
1. General description

Smart nails are intended for marking both living wood (trees) as well as round timber and for all kind of wooden products and semi-products.

Marking means that each wooden object is assigned a unique code and if necessary, additional properties, which we enter into a Smart nail.

Smart nails are mainly made of material similar to wood. The design enables the nail to penetrate into the wood along the fibers. The nails contain a unique identification code and they have free memory available which is intended for entering any data. To communicate their identification codes and other data recorded in the memory, they use radio waves.

ISO/IEC 15693 and ISO/IEC 18000-3, prolonging a successful story of NXP in the field of vicinity identification systems.

The ICODE system offers the possibility of operating labels simultaneously in the field of the reader antenna (anticollision). It is designed for long range applications.

1.1 Contactless energy and data transfer

Whenever connected to a very simple and easy-to-produce type of antenna (as a result of the 13.56 MHz carrier frequency) made out of a few windings printed, wound, etched or punched coil, the ICODE SLIX IC can be operated without line of sight up to a distance of 1.5 m (gate width). No battery is needed. When the smart label is positioned in the field of an interrogator antenna, the high speed RF communication interface enables data to be transmitted up to 53 kbit/s.

1.2 Anticollision

An intelligent anticollision function enables several tags to operate in the field simultaneously. The anticollision algorithm selects each tag individually and ensures that the execution of a transaction with a selected tag is performed correctly without data corruption resulting from other tags in the field.

1.3 Security and privacy aspects

- Unique Identifier (UID):

The UID cannot be altered and guarantees the uniqueness of each label.

- Password protected EAS and AFI functionality:

The 32-bit EAS/AFI password enables the addressed label to be set in a mode where the EAS status and the AFI value can only be changed if the correct EAS/AFI password is transmitted to the label within the mentioned commands.

2. Features and benefits

2.1 ICODE SLIX RF interface (ISO/IEC 15693)

- ∅ Contactless transmission of data and supply energy (no battery needed)
- ∅ Operating distance: up to 1.5 m (depending on antenna geometry)
- ∅ Operating frequency: 13.56 MHz (ISM, world-wide licence freely available)
- ∅ Fast data transfer: up to 53 kbit/s

- ∅ High data integrity: 16-bit CRC, framing
- ∅ True anticollision
- ∅ Password protected Electronic Article Surveillance (EAS)
- ∅ Password protected Application Family Identifier (AFI)
- ∅ Data Storage Format Identifier (DSFID)
- ∅ Additional fast anticollision read
- ∅ Write distance equal to read distance

2.2 EEPROM

- ∅ 1024 bits, organized in 32 blocks of 4 bytes each
- ∅ 50 years data retention
- ∅ Write endurance of 100000 cycles

2.3 Security

- ∅ Unique identifier for each device
- ∅ Lock mechanism for each user memory block (write protection)
- ∅ Lock mechanism for DSFID, AFI, EAS
- ∅ Password (32-bit) protected EAS and AFI functionality

3. Applications

- ∅ Living trees
- ∅ Wooden products
- ∅ Wooden object
- ∅ Industrial applications