GB

Operating instructions

RF-identification system

ANT424
ANT425

Read/write head

11424517 / 01 01 / 2025

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1 Preliminary note

You will find instructions, technical data, approvals and further information using the QR code on the unit / packaging or at documentation.ifm.com.

1.1 Symbols used

✓	Requirement
▶	Instructions
▷	Reaction, result
[...]	Designation of keys, buttons or indications
→	Cross-reference
!	Important note Non-compliance may result in malfunction or interference.
i	Information Supplementary note

1.2 Warnings

Warnings indicate the possibility of personal injury and damage to property. This enables safe product handling. Warnings are graded as follows:

WARNING

Warning of serious personal injury

▷ If the warning is not observed, fatal and serious injuries are possible.

CAUTION

Warning of minor to moderate personal injury

▷ If the warning is not observed, minor to moderate injuries are possible.

ATTENTION

Warning of damage to property

▷ If the warning is not observed, damage to property is possible.

1.3 Legal and copyright information

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All product names, pictures, companies or other brands used on our pages are the property of the respective rights owners.

1.4 Open source information

For more open source information see: documentation.ifm.com.

2 Safety instructions

- The unit described is a subcomponent for integration into a system.
  - The system architect is responsible for the safety of the system.
  - The system architect undertakes to perform a risk assessment and to create documentation in accordance with legal and normative requirements to be provided to the operator and user of the system. This documentation must contain all necessary information and safety instructions for the operator, the user and, if applicable, for any service personnel authorised by the architect of the system.
- Read this document before setting up the product and keep it during the entire service life.
- The product must be suitable for the corresponding applications and environmental conditions without any restrictions.
- Only use the product for its intended purpose (→ Intended use).
- If the operating instructions or the technical data are not adhered to, personal injury and/or damage to property may occur.
- The manufacturer assumes no liability or warranty for any consequences caused by tampering with the product or incorrect use by the operator.
- Installation, electrical connection, set-up, operation and maintenance of the product must be carried out by qualified personnel authorised by the machine operator.
- Protect units and cables against damage.
- Store the product in its original packaging.

2.1 Safety symbols on the unit

The following symbols are used on the device. Observe the instructions in order to avoid hazards:

- Electric supply must correspond to IEC 61010-1, chapter 9.4 - Limited-energy circuit.

- Device of protection class III. Only for operation in SELV/PELV circuits.

2.2 Safety note on high-frequency electromagnetic radiation

Under application-specific conditions, the risk for the user may differ depending on the installation situation and the device settings.

The system architect/operator is required to carry out a hazard analysis and to take appropriate measures for the protection of persons. In particular national regulations also have to be adhered to. Possible protective measures may include guaranteed minimum distances of a user, access controls and user training.

WARNING

Operation of this device can cause radio interference in residential areas.

▷ The device emits high-frequency electromagnetic waves that may interfere with the operation of electronic devices in the vicinity, including pacemakers, hearing aids and defibrillators.

▶ Due to human exposure regulations, a minimum distance of 20 cm must be maintained between the device and persons.

▶ If you have a pacemaker or other implanted medical product, do not use the device without first consulting your doctor or the manufacturer of your medical product. Keep a safe distance between the device and your medical devices and refrain from further use of the device if you observe permanent impairment of your medical product.

2.3 Cybersecurity

Installation

The device is suitable for operation in a secure environment according to IEC 62443-1-1.

The device was designed for operation behind a firewall.

▶ Carry out a risk assessment of the system according to IEC 62443-1-1.

▶ Take measures to ensure physical security.

Operation

▶ Observe the security functions described in the product documentation and the recommendations for their use.

Maintenance

▶ Regularly check whether software updates are available for the device.

▶ Back up system configuration and system data in accordance with your company's change management processes.

Decommissioning

▶ Ensure that no sensitive information can fall into unauthorised hands.

▶ Always reset the system settings to the factory settings before decommissioning the device.

3 Intended use

The read/write head reads and writes ID tags without contact. For use, the read/write head must be connected to the DTE10x evaluation unit.

The data is converted into digitally coded values and provided to the evaluation unit.

3.1 Application area

The device safety is rated for use under the following operating conditions:

- Protection class 3 (SELV/PELV) and supply of the device to limited energy according to IEC 61010-1, chapter 9.4. Isolate the external circuits as required by figure 102 in IEC 61010-2-201.
- For indoor use.
- Altitudes up to 2000 m.
- Relative air humidity up to max. 80 %, non condensing.
- Pollution degree 2.

4 Items supplied

- Read/write head

The device is supplied without installation and connection accessories.
Available accessories: www.ifm.com.
The optimum function is not ensured when using components from other manufacturers.

5 Function

5.1 ID tags

The ID tags are passively operated without a battery. The energy required for operation is provided by the read/write head.

The energy is provided via an inductive coupling. The integrated antenna coil in the read/write head generates a magnetic field which partly penetrates the antenna coil of the ID tag. A voltage is generated by induction that supplies the data carrier with energy.

The device supports ID tags according to ISO 15693.

5.2 Device overview

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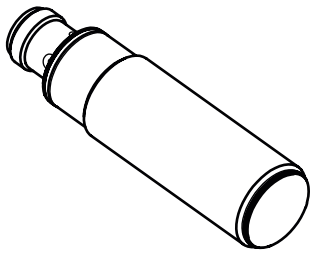
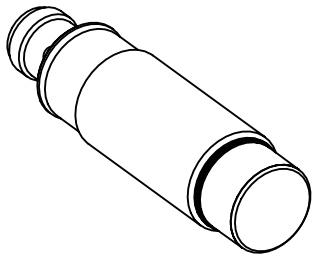
	Article number:	ANT424
	Function:	Read/write head
	Type designation:	DTRHF GBRWIDUS03
	Type:	M18, flush mountable

ANT425

	Article number:	ANT425
	Function:	Read/write head
	Type designation:	DTRHF GNRWIDUS03
	Type:	M18, non flush mountable

6 Installation

6.1 Notes on the unit installation

When mounting several RFID units adhere to the minimum distances between the systems.

Flush mounting of a read/write head in metal reduces the read/write distance.

Device performance can be affected if positioned in the immediate vicinity of powerful HF emission sources such as welding transformers or converters.

6.2 Avoiding interference

The device generates a modulated electrical field with a frequency of 13.56 MHz.

Avoid interference with data communication:

▶ Do not operate any devices in the vicinity that use the same frequency band.

▷ Such devices are for example frequency converters and switched-mode power supplies.

If there are other devices in the same frequency band in the vicinity:

▶ The mounting distances between the devices should be as large as possible.

▶ Use the devices in alternating operation.

▶ Switch the HF field of the device on/off.

6.3 Mechanical design

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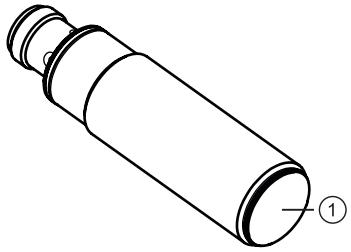

Fig. 1: ANT424

1 Sensing face

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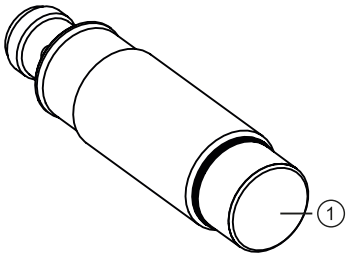

Fig. 2: ANT425

1 Sensing face

6.4 Install device

▶ Fix the device using the supplied nuts (M18).

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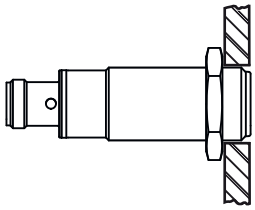

Fig. 3: Flush mounting

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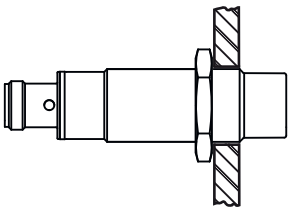

Fig. 4: Non flush mounting

6.5 Mounting distances

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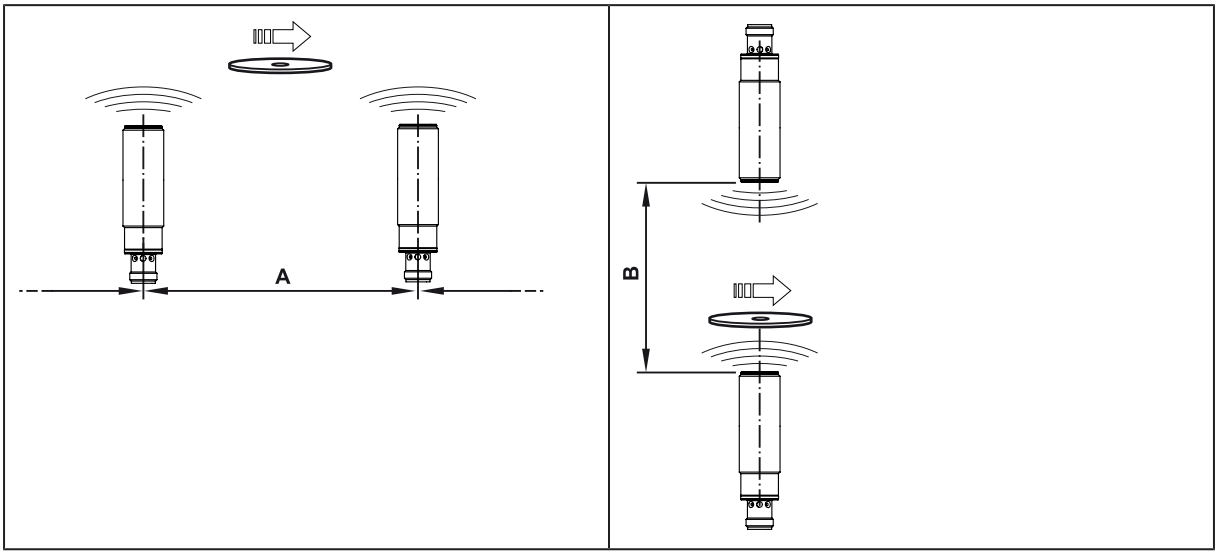

Operating mode	Distance side (A)	Distance front (B)
For reading and writing	≥ 60 mm	≥ 100 mm

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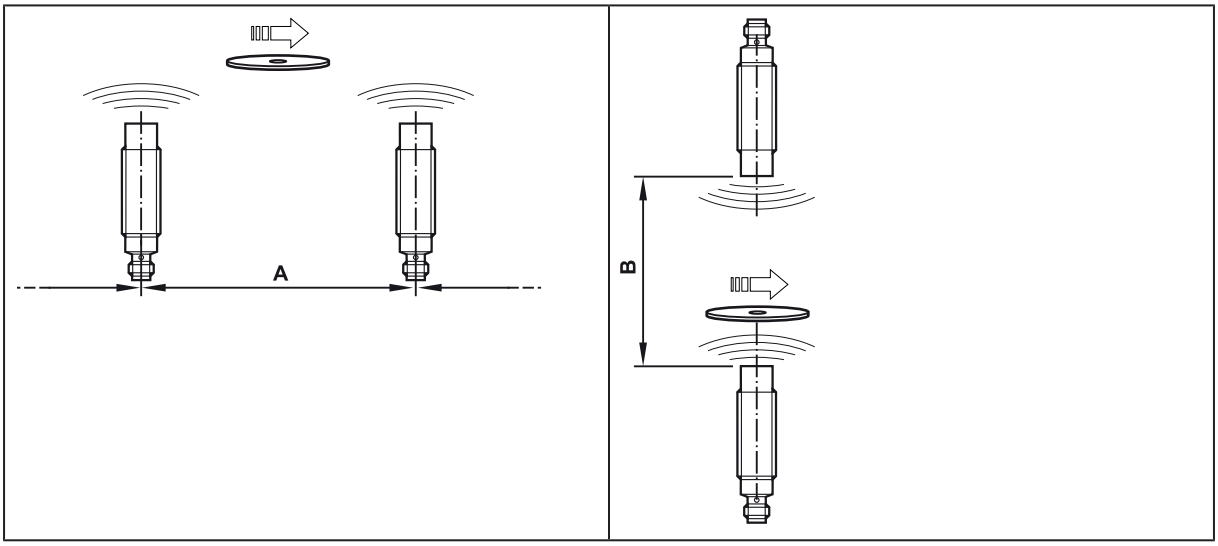

Operating mode	Distance side (A)	Distance front (B)
For reading and writing	≥ 90 mm	≥ 180 mm

6.6 Positioning of the ID tags

The read/write heads are marked with an antenna symbol on the sensing face. It designates the middle of the integrated antenna coil and has to correspond with the middle of the ID tag.

▶ Align the axes of the RFID device and the ID tag in the same way.

For installation in or on metal use the ID tags provided for this purpose.

Position the ID tag in the area of the sensing face. When doing so, the angle of aperture and the operating distance must be adhered to (→ Data sheet of the device).

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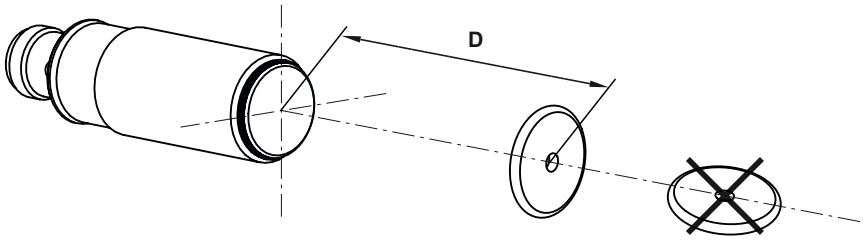
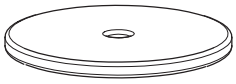


Fig. 5: Position the ID tag

▶ Align the ID tag on the central axis of the antenna of the unit.

ID tag	Type	Distance read/write head (D) in plastic
E80371		16 mm

The indications in the table apply to static read/write operations.

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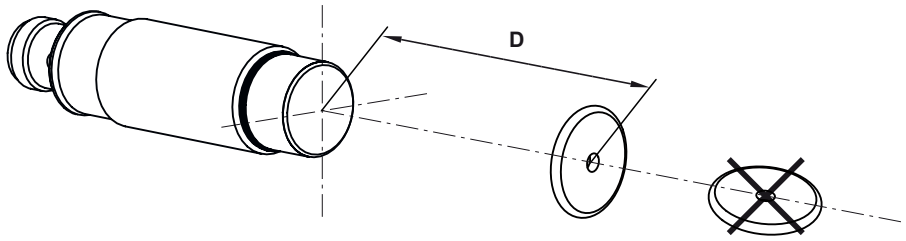
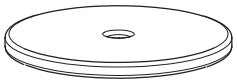


Fig. 6: Position the ID tag

▶ Align the ID tag on the central axis of the antenna of the unit.

ID tag	Type	Distance read/write head (D) in plastic
E80371		40 mm

The indications in the table apply to static read/write operations.

7 Electrical connection

The device must be connected by a qualified electrician.

▶ Disconnect power before connecting the device.

Protection class III device (IEC 61010-2-201 chap. 6.5.2.101.4).

The electrical supply must meet the following requirements:

- Use of a power supply with limited output voltage (ES1 according to IEC 62368-1)
- Use of a power supply with limited output power (PS2 according to IEC 62368-1)
- Supply only via SELV/PELV circuits (IEC 61010-2-201 chap. 3.111)
- Maximum supply voltage during operation: 35 V DC
- Maximum supply voltage in the event of a single fault: 60 V DC
- The permitted operating voltage of the device must not be exceeded (see data sheet).

The separation of external circuits must comply with IEC 61010-2-201, Figure 102.

WARNING

Unsuitable power supply

▷ Electric shock may cause serious injury or death.

▶ Use a SELV/PELV power supply within the specified voltage range.

Use energy-limited circuits for the electrical supply (IEC 61010-1 chap. 9.4). The energy of the circuit can be limited at an operating voltage of 24 V by an overcurrent protection device. The overcurrent protection device must switch off a current of 8.3 A in maximum 120 s. Observe the specific tripping characteristic. Possible overcurrent protection devices:

- Fuse or
- Non-adjustable and non-self-reclosing electromechanical device.

▶ Separate the circuit from other, non-energy-limited circuits by at least basic insulation.

ATTENTION

No suitable energy limitation of the circuit

▷ Fire hazard in case of a malfunction.

▶ Use energy-limited circuit according to IEC 61010-1 chap. 9.4.

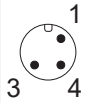
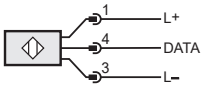
ATTENTION

Use an additional protection against surge voltages according to IEC 61000-4-5 if the connection cable is longer than 30 m.

7.1 Wiring

▶ Connect the unit to a DTE10x evaluation unit via the M12 connector.

▷ Voltage is supplied via the evaluation unit.

Pin assignment	Wiring
	

Information on available sockets see: www.ifm.com.

Cables with the following characteristics are suitable for the connection:

Length	Ohmic resistance (feed + return line)	Effective cable capacity
< 20 m	max. 3 Ω	max. 3 nF

8 Operating and display elements

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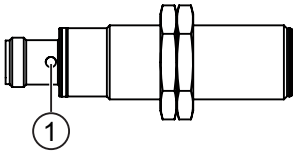	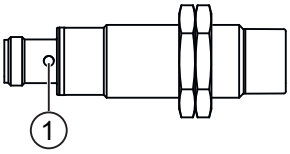

1 LED green: operating voltage
LED yellow: ID tag

LED	State	Description
green	on	operating voltage OK
	off	operating voltage missing
	flashing slowly	deactivated
yellow	on (permanently)	ID tag detected
	on (pulse)	ID tag read/written successfully
	flashing quickly	error when reading/writing on ID tag
	off	• no ID tag in the field • faulty ID tag in the field • invalid ID tag in the field
green and yellow	flashing alternately	error in communication or device fault

9 Operation

The read/write head is configured via the connected evaluation unit DTE10x.

Further information on operation can be found in the operating instructions of the evaluation unit:
www.ifm.com

10 Maintenance, repair and disposal

The unit is maintenance-free.

- ▶ Contact ifm in case of malfunction.
- ▶ Do not open the housing as the unit does not contain any components which can be maintained by the user. The unit must only be repaired by the manufacturer.
- ▶ Clean the device using a dry cloth.
- ▶ Dispose of the unit in accordance with the national environmental regulations.

11 Approvals/standards

For approvals and standards, the following information is available:

- Test standards and regulations: documentation.ifm.com
- EU declaration of conformity and approvals: documentation.ifm.com
- Notes relevant for approval: Package insert of the device and documentation.ifm.com

Glossary

ID tag

An ID tag is used to identify objects. A read/write device is used to read the ID tag via a high-frequency radio signal. An ID tag consists of an antenna, an analogue circuit for receiving and transmitting (transceiver), a digital circuit and a non-volatile memory.