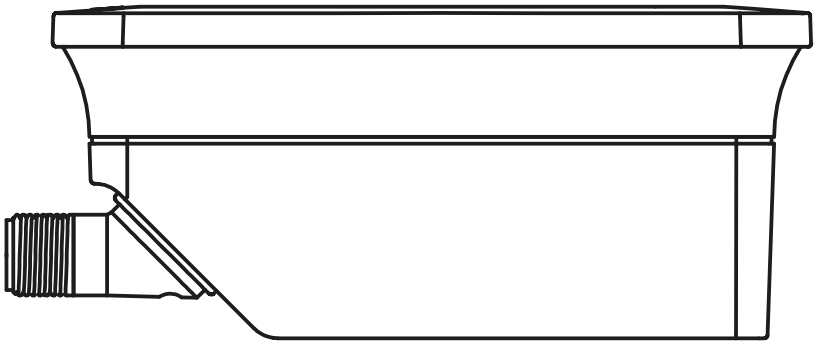
Operating instructions
RFID compact unit

UK

DTE801/DTE802/DTE804/DTE805
DTE901/DTE902/DTE904/DTE905
DTE911/DTE912/DTE914/DTE915
DTE961/DTE962/DTE964/DTE965

80301703 / 00 02 / 2021



Content

1 Preliminary note

Technical data, approvals, accessories and further information → www.ifm.com.

1.1 Symbols used

▶ Instruction
> 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

NOTE!

Kind and source of the hazard
> Possible consequences.
▶ Actions to refrain from.
▶ Measures to take.

1.3 Copyright and trademarks

2 Safety instructions

- The device 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 (→ Functions and features).
- 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 the device and the cables against damage.
- Use the device outside petrol stations, fuel depots, chemical plants or blasting operations.
- Do not transport and store any flammable gases, liquids or explosive substances near the unit.
- Contact the manufacturer of the corresponding device in case of any interference.
- Device safety: The device is intended for indoor use only.

3 Functions and features

The DTExxx device is composed of an evaluation unit and an integrated RFID read/write head and provides the following functions

- read and write ID tags which conform to the system without contact,
- DTE8x1/DTE9x1:
  communication with the control level via PROFINET IO,
- DTE8x2/DTE9x2:
  communication with the control level via EtherNet/IP,
- DTE8x4/DTE9x4: communication with the control level via EtherNet TCP/IP,
- DTE8x5/DTE9x5:
  communication with the control level via EtherNet IoT protocols
- can be configured via a web server.

Example applications:

- material flow control in production lines
- warehouse management by the automatic detection of stored products
- tank management, order picking or product tracking

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

3.1 Configuration via Ethernet interface

- 10 Mbps and 100 Mbps
- TCP/IP - Transport Control Protocol / Internet Protocol
- IT functionality: HTTP server
- M12, twisted pair

4 Items supplied

- DTE RFID compact unit
- Package insert general information
- Package insert radio approval

The device is supplied without installation and connection accessories.

In the event of incomplete or damaged items supplied, please contact ifm electronic.

5 Function

5.1 Operating principle

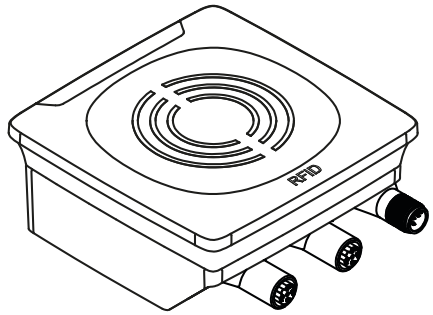
The ID tags are operated passively, i.e. without battery. The energy required for operation is supplied by the RFID compact unit.

The energy is transferred via an electromagnetic wave. The receiving antenna takes up the wave and transforms it into voltage which supplies the data carrier with energy.

The radiated power is specified in ERP (Effective Radiated Power) for the DTE80x units and in EIRP (Effective Isotropic Radiated Power) for the DTE90x units. The respective value can be converted using the following formula:

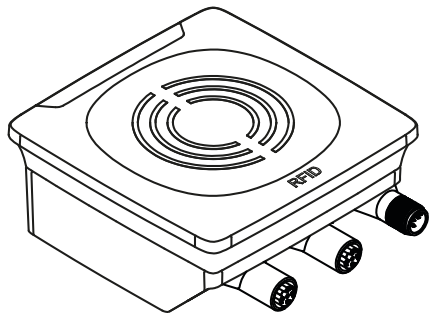
P [dBm EIRP] = P [dBm ERP] + 2.15 [dB]

5.2 Overview DTE801



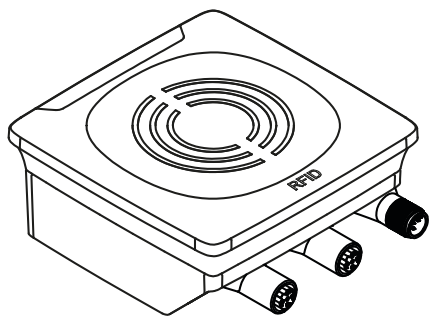
Art. no.:	DTE801
Function:	RFID compact unit
Type designation:	DTRUHFE HLRWPNUS04
Operating frequency:	865-868 MHz
Design:	rectangular
Typ. transm. power:	22.5 dBm ERP (178 mW)

5.3 Overview DTE802



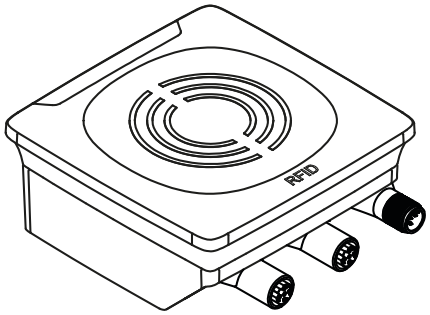
Art. no.:	DTE802
Function:	RFID compact unit
Type designation:	DTRUHFE HLRWEIUS04
Operating frequency:	865-868 MHz
Design:	rectangular
Typ. transm. power:	22.5 dBm ERP (178 mW)

5.4 Overview DTE804



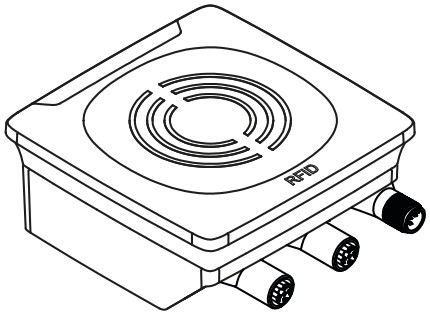
Art. no.:	DTE804
Function:	RFID compact unit
Type designation:	DTRUHFE HLRWENUS04
Operating frequency:	865-868 MHz
Design:	rectangular
Typ. transm. power:	22.5 dBm ERP (178 mW)

5.5 Overview DTE805



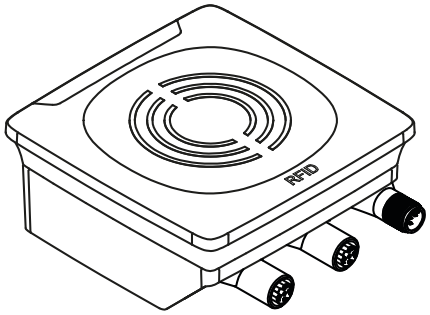
Art. no.:	DTE805
Function:	RFID compact unit
Type designation:	DTRUHFE HLRWITUS04
Operating frequency:	865-868 MHz
Design:	rectangular
Typ. transm. power:	22.5 dBm ERP (178 mW)

5.6 Overview DTE901



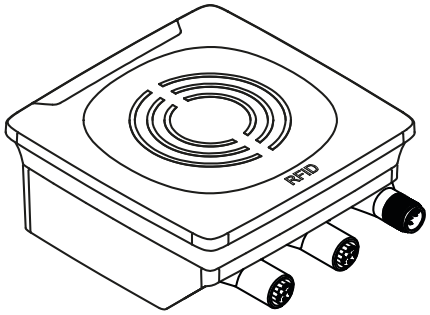
Art. no.:	DTE901
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWPNUS04
Operating frequency:	902-928 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.7 Overview DTE902



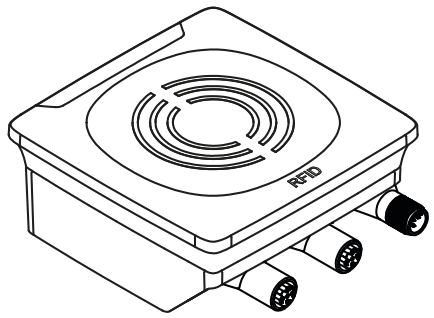
Art. no.:	DTE902
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWEIUS04
Operating frequency:	902-928 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.8 Overview DTE904



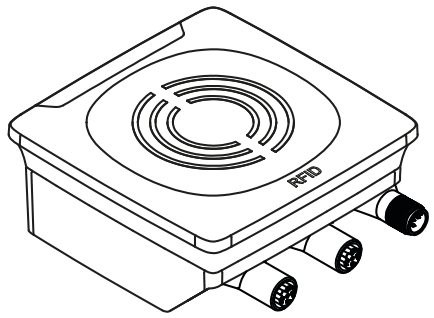
Art. no.:	DTE904
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWENUS04
Operating frequency:	902-928 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.9 Overview DTE905



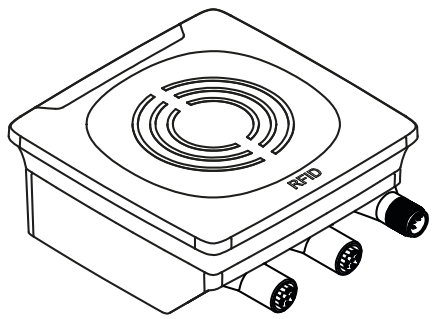
Art. no.:	DTE905
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWITUS04
Operating frequency:	902-928 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.10 Overview DTE911



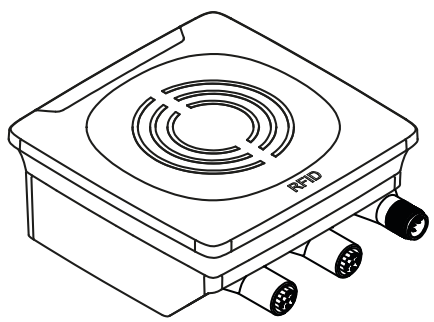
Art. no.:	DTE911
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWPNUS04
Operating frequency:	920–925 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.11 Overview DTE912



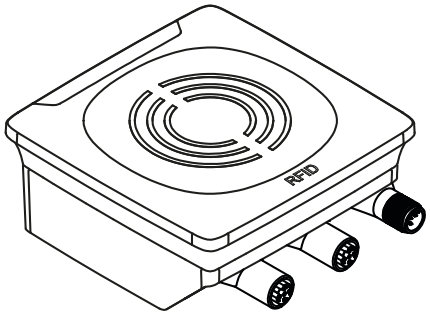
Art. no.:	DTE912
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWEIUS04
Operating frequency:	920–925 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.12 Overview DTE914



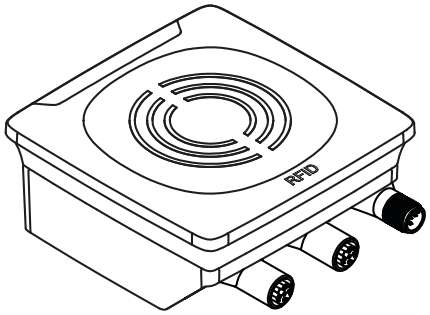
Art. no.:	DTE914
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWENUS04
Operating frequency:	920–925 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.13 Overview DTE915



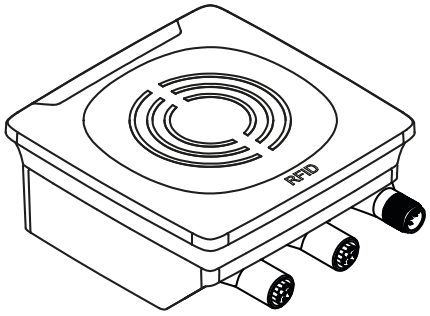
Art. no.:	DTE915
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWITUS04
Operating frequency:	920–925 MHz
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.14 Overview DTE961



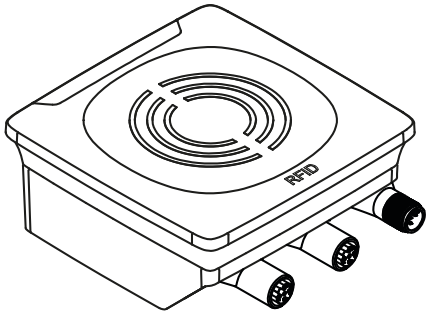
Art. no.:	DTE961
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWPNUS04
Operating frequency:	916,8–920,4
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.15 Overview DTE962



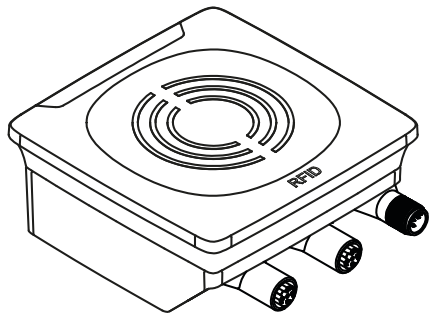
Art. no.:	DTE962
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWEIUS04
Operating frequency:	916,8–920,4
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.16 Overview DTE964



Art. no.:	DTE964
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWENUS04
Operating frequency:	916,8–920,4
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

5.17 Overview DTE965



Art. no.:	DTE965
Function:	RFID compact unit
Type designation:	DTRUHFA HLRWITUS04
Operating frequency:	916,8–920,4
Design:	rectangular
Typ. transm. power:	21.5 dBm EIRP (141 mW)

6 Installation

NOTE!

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 General installation instructions

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

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

Installing a unit in or on metal reduces the read and write distance.

The immediate vicinity of powerful HF emission sources such as welding transformers or converters can affect operation of the RFID compact units.

6.2 Notes on ID tag mounting

For installation in and on metal the ID tags provided for this purpose must be used.

The ID tag must be positioned in the area of the sensing face (→ chapter „6.4 Mechanical design“). When doing so, the angle of aperture and the operating distance must be adhered to (→ Data sheet of the device).

The orientation of the RFID compact unit axis must correspond with the axis of the ID tag.

6.3 Avoiding interference

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

- DTE80x: 865-868 MHz
- DTE90x: 902-928 MHz
- DTE91x: 920–925 MHz
- DTE96x: 916,8–920,4 MHz

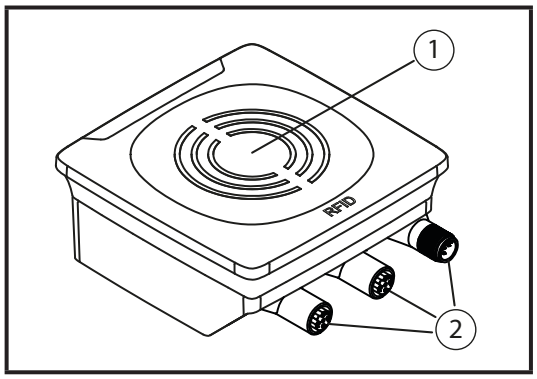
To avoid interference of the data communication no other RFID UHF devices generating interference emission in this frequency band must be operated in its vicinity.

▶ Use in alternating operation.

▶ Switch on/off the HF field.

During a read or write operation, there must not be any objects or persons between the device and an ID tag as this has a strong damping influence on the UHF field.

6.4 Mechanical design



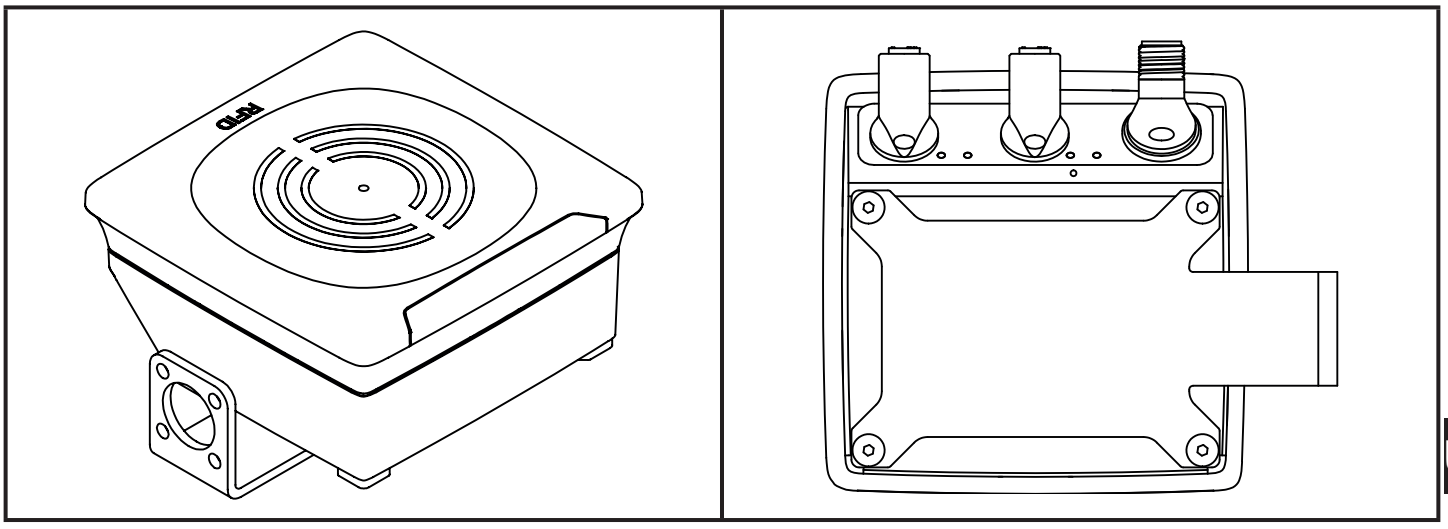
1: Sensing face
2: Connections (can be rotated by 270°)

6.5 Mounting options

For installation, the following optional accessories are available.

The unit can be mounted without the accessories. For installation, please use the threaded sleeves on the back of the unit. The necessary screws are not supplied with the unit.

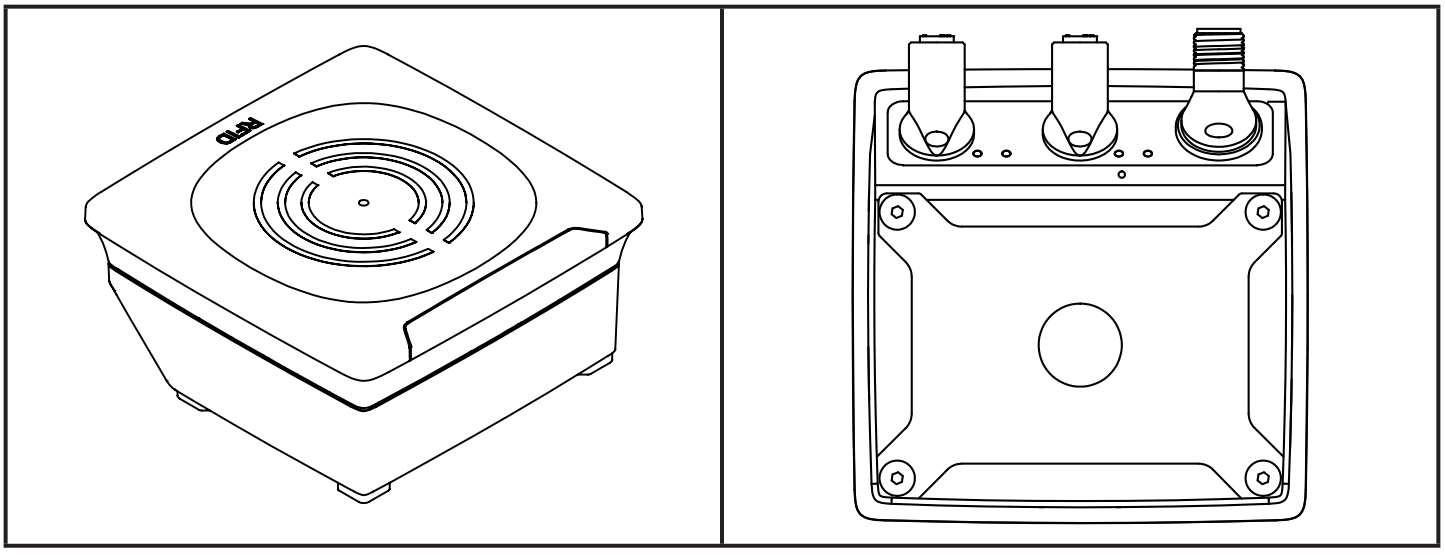
6.5.1 Installation with angle bracket E80335



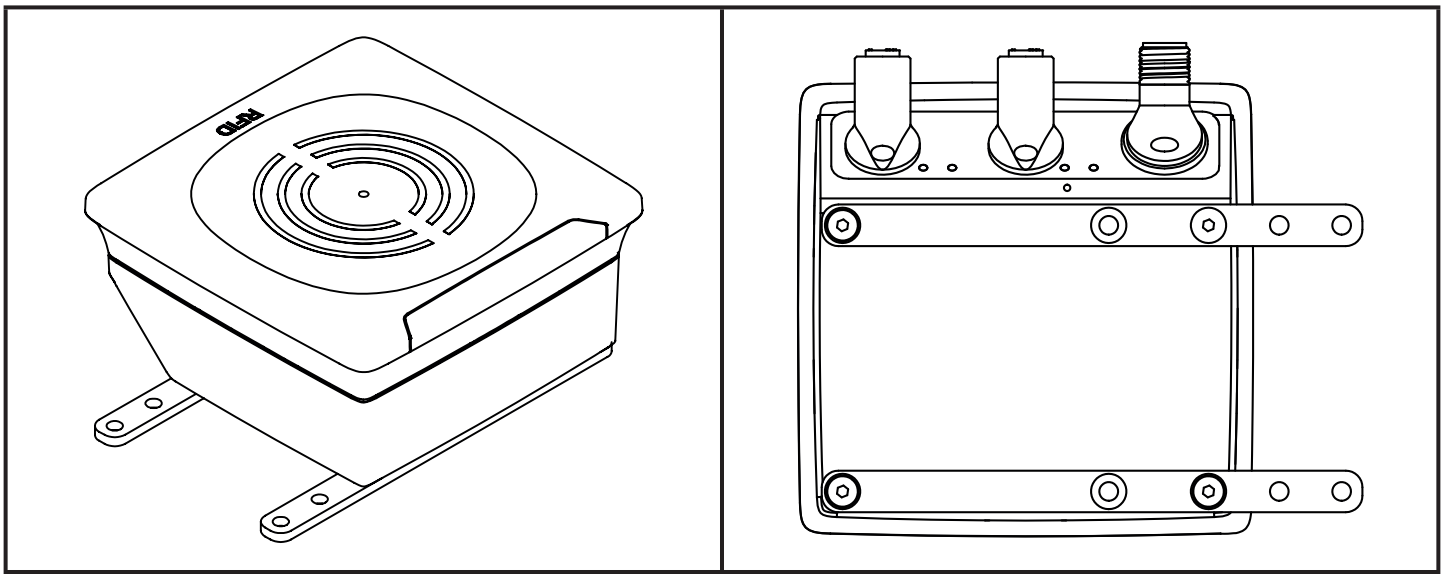
6.5.2 Installation with mounting device E80336

The mounting device is used to mount the device to a clamp. The following clamps can be used:

- E21110 with a rod diameter of 12 mm
- E20795 with a rod diameter of 14 mm
- E21109 with a rod diameter of 14 mm

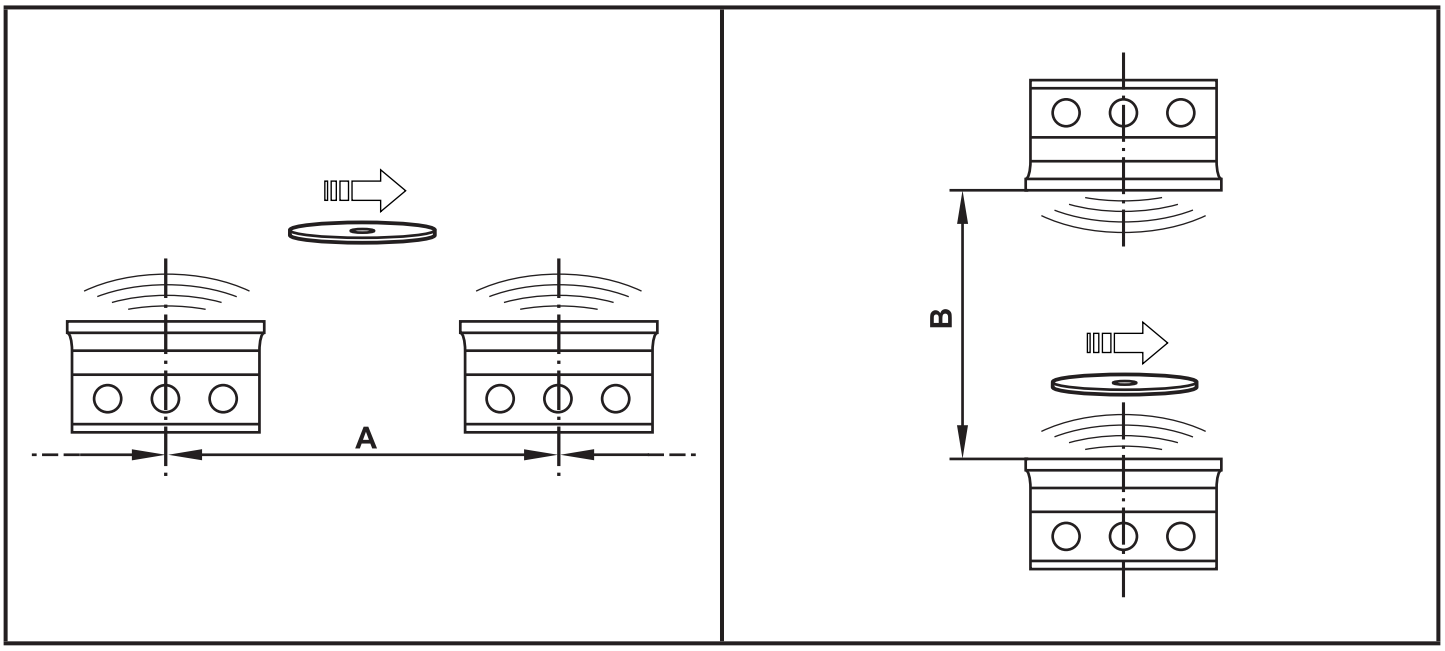


6.5.3 Installation with fixing bars E80337



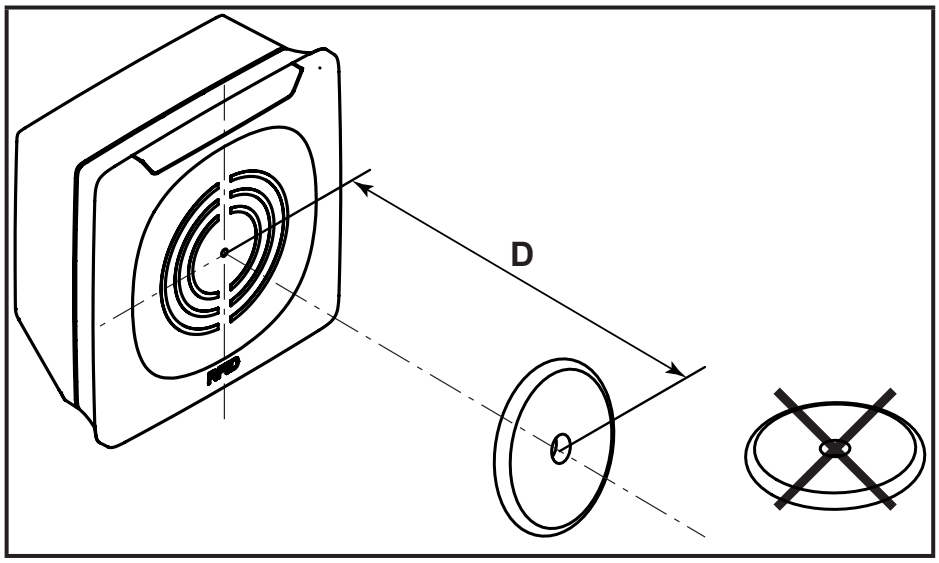
▶ Fix the unit with fixing screws to the designated location.

6.6 Mounting distances



Operating mode	Distance side (A)	Distance front (B)
Reading and writing at 100% transmitting power (simultaneous operation)	>6.0 m	>10.0 m
Reading and writing at 100% transmitting power (alternating operation)	>0.3 m	>0.3 m

6.7 Positioning of the ID tags



▶ Align the ID tag on the antenna central axis.

> Distance D see data sheet

ID tags can also be read behind the unit. Should such cases occur despite mounting precautions, the RSSI filter is recommended for suppression.

7 Electrical connection

NOTE!

The unit must be connected by a qualified electrician.
Device of protection class III (PC III)
The electric supply must only be made via SELV circuits.

▶ Disconnect power before connecting the device.
▶ For cable lengths > 30 m use an additional protection against surge voltages to IEC 61000-4-5.

NOTE!

The IP rating indicated in the data sheet is only guaranteed if the M12 connectors are firmly screwed.

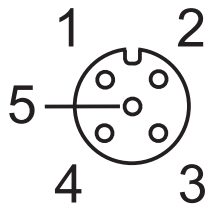
The device can be damaged by insufficiently tightened M12 connectors.

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

UK

7.1 Voltage supply PWR

▶ Connect the device to the voltage supply using an M12 connection cable.



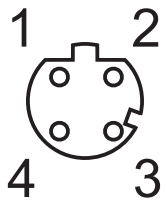
Pin	Connection
1	24 V DC
2	Digital input / output 2
3	0 V
4	Digital input / output 1
5	Not connected

Pin connection voltage supply

7.2 Ethernet

▶ Connect the device to a PC using a suitable M12 Ethernet connection cable.

The M12 Ethernet cable must be screened to ensure interference-free operation.



Pin	Connection
1	TD+
2	RD+
3	TD-
4	RD-

Pin connection fieldbus connection

7.2.1 Factory setting of the Ethernet parameters

The following values are preset at the factory:

Parameter	Factory setting
IP address	192.168.0.79
Gateway address	192.168.0.100
Subnet mask	255.255.255.0
Auto-negotiation	On
DHCP	Off

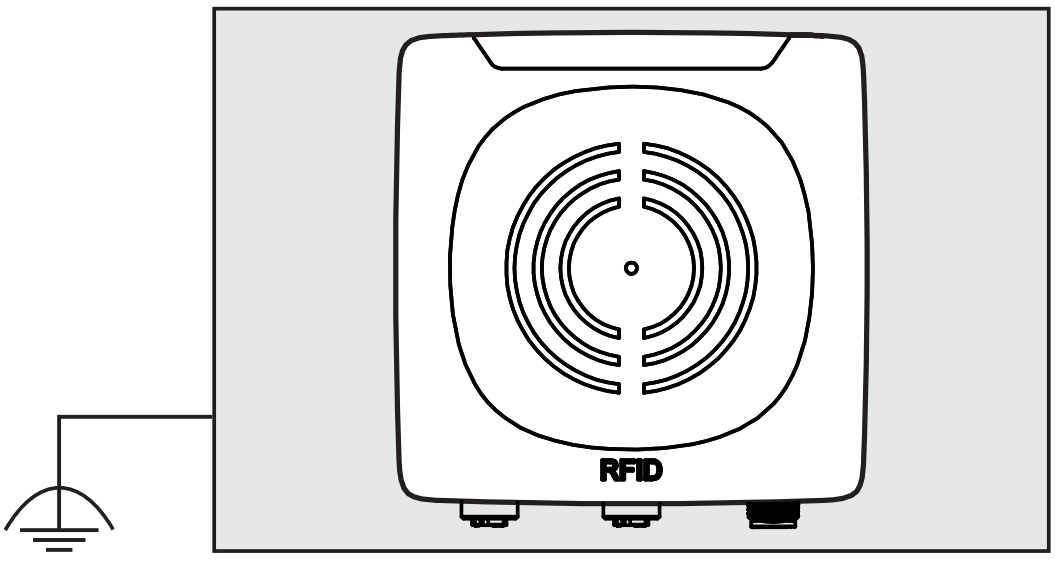
The settings can be changed via the unit's web server or via the PC.

7.3 Functional earth connection

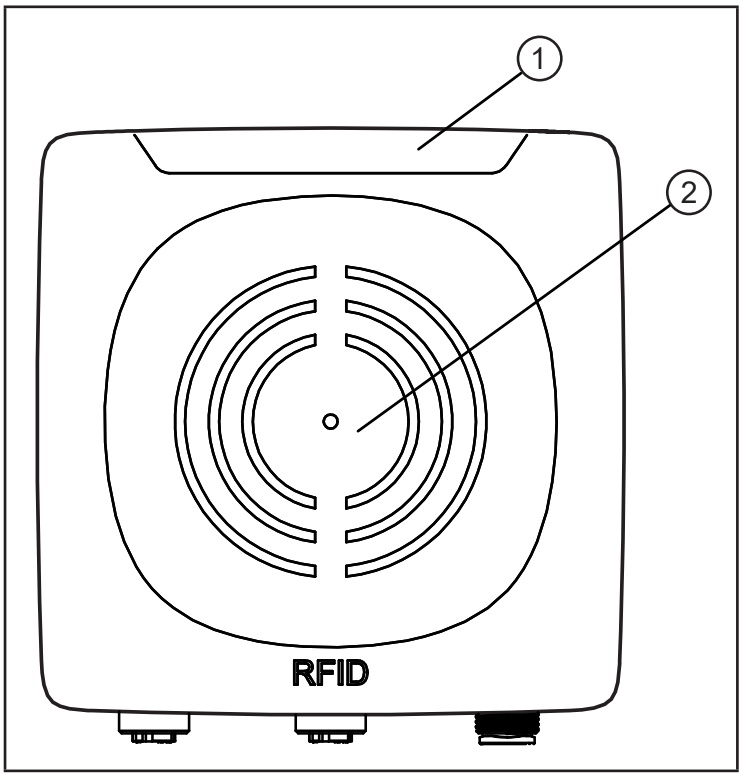
To ensure interference-free operation, the unit must be connected to an earth potential free from external voltage.

7.3.1 Mounting plate

When the unit is fixed on a mounting plate, the connection is made via one of the four mounting bolts on the back. Note that the plate must be connected with the earth potential.



8 Operating and display elements



①: 1 power LED (green)
4 LEDs on signal bar (yellow)
2 fieldbus LEDs (green/red)

②: sensing face

8.1 Reset to factory settings

The Ethernet parameters can be reset to factory setting. To do so, proceed as follows:

▶ Remove all cable connections from the device.

▶ Insert an electrically conductive bridge between pin 2 and pin 4 on the process connection voltage supply PWR.

▶ Connect the unit to the voltage supply.

> The LEDs of the signal bar (yellow) are on one after the other. Then LED 4 of the signal bar (yellow) flashes at 8 Hz.

▶ As soon as the LEDs of the signal bar (yellow) flash at 8 Hz, disconnect the unit.

▶ Remove the bridge.

▶ Connect the unit to the voltage supply.

> The settings are reset.

8.2 LED indicators

The following LED indicators apply to all units.

8.2.1 Power LEDs and signal bar

LED PWR (1x green)	LED signal bar (4x yellow)	State	Note
On	Off	Voltage supply OK	18 V ≤ U_{PWR} ≤ 36 V
Flashing at 2 Hz	Off	Antenna (HF field) is deactivated	
On	Flashes twice	ID tag read / written successfully	
On	Flashing quickly	ID tag read / written incorrectly	

If the ID tag has a high receive signal strength, all LEDs of the signal bar are on (configurable).

The maximum receive signal strength depends on the type of the ID tag.

8.2.2 LED signal bar

LED signal bar LED 1	LED signal bar LED 2	LED signal bar LED 3	LED signal bar LED 4	State
Off	Off	Off	Off	No ID tag detected
On	Off	Off	Off	1 ID tag detected
On	On	Off	Off	2 ID tags detected
On	On	On	Off	3 ID tags detected
On	On	On	On	4 or more ID tags detected

8.2.3 LED LINK/ACT ETH 1 / ETH 2

LED green	LED yellow	State	Note
Off	Off	No connection to another Ethernet counterpart	Link status "no link"
On	Off	Connection to Ethernet counterpart exists, no data exchange	Link status "link", "no traffic"
On	Flashes sporadically	Connection to Ethernet counterpart exists, data exchange running	Link status "link", "traffic"

8.2.4 Special device LED indicators

LED	State	Note
PWR LED (green) on LEDs of signal bar (yellow) flashing at 8 Hz	Device is in the service mode "emergency system started"	A firmware update is necessary and can be executed via the web server
PWR LED (green) on LEDs of signal bar (yellow) flashing at 8 Hz	Major error, device has to be returned	Hardware fault or permanent data in the device are corrupt
PWR LED (green) on The LEDs of the signal bar (yellow) are on one after the other. Then LED 4 of the signal bar (yellow) flashes at 8 Hz.	Reset to factory settings	-

8.3 LED indicators DTE8x1/DTE9x1

The following LED indicators only apply to DTE8x1/DTE9x1.

8.3.1 LED SF

LED red	LED green	State	Note
Off	Off	No voltage supply	Check the voltage supply
Off	Flashes	"Node flash test", initiated by PROFINET IO controller	-
Off	On	Normal operation	-
Flashes	Off	Error at channel level	- Temperature - Internal fault
On	Off	Error at device level	Temperature
Flashes	Flashes	Self-test	Starting phase of the device

8.3.2 LED BF

LED red	LED green	State	Note
Off	Off	No voltage supply	Check the voltage supply
Off	Flashes	PROFINET IO controller is in STOP mode	-
Off	On	PROFINET IO controller is in RUN mode	-
Flashes	Off	Connection to the PROFINET IO controller is established, no valid configuration	Check configuration
On	Off	No connection to the Profinet IO controller	Check connection
Flashes	Flashes	Self-test	Starting phase of the device

8.4 LED indicators DTE8x2/DTE9x2

The following LED indicators only apply to DTE8x2/DTE9x2.

8.4.1 LED Mod (module status)

LED red	LED green	State	Note
Off	Off	No voltage supply	Check the voltage supply
Off	Flashes	Ready for operation	Device is not configured. There is no exchange of data: ▶ Check the connection of the Ethernet/IP scanner. ▶ Check the parameter setting of the configuration assembly.
Off	On	Normal operation	Connection to the EtherNet/IP scanner is established. The device is configured. The data transfer is running.
Flashes	Off	Minor error	A connection to the EtherNet/IP scanner was not established: ▶ Check the voltage supply. ▶ Check the configuration of the device.
On	Off	Major error	Software / hardware error of the device: ▶ Restart the device. > If the error remains, send the device for service.
Flashes	Flashes	Self-test	Starting phase of the device

8.4.2 LED Net (network status)

LED red	LED green	State	Note
Off	Off	No IP address or no voltage supply	▶ Check the voltage supply ▶ If DHCP is activated, check presence of a DHCP server in the network.
Off	Flashes	No connection	The device has received an IP address. An EtherNet/IP connection was not established. ▶ Check the configuration of the device via EtherNet/IP scanner.
Off	On	connection available	At least one EtherNet/IP connection to the device was established.
Flashes	Off	Timeout of the connection	A timeout was found with one of the existing EtherNet/IP connections. ▶ Check the status of the connection in the EtherNet/IP scanner.
On	Off	IP address exists already	The same IP address as that of the device was detected in the EtherNet/IP network. ▶ Activate DHCP.
Flashes	Flashes	Self-test	Starting phase of the device

8.5 LED indicators DTE8x4/DTE8x5/DTE9x4/DTE9x5

The following LED indicators only apply to DTE8x4/DTE8x5/DTE9x4/DTE9x5.

8.5.1 LED SF

LED red	LED green	State	Note
Off	Off	No voltage supply	Check the voltage supply
Off	On	Normal operation	-
Flashes	Off	Error at channel level	- Temperature - Internal fault
On	Off	Error at device level	Temperature
Flashes	Flashes	Self-test	Starting phase of the device

8.5.2 LED BF

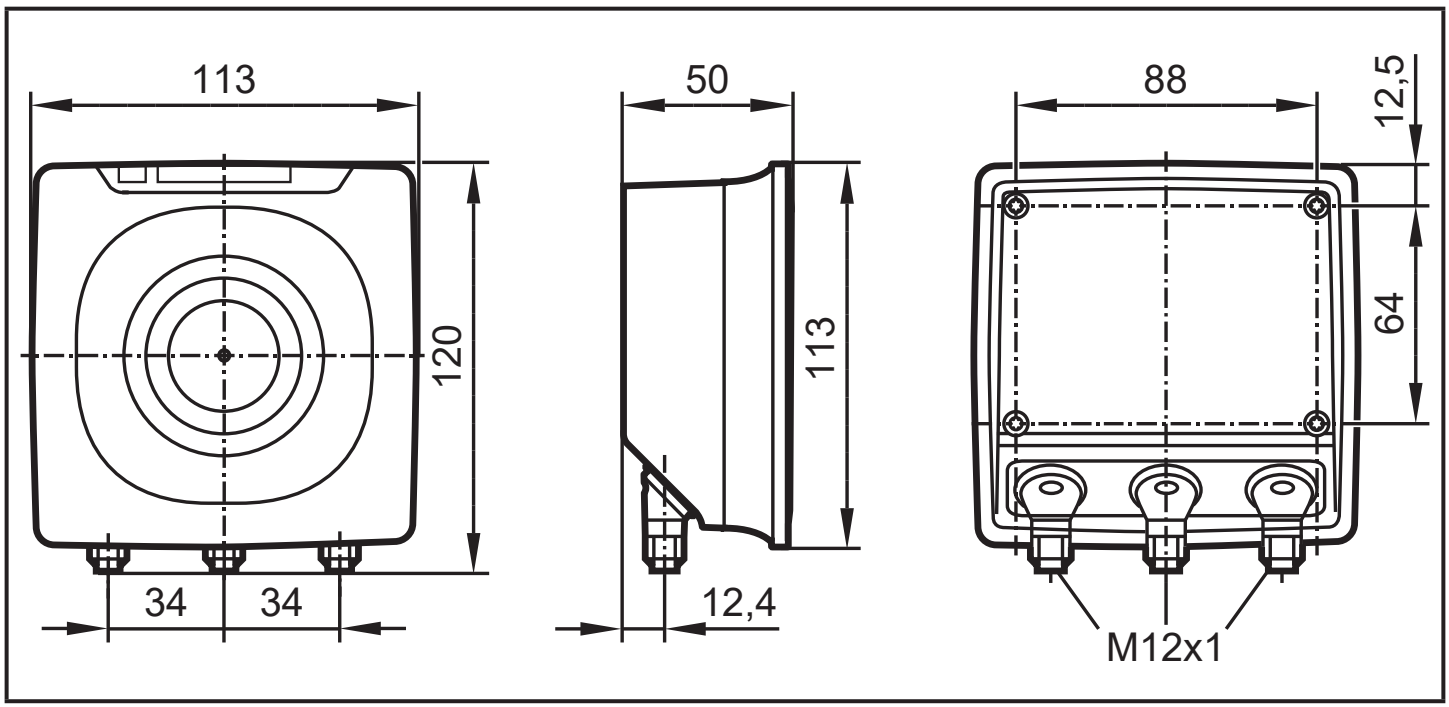
LED red	LED green	State	Note
Off	Off	No voltage supply	Check the voltage supply
Off	Flashes	Connection to host Controller exists, there is no data exchange	-
Off	On	Connection to host Controller exists, data exchange running	-
Flashes	Off	Connection to host Controller exists, there is no valid configuration	Check configuration
On	Off	No connection to the host controller	Check connection
Flashes	Flashes	Self-test	Starting phase of the device

9 Maintenance, repair and disposal

If used correctly, no maintenance and repair measures are necessary.

- ▶ The device must only be repaired by the manufacturer.
- ▶ After use dispose of the unit in an environmentally friendly way in accordance with the applicable national regulations.
- ▶ Keep the device free from soiling.
- ▶ Use glass cleaner as cleaning agent.
- ▶ Do not open the device.

10 Scale drawing



11 Approvals / standards

The EU declaration of conformity, approvals and country-specific certificates are available at: → www.ifm.com

Notes relevant for approval: → Package insert