



Operating instructions
RF-identification system

DTA200
DTA201

Read/write head
AS-i slave

GB

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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.
-  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

- ▶ 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 DTA200 read/write head reads and writes **ID tags** without contact.

The DTA201 read head reads **ID tags** without contact.

The data is made available to the following devices as process data via the **AS-i** control level:

- AS-i master
- AS-i controller
- AS-i host

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 Operating principle

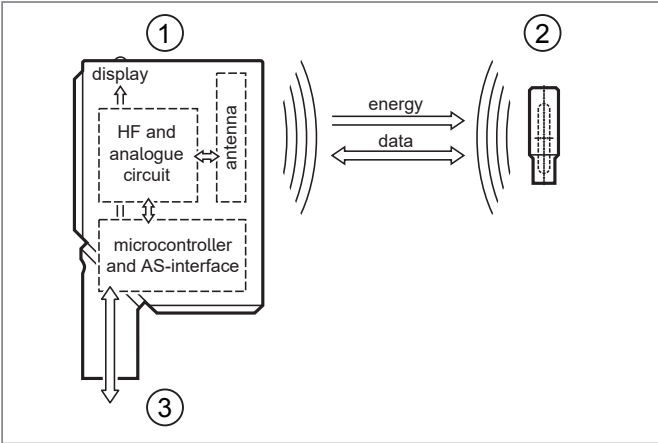


Fig. 1: Operating principle of the device

4.1 ID tags

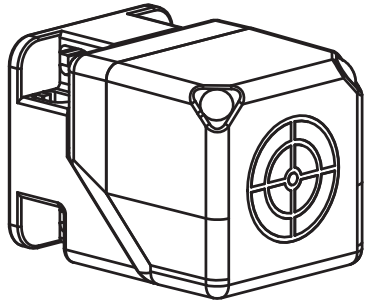
The **ID tags** are passively operated without a battery. The energy required for operation is provided by the read/write head.

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.

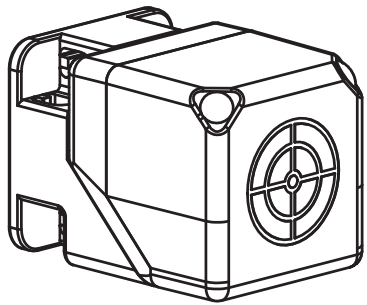
4.2 Device overview

DTA200

	Article number:	DTA200
	Function:	Read/write head
	Type designation:	DTSLF MCRWASUS01
	Type:	Rectangular

Tab. 1: DTA200 device overview

DTA201

	Article number:	DTA201
	Function:	Read head
	Type designation:	DTSLF MCROASUS01
	Type:	Rectangular

Tab. 2: DTA201 device overview

5 Installation

5.1 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.

5.2 Avoiding interference

The device generates a modulated electrical field with a frequency of 125 kHz.

Avoid interference of the 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.

5.3 Mechanical design

The antenna head can be aligned. On delivery, the active surface faces forward.

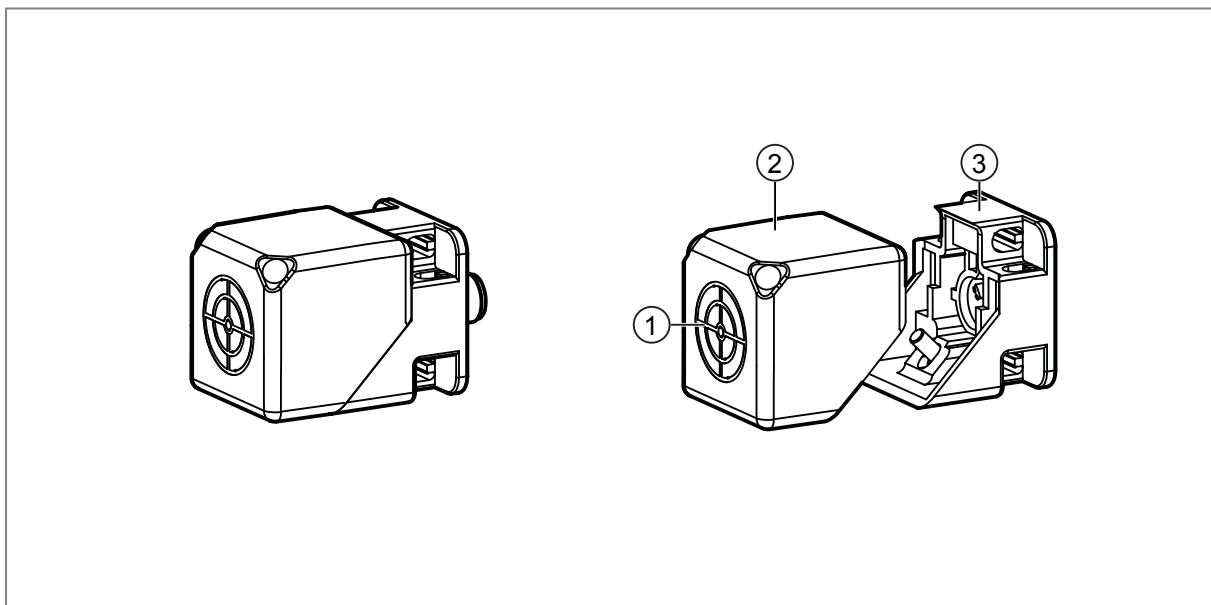
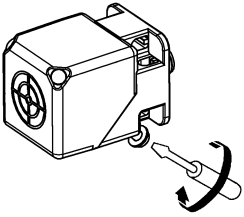
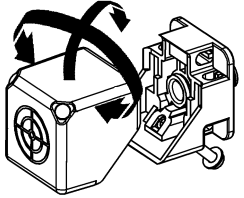
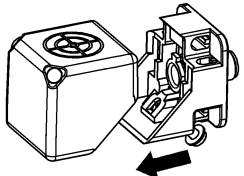
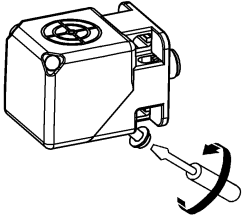


Fig. 2: As on delivery / Antenna head detached from the fixing element

- 1: Sensing face
- 2: Adjustable antenna head
- 3: Fixing element

5.4 Alignment of the sensing face

	► Loosen the screw.
	► Remove the antenna head from the fixing element and turn it.
	► Attach the fixing element to the antenna head.
	► Tighten the screw.

5.5 Install device

- Fix the device with 2 M5 screws and nuts.

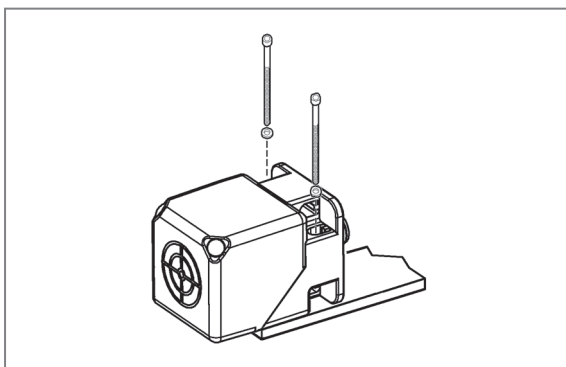


Fig. 3: Non-flush mounting

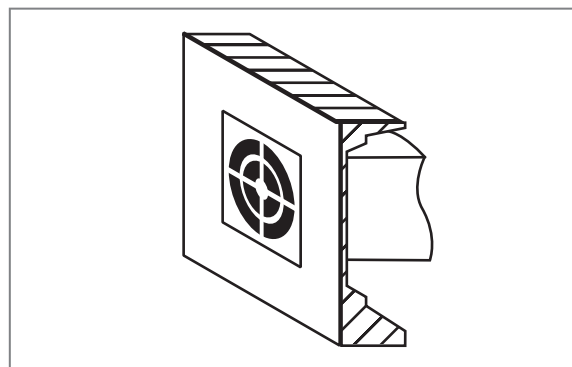


Fig. 4: Flush mounting

5.6 Mounting distances

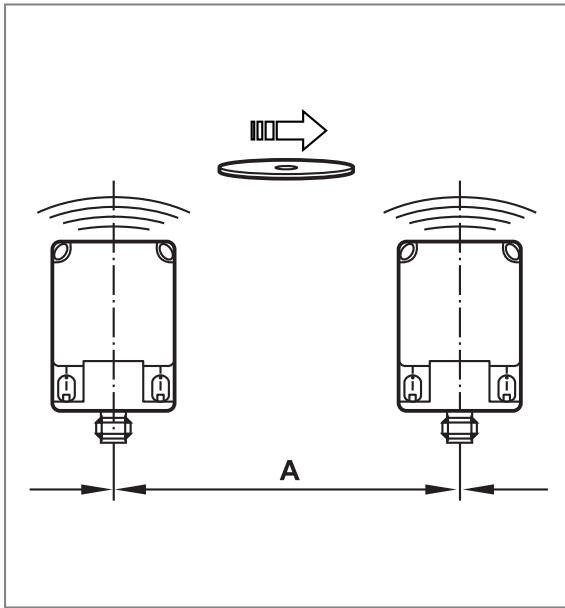


Fig. 5: Minimum lateral distance

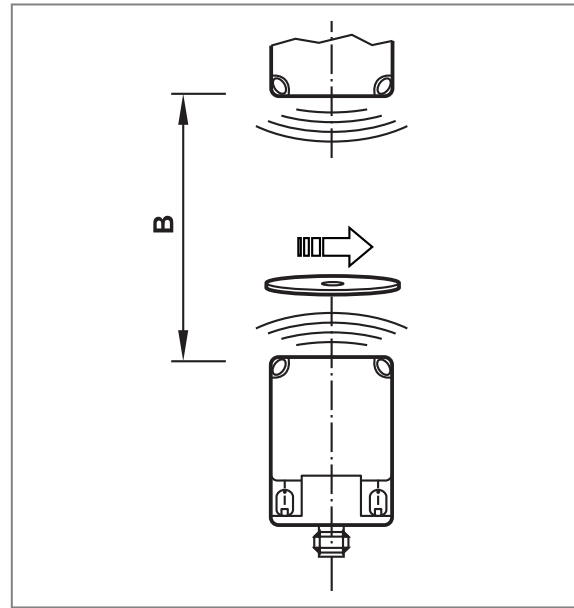


Fig. 6: Minimum frontal distance

Operating mode	Lateral distance [A]	Frontal distance [B]
Reading and writing	≥ 300 mm	≥ 300 mm
Reading only	≥ 150 mm	≥ 150 mm

Tab. 3: Mounting distances

5.7 Positioning of the ID tag



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

- Align the ID tag on the central axis of the antenna of the device.
 - ▷ The distance “D” is indicated in the data sheet.
 - ▷ All indications apply to static read/write operations.

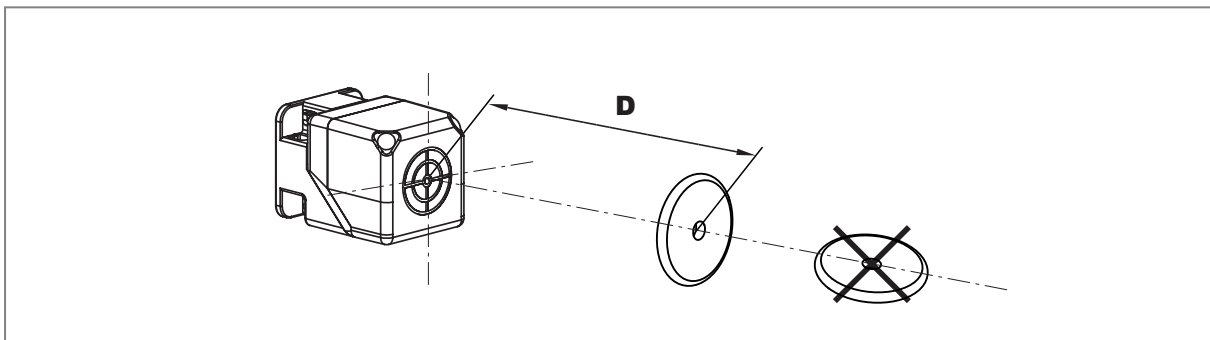
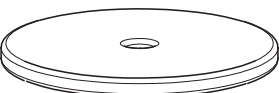
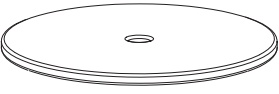
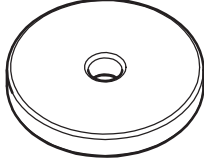


Fig. 7: Position the ID tag

5.8 Read/write distances

The indications apply to static read/write operations.

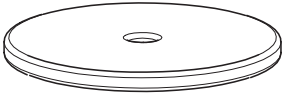
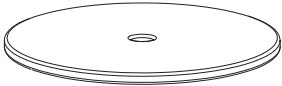
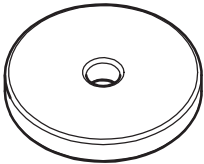
Non-flush installed ID tags in non-metallic environments

ID tag	Type	Position of the ID tag	Writing and reading [mm]
E80311		Above the device	25
E80312		Above the device	25
E80317		Above the device	35
E80318		Above the device	55
E80319		Above the device	65
E80320		Above the device	60
E80322		Above the device	55

Tab. 4: Read/write distances for non-flush installed ID tags in non-metallic environments

Flush-installed ID tags in metallic environments

ID tag	Type	Position of the ID tag	Writing and reading [mm]
E80311		Above the device	22
E80312		Above the device	22

ID tag	Type	Position of the ID tag	Writing and reading [mm]
E80317		Above the device	28
E80318		Above the device	36
E80319		Above the device	45
E80320		Above the device	40
E80322		Above the device	36

Tab. 5: Read/write distances for flush-installed ID tags in metallic environments

6 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

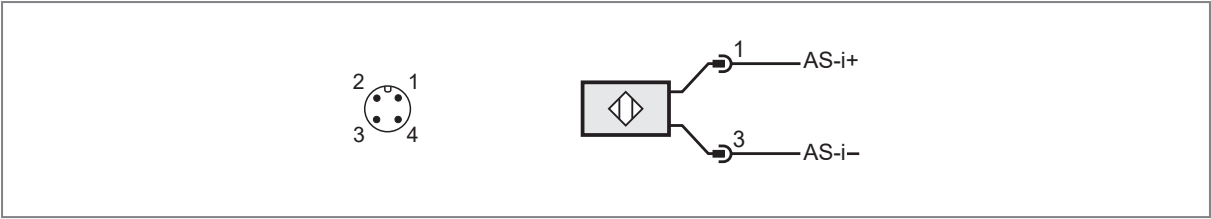
- ▷ Fire hazard in case of a malfunction.
- ▶ Use energy-limited circuit according to IEC 61010-1 chap. 9.4.

ATTENTION

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

6.1 Wiring

- ▶ Connect the device to the AS-i network using the M12 connector.
- ▷ Voltage is supplied via the AS-i network.



Pin	Assignment
1	AS-i+
3	AS-i-

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

6.2 Minimum distance between AS-i cable and housing

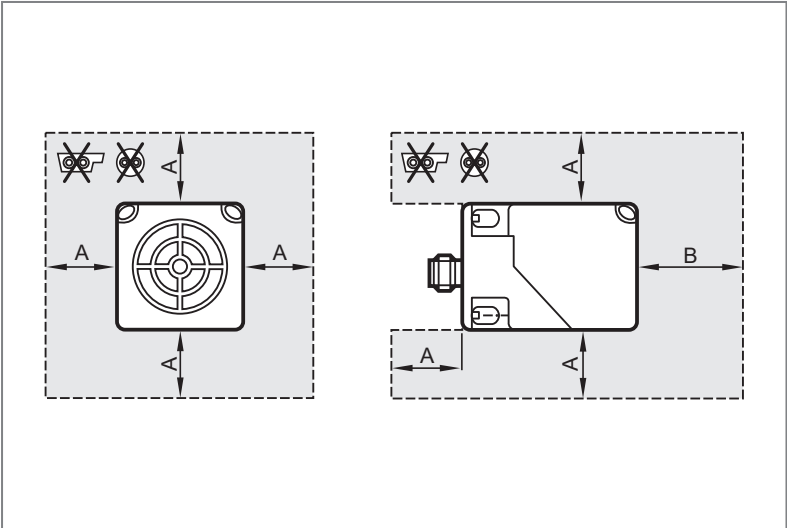
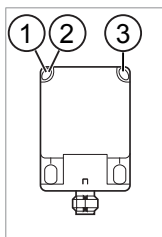


Fig. 8: Minimum distance of the device to AS-i cables

[A] and [B] are used to specify the minimum distances between the device and AS-i cables.

- ▶ [A] = 50 mm must be observed.
- ▶ [B] = 100 mm must be observed.

7 Operating and display elements



- 1: Yellow LED (ID tag)
 2: Red LED (AS-i data communication)
 3: Green LED (operating voltage)

Fig. 9: Operating and display elements

Reading an ID tag

In the basic setting, the device reads an ID tag.

LED	Status	Description
Green	On	Operating voltage OK
	Off	Operating voltage missing
Yellow	On (pulse)	ID tag read successfully
	On (permanently)	ID tag read successfully and still in the field
	Off	Possible reasons: • No ID tag in the field. • Faulty ID tag in the field. • Invalid ID tag in the field.
Red	On	AS-i data communication error
	Off	AS-i data communication OK

Tab. 6: Display elements for reading an ID tag

Writing an ID tag

The DTA200 device can also write an ID tag.

LED	Status	Description
Green	On	Operating voltage OK
	Off	Operating voltage missing
Yellow	On (pulse)	ID tag written successfully
	On (500 ms flashing)	ID tag not written. Possible reasons: • ID tag unformatted. • ID tag outside the detection range. • ID tag protected by a lock bit. • Value outside the value range. • Invalid command.
	Off	Possible reasons: • No ID tag in the field. • Faulty ID tag in the field. • Invalid ID tag in the field.
Red	On	AS-i data communication error
	Off	AS-i data communication OK

Tab. 7: Display elements for writing an ID tag

8 Operation

8.1 Basic settings in the AS-i network

Parameter	DTA200 write/read head	DTA201 read head
AS-i profile	7.4	7.3
I/O code	7h	7h
ID code	4h	3h
Extended ID2 code	Ch	Ch
ID1 code for code value	Fh	Fh
Slave address (factory setting)	0	0

Tab. 8: Basic settings in the AS-i network

8.2 Addressing

The device is addressed with one of the following components:

- Addressing device (e.g. AC1154),
- AS-i master,
- AS-i software of the host.



The component must support AS-i version 2.1.

Addressing the device:

- Assign an address between [1] and [31].

8.3 Analogue value representation

For the AS-Interface, the device is an analogue input slave. The transmission protocols of the AS-i profile 7.4 or 7.3 are supported.

If the master is operating on the M3 or M4 master profile, it will automatically detect the device and support the 7.4 profile.

For the analogue value transmission the AS-i profiles 7.3 and 7.4 are identical.

8.4 Assignment of the data bits

The following data is transmitted in a transmission cycle:

E1	E2	E3	D16	D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	O	V
Extension bits (static "0")			User data bits																Additional information bits	

Tab. 9: Transmitted data in a cycle

Additional Information bits:

[O]: Overflow bit (is set with the values 7FFF and 8000h, otherwise "0")

[V]: Valid bit (is set with a valid value)

8.5 Coded value representation using the data bits D16...D1

The ID value is represented as a signed 16-bit number.

Range	Decimal from	Decimal to	Hex from	Hex to
Value range	0	32767	0	7FFF
Message range	-1	-32768	FFFF	8000h

Tab. 10: Coded value representation using data bits



If the value is "0", there is no ID tag in the reading range or the ID tag has not been detected.

8.6 Additional functions to the AS-i profile 7.4

The following additional functions are available for the DTA200 read/write head:

- Read ID string (reading AS-i slave information)
- Read diagnosis string (reading statistics on read/write processes)
- Read parameter string (reading data from ID tag)
- Write parameter string (writing data to ID tag)
- Requesting data from the ID tag

More information at www.ifm.com.

9 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.

10 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

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Glossary

AS-i

The AS-Interface (Actuator Sensor Interface) is a fieldbus communication standard for connecting sensors and actuators.

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.