

Mounting Instructions

ENGLISH

Note

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General information's regarding this document

- If bits within one byte are filled with "-", these bit spaces are reserved for future extensions or for internal testing- and manufacturing-functions. These bit spaces must not be changed, as this may cause faulty operation of the reader.
- The following figure formats are used:
 - 0...9: for decimal figures,
 - 0x00...0xFF: for hexadecimal figures,
 - b0...1 for binary figures.
- The hexadecimal value in brackets "[]" marks a control byte (command).

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8. Extent of supply

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- *Static Antenna Tuning Controller* ID ISC.SAT.C
 - Device ID ISC.SAT.C
 - This installation manual
 - 1 piece coaxial cable (reference signal cable) with toroid
 - 2 compound batteries 9V (6 LR 61)

- *Static Antenna Tuner Type* ID ISC.SAT.A
 - Board ID ISC.SAT.A

- *Static Antenna Tuner Type* ID ISC.SAT.B
 - Board ID ISC.SAT.B

9. Safety- and warning notes - read in any case BEFORE installation!

- The device has to be used only for the purpose designed by the manufacturer.
- The mounting instructions have to be stored available at any time and has to be handed over to each user.
- Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such measures will lead to exclusion of any liability by the manufacturer.
- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer is not legally responsible for incorrect, unsuitable manual or automatic setting of parameters for a device or the incorrect application of a device.
- Repairs can only be executed by the manufacturer.
- Installation-, operation- and maintenance procedures should only be carried out by qualified personnel.
- When working with devices with current-carrying parts, please observe the valid security prescriptions.
- CAUTION! The *Antenna-Tuner* and the antenna conductor carry voltages up to 1000V.
- Before opening the device or the antenna casings or touching the board, the power supply must always be interrupted. Make sure that the device is without voltage by measuring.
- CAUTION! The fading of an operation control (LED) is no indicator for an interrupted power supply or the device being without voltage!
- Working with the opened device, please observe that hot parts near the power unit, the relay and the connection terminal may be bare.
- Please observe that some parts of the device (resistors) may heat severely.
- Works at the device and its installation have to be executed according to the national legal requirements and local prescriptions.
- The user is responsible for the installation, application and connecting of the device according to the technical standards of the installation country and other valid prescriptions. Dimensions of wires and cables, safety regulations, earthing, separation, insulation control and overcurrent protection have to be considered in particular.
- Make sure that the *Controller* only is plugged onto the tuner if the carrier frequency has been switched off.



Touching electrostatically charged parts with open exposed contacts (especially slot X1) may destroy the *Controller*.

10. Principle of function of the OBID®-system

The identification system **OBID®** is an inductive transmission system for contactless identification of moving objects. The components of the read-/ write system enable the user to read and write transponders. It consists of the following components: reader ID ISCLR200, one or several antennas and a transponder as storage for the data.

If a transponder is brought into the local magnetic field of the antenna, it will be supplied with power and can be read or written. The data are received by the same *Reader*-antenna that generates the magnetic field and sends the data to the transponder.

The magnetic field and the sent and received data of the transponder are able to penetrate almost all non-conductive materials, which allows concealed writing and reading.

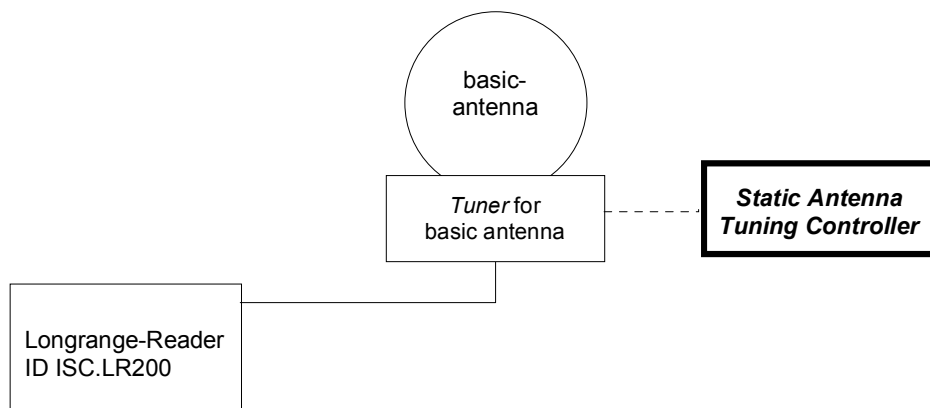
11. Features of the devices ID ISC.SAT.A, ID ISC.SAT.B and ID ISC.SAT.C

The devices ID ISC.SAT.A, ID ISC.SAT.B and ID ISC.SAT.C have been developed for automatic tuning of antennas which operate with a frequency of 13.56MHz and 50Ω.

The *Static Antenna Tuning Controller (Controller)* is always used together with a *Static Antenna Tuner (Tuner)*. Connected with the corresponding *Tuner* (for base and complementary antennas), the *Controller* directs the tuning procedure by measuring the current antenna parameters and by changing their adjustment at the *Tuner* until an optimal adjustment has been obtained. The *Tuner* keeps this optimal adjustment as long as the environmental conditions remain unchanged. The *Controller* has been designed for the initial installation of an **OBID® i-scan** long range application or may be needed to adapt the antenna tuning to changed environmental conditions.

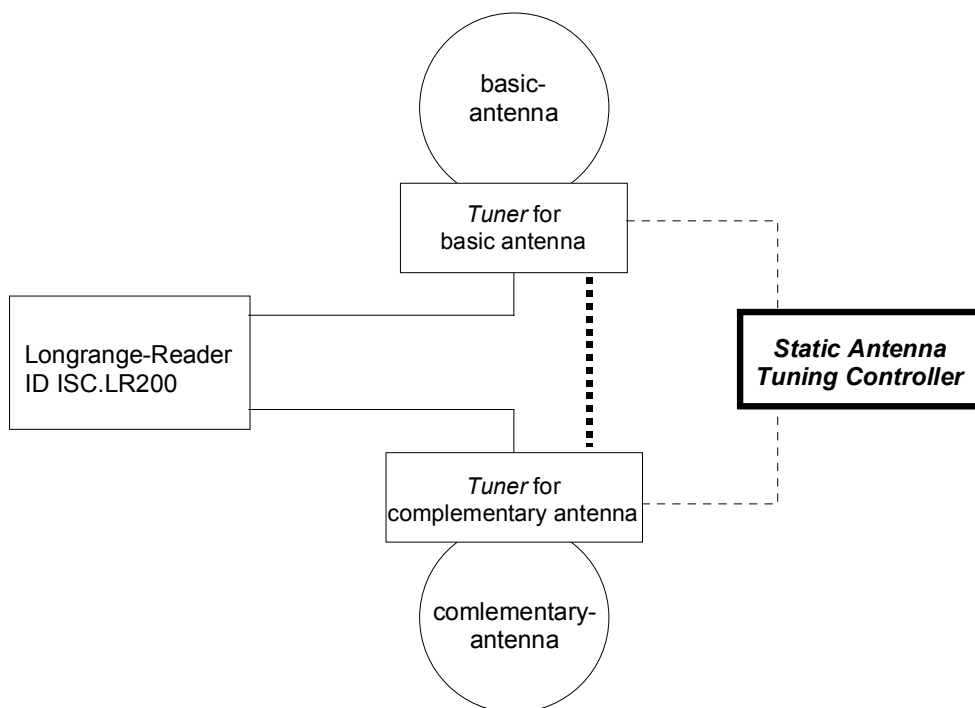
According to the antenna configuration, either a *Static Antenna Tuner* type ID ISC.SAT.A for the base antenna (Figure 1) or a *Static Antenna Tuner* type ID ISC.SAT.A for the base antenna and a *Static Antenna Tuner* type ID ISC.SAT.B for the complementary antenna will be necessary (Figure 2).

Figure 1: configuration with one antenna



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Figure 2: configuration with two antennas



After the installation of the antenna and its connection to the *Reader*, the *Controller* type ID ISC.SAT.C is plugged onto the antenna for the tuning procedure. This connection between tuner and controller has to remain only during the tuning procedure.

For the tuning of complementary antennas, a connection between both *Tuners* via a reference signal connection is necessary. A special cable serving for this purpose is enclosed with the *Controller*.

For the adjustment of the quality, resistors may be switched on or off manually. The fine tuning of the impedance and phase can be realized with trimming capacitors.

12. Mounting of the printed boards

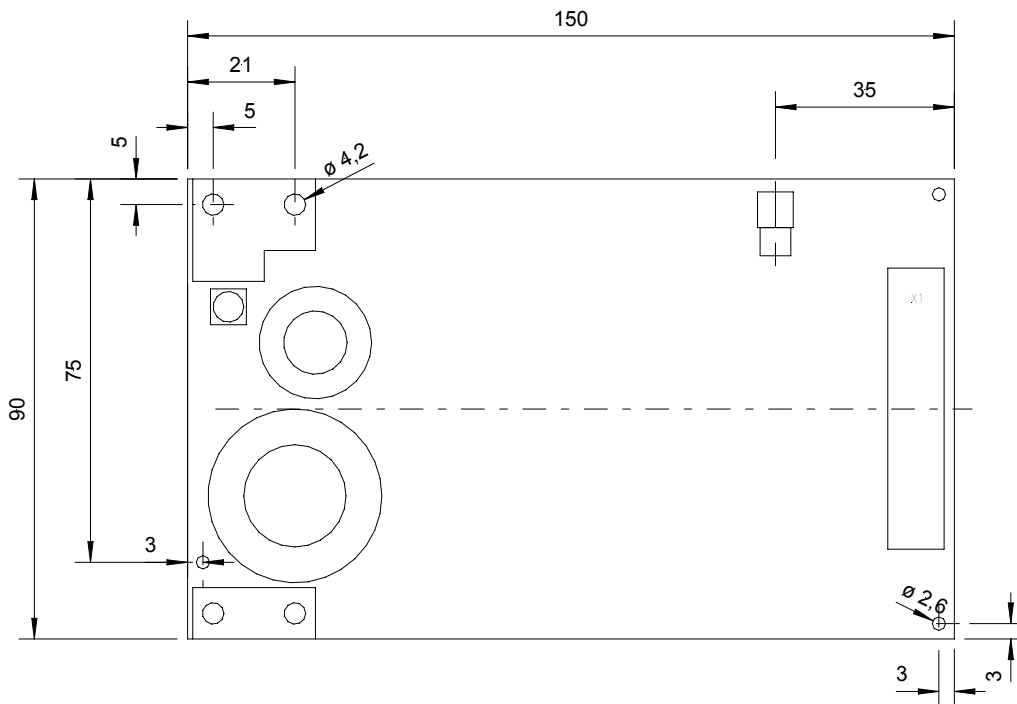
12.1. ID ISC.SAT.A

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The ID ISC.SAT.A is delivered as a board without casing and has been designed for direct installation at the antenna. The board provides drilled holes for fixing at each corner.

Figure 3: Dimensioned drawing device ID ISC.SAT.A

All dimensions in millimetres.



During the installation please observe that there is enough space to plug the *Controller* ID ISC.SAT.C onto terminal X1 for the tuning of the antenna.

13. Connection terminals and operational control elements

13.1. Connection terminals and operational control elements ID ISC.SAT.A

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Figure 5: Connection terminals and operational control elements ID ISC.SAT.A

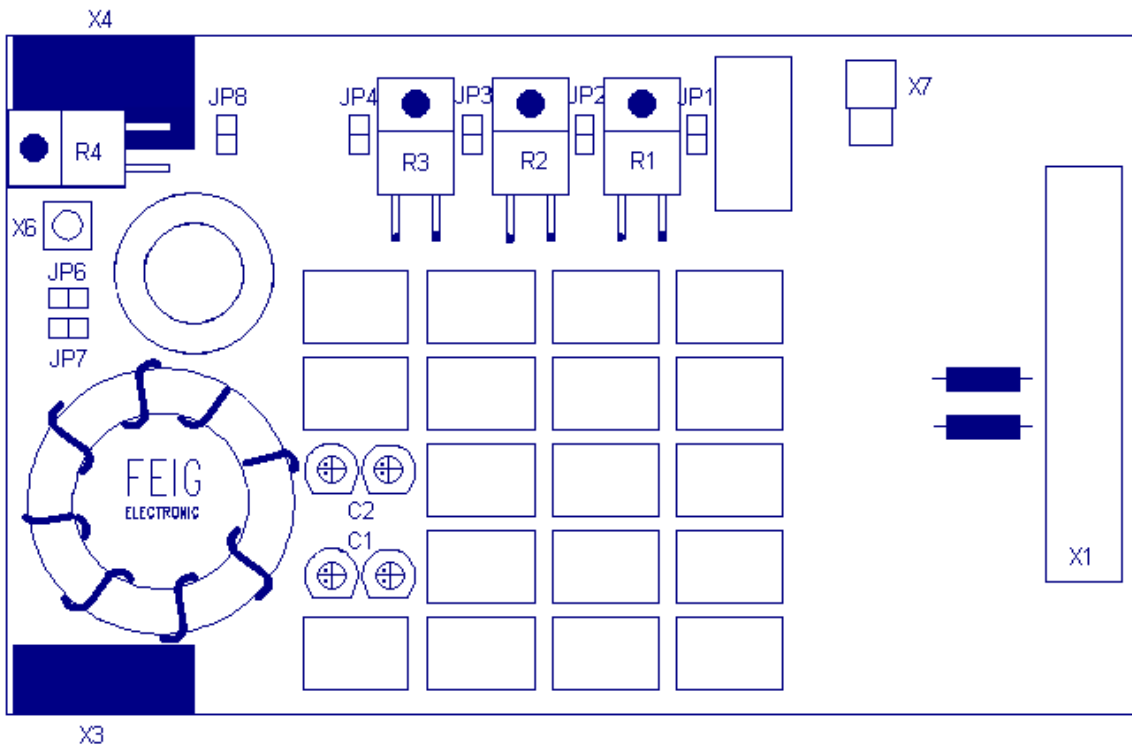


Table 1: Pin configuration

terminal	description
X1	socket board for <i>static antenna tuning controller</i>
X3	connection 1 for the antenna conductor
X4	connection 2 for the antenna conductor
X6	SMA-socket: connection cable for reference signal between base antenna and complementary antenna
X7	SMA-socket: antenna connection for transmitting- and receiving cable of the <i>reader</i> (reader-socket X2)



maximum tightening torque for SMA-socket 0,45Nm

The connection of the antenna loop is executed via the cable terminals X3 and X4, via soldered joints at these pads or via screw joints at the insert nuts. As antenna loop, we recommend coaxial cable type RG213 or RG214, where only the shield is connected as conductor.

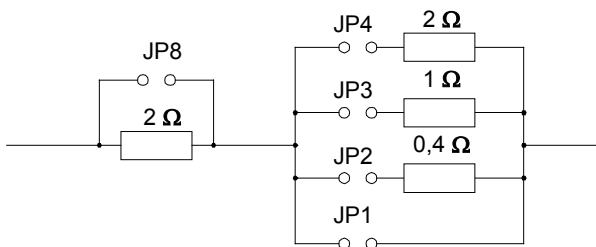
By means of the jumpers JP1 – JP4 and JP8, the series resistance and thus the quality of the antenna can be set. The corresponding value of the combined resistance please take from Table 2. Also look at Figure 6.

Table 2: Value of the series resistance

jumper	combined resistance R	
	JP8 open	JP8 closed
JP1 closed	2.0Ω	0Ω
JP2 closed	2.4Ω	0.4Ω
JP3 closed	3.0Ω	1.0Ω
JP4 closed	4.0Ω	2.0Ω
JP2 and JP3 closed	2.28Ω	0.28Ω
JP2 and JP4 closed	2.33Ω	0.33Ω
JP3 and JP4 closed	2.66Ω	0.66Ω
JP2, JP3 and JP4 closed	2.23Ω	0.23Ω
JP1 – JP4 open	Antenna-Circuit is open	

A small series resistance causes a higher quality of the antenna. The higher the quality of the antenna, the more sensitive it will be to environmental influence, and the more difficult a 100% tuning will be. Although, an increasing quality produces a higher current in the antenna and thus a higher range.

Figure 6: Resistor-Network



For antennas made of cable type RG213 and with a conductor length of ca. 2m, a resistance of 3.0Ω should be set.



In case of high power (> 4W) please observe a sufficient cooling of the resistors. Additionally a strong rise in temperature can lead to a drifting of the adjusted impedance.

13.2. Connection terminals and operational control elements ID ISC.SAT.B

Figure 7: Connection terminals and operational control elements ID ISC.SAT.B

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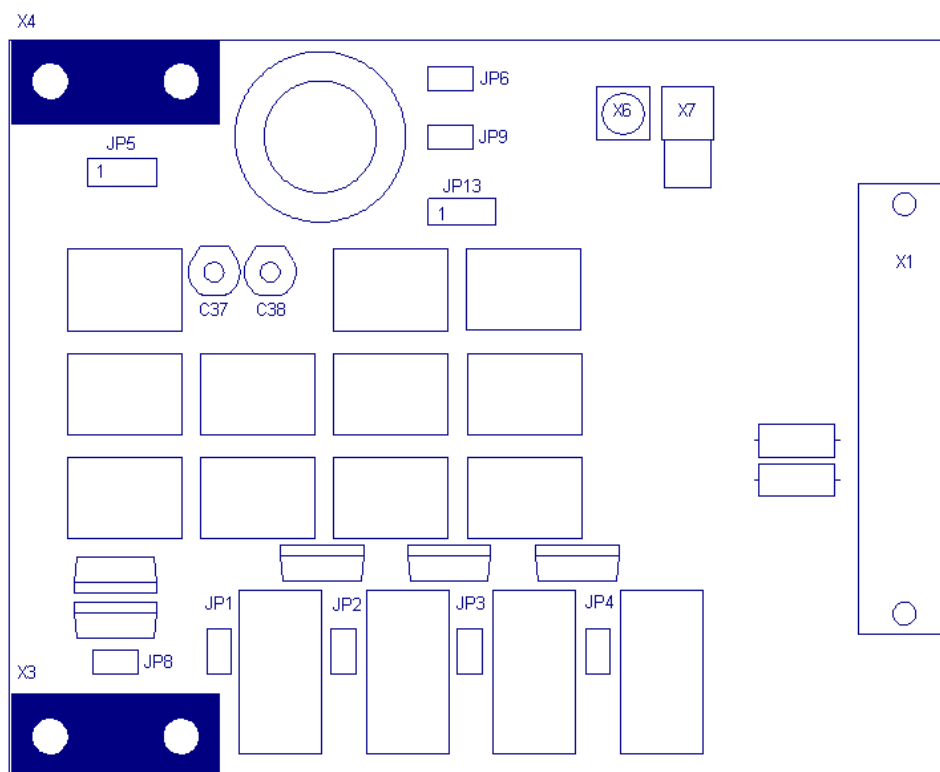


Table 3: Pin configuration ID ISC.SAT.B

terminal	description
X1	socket board for <i>Static Antenna Tuning Controller</i>
X3	connection 1 for the antenna conductor
X4	connection 2 for antenna conductor
X6	SMA-socket: connection cable for reference signal between base antenna and complementary antenna
X7	SMA-socket: antenna connection 2. Receiving channel of the <i>Reader</i> (reader-socket X1)

The connection of the antenna loop is executed via the cable terminals X3 and X4, via soldered joints at these pads or via screw joints at the insert nuts. As antenna loop, we recommend coaxial cable type RG213 or RG214, where only the shield is connected as conductor.

The following Jumpers have to be set:

- JP5 (see setting of jumper JP5 on page 42)
- JP6
- JP9
- JP13 (1-2)

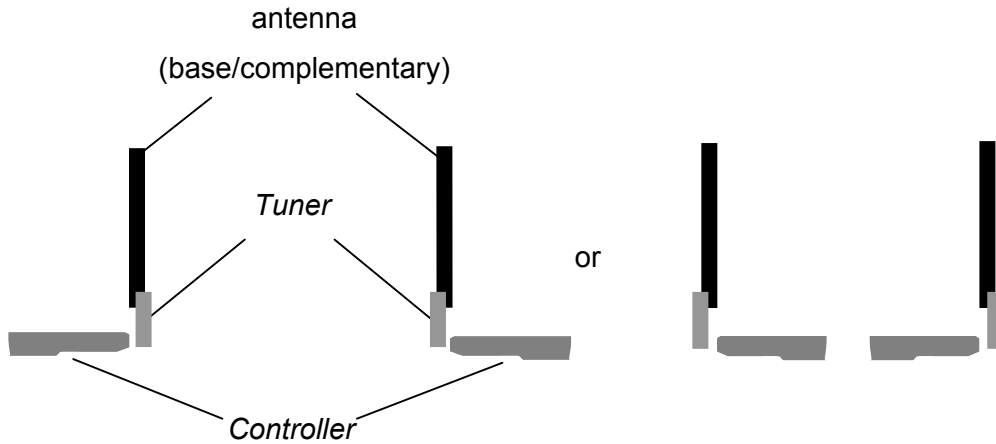
With Jumper JP8 the series resistor of the antenna can be increased or decreased by 0.2Ω . If jumper JP8 is closed the 0.2Ω resistor is hot-wired.

Setting of jumper JP5

By means of the jumper JP5, the phase position of the measure signal for the tuning process may be influenced. According to the type of installation of the *Tuner* (Figure 8), the jumper has to be set on position 1-2 or 2-3.

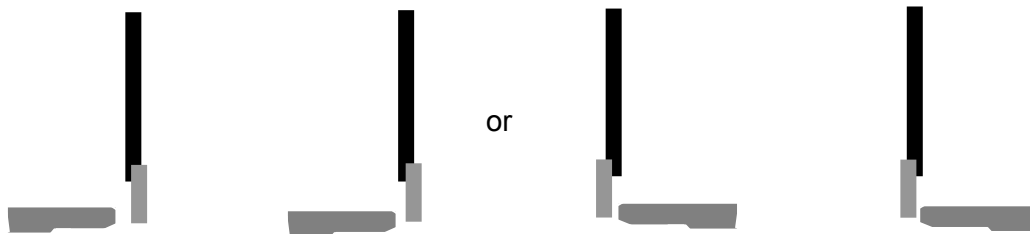
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Figure 8: Installation of the *Tuners* with jumper position 1-2



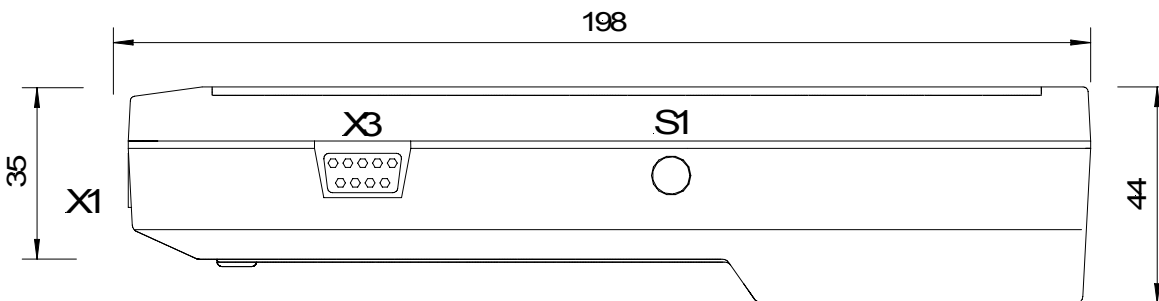
Jumper JP5 connects pin 2 with pin 3, if the *Tuners* have been fixed at the antennas according to Figure 9.

Figure 9: Installation of the *Tuners* with jumper position 2-3



13.3. Connection- and operational elements ID ISC.SAT.C

Figure 10: Side view *Static Antenna Tuning Controller*



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13.3.1. Keys / Switches

The *Controller* can be started by means of the key S1 at the device ID ISC.SAT.C. First, the *Controller* has to be plugged onto the socket board X1 and the reader has to be connected to the antenna and switched on.

Short pressing (< 2 seconds) effects the initiation of the control mode. During this, the *Controller* checks the tuning state of the antenna.

Longer pressing of the key (> 2 seconds) effects the tuning procedure. The duration of the tuning procedure depends on the inductivity of the antenna and its environmental conditions. It will take up to 60 seconds.

Then, the result of the control respectively the tuning is displayed by the LEDs (11.3.2 page 44), and the *Controller* automatically switches off the power supply.

13.3.2. LEDs

At the beginning of the tuning procedure or the control procedure, the green LED will flash for approx. one second before any of both procedures is started. After the procedure, the result of the control- or tuning procedure will be signaled by the LEDs. The following signals are possible:

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Table 4: LED signals

LED	description
tuning mode (long pressing of key S1 (13.3.1. Keys / Switches))	
LED 1 (green)	lights up for ca. 4 seconds. signallizes successful tuning procedure.
LED 2 (red)	flashes for ca. 4 seconds, if the antenna is powerless.
LED 2 (red)	lights up for ca. 4 seconds. signalizes that the antenna could not be tuned.
LED 3 (yellow)	lights up for ca. 4 seconds, if the batteries are flat.
control mode (short pressing of the key S1 (13.3.1. Keys / Switches))	
LED 1 (green)	lights up for ca. 4 seconds. signalizes that the antenna has been tuned.
LED 2 (red)	flashes for ca. 4 seconds, if the antenna is powerless.
LED 2 (red)	lights up for ca. 4 seconds. antenna has not been tuned
LED 3 (yellow)	lights up for ca. 4 seconds, if the batteries are flat.

If the green LED flashes only every 5 seconds for a short time, the controller is in service-mode (FEIG intern / no user-function). This mode will be left automatically after 2 minutes or by pressing the key S1.

Possible faults, if the antenna has not been tuned

- the antenna is without transmitting power.
 - reader transmitting power is not switched on.
 - connection cable between reader and antenna is defect.
 - transformer has been inserted between reader and antenna.
- wrong transmitting power ($\neq 4W$)
- inductivity of the antenna is too high or too low.
- *Controller* has been plugged onto the board incorrectly.
- modulation at the reader is switched on.
 - buffered read mode is switched on
 - read transponder is switched on (ISCStart: Test and Measurement)
- *Tuner* board is defect.

13.3.3. X3 Asynchronous interface**Table 5: Socket X3 (D-SUB female)**

pin	description
1	
2	RS232 – TxD (V24)
3	RS232 – RxD (V24)
4	
5	RS232 - GND (V24)

The serial interface serves for the output of the tuning parameters on the PC. It provides V24 level and the following interface parameters:

Baudrate 9600 Baud, 8 data bits, 1 start bit, 1 stop bit, parity: even

The interface is connected to the PC via commercial 1:1 cable (max. length 3m).

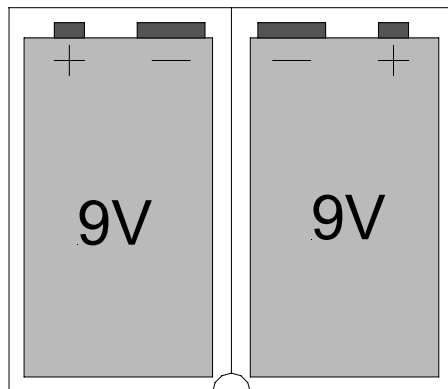
13.3.4. Battery installation and replacement

When the yellow LED comes on (s. Table 4), this indicates that the battery needs to be replaced. Proceed as follows:

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Disconnect the *Controller* from the antenna and turn it off. Use an appropriate screwdriver to remove the mounting screws from the battery compartment cover. Remove the old batteries and replace them with two new ones. You must always replace both batteries and use the same type. Be sure to observe the correct polarity (Figure 11)! After you have replaced the batteries, carefully close up the battery compartment.

Figure 11: Polarity for the batteries



Never allow used batteries to remain or be installed in the *Controller*, since even drained batteries can corrode and release chemicals which are hazardous to your health and will destroy the *Controller*.

Replace the batteries only with the same type or one recommended as an equal replacement by the manufacturer.

Used batteries are a potential hazard to the environment and must be properly disposed of !

14. Structure and tuning of a single- and gate-antenna

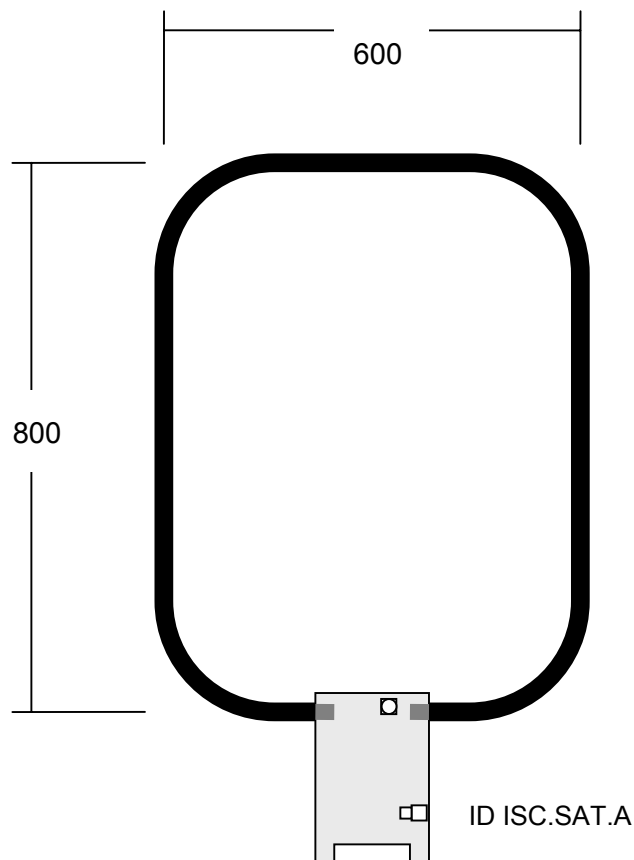
Notes for the setting up and for adjustment of standard configurations with FEIG-antennas can be seen in the appropriate Mounting Instructions and Application Notes on the OBID®i-scan CD of FEIG ELECTRONIC.

14.1. Structure of a base antenna

Figure 12 shows the dimensions of a possible antenna made of RG214-cable. Here only the shield will be connected as conductor. The centre conductor is not used. For the installation of *Tuner* ID ISC.SAT.A for the base antenna or ID ISC.SAT.B for the complementary antenna, about 10mm of the insulation of the cable ends should be stripped.

Figure 12: Dimensions of a base antenna

All dimensions in millimetres



14.2. Initialization of a single antenna (base antenna)

First, adjust the resistors according to table 2. The trimming capacitors are in center position (Figure 13). In order to start the tuning, the reader has to be connected to the SMA-socket X7 and with ISCStart (V04.01; on the OBID®i-scan CD) in Commands the protokol "Base Antenna Tuning" [0x6F] has to be sent (Figure 14).

Figure 13: Center position

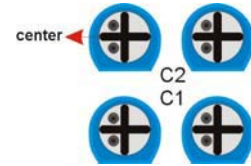
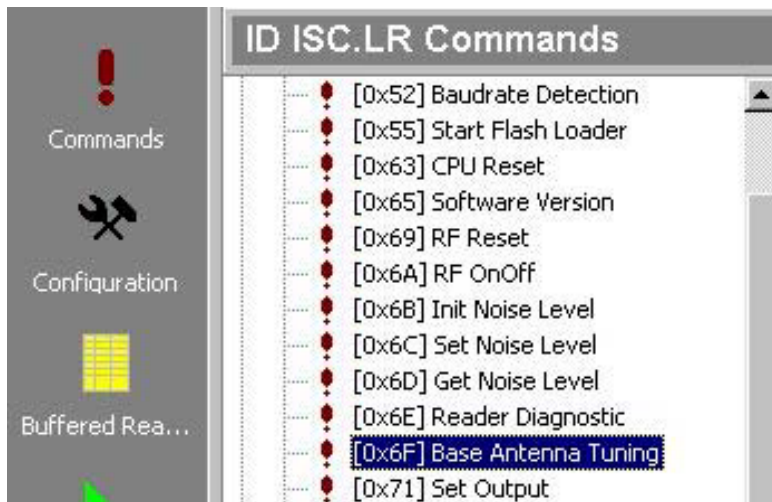
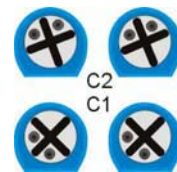


Figure 14: Configuration in ISCStart



Now the *Controller* ID ISC.SAT.C can be connected to the *Tuner* and the "start"-key can be pressed (13.3.1. Keys / Switches). Depending on the pressing period, the tuning- or the control mode will be started. The result will be signalized by the LEDs (13.3.2. LEDs) after the completed procedure. Then, the *Controller* can be removed again and the antenna is ready to operate. The mode "Base Antenna Tuning" has be deactivated by sending the *Reset*-Command. By means of the trimming capacitors C1 and C2, the antenna can be fine-tuned. Two trimming capacitors forming a pair should always be set to the same capacity values (Figure 15).

Figure 15: Equal C-values



The antenna will keep the tuned state as long as the environment doesn't change. Figure 16 shows the tuning procedure.

Figure 16: Tuning procedure at the base antenna



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We recommend to check the tuning state by working temperature after a working period of ca. 30min. For a new tuning the *“Base Antenna Tuning”* mode in the ISCStart program has to be activated again.

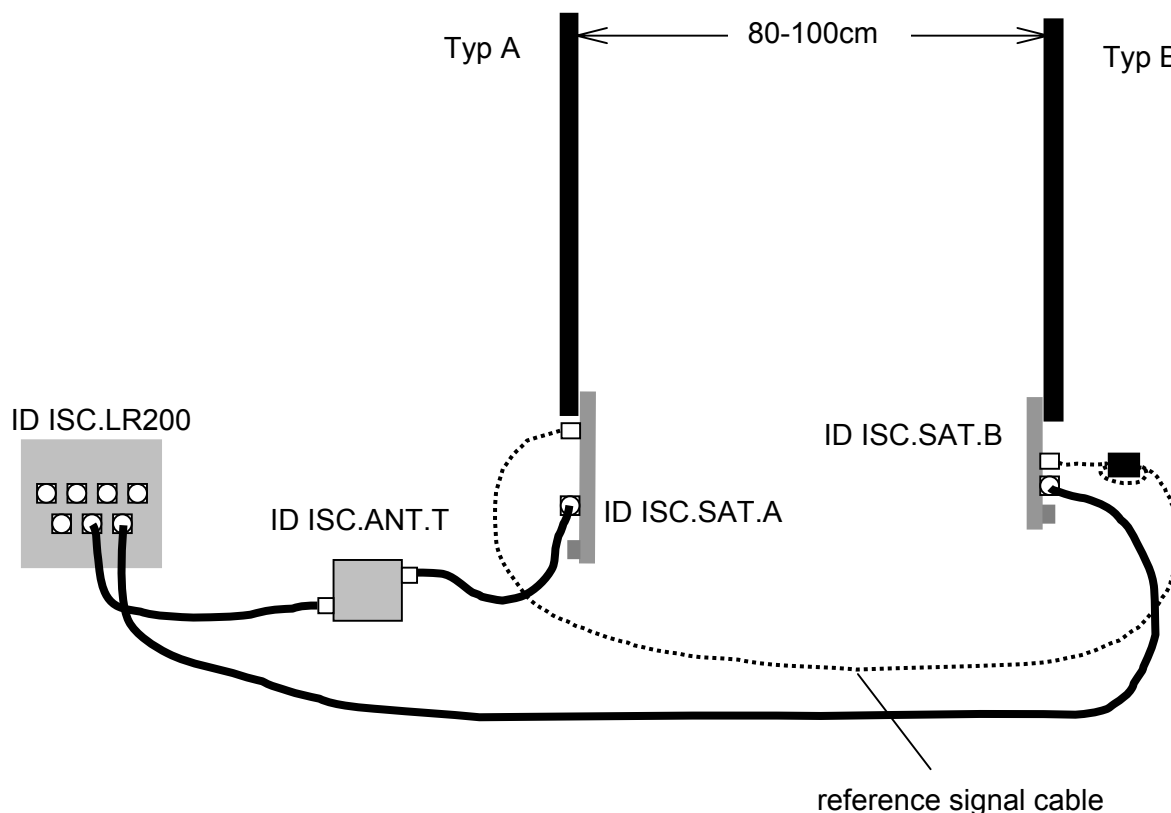
14.3. Initialization of a gate-antenna (base and complementary antenna)

14.3.1. Structure of a gate-antenna

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Figure 17 shows the base structure of a gate-antenna with the necessary connections. The complementary antenna (type B) has the same dimensions as the base antenna (type A) shown in Figure 12. The transformer ID ISC ANT.T-A provides the possibility to reduce the noise level. The antenna tuning has to be executed without the transformer ID ISC ANT.T-A. During the tuning procedure, connect the socket X7 of the *Tuner* of the complementary antenna and X6 of the *Tuner* of the base antenna with the reference signal cable. The connection of socket X7 of the *Tuner* ID ISC.SAT.B with the one of the reader (socket X1) is completed in the operation mode.

Figure 17: Structure of a gate-antenna in operation mode



14.3.2. Tuning of base and complementary antenna

Before the complementary antenna can be adjusted, the base antenna has to be tuned by means of the controller. The tuning of the base antenna is executed according to 14.2 (page 48). Before the tuning of the complementary antenna, the jumpers have to be checked, the trimming capacitors are in center position (Figure 18) and the included reference signal cable has to be connected. It connects X6 of the base antenna to X6 of the complementary antenna. The end of the cable with the toroid is connected to the complementary antenna (Figure 19). The transmitting power is adjusted to the operating power and the modulation has to be switched off.

Figure 18: neutral position



Now the *Controller* can be plugged onto the *Tuner* and the tuning procedure can be started by the "start"-key (13.3.1. Keys / Switches). If necessary by means of the trimming capacitors the complementary antenna has to be fine-tuned. After the tuning of the complementary antenna, the base antenna has to be tuned again. For that the reference signal cable has to be removed.

The tuning of the base antenna is executed again according to 14.2 (page 48). After the tuning of the base antenna, the gate antenna is ready to operate.

Figure 19: Connections and Jumperpositions



ANNEX A: Technical data ID ISC.SAT.A

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• construction type	double-assembled board
• dimensions (W x H x D)	150 x 90 x 24mm ³
• weight	ca. 0.2kg
• antenna connection	cable terminals d = 2 - 8mm
• reader connection	50Ω SMA-socket max. starting torque 0.45Nm
• reference signal	50Ω SMA-socket (for gate arrangements) max. tightening torque 0.45Nm
• maximum transmitting power	8W
• temperature range / humidity	
- Operating	-25°C to 55°C / max 95%, non condensing
- Storage	-25°C to 80°C / max 95%, non condensing
• antenna parameters	
- transmitting / receiving frequency	13.56MHz
- impedance	50Ω
- tuning range inductivity	0.7 – 2.5μH
- quality	10 – 50

ANNEX B: Technical data ID ISC.SAT.B

• constructioun type	double-assembled board
• dimensions (W x H x D)	115 x 90 x 24mm ³
• weight	ca. 0.2kg
• antenna connection	cable terminals d = 2 – 8mm
• receiver connection	50Ω SMA-socket max. tightening torque 0.45Nm
• reference signal	50Ω SMA-socket max. tightening torque 0.45Nm
• maximum power	8W
• temperature range / humidity	
- Operating	-25°C to 55°C / max 95%, non condensing
- Storage	-25°C to 80°C / max 95%, non condensing
• antenna parameters	
- transmitting- / receiving frequency	13.56MHz
- tuning range inductivity	0.3 –3.5μH
- quality	10 – 50

ANNEX C: Technical data ID ISC.SAT.C

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• casing	plastic material ABS
• colour	grey-white similar RAL 9002
• dimensions (W x H x D)	198 x 101 x 44mm ³
• weight	ca. 0.35kg
• protective system	IP 40
• power supply	18V (2 x 9V compound battery)
- battery-type	VARTA 6 LR 61 or Duracell 9V MN1604
• power consumption	ca. 300mA (during the tuning procedure)
• temperature range / humidity	
- Operating	-25°C to 50°C / max 95%, non condensing
- Storage	-25°C to 80°C / max 95%, non condensing
• working frequency	13.56MHz
• optical signal emitters	3 x LED
• interfaces	RS232