Field 5	Device state
Field 6	Unit type (0 = sensor)
Field 7	Test result (bitmask) Test Result 16 bits **SENSOR Unit:** Bit0 Flash Status Bit1 Hardware version Status Bit2 Voltage in Status Bit3 Voltage DSP board Status Bit4 Temperature Status Bit5 RAM Status Bit6 Serial Number Status Bit7 Clock Status Bit8 Voltage MicroWave Status Bit9 Temperature HW port Status Bit10 Voltage System Status Bit11 DSP HW Status Bit12 MCU-DSP FIFO Status Bit 13-Bit15 = 0 Not used. Warning information 16 bits: **SENSOR:** Bit0 Wrong EEPROM checksum status Bit1 Battery Voltage is low. Bit2 –15 = 0 Not used.
Communication failed	
Field 1	F = Failure

Field 2	LCO time
Field 3	Device name
Field 4	”Communication lost”
Communication re-established	
Field 1	I = Information
Field 2	LCO time
Field 3	Device name
Field 4	”Communication re-established”
Ordered Reset	
Field 1	O = Ordered reset
Field 2	LCO time
Field 3	Device name
Field 4	Reset type

Table 1

The LCO application handles log files as well as the log window. The directory where the log files are stored is configured in the ”Options | Preferences…” dialog. It is currently set to ”C:\LCO_logfiles”. The log file names are constructed as follows:

<site code>_<LCO date>_<LCO time>.log

where LCO date is formatted as YYYYMMDD and LCO time is formatted as HHMMSS. The file begins with a chunk of header information and ends with the time when the file was completed. In between these blocks message and system logs are stored. The message information is in most cases stored as a hexadecimal dump of the raw binary message data.

9 APPENDIX

Appendix No.	Name
[App 1]	None

9.1 Appendix 1.

None.