



Operating instructions

DTC124

DTC125

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 www.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 used

ATTENTION

Warning of damage to property

1.3 Legal and copyright information

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This offer is valid to anyone in receipt of this information. This offer is valid for at least three years (from the date you received the GPL/LGPL covered code).

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.

3 Intended use

The device is an RFID read/write head for reading and writing ID tags in industrial environments. The read/write head is configured and data is exchanged via the integrated CANopen interface.

Possible applications:

- Identification of interchangeable tools,
- identification of attachments on mobile machines.



The device may only be used under the operating conditions specified in the data sheet.

4 Items supplied

- DTC RFID read/write head
- Package insert 'general information'
- Package insert 'radio approval'

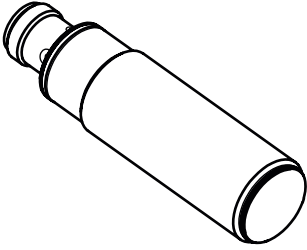
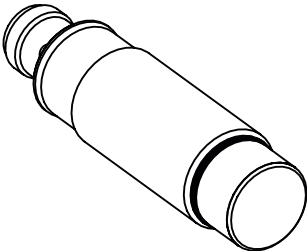


The device is supplied without installation and connection accessories.

Available accessories: www.ifm.com.

The optimum function is not ensured when using components from other manufacturers.

5 Function

	Art. no.: Function: Operating frequency: RFID standard: Type: Max. transmitter power:	DTC124 Read/write head 13.56 Mhz ISO 14443A M18, flush mountable 200 mW
	Art. no.: Function: Operating frequency: RFID standard: Type: Max. transmitter power:	DTC125 Read/write head 13.56 Mhz ISO 14443A M18, non flush mountable 200 mW

5.1 CANopen technology

The **CANopen** communication profile is based on the **CAN** Application Layer (CAL) specification of the **CiA** organisation. CANopen is considered as a robust fieldbus with highly flexible configuration options. It is used in many different applications which are based on different application profiles. CANopen comprises a concept to configure and communicate real-time data using synchronous and asynchronous messages. Four message types (**objects**) are distinguished.

1. Administration messages (layer management, network management and **identifier** distribution)
2. Service Data Objects (**SDO**)
3. Process Data Objects (**PDO**)
4. Predefined Objects (emergency)

For further information please refer to the CiA-CAN specification (CiA 301 - CANopen).

References

<http://www.can-cia.org>

CAN Application Layer, DS 201 ...207	CiA
LSS profile	DS305 CiA
CAN-based communication profile	DS 301 CiA
CAN specification version 2.0 A	Robert Bosch GmbH

6 Installation

ATTENTION

Radiated electromagnetic field strengths

- ▷ The device sends ultrahigh frequency electromagnetic waves. It complies with the country-specific limit values for the public and workers.
- ▶ Disconnect the device in the vicinity of medical equipment.

6.1 Installation instructions for devices



Devices installed next to each other interfere if they are not configured correspondingly.



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



Installing a unit in or on metal reduces the read and 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 Installation instructions for ID tags



For installation in and 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).



Align the axes of the RFID device and the ID-TAG in the same way.

6.3 Avoiding interference

The unit generates a modulated electromagnetic field in the following frequency ranges:

DTC124: 13.56 Mhz

DTC125: 13.56 Mhz

Interference in data communication is avoided if there are no other RFID devices in the vicinity, for example frequency converters and switched-mode power supplies. If there are other RFID devices in the vicinity:

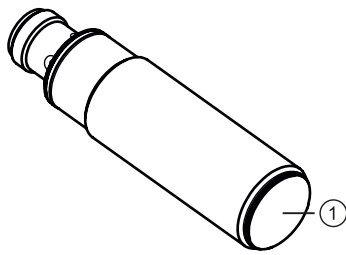
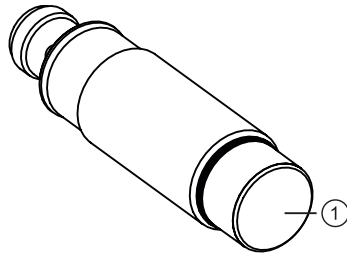
- ▶ The mounting distances between the devices should be as large as possible.
- ▶ Use the devices in alternating operation.
- ▶ Switch the HF field of the device on/off.



The HF field is attenuated if there are people or objects (cables, metal profiles, etc.) between the device and ID tag.

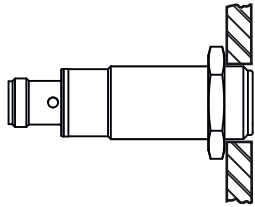
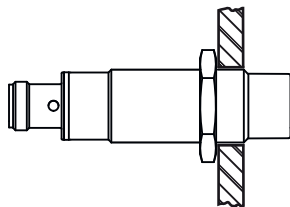
- ▶ Keep the area between the device and ID tag clear during reading or writing.

6.4 Mechanical design

DTC124	DTC125
	

1 Sensing face

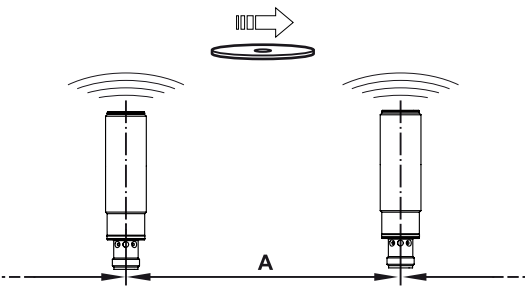
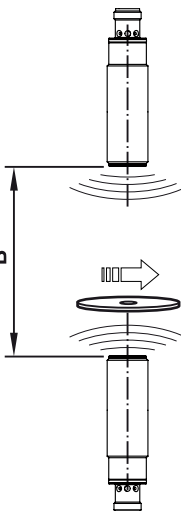
6.5 Mounting options

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Flush mounting	Non flush mounting

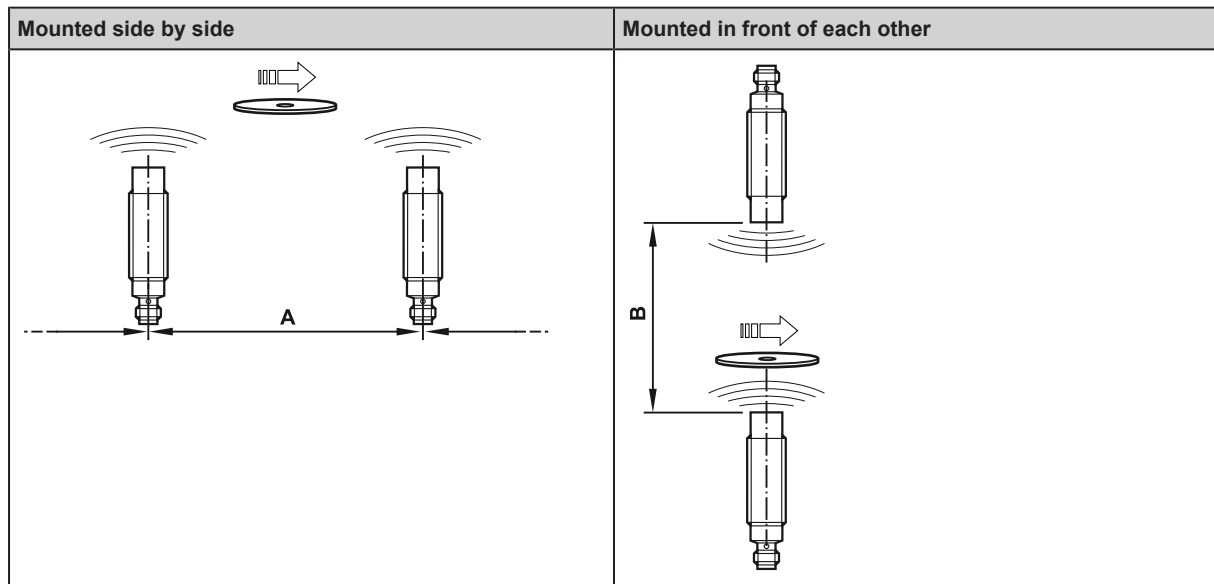
► Fix the device using the supplied M18 nut.

6.6 Mounting distances

DTC124

Mounted side by side	Mounted in front of each other
	

Operating mode	Distance (A)	Distance (B)
For reading and writing	≥ 50 mm	≥ 100 mm

DTC125

Operating mode	Distance (A)	Distance (B)
For reading and writing	≥ 65 mm	≥ 180 mm



Interference in data communication is avoided if there are no other RFID HF devices in the vicinity. If there are other RFID HF devices 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.

6.7 Positioning of the ID tags

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

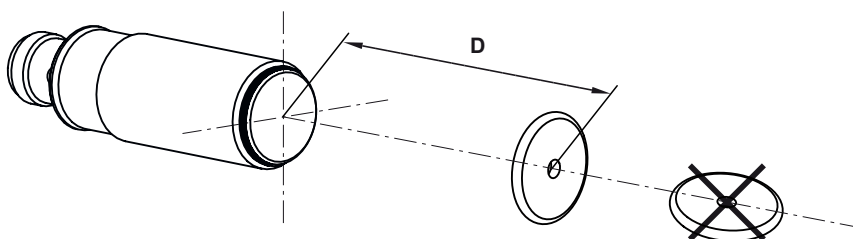
DTC124

Fig. 1: Position the ID tag

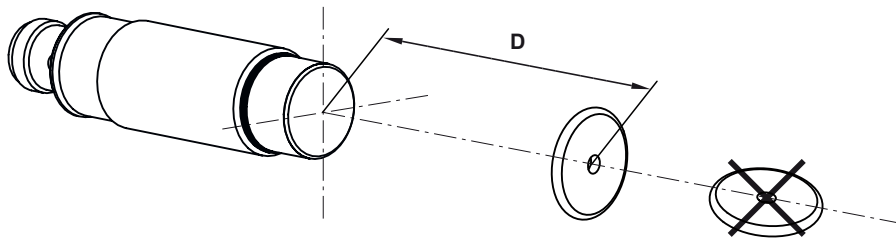
DTC125

Fig. 2: Position the ID tag

7 Electrical connection



The device must be connected by a qualified electrician.

Device of protection class III (PC III).

The electrical supply must only be made via PELV/SELV circuits.

► Disconnect power before connecting the device.

ATTENTION

The IP rating indicated in the data sheet is only guaranteed if the M12 connectors are firmly screwed. The device can be damaged by insufficiently tightened M12 connectors.

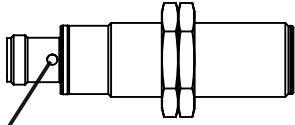
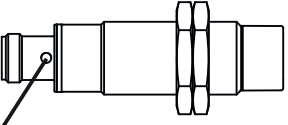
► Screw the M12 connector to the device applying 1 to 1.5 Nm.

7.1 Wiring

The device has a 5-pole round M12 connector (A-coded). The pin connection corresponds to CiA DR-303-1.

Wiring diagram	Pin assignment	Description
	1: CAN shield 2: + UB 3: CAN_GND 4: CAN_H 5: CAN_L	Not used Supply voltage GND H bus cable L bus cable

8 Operating and display elements

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 LED	 LED

Operating status	LED red	LED green	LED yellow
Preoperational	Off	Permanently on	Off
Preoperational and ID tag detected	Off	Flashes alternately with yellow LED (every 1.6 s)	Flashes alternately with green LED (every 1.6 s)
Operational	Off	Flashes (every 0.4 s)	Off
Operational and ID tag detected	Off	Off	Permanently on
Configuration error	Flashes (every 0.4 s)	LED reacts according to the current operating status	
Error in the CAN network	Flashes (every 1.2 s)		
CAN bus deactivated	Permanently on	Off	Off
LSS service activated	Flashes	Off	Off
Hardware error detected in the device	Off	Off	Flashes

9 Operation

9.1 CANopen interface

The RFID read/write head has a standardised CANopen interface according to CiA DS-301. All measured values and parameters can be accessed via the object directory (OD). The individual configuration can be saved in the internal permanent memory.

The device is delivered with Node ID 32 and a bit rate of 125 Kbits/s.



- ▶ Only use cables approved for CANopen.
- ▶ Terminate the cables using terminating resistors (120 Ω).
- ▷ The ifm cable EVC492 contains integrated terminating resistors.

9.1.1 CANopen functions

The following CANopen functions are available:

- 64 transmit and receive process data objects (TPDO1.. 64, RPDO1.. 64) in two possible operating modes:
 - individual check via remote transmission request telegram (RTR)
 - event-controlled transmission
- Error messages via emergency object (EMCY) with support of the:
 - general error register
 - manufacturer-specific status register
 - error list
- Heartbeat monitoring mechanism
- Status and error indication via LED
- In addition to the CiA DS-301 functionality there are more manufacturer and profile-specific characteristics:
 - setting of the Node ID and the bit rate via object directory entry (SDO)
 - configuration and reading/writing of operational data via service data objects (SDO)
- Support of the layer settings service (LSS)
- Support of synchronous process data transmission (SYNC)

9.1.2 Change the Node ID and bit rate

The device supports several options how to change the Node ID and the bit rate. The device is delivered with the Node ID 32 and a bit rate of 125 Kbits/s.



Each Node ID must only be assigned once in the CANopen network. If a Node ID is assigned several times, malfunction in the CANopen network will result.

Change the Node ID and bit rate in the object directory

The Node ID is entered in the object directory in the objects 0x20F0 and 0x20F1. If the two values are identical, the setting is stored and is active after a software reset of the device. Values between 1 and 127 may be used as Node ID.

The bit rate is entered in the objects 0x20F2 and 0x20F3. If the two values are identical, the setting is stored and is active after a software reset of the device. The following values may be used as bit rate:

Value	Bit rate
0	1000 kBits/s
1	800 kBits/s
2	500 kBits/s
3	250 kBits/s
4	125 kBits/s
5	100 kBits/s
6	50 kBits/s
7	20 kBits/s



If a master is used in the CANopen network for central storage of parameters, the changed values for Node ID (0x20F0 and 0x20F1) and bit rate (0x20F2 and 0x20F3) must be additionally entered in the master.

Otherwise the values will be reset during each start of the CANopen network.

Change the Node ID and bit rate via LSS

Using the layer setting service (LSS) an LSS master can change the Node ID and bit rate of the device (LSS slave) via the CAN bus. The LSS master sets all LSS slaves to a configuration mode. Each LSS slave can be unambiguously identified via the device data (vendor ID, product code, revision number and serial number).

To change the bit rate the LSS master transfers the new bit rate in the configuration mode with the service "Configure timing bit". The LSS slave replies to the LSS master if the new bit rate is supported. Then the LSS master transmits the time "Switch delay" via the service "Activate bit timing" after which the new bit rate should be activated. After activation the LSS master switches the LSS slave again to the operating mode.

To change the Node ID the LSS master transfers the new Node ID in the configuration mode. The LSS slave replies to the master if the new Node ID is valid. After changing the Node ID the LSS master switches the LSS slave again to the operating mode.

The new bit rate and Node ID become active after a software reset of the LSS slave.

9.1.3 Set-up

The CANopen standard CiA301 defines three possible operating states:

Pre-operational

In the pre-operational state no **PDO** messages (process data) can be transmitted. The pre-operational state is used to set the sensor parameters or as standby mode.

During booting in the pre-operational mode, the device reports the bootUP message "0x700+**Node ID**" to the CAN bus.

Operational

In the operational state all communication services are carried out. The operational state is used to exchange the process data while in operation.

Stopped

In the stopped state only **NMT** messages (network management) are possible. This allows almost complete separation of redundant or faulty sensors from the bus.

The master or network manager can request the sensor via NMT messages to change the state accordingly.

9.1.4 Use of 32 bit data types

CANopen defines data types with a maximum size of 64 bits (8 bytes). By means of the data type, the user data of ID tags is transmitted efficiently via the **CANopen** interface. The data type is also used for the default setting of the device and the **EDS** file.

However, some controllers can only process data types with a maximum width of 32 bits (4 bytes). In order to support all types of controllers, the device offers alternative data objects whose data types are restricted to max. 32 bits. These data objects are marked by the addition "32 bits" in these instructions. Additionally, an EDS file is supplied for use of the data types that is read by the controller software.

By default, the device uses 64-bit data types (e.g. for the preconfigured **PDOs**). The setting must be adapted to the use of 32-bit data types. The setting can be changed via the controller software, by reading the corresponding EDS file.

9.1.5 Communication types of the process data object (PDO)

The **TPDO** can be checked at any time by transmitting a remote transmission request telegram (RTR). Otherwise the TPDOs are sent automatically as soon as their value changes (event-driven).

As an option, the CANopen service "**SYNC**" can be used (see CiA 301, 7.2.5 Synchronization object (SYNC)). For the synchronised transmission CANopen provides the SYNC object at which the TPDOs are transmitted after every "nth" reception of a SYNC telegram.

A total of 64 TPDOs and 64 **RPDOs** is available; on delivery only the first 4 RX and 3 TX of each are active. If the configuration of the CANopen network allows it, the remaining process data objects can also be activated.

The process data is assigned to the linear address range in the standard settings of the ID tag. The TPDO1 maps e.g. the first 8 bytes of the user data memory of the ID tag.

Reading of the memory and transmission of the data via TPDO is effected automatically as soon as a new ID tag is detected.

Writing of the data to the ID tag is effected in the same way by writing access to the respective RPDO.



Data transfer per process data object is only possible in the "Operational" operating mode. (→ Set-up □ 17)



The preset TPDOs and RPDOs are allocated 64-bit data objects. For use of 32-bit controllers, the settings of the PDOs must be adapted. (→ Use of 32 bit data types □ 18)

9.1.6 Object directory (OD)

CANopen communication (CiA 301)

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x1000	0x00	Device type	u32	ro	0x00000000	-	-
0x1001	0x00	Error register	u8	ro	0x00	-	-
0x1003	0x01 0x02	Pre-defined error field	032	ro	0x00000000	-	-
0x1005	0x00	COB-ID SYNC	u32	rw	0x00000000	-	Yes
0x1008	0x00	Manufacturer device name	vSTR	ro	Article no. of the device	-	-
0x1009	0x00	Manufacturer hardware version	vSTR	ro	Current hardware version	-	-
0x100A	0x00	Manufacturer software version	vSTR	ro	Current software version	-	-

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x1010	0x01	Save parameters (Save device parameters in non-volatile memory)	u32	rw	0x00000000	-	-
0x1011	0x01	Load default communication parameters	u32	rw	0x00000000	-	-
0x1014	0x00	COB ID EMCY (COB-ID emergency message)	u32	rw	Node ID + 0x80	-	-
0x1015	0x00	Inhibit time EMCY (Inhibit time between EMCY messages)	u16	rw	0x0000	-	Yes
0x1017	0x00	Producer Heartbeat time (Time difference between sent heartbeats in ms)	u16	rw	0x0000	-	Yes
0x1018	0x01	Vendor ID	u32	ro	0x0069666D	-	-
	0x02	Product code	u32	ro	Product code of the device version	-	-
	0x03	Revision number	u32	ro	Main revision and current software version	-	-
	0x04	Serial number	u32	ro	Serial number of the device	-	-
0x1200	0x01	COB ID client to server	u32	ro	Node ID + 0x600	-	-
	0x02	COB ID client to server	u32	ro	Node ID + 0x580	-	-
0x1400 0x143F	0x01	RPDO parameter: COB ID	u32	rw	Link (→ Process data objects □ 24)	-	Yes
	0x02	RPDO parameter: Transmission type	u8	ro	0xFF	-	Yes
0x1600 0x163F	0x01-0x08	RPDO mapping	u32	rw	Link (→ Process data objects □ 24)	-	Yes
0x1800 0x183F	0x01	TPDO parameter: COB ID	u32	rw	Link (→ Process data objects □ 24)	-	Yes
	0x02	TPDO parameter: Transmission type	u8	rw	0xFF	-	Yes
	0x03	TPDO parameter: Inhibit time	u16	rw	0x00	-	Yes
0x1A00 0x1A3F	0x01-0x08	TPDO mapping	u32	rw	Link (→ Process data objects □ 24)	-	Yes

Bus configuration

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x20F0	0x00	Node ID Setting A (Node ID for CAN-open communication)	u8	rw	32	-	Auto-save

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x20F1	0x00	Node ID Setting B (Node ID for CAN-open communication)	u8	rw	32	-	Auto-save
0x20F2	0x00	Bit rate setting A (CAN bus bit rate)	u8	rw	4	-	Auto-save
0x20F3	0x00	Bit rate setting B (CAN bus bit rate)	u8	rw	4	-	Auto-save

Status and control of the reader

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2150	0x00	Device status (device status flags)	u32	ro		Yes	-
0x2151	0x00	Antenna active (enable HF front end of the device)	bool	rw	1	-	Yes
0x2160	0x01-0xFE	Definition ID tag type (name of supported ID tags)	dom	ro	Link (→ Select the ID tag type □ 27)	-	-
0x2161	0x00	Selects ID tag type (value selects ID tag type defined in 0x2160)	u8	rw	2	-	Yes
0x2162	0x00	RSSI	u8	ro	-	Yes	-

ID tag information

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2188	0x00	Current UID (UID of the ID tag in the reading range, PDO mappable)	u64	ro	0x0000000000000000	Yes	
0x2189	0x00	Current UID length (UID of the ID tag in the reading range, PDO mappable)	u8	ro	0x00	Yes	
0x218A	0x01	ID tag information: UID	u64	ro	0x0000000000000000	-	
	0x02	ID tag information: UID length (can assume 4, 7, 10)	u8	ro	0x00	-	

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x218A	0x03	ID tag information: Level 4 (0 or 1)	u8	ro	0x00	-	
	0x04	ID tag information: SAK	u8	ro	0x00	-	
	0x05	ID tag information: ATQA	u16	ro	0x0000	-	
	0x06	ID tag information: Memory size	u8	ro	0x00	-	
	0x07	ID tag information: Transponder type (detected type of ID tag, defined in 0x2160)	u8	ro	0x00	-	
0x2198	0x00	Current UID upper 4 bytes (32 bit) (UID of the ID tag, in reading range, PDO mappable)	u32	ro	0x00000000	Yes	
0x2199	0x00	Current UID medium 4 bytes (32 bit) (UID of the ID tag, in reading range, PDO mappable)	u32	ro	0x00000000	Yes	
0x219A	0x00	Current UID lower 2 bytes (32 bit) (UID of the ID tag, in reading range, PDO mappable)	u16	ro	0x0000	Yes	

Read mappable data

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2200	0x01-0x40	Read start address in the user memory (start of the address range on the ID tag to be read)	u16	rw	Link (→ Process data objects □ 24)	-	Yes
0x2201	0x01-0x40	Read length (length of the memory range on the ID tag to be read; max. 8 bytes)	u8	rw	Link (→ Process data objects □ 24)	-	Yes

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x220A	0x01-0x40	ID tag data 8 bytes ID tag data, updated when new ID tag enters the reading range)	u64	ro		Yes	-
0x220B	0x01-0x40	ID tag data (32 bit) (4 bytes of ID tag data, updated when new ID tag enters the reading range)	u32	ro		Yes	-

Read data range

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2280	0x00	Read start of address (start of the address range on the ID tag to be read)	u16	rw	0x0000	-	Yes
0x2281	0x00	Read length (length of the memory range on the ID tag to be read)	u16	rw	0x0000	-	Yes
0x2282	0x00	ID tag data (requested data from the ID tag as configured in objects 0x2280 and 0x2281)	dom	ro		-	-

Write mappable data

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2300	0x01-0x40	Write start address (start of the address range on the ID tag to be written)	u16	rw	Link (→ Process data objects □ 24)	-	Yes
0x2301	0x01-0x40	Write length (length of the memory range on the ID tag to be written; max. 8 bytes)	u8	rw	Link (→ Process data objects □ 24)	-	Yes

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2302	0x01-0x40	Auto-write (activate automatic writing access if a new ID tag is detected)	bool	rw	0	-	Yes
0x230A	0x01-0x40	ID tag data (8 bytes of ID tag data)	u64	rw		Yes	-
0x230B	0x01-0x40	ID tag data (32 bit) (4 bytes of ID tag data)	u32	rw		Yes	-
0x231E	0x00	Write trigger (32 bits) upper PDOs	u32	rw	0x00000000 00000000	Yes	-
0x231F	0x00	Write trigger (32 bits) lower PDOs	u32	rw	0x00000000 00000000	Yes	-

Write data range

Index	Sub-index	Name (object)	Type	Access	Default value	PDO mapping capability	Save object value
0x2380	0x00	Write start address (start of the address range on the ID tag to be written)	u16	rw	0x0000	-	Yes
0x2381	0x00	Write length (length of the memory range on the ID tag to be written)	u16	rw	0x0000	-	Yes
0x2382	0x00	ID tag data (data to be written to the ID tag as configured in objects 0x2380 and 0x2381)	dom	wo		-	-

9.1.7 Monitoring activity via Heartbeat

By means of the **Heartbeat** function the activity of a device in the CANopen network can be monitored by the master. The device regularly sends a Heartbeat message containing the device status.

The Heartbeat function is activated by entering a value greater than "0" into the Heartbeat interval time object (OV index 0x1017). The value indicates the time between two Heartbeat signals in milliseconds. The Heartbeat function is deactivated with the value "0".

9.1.8 Change objects

Changes of the **objects** in the object directory are applied at once. The changes will get lost by a reset. To prevent this the objects have to be saved in the internal permanent memory (flash). All the objects marked in the object directory with "Save object value: yes" are permanently stored in the flash of the device. By writing the command "Save" (65766173h) to save the objects (OV index 1010h/01h) all current objects of the object directory are transferred to the flash memory.

The objects can be reset to factory setting by writing the signature "Load" (64616F6Ch) to the OV index 1011h/01h. After a reset the changes are applied.

Depending on the architecture of the CANopen network the objects can also be stored centrally in a CANopen master. In this case the objects are transferred to the device when the system is started and the locally stored values are overwritten.



Special features of the objects **Node ID** (OV index 0x20F0 and 0x20F1) and the bit rate (OV index 0x20F2 and 0x20F3):

- ▶ Changes of the objects are only applied after a reset. (→ Change the Node ID and bit rate ¶ 16)
- ▶ The objects cannot be transferred to the flash via the OV index 1010h/01h.
- ▶ The objects cannot be reset to the factory setting via the OV index 1011h/01h.

9.1.9 Process data objects

64 transmit and receive process data objects each are available. On delivery 3 process data objects are active.

Transmit process data objects (TPDO)

The table below contains the transmit process data objects (**TPDO**) on delivery.

TPDO	Settings for PDO mapping: COB	Object directory: Mapped object index	Object directory: Mapped object sub-index	Object directory: Mapped object length	ID tag memory: Read start address	ID tag memory: Read length
1	Node ID + 0x0180	0x2150	0x00	0x20	Device status	
2	Node ID + 0x0280	0x2188	0x00	0x40	UID	
3	Node ID + 0x0380	0x2189	0x00	0x40	UID length	
4	0 (deactivated)	0x220A	0x01	0x40	0x00000000	0x08
5	0 (deactivated)	0x220A	0x02	0x40	0x00000008	0x08
64	0 (deactivated)	0x220A	0x3D	0x40	0x000001E0	0x08



The preset **TPDOs** and **RPDOs** are allocated 64-bit data objects. For use of 32-bit controllers, the settings of the TPDOs and RPDOs must be adapted. (→ Use of 32 bit data types ¶ 18)

Receive process data objects (RPDO)

The table below contains the receive process data objects (**RPDO**) on delivery.

RPDO	Settings for PDO mapping: COB	Object directory: Mapped object index	Object directory: Mapped object sub-index	Object directory: Mapped object length	ID tag memory: Write start address	ID tag memory: Write length
1	Node ID + 0x0180	0x2150	0x00	0x40	Write trigger	
2	Node ID + 0x0280	0x230A	0x01	0x40	0x00000000	0x08

RPDO	Settings for PDO mapping: COB	Object directory: Mapped object index	Object directory: Mapped object sub-index	Object directory: Mapped object length	ID tag memory: Write start address	ID tag memory: Write length
3	Node ID + 0x0380	0x230A	0x02	0x40	0x00000008	0x08
4	0 (deactivated)	0x230A	0x03	0x40	0x00000010	0x08
5	0 (deactivated)	0x230A	0x04	0x40	0x00000018	0x08
64	0 (deactivated)	0x230A	0x3F	0x40	0x000001F8	0x08



The preset TPDOs and RPDOs are allocated 64-bit data objects. For use of 32-bit controllers, the settings of the TPDOs and RPDOs must be adapted. (→ Use of 32 bit data types ¶ 18)

9.1.10 Device status

The current device status is represented in the object "Device status" (OV index 0x2150, sub-index 0x00). On delivery the object is assigned to TPDO1.

Bit	31	30	29	28	27	26	25	24
Status	tag_err							
Default value	0	0	0	0	0	0	0	0

Bit	23	22	21	20	19	18	17	16
Status	write_err							
Default value	0	0	0	0	0	0	0	0

Bit	15	14	13	12	11	10	9	8
Status	read_err							
Default value	0	0	0	0	0	0	0	0

Bit	7	6	5	4	3	2	1	0
Status	bulk_err	temp_err	buf_ovfl	fr_err	busy	Present	ant	pow
Default value	0	0	0	0	0	0	1	1

Status	Value	Description	EMCY message
pow	1	Power enabled (always 1)	
ant	0	Antenna deactivated	
	1	Antenna enabled	
present	0	No ID tag present	
	1	ID tag present	
busy	0	Idle	
	1	Read or write access active	

Status	Value	Description	EMCY message
fr_err	0	Front end OK	
	1	Front end error detected (hardware problem)	Yes
buf_ovfl	0	Buffer ok	
	1	Buffer overflow detected	Yes
temp_err	0	Temperature OK	
	1	Excess temperature	
bulk_err	0	OK	
	1	More than 1 ID tag in the reception zone.	
read_err		Error during the last read operation	Yes
write_err		Error during the last write operation	Yes
tag_err		Error message from ID tag for last operation	Yes

read_err error codes (updated after each read access of the ID tag)

0x00	No Error, Command successfully executed
0x01	ID tag did not answer, maybe ID tag is no longer in the field
0x02	Error while receiving the answer from the ID tag (CRC error, framing error, collision, etc.)

write_err error codes (updated after each write access of the ID tag)

0x00	No Error, Command successfully executed
0x01	ID tag did not answer, maybe ID tag is no longer in the field?
0x02	Error while receiving the answer from the ID tag (CRC error, framing error, collision, etc.)

tag_err error codes (updated after read or write access of the ID tag)

0x00	The ID tag does not cause an error.
0x01	The specified command is not supported. Example: command code error.
0x02	The command is not detected. Number of blocks is too high. Example: format error.
0x03	The indicated options are not supported.
0x05	It is written outside the writable area.
0x06	There is more than 1 ID tag in the detection field.
0x0F	NXP ID tag: other error.
0x10	NXP ID tag: invalid argument.
0x11	NXP ID tag: CRC or parity error.
0x12	NXP ID tag: authentication counter too high.
0x13	NXP ID tag: write to memory failed.
0x14	NXP ID tag: other error.
0x15	NXP ID tag: write to memory failed.
0x16	NXP ID tag: other error.

0x00	The ID tag does not cause an error.
0x1F	ID tag: other error.
0x20	The data range is exceeded.
0x21	The end of the data range is reached.
0x22	The password is required.
0x23	The password is wrong, no further try.
0x24	The password is wrong, 1 more try.
0x25	The password is wrong, 2 more attempts.
0x26	The update is not successful.
0x27	The transmission size is wrong.
0x28	The command is incompatible with the file structure.
0x29	The security status is not fulfilled.
0x2A	The reference data cannot be used.
0x2B	The condition of use is not fulfilled.
0x2C	The parameter is incorrect (e.g. Le or Lc).
0x2D	The file or application is not found.
0x2E	The file length is exceeded (e.g. Lc).
0x2F	The P1 or P2 value is wrong.
0x30	The INS field is not supported.
0x31	The class is not supported.
0x32	The ID tag needs more time for the response.

9.1.11 Deactivate antenna

The antenna in the device can be deactivated if the value 0 is written to the object "Antenna active" (OV index 0x2151). In this case no ID tag is detected any more since the magnetic field of the device is no longer active.

The antenna is reactivated with the value 1. With the object "Antenna active" it is possible to prevent interference between two devices placed next to each other by alternately deactivating the antennas of the two devices.

9.1.12 Select the ID tag type

The device is compatible with several ID tag types. Depending on the size of the user data memory and manufacturer, the ID tags differ in the access to data. Therefore, the device must know which type of ID tag is used in the system.

In object 0x2161, the ID tag type used in the RFID system can be selected. The available ID tag types can be read in the object 0x2180, sub-index 0x01-0xFE.

ID tag type	Manufacturer	Name	Block size [bytes]	Number of blocks	User data [bytes]
1		Self-identification			
2		Unknown			
3	NXP	NTAG210	4	16	48
4	NXP	NTAG212	4	36	128
5	NXP	NTAG213	4	40	144
6	NXP	NTAG215	4	130	504
7	NXP	NTAG216	4	226	888
8	NXP	Ultralight	4	16	48

ID tag type	Manufacturer	Name	Block size [bytes]	Number of blocks	User data [bytes]
9	NXP	UL_EV1_80	4	16	48
10	NXP	UL_EV1_128	4	36	128
11	ST	ST512	4	15	60
12	ST	ST02K	4	63	252
13	ST	ST16K	8	255	2040
14	ST	ST64K	8	1023	8184
15	ST	ST04k	8	127	1016

Via the object 0x2182 0x06 it is possible to poll the ID tag type read by the device. First of all, the detected ID tag type must be read from the object 0x2182 sub-index 0x06 and this value must be entered in the object 0x2161.



ID tag type 1 is preset.



Change objects (→ 24)

9.1.13 Read information of an ID tag

The information of an ID tag can be read via the objects 0x2180 to 0x2182. To do so, the ID tag has to be within the detection range of the device.

The objects 0x2180 and 0x2182 are only valid as long as the ID tag is detected. If there is no ID tag within the range, the values of the objects are reset to 0.

The value of the object 0x2182 can be read from the ID tag on request.



Reading of information is not supported by each ID tag type.



The data is read exclusively from the user data area of an ID tag. Data before or after the user data area is ignored.

9.1.14 RSSI value

The RSSI value (Received Signal Strength, OV index 0x2162) informs about the strength of the received signal that is emitted by the ID tag in front of the device:

“0”: no ID tag detected

“1”: minimum signal strength

“8”: maximum signal strength



The maximum signal strength is only reached with certain device / ID tag combinations.



The signal strength depends on the distance between the ID tag and the active face of the device.



Position changes in the environment, e.g. of metallic objects, can influence the signal strength.

9.1.15 Error messages

The device supports a number of error messages that are sent in the event of a communication, hardware or RFID error. If one of these errors occurs, the error register (OV index 0x1001) and the error field (OV index 0x1003) are updated.

The **COB** ID of the emergency message can be changed in the object "COB ID EMCY" (OV index 0x1014). By setting bit 31 in this object the emergency messages are deactivated.

The disable time between two emergency messages can be defined via the object 0x1015. The indication is made in steps of 100 µs.



The COB ID of the emergency messages is preset to 0x80 + **Node ID**.

Error message	Error register (0x1001)	Error field (0x1003)	Description
0x8210	0x11		Protocol: PDO not processed due to length error.
0x8130	0x01		Monitoring: Node guarding or Heartbeat error
0x8100	0x11		Monitoring: general communication error when sending "Bus off"
0x5000	0x81	0x01	Device hardware error (antenna error)
0x4200	0x09	0x02	Device temperature too high
0xFF00	0x81	0x01	ID tag did not answer. Possibly the ID tag is no longer in the field.
0xFF00	0x81	0x02	Error while receiving the answer from the ID tag (CRC error, framing error, collision, etc.).
0xFF01	0x81	0x01	ID tag did not answer. Possibly the ID tag is no longer in the field.
0xFF01	0x81	0x02	Error while sending the answer from the ID tag (CRC error, framing error, collision, etc.).
0xFF02	0x81	0x01	The command is not supported. Possible reason: faulty command.
0xFF02	0x81	0x02	The command is not detected. Possible reason: format error.
0xFF02	0x81	0x03	Indicated options are not supported.
0xFF02	0x81	0x05	Writing outside the writable area.
0xFF02	0x81	0x06	There is more than one ID tag in the field.
0xFF02	0x81	0x0F	NXP ID tag: other error.
0xFF02	0x81	0x10	NXP ID tag: invalid argument.
0xFF02	0x81	0x11	NXP ID tag: CRC or parity error.
0xFF02	0x81	0x12	NXP ID tag: authentication counter too high.
0xFF02	0x81	0x13	NXP ID tag: write to memory failed.
0xFF02	0x81	0x14	NXP ID tag: other error.
0xFF02	0x81	0x15	NXP ID tag: write to memory failed.
0xFF02	0x81	0x16	NXP ID tag: other error.
0xFF02	0x81	0x1F	ID tag: other error.

Error message	Error register (0x1001)	Error field (0x1003)	Description
0xFF02	0x81	0x20	Data range exceeded.
0xFF02	0x81	0x21	End of data range reached.
0xFF02	0x81	0x22	Password required.
0xFF02	0x81	0x23	Password incorrect: no further try.
0xFF02	0x81	0x24	Password incorrect: 1 more try.
0xFF02	0x81	0x25	Password incorrect: 2 more attempts.
0xFF02	0x81	0x26	Data update not successful.
0xFF02	0x81	0x27	Wrong transmission size.
0xFF02	0x81	0x28	Command incompatible with the file structure.
0xFF02	0x81	0x29	Security status not fulfilled.
0xFF02	0x81	0x2A	Reference data not usable.
0xFF02	0x81	0x2B	Condition of use not fulfilled.
0xFF02	0x81	0x2C	Wrong parameter, example: Le or Lc.
0xFF02	0x81	0x2D	File or application not found.
0xFF02	0x81	0x2E	File length exceeded, example: Lc.
0xFF02	0x81	0x2F	P1 or P2 value incorrect.
0xFF02	0x81	0x30	INS field not supported.
0xFF02	0x81	0x31	Class not supported.
0xFF02	0x81	0x32	ID tag needs more time for the response.
0xFF03	0x81	0x00	Internal buffer overflow.

9.2 Data transfer with an ID tag

9.2.1 Read UID of the ID tag

The UID (Unique Identification Number) of the ID tag is available in object 0x2180 as soon as an ID tag is within the reading range of the device. If no ID tag is available, the value 0x0000000000000000 is entered.

If the object is mapped on a TPDO, transmission is event-controlled as soon as an ID tag enters the reading range or is removed from the reading field.



For 32-bit controls, the following objects are used instead of object 0x2180: 0x2198, 0x2199 and 0x219A.

9.2.2 Read data from the ID tag via PDO transfer

The transfer of the PDO data from the ID tag is event-controlled. That means that the configured TPDOs are automatically transmitted by the device when the data change. This is the case, for example, when a new ID tag is detected in the detection range of the device. The data is automatically read by the ID tag and transferred by means of the TPDOs via the CAN bus.

The data that was read by the ID tag and assigned to a TPDO is in the objects 0x220A with the sub-indices 0x01-0x40.



Only that data is read by the ID tag that is assigned to a TPDO. Data objects that are not assigned are not updated automatically.

There are two objects for each data object that are used for configuration:

- 0x2200 (read start address),
- 0x2201 (read length) with sub-indices matching the data object.

The start address in the user data area of the ID tag and length of the files to be read are set in the objects.



For 32-bit controllers, the object 0x220B must be used instead of object 0x220A. The maximum data length is restricted to 32-bit data (4 bytes).



If the configured data length is smaller than the data length of the object used (64 bits or 32 bits), the remaining bits are filled with 0.



Max. 64 bits or 32 bits can be transmitted in one TPDO. For the transmission of larger amounts of data, further TPDOs are assigned and the corresponding data objects are configured.



The data is read exclusively from the user data area of an ID tag. Data before or after the user data area is ignored.

9.2.2.1 Example 1

The data range 0x10 to 0x18 (8 bytes) is to be transferred with the 2nd TPDO.

TPDO	Settings for PDO mapping: COB	Object directory: Object index	Object directory: Object sub-index	Object directory: Object length
2	Node ID + 0x0280	0x220A	0x01	0x40

Object directory

Index	Sub-index	Name (object)	Value
0x2200	0x01	Read start of the address (start of the address range on the ID tag to be read)	0x10
0x2201	0x01	Read length (length of the memory range on the ID tag to be read; max. 8 bytes)	0x08

9.2.2.2 Example 2

The data range 0x44 to 0x48 (4 bytes) is to be transferred with the 6th TPDO.

TPDO	Settings for PDO mapping: COB	Object directory: Object index	Object directory: Object sub-index	Object directory: Object length
6	Node ID + 0x0680	0x220A	0x05	0x40

Object directory

Index	Sub-index	Name (object)	Value
0x2200	0x05	Read start of the address (start of the address range on the ID tag to be read)	0x44
0x2201	0x05	Read length (length of the memory range on the ID tag to be read; max. 8 bytes)	0x04

9.2.3 Write data to the ID tag via PDO transfer

To write data to an ID tag via PDO transfer an **RPDO** must be assigned to the object 0x230A with a sub-index in the range from 0x01 to 0x40. The address of the ID tag user data range to which the data is to be written is defined in object 0x2300. The subindices of these objects have to be identical.

The ID tag is written to after the data was written to the RPDO and the respective bit was changed in the "Write trigger" object (OV index 0x230F, sub-index 0x00).

	MSB								LSB
Bit	63	62	61	..	..	..	2	1	0
Trigger	tr64	tr63	tr62	..	..	..	tr3	tr2	tr1
Default value	0	0	0	0	0	0	0	0	0

Trigger	Description
tr64	Trigger for ID tag data 64 (0x230A/0x40)
tr63	Trigger for ID tag data 63 (0x230A/0x3F)
tr62	Trigger for ID tag data 62 (0x230A/0x3E)
tr61	Trigger for ID tag data 61 (0x230A/0x3D)
tr60	Trigger for ID tag data 60 (0x230A/0x3C)
tr59	Trigger for ID tag data 59 (0x230A/0x3B)
tr58	Trigger for ID tag data 58 (0x230A/0x3A)
...	...
tr6	Trigger for ID tag data 6 (0x230A/0x6)
tr5	Trigger for ID tag data 5 (0x230A/0x5)
tr4	Trigger for ID tag data 4 (0x230A/0x4)
tr3	Trigger for ID tag data 3 (0x230A/0x3)
tr2	Trigger for ID tag data 2 (0x230A/0x2)
tr1	Trigger for ID tag data 1 (0x230A/0x1)

The writing process is always made with the bit change of the respective bit (0->1 or 1->0). Ideally, the object "Write trigger" (OV index 0x230F, sub-index 0x00) is assigned to an RDPO. On delivery, the object "Write trigger" is assigned to the first RPDO.

Automatic writing of data can be activated with the object "Auto write" (OV index 0x2302). As soon as an ID tag is in the detection range, the last data is written to the ID tag.



Only data up to the configured data length is written to the ID tag. Subsequent data is ignored. For the writing of more than 8 bytes (4 bytes for 32-bit data objects), more RPDOs have to be assigned and the respective data objects have to be configured.



For 32-bit controllers, the object 0x230B must be used instead of object 0x230A. The maximum data length is restricted to 32-bit data (4 bytes).

The trigger is divided between the objects 0x231E and 0x231F. The object 0x231E contains the triggers for ID data 33 to 64. The object 0x231F contains the triggers for ID data 1 to 32.

9.2.3.1 Example 1

The data range 0x10 to 0x18 (8 bytes) is to be transferred with the 2nd RPDO.

RPDO	Settings for PDO mapping: COB	Object directory: Object index	Object directory: Object sub-index	Object directory: Object length
2	Node ID + 0x0200	0x230A	0x01	0x40

Object directory

Index	Sub-index	Name (object)	Value
0x2300	0x01	Read start of the address (start of the address range on the ID tag to be read)	0x10
0x2301	0x01	Read length (length of the memory range on the ID tag to be read; max. 8 bytes)	0x08
0x2302	0x01	Auto-write	0x00

Transfer data via RPDO:

PDO Transmission	PDO	Data
To the device	RPDO 2	0x12345678

Start write access:

PDO Transmission	PDO	Data
To the device	RPDO 1	Select bit 0 status

9.2.3.2 Example 2

The data range 0x44 to 0x48 (4 bytes) is to be transferred with the 6th RPDO. In addition, this data is to be written to an ID tag each time it reaches the detection range of the device.

RPDO	Settings for PDO mapping: COB	Object directory: Object index	Object directory: Object sub-index	Object directory: Object length
6	Node ID + 0x0600	0x230A	0x05	0x40

Object directory

Index	Sub-index	Name (object)	Value
0x2300	0x05	Read start of the address (start of the address range on the ID tag to be read)	0x44
0x2301	0x05	Read length (length of the memory range on the ID tag to be read; max. 8 bytes)	0x04
0x2302	0x05	Auto-write	0x01

Transfer data via RPDO:

PDO Transmission	PDO	Data
To the device	RPDO 6	0x12340000

The data is written to the ID tag when it has reached the detection range.



64-bit data (8 bytes) / 32-bit data (4 bytes) always have to be sent to an RPDO. For smaller data lengths than 64 bits / 32 bits, the remaining bits are ignored.

9.2.4 Error handling for PDO transfer

If a read or write access to an ID tag is not possible, the device creates an emergency message on the CAN bus.

The error code can be read from the error register (OV index 0x1001, sub-index 0x00) and the predefined error field (OV index 0x1003, sub-index 0x01-0x02). (→ Error messages □ 28)

9.2.5 Read data from the ID tag via SDO transfer

To read data from an ID tag via SDO transfer it is necessary to define the data address and length on the ID tag. The address must be indicated in object 0x2280 and the data length in object 0x2281.

Then read access can be started from the ID tag via a data transfer to object 0x2282.

9.2.5.1 Example

The data range 0x50 to 0x70 is to be read from the ID tag.

Object directory

Index	Sub-index	Name (object)	Value
0x2280	0x00	Read start of the address (start of the address range on the ID tag to be read)	0x50
0x2281	0x00	Read length (length of the memory range on the ID tag to be read; max. 8 bytes)	0x20

Transfer is started via reading the object 0x2282, sub-index 0x00.



The data is transferred in one piece as domain data type. Up to a data length of 4 bytes transfer is effected as expedited transfer; longer data lengths as segmented transfer.



The recipient must be prepared for temporary storage and processing of the data.

9.2.6 Write data to the ID tag via SDO transfer

To write data to an ID tag via SDO transfer it is necessary to define the data address and length on the ID tag.

The address must be indicated in object 0x2380 and the data length in object 0x2381. Then the write access to the ID tag can be started via a data transfer to object 0x2382.

9.2.6.1 Example

The data range 0x34 to 0x38 is to be transferred to the ID tag.

Object directory

Index	Sub-index	Name (object)	Value
0x2380	0x00	Write start of the address (start of the address range on the ID tag to be written)	0x34
0x2381	0x00	Write length (length of the memory range on the ID tag to be written)	0x03
0x2382	0x00	ID tag data (data to be written to the ID tag)	0x01020304



The data is transferred in one piece as domain data type. Up to a data length of 4 bytes transfer is effected as expedited transfer; longer data lengths as segmented transfer.



The transmitter must be able to provide the indicated data length.

9.2.7 Error codes during SDO transfer

SDO transfers are acknowledged transfers. If there is an error during transfer or during actions caused by the transfer, an error is signalled after the SDO transfer.

SDO error code	Description	Possible cause
0x05030000	Toggle bit unchanged.	
0x05040000	SDO protocol expired.	
0x05040001	Client/server command specifier not valid or unknown.	
0x05040002	Invalid block size (block mode only).	
0x05040003	Invalid sequence number (block mode only).	
0x05040004	CRC error (block mode only).	
0x05040005	Out of memory.	
0x06010000	Access to the object is not supported.	
0x06010001	Attempt to read a write only object.	
0x06010002	Attempt to write a read only object.	
0x06020000	Object does not exist in the object dictionary.	
0x06040041	Object cannot be mapped to the PDO.	
0x06040042	The number and length of the objects to be mapped would exceed PDO length.	
0x06040043	Reason: general parameter incompatibility.	
0x06040047	General parameter incompatibility in the device.	
0x06060000	Access failed due to a hardware error.	
0x06070010	Data type does not match; length of the service parameter does not match.	
0x06070012	Data type does not match; service parameter too long.	
0x06070013	Data type does not match; service parameter too short.	
0x06090011	Sub-index does not exist.	
0x06090030	Invalid value for parameter (download only).	
0x06090031	Value of written parameter is too high (download only).	
0x06090032	Value of written parameter is too low (download only).	
0x06090036	Maximum value is lower than minimum value.	
0x060A0023	Resource not available: SDO connection.	
0x08000000	General Error.	
0x08000020	Data cannot be transferred to the application or be stored.	Error read or write access of the ID tag. Detailed information in the device status object (0x2150).
0x08000021	Data cannot be transferred to the application or be stored due to a local controller.	
0x08000022	Data cannot be transferred to the application or stored due to the current device status.	
0x08000023	The dynamic generation of the object directory fails or no object directory is present (e.g. object directory is generated from the file and the generation fails because of a file error).	

SDO error code	Description	Possible cause
0x08000024	No data available.	Data length = 0

9.3 EDS file

The **EDS** file serves as a template for different configurations of a device type. The EDS file is turned into a DCF file which contains device configurations, object values, **Node ID** and bit rate.

CANopen configuration tools are available for the configuration of the **CANopen** network and the devices.

The EDS files are available on ifm's website: www.ifm.com

Contents of the EDS file:

- Communication functions and **objects** (to CANopen profile DS-301)
- Manufacturer-specific objects



The installation of the EDS file depends on the configuration tool.

- ▶ Contact the manufacturer of the controller for more information.



▶ **The EDS files are supplied with 64-bit or 32-bit data types. The controller determines whether 64-bit or 32-bit data types can be processed.**

- ▶ Select the EDS file appropriate to the controller.

10 Maintenance

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 inserts of the device

Glossary

ATQA

The ATQA (Answer To reQuestA) is used to identify the ID tag type.

CAN

Controller Area Network, bus system for use in mobile applications.

CANopen

CAN-based network protocol on the application level with an open configuration interface (object directory)

CiA

CAN in Automation e.V., user and manufacturer organisation in Germany/ Erlangen, definition and control body for CAN and CAN-based network protocols.

COB

CANopen communication object (PDO, SDO, EMCY, ...)

EDS

Electronic data sheet

EMCY

The emergency object contains an alarm message with which the device signals an error.

Heartbeat

Configurable cyclic monitoring among network participants. In contrast to "node guarding" no superior NMT master is required.

Identifier

The identifier (ID) marks a CAN message. The numerical value of the ID also contains a priority concerning the bus access (ID 0 = highest priority)

LSS

Procedure to set basic device settings

NMT

Network management

Node ID

Unambiguous number of a participant in the CANopen network.

Object

Term for data/messages which can be exchanged in the CANopen network.

PDO

The Process Data Object transmits process data in real time in the CANopen network, for example the speed of a motor. PDOs have a higher priority than SDOs; in contrast to the SDOs they are transferred without confirmation. PDOs consist of a CAN message with identifier and up to 8 bytes of user data.

PDO mapping

Describes the application data transferred with a PDO.

RPDO

Process data object received from the device.

RSSI

The Received Signal Strength Indication is the field strength of the received signal.

SAK

SAK (Select AcKnowledge) is used to identify the ID tag type.

SDO

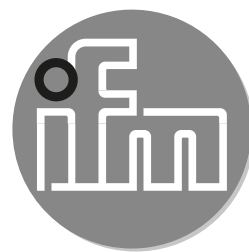
The SDO directly accesses the object directory of a network participant (read/write). An SDO can consist of several CAN messages. The transfer of the individual messages is confirmed by the addressed participant. With the SDOs, devices can be configured and parameters can be set.

SYNC

The SYNC telegram initiates the synchronised transmission of process data.

TPDO

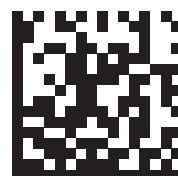
Process data object sent by the device.



Funkzulassung
Radio approval
Agrément radio
Aprobación de radio

ANTxxx
DTCxxx
DTExxx
DTIxxx
DTMxxx

RFID 13,56 MHz



Hinweis / Note / Remarque

Deutsch



Die aktuell gültigen Zulassungen der Geräte sind als Download verfügbar: documentation.ifm.com

English



The currently valid approvals of the units are available for download: documentation.ifm.com

Français



Les homologations actuellement en vigueur des appareils sont disponibles en téléchargement : documentation.ifm.com

Europäische Union / European Union / L'Union Europe

Deutsch

Vor Inbetriebnahme die Bedienungsanleitung lesen und während der Einsatzdauer aufbewahren.

- Hiermit erklärt die ifm electronic GmbH, dass die Geräte in der folgenden Tabelle der Richtlinie 2014/53/EU entsprechen.
- Der vollständige Text der EU-Konformitätserklärung, Technische Daten, Anleitungen, Zulassungen, Kontakte und weitere Informationen unter documentation.ifm.com.

WARNUNG! Der Betrieb des Gerätes kann Funkstörungen in Wohngebieten verursachen.

Gerät	Frequenz	Max. H-Feld- stärke
ANT410, ANT411, ANT420, ANT421, ANT424, ANT425, ANT430, ANT431, ANT434, ANT435, ANT513, ANT515, ANT516, DTC124, DTC125, DTC510, DTI410, DTI411, DTI420, DTI421, DTI424, DTI425, DTI430, DTI431, DTI434, DTI435, DTI513, DTI515, DTI516, DTM424, DTM425, DTM426, DTM427, DTM428, DTM434, DTM435, DTM436, DTM437	13,56 MHz	5 dB μ A/m @ 10 m
ANT600, DTC600, DTE601, DTE602, DTE604, DTE605, DTI600	13,56 MHz	30 dB μ A/m @ 10 m

English

Read the operating instructions before set-up and keep them for the duration of use.

- ifm electronic gmbh hereby declares that the devices indicated in the following table corresponds to the directive 2014/53/EU.
- The full text of the EU Declaration of Conformity, technical data, instructions, approvals, contacts and further information is available at documentation.ifm.com.

WARNING! The operation of this device can cause radio interference in residential areas.

Device	Frequency	Max. H-field strength
ANT410, ANT411, ANT420, ANT421, ANT424, ANT425, ANT430, ANT431, ANT434, ANT435, ANT513, ANT515, ANT516, DTC124, DTC125, DTC510, DTI410, DTI411, DTI420, DTI421, DTI424, DTI425, DTI430, DTI431, DTI434, DTI435, DTI513, DTI515, DTI516, DTM424, DTM425, DTM426, DTM427, DTM428, DTM434, DTM435, DTM436, DTM437	13,56 MHz	5 dB μ A/m @ 10 m
ANT600, DTC600, DTE601, DTE602, DTE604, DTE605, DTI600	13,56 MHz	30 dB μ A/m @ 10 m

Français

Lire la notice d'utilisation avant l'utilisation et conserver-la pendant toute la durée d'utilisation.

- ifm electronic gmbh déclare par la présente que les appareils indiqués dans le tableau ci-après sont conformes à la directive 2014/53/UE.
- Vous trouverez le texte intégral de la déclaration de conformité de l'UE, les données techniques, les instructions, les homologations, les contacts et d'autres informations sur le site documentation.ifm.com.

AVERTISSEMENT ! Le fonctionnement de cet appareil peut causer des interférences radio dans les zones résidentielles.

Appareil	Fréquence	Intensité max. du champ H
ANT410, ANT411, ANT420, ANT421, ANT424, ANT425, ANT430, ANT431, ANT434, ANT435, ANT513, ANT515, ANT516, DTC124, DTC125, DTC510, DTI410, DTI411, DTI420, DTI421, DTI424, DTI425, DTI430, DTI431, DTI434, DTI435, DTI513, DTI515, DTI516, DTM424, DTM425, DTM426, DTM427, DTM428, DTM434, DTM435, DTM436, DTM437	13,56 MHz	5 dB μ A/m @ 10 m
ANT600, DTC600, DTE601, DTE602, DTE604, DTE605, DTI600	13,56 MHz	30 dB μ A/m @ 10 m

Great Britain

English

Read the operating instructions before set-up and keep them for the duration of use.

- ifm electronic gmbh hereby declares that the devices indicated in the following table are in compliance with the relevant statutory requirements.
- The full text of the Declaration of Conformity, technical data, instructions, approvals, contacts and further information is available at documentation.ifm.com.

WARNING! The operation of this device can cause radio interference in residential areas.

Device	Frequency	Max. H-field strength
ANT410, ANT411, ANT420, ANT421, ANT424, ANT425, ANT430, ANT431, ANT434, ANT435, ANT513, ANT515, ANT516, DTC124, DTC125, DTC510, DTI410, DTI411, DTI420, DTI421, DTI424, DTI425, DTI430, DTI431, DTI434, DTI435, DTI513, DTI515, DTI516, DTM424, DTM425, DTM426, DTM427, DTM428, DTM434, DTM435, DTM436, DTM437	13,56 MHz	5 dB μ A/m @ 10 m
ANT600, DTC600, DTE601, DTE602, DTE604, DTE605, DTI600	13,56 MHz	30 dB μ A/m @ 10 m

USA

English

ANT410 / ANT411 / ANT420 / ANT421 / ANT424 / ANT425 / ANT430 / ANT431 / ANT434 / ANT435 / ANT513 / ANT515 / ANT516 / ANT600 / DTC124 / DTC125 / DTC510 / DTC600 / DTE601 / DTE602 / DTE604 / DTE605 / DTI410 / DTI411 / DTI420 / DTI421 / DTI424 / DTI425 / DTI430 / DTI431 / DTI434 / DTI435 / DTI513 / DTI515 / DTI516 / DTI600 / DTM424 / DTM425 / DTM426 / DTM427 / DTM428 / DTM434 / DTM435 / DTM436 / DTM437

FCC information

The devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device must not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this device that have not been expressly approved by ifm could void the user's authority to operate the equipment.

RF Exposure Info

Due to radio frequency exposure limits this device should be installed and operated with a minimum distance of 20 cm between the device and the body of the user or nearby persons.

Note

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada / Canada

English

ANT410 / ANT411 / ANT420 / ANT421 / ANT424 / ANT425 / ANT430 /
ANT431 / ANT434 / ANT435 / ANT513 / ANT515 / ANT516 / ANT600 /
DTC124 / DTC125 / DTC510 / DTC600 / DTE601 / DTE602 / DTE604 /
DTE605 / DTI410 / DTI411 / DTI420 / DTI421 / DTI424 / DTI425 / DTI430 /
DTI431 / DTI434 / DTI435 / DTI513 / DTI515 / DTI516 / DTI600 / DTM424 /
DTM425 / DTM426 / DTM427 / DTM428 / DTM434 / DTM435 / DTM436 /
DTM437

ISED note

The devices contain licence-exempt transmitters/receivers that comply with Innovation, Science and Economic Development Canada's licence-exempt RSSs.

Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

RF Exposure Info

Due to radio frequency exposure limits this device should be installed and operated with a minimum distance of 20 cm between the device and the body of the user or nearby persons.

Français

ANT410 / ANT411 / ANT420 / ANT421 / ANT424 / ANT425 / ANT430 /
ANT431 / ANT434 / ANT435 / ANT513 / ANT515 / ANT516 / ANT600 /
DTC124 / DTC125 / DTC510 / DTC600 / DTE601 / DTE602 / DTE604 /
DTE605 / DTI410 / DTI411 / DTI420 / DTI421 / DTI424 / DTI425 / DTI430 /
DTI431 / DTI434 / DTI435 / DTI513 / DTI515 / DTI516 / DTI600 / DTM424 /
DTM425 / DTM426 / DTM427 / DTM428 / DTM434 / DTM435 / DTM436 /
DTM437

Avis ISDE

L'émetteur/récepteur exempt de licence contenu dans les présent appareils est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Informations sur l'exposition RF

En raison des limites d'exposition aux radiofréquences, cet appareil doit être installé et utilisé à une distance minimale de 20 cm entre l'appareil et le corps de l'utilisateur ou des personnes à proximité.

Taiwan / Taiwan

English

ANT410: 📶 CCAE13LP0740T6 / ANT411: 📶 CCAE13LP0750T9 /
ANT420: 📶 CCAM18LP1460T8 / ANT421: 📶 CCAM18LP1461T0 /
ANT424: 📶 CCAM20LP0660T8 / ANT425: 📶 CCAM20LP0661T0 /
ANT430: 📶 CCAE14LP1890T2 / ANT431: 📶 CCAE14LP1900T2 /
ANT434: 📶 CCAM20LP0662T2 / ANT435: 📶 CCAM20LP0663T1 /
DTI410: 📶 CCAM18LP1060T5 / DTI411: 📶 CCAM18LP1061T7 /
DTI420: 📶 CCAM18LP1090T1 / DTI421: 📶 CCAM18LP1091T3 /
DTI424: 📶 CCAN22LP0130T5 / DTI425: 📶 CCAN22LP0131T7 /
DTI430: 📶 CCAM18LP1070T8 / DTI431: 📶 CCAM18LP1071T0 /
DTI434: 📶 CCAN22LP0132T9 / DTI435: 📶 CCAN22LP0133T1 /
DTM424: 📶 CCAE15LP2930T1 / DTM425: 📶 CCAE15LP0970T0 /

DTM426: 📶 CCAE15LP293AT0 / DTM427: 📶 CCAE15LP293BT2 /
DTM428: 📶 CCAE17LP0170T0 / DTM434: 📶 CCAE15LP2940T1 /
DTM435: 📶 CCAE15LP294AT3 / DTM436: 📶 CCAE15LP294BT5 /
DTM437: 📶 CCAE15LP294CT7

Without permission granted by the NCC, any company, enterprise, or user is not allowed to change frequency, enhance transmitting power or alter original characteristic as well as performance to approved low power radio-frequency devices.

The low power radio-frequency devices shall not influence aircraft security and interfere legal communications; If found, the user shall cease operating immediately until no interference is achieved. The said legal communications mean radio communications is operated in compliance with the Telecommunication Management Act.

The low power radio-frequency devices must be susceptible with the interference from legal communications or ISM radio wave radiated devices.

繁體中文

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。

低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。

前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

Mexiko

Español

Los certificados de homologación de equipos de radio para los equipos homologados están disponibles en: documentation.ifm.com.

La operación de este equipo está sujeta a las siguientes dos condiciones:

1. Es posible que este equipo o dispositivo no cause interferencia perjudicial.
2. Este equipo o dispositivo debe aceptar cualquier interferencia. Incluyendo la que pueda causar su operación no deseada.

Korea / 한국어

English

Sellers and users shall be noticed that this equipment is a business (Class A) electromagnetic wave device, and it is intended to be used outside residential areas.

한국어

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

	상호 : ifm electronic gmbh 기자재명칭 : RFID용 무선기기 (13.56 MHz 주파수 대역) 모델명 : DTE601 제조자 및 제조국가 : ifm electronic gmbh/독일
R-R-ifm-DTE605	

	상호 : ifm electronic gmbh 기자재명칭 : RFID용 무선기기 (13.56 MHz 주파수 대역) 모델명 : DTE602 제조자 및 제조국가 : ifm electronic gmbh/독일
R-R-ifm-DTE605	

	상호 : ifm electronic gmbh 기자재명칭 : RFID용 무선기기 (13.56 MHz 주파수 대역) 모델명 : DTE604 제조자 및 제조국가 : ifm electronic gmbh/독일
R-R-ifm-DTE605	

	상호 : ifm electronic gmbh 기자재명칭 : RFID용 무선기기 (13.56 MHz 주파수 대역) 모델명 : DTE605 제조자 및 제조국가 : ifm electronic gmbh/독일
R-R-ifm-DTE605	

Australia

English

Use in Australia:



Singapore

English

Complies with
IMDA standards
DB 103032

The “Equipment Registration” is available on our website at:
documentation.ifm.com

South Africa

English

The Radio Equipment Type Approval Certificates for approved devices are
available at: documentation.ifm.com.

