



Operating instructions
RFID compact unit

GB

DTE801
DTE802
DTE804
DTE805
DTE901
DTE902
DTE904
DTE905
DTE911
DTE912
DTE914
DTE915
DTE921
DTE922
DTE924
DTE925
DTE961
DTE962
DTE964
DTE965



Contents

1	Preliminary note	3
1.1	Symbols used	3
1.2	Warnings used	3
1.3	Legal and copyright information	3
1.4	Open source information	4
2	Safety instructions	5
3	Intended use	6
4	Items supplied	7
5	Function	8
5.1	Device overview	8
6	Installation	14
6.1	Installation instructions for devices	14
6.2	Installation instructions for ID tags	14
6.3	Avoiding interference	14
6.4	Mechanical design	15
6.5	Mounting options	15
6.5.1	Installation with angle bracket E80432	16
6.5.2	Installation with mounting device E80431	16
6.5.3	Installation with fixing bars E80337	17
6.5.4	Installation with cooling element E80430	17
6.6	Mounting distances	18
6.7	Positioning of the ID tags	18
7	Electrical connection	19
7.1	Wiring	19
7.2	Connecting the functional earth	20
8	Operating and display elements	21
8.1	Display elements DTE8x1 / DTE9x1	22
8.2	Display elements DTE8x2 / DTE9x2	23
8.3	Display elements DTE8x4/DTE8x5/DTE9x4/DTE9x5	24
9	Maintenance, repair and disposal	25
10	Approvals / standards	26

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

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2 Safety instructions

General

- 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.

Radio equipment

In general, radio equipment must not be used in the vicinity of petrol stations, fuel depots, chemical plants or blasting operations.

- ▶ Do not transport and store any flammable gases, liquids or explosive substances near the unit.

Interference of electronic and medical devices

Operation can affect the function of electronic devices that are not correctly shielded.

- ▶ Disconnect the device in the vicinity of medical equipment.
- ▶ Contact the manufacturer of the corresponding device in case of any interference.

3 Intended use

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

- non-contact reading and writing of ID tags that conform to the system,
- configuration via a web server,
- DTE8x1/DTE9x1 only: communication with the control level via PROFINET IO,
- DTE8x2/DTE9x2 only: communication with the control level via EtherNet/IP,
- DTE8x4/DTE9x4 only: communication with the control level via EtherNet TCP/IP,
- DTE8x5/DTE9x5 only: communication with the control level via EtherNet IoT protocols.

The device is intended for indoor use only.

Possible 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.

4 Items supplied

- RFID compact unit
- 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

The ID tags are operated passively without battery. The energy required for operation is provided by the compact RFID device.

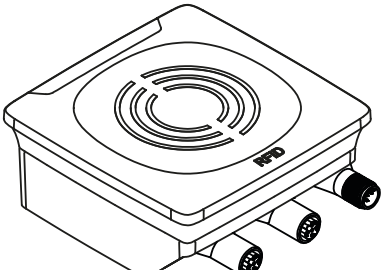
The energy is transferred via an electromagnetic wave. The receiving antenna takes up the wave and transforms it into voltage which supplies the data carrier with energy.

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

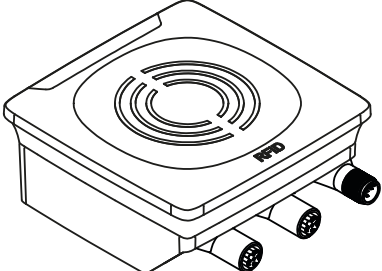
$$P \text{ [dBm EIRP]} = P \text{ [dBm ERP]} + 2.15 \text{ [dB]}$$

5.1 Device overview

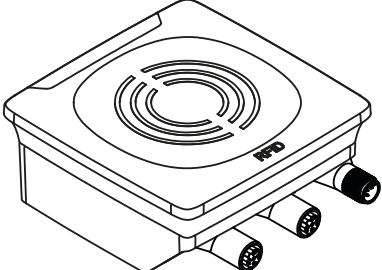
DTE801

	Article number:	DTE801
	Function:	RFID compact device
	Type designation:	DTRUHFE HLRWPNUS04
	Type:	Rectangular

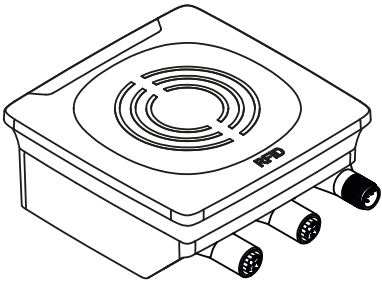
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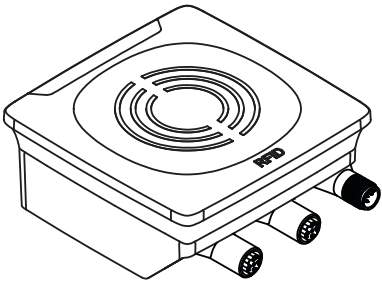
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	Type:	Rectangular

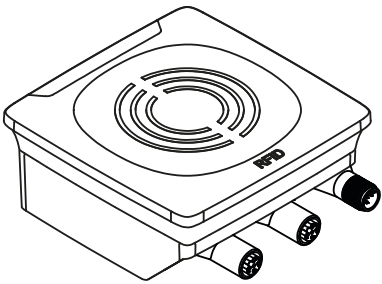
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	Type:	Rectangular

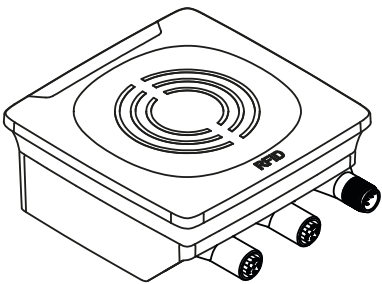
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	Type:	Rectangular

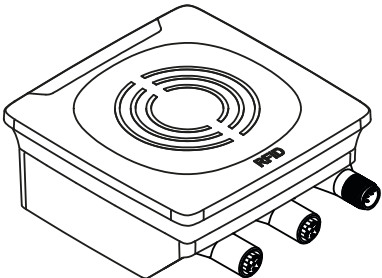
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	Type:	Rectangular

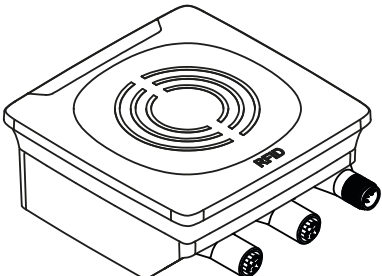
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	Type:	Rectangular

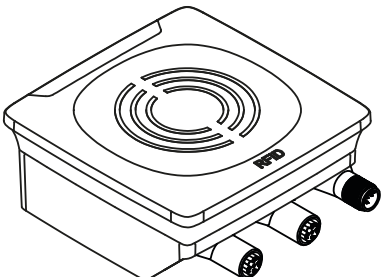
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	Type:	Rectangular

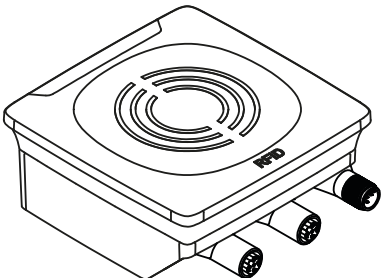
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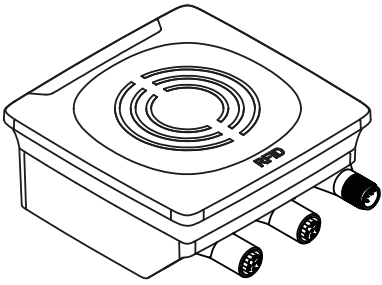
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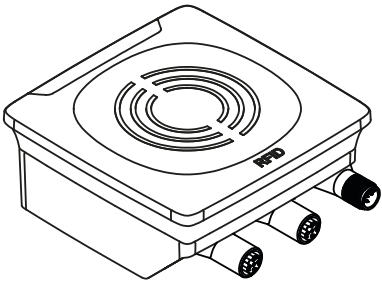
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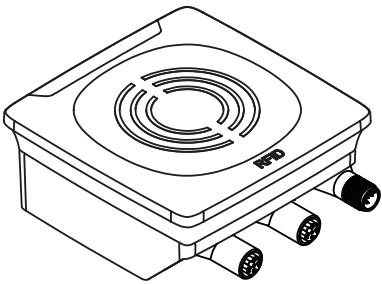
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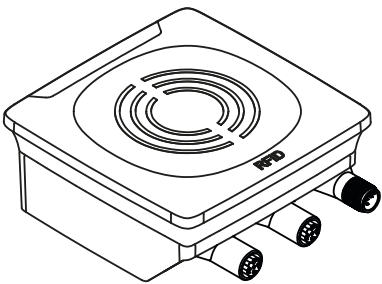
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	Type:	Rectangular

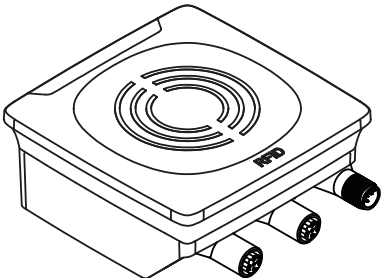
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	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWEIUS04
	Type:	Rectangular

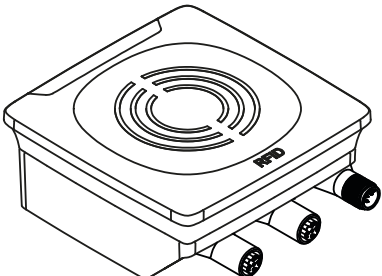
DTE924

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	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWETUS04
	Type:	Rectangular

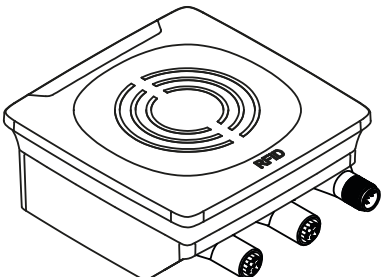
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	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWITUS04
	Type:	Rectangular

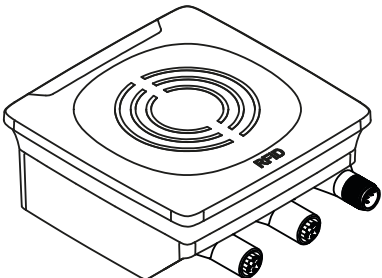
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	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWPNUS04
	Type:	Rectangular

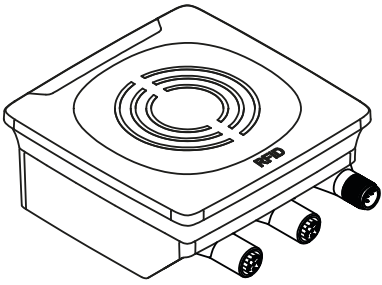
DTE962

	Article number:	DTE962
	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWEIUS04
	Type:	Rectangular

DTE964

	Article number:	DTE964
	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWENUS04
	Type:	Rectangular

DTE965

	Article number:	DTE965
	Function:	RFID compact device
	Type designation:	DTRUHFA HLRWITUS04
	Type:	Rectangular

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 device generates a modulated electromagnetic field in the following frequency ranges:

DTE80x: 865-868 MHz

DTE90x: 902-928 MHz

DTE91x: 920-925 MHz

DTE92x: 915-928 MHz

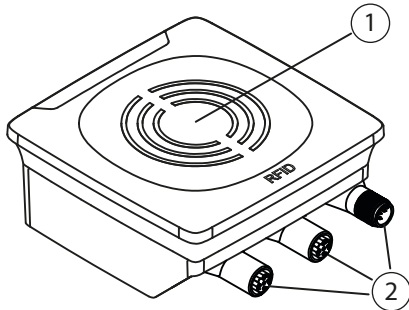
DTE96x: 916.8-920.4 MHz

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

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

- !** The UHF 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



1 Sensing face

2 Connections (can be rotated by 270°)

6.5 Mounting options

- i** The device can be mounted without the accessories.
 - ▶ For installation, please use the threaded sleeves on the back of the device.
 - ▷ The required screws are not supplied with the device.
- !** No liquid should be allowed to accumulate on the connected sockets and plugs.
 - ▶ Mount the device preferably vertically, with the connections facing downwards.
 - ▶ Route the connection cables vertically or horizontally downwards away from the device.

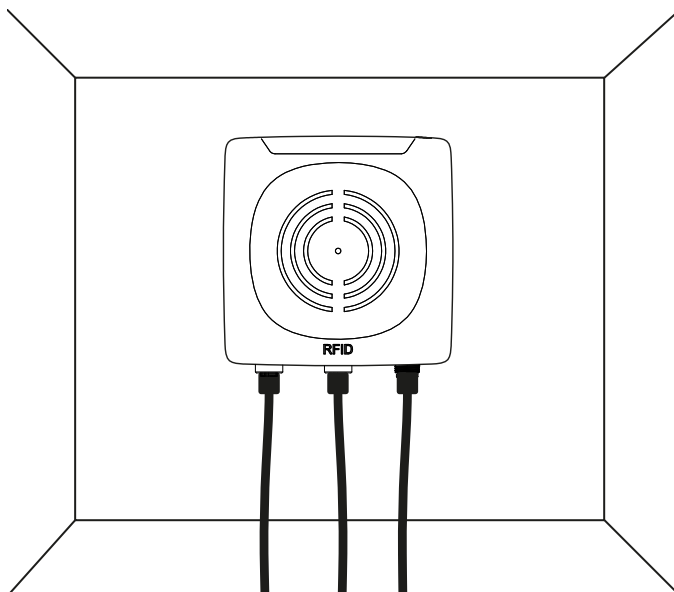
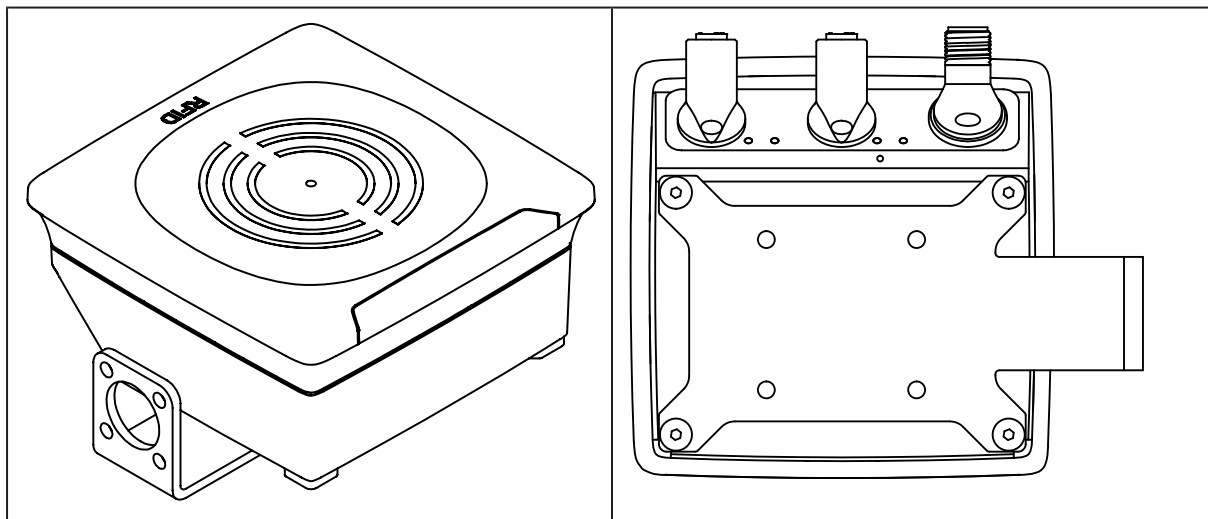


Fig. 1: Vertically mounted device with the connections facing downwards

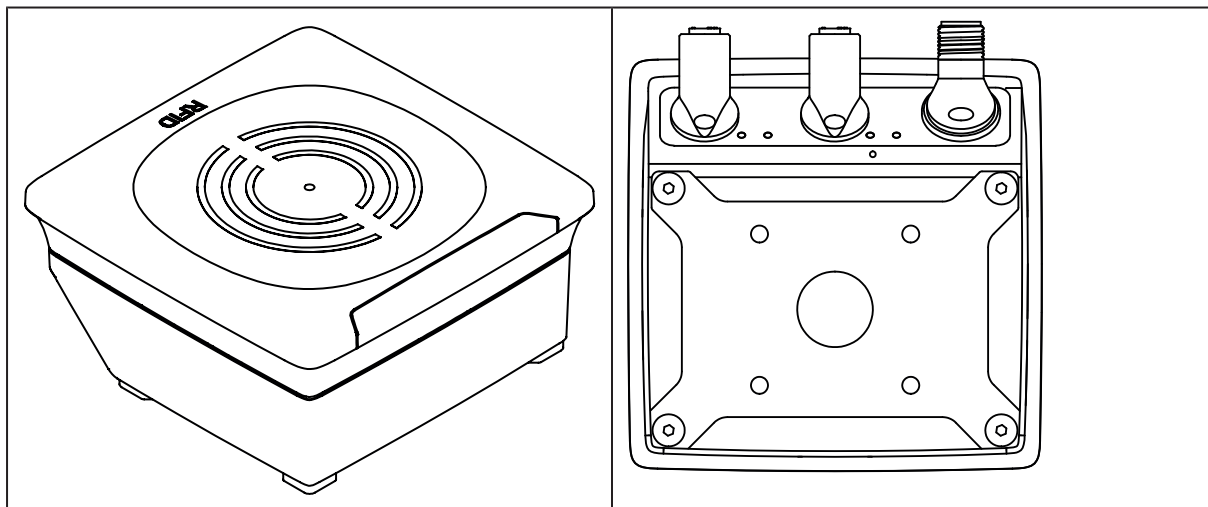
6.5.1 Installation with angle bracket E80432



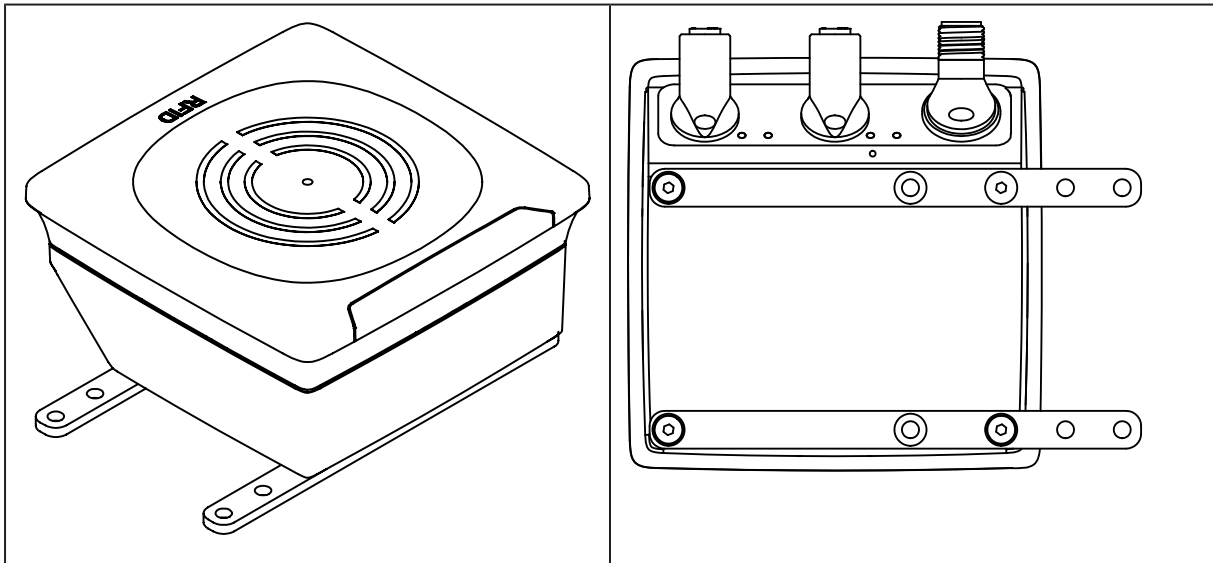
6.5.2 Installation with mounting device E80431

The mounting device is used to mount the unit on a clamp. Compatible clamps:

- 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



6.5.4 Installation with cooling element E80430

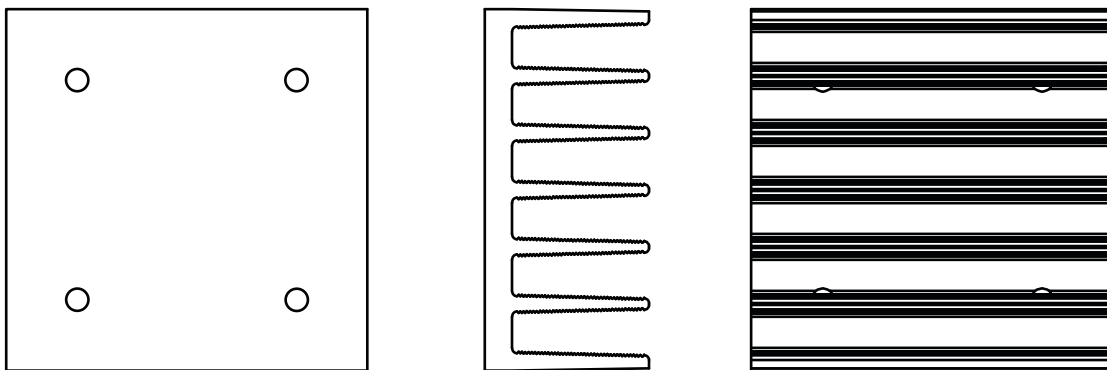


Fig. 2: Cooling element E80430

The cooling element E80430 can improve the heat dissipation of the device when

- the device is used in environments with high temperatures,
- the device is loaded by computationally intensive tasks.

Mounting the cooling element:

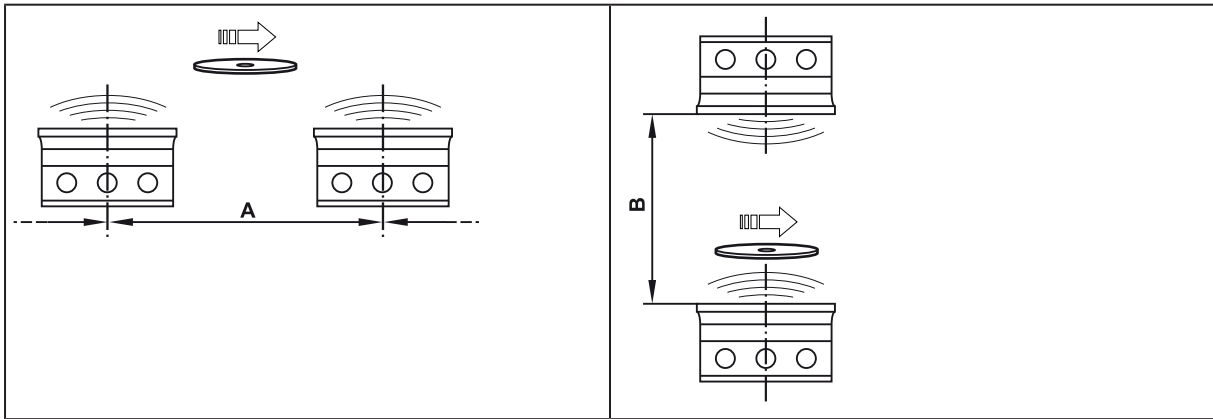
- ▶ Mount the cooling element E80430 on the mounting device E80431 or the angle bracket E80432.
- ▶ Mount the mounting device or the angle bracket on the device.



In addition, the mounting device E80336 and the angle bracket E80335 are available. Both articles are missing the drill holes for the cooling element E80430.

- ▶ For mounting the cooling element E80430, only use the mounting device E80431 or the angle bracket E80432.

6.6 Mounting distances



Operating mode	Distance side (A)	Distance front (B)
Reading and writing at 100% transmitting power (simultaneous operation)	> 0.6 m	> 0.6 m
Reading and writing at 100% transmitting power (alternating operation)	> 0.3 m	> 0.3 m



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

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

6.7 Positioning of the ID tags

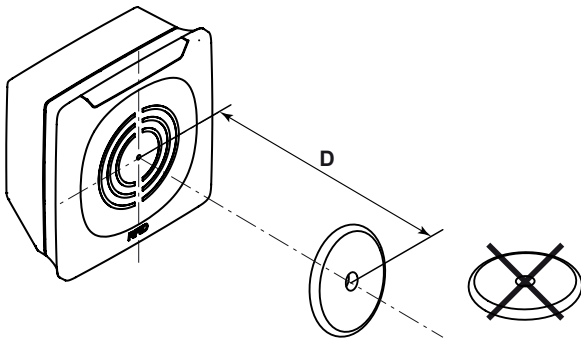


Fig. 3: Position the ID tag

- ▶ Align the ID tag on the antenna central axis.
- ▷ The distance "D" is indicated in the data sheet.



ID tags are also detected on the back of the device. To avoid this:

- ▶ Use the RSSI filter.

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.



Use strain reliefs for cables connected to the device.

7.1 Wiring

+PWR voltage supply

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

	Pin assignment	Wiring
	1	24 V DC
	2	Digital input / output 2
	3	0 V
	4	Digital input / output 1
	5	not connected

Ethernet

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

	Pin assignment	Wiring
	1	TD+
	2	RD+
	3	TD-
	4	RD-



For trouble-free operation:

- ▶ use a shielded M12 Ethernet connection cable.

The following parameters are preset at the factory:

Parameter	Preset
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 device's web server or via a connected PC.

Resetting the Ethernet parameters

Reset the Ethernet parameters to factory setting:

- ▶ Remove all cable connections from the device.
- ▶ Insert an electrically conductive bridge between pin 2 and pin 4 on the connection “PWR voltage supply”.
- ▶ Connect the device 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, remove the electrically conductive bridge between pin 2 and pin 4.
- ▶ Disconnect the device from the voltage supply and connect it again after 1 s.
 - ▷ The Ethernet parameters have been reset.

7.2 Connecting the functional earth



For trouble-free operation:

- ▶ Connect the device to an earth potential free from external voltage.

Connect the mounting plate to functional earth.

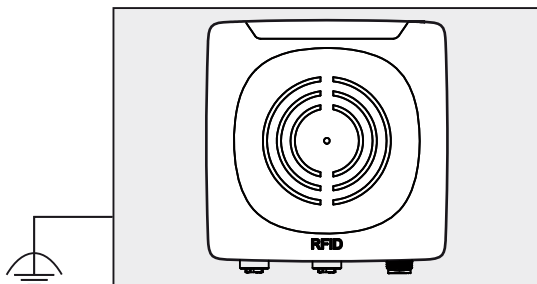


Fig. 4: Mounting plate with mounted device

When the device is mounted on a mounting plate:

- ▶ Connect one of the 4 mounting bolts on the back of the device to the mounting plate.
- ▶ Connect the mounting plate to an earth potential free from external voltage.

8 Operating and display elements

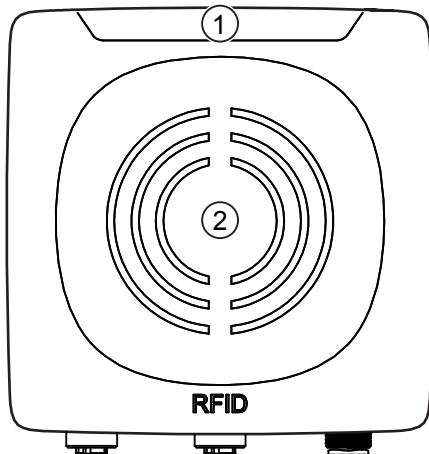


Fig. 5: LED signal bar and sensing face

- 1 1x LED Power (green)
- 4x LED signal bar (yellow)
- 2x LEDs SF/BF or LEDs Mod/Net (green/red)
- 2 Sensing face



Depending on the device, the LEDs SF/BF or the LEDs Mod/Net are used:

- ▷ DTE8x1/DTE9x1: LEDs SF/BF (→ [Display elements DTE8x1 / DTE9x1](#) □ 22)
- ▷ DTE8x2/DTE9x2: LEDs Mod/Net (→ [Display elements DTE8x2 / DTE9x2](#) □ 23)
- ▷ DTE8x4/DTE8x5/DTE9x4/DTE9x5: LEDs SF/BF (→ [Display elements DTE8x4/DTE8x5/DTE9x4/DTE9x5](#) □ 24)

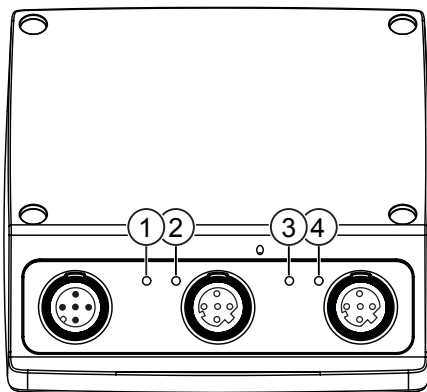


Fig. 6: Connections with LEDs

- 1 ETH2 ACT
- 2 ETH2 LINK
- 3 ETH1 ACT
- 4 ETH1 LINK

The following table applies to all devices.

State	Power LED (green)	LED signal bar (yellow)
Voltage supply OK ($18\text{ V} \leq \text{UPWR} \leq 36\text{ V}$)	on	off
Antenna (HF field) is deactivated	flashes at 2 Hz	off
ID tag read / written successfully	on	flashes twice
ID tag read / written incorrectly	on	flashing quickly



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



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

- ▷ The response of the LEDs of the signal bar is adjustable.

LED LINK/ACT ETH1 / ETH2

LED green	LED yellow	State	Note
off	off	No connection to an 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"

Special device LED indicators

LED	State	Note
Power 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.
Power 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.
Power 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.	-

8.1 Display elements DTE8x1 / DTE9x1

The following tables only apply to the DTE8x1 / DTE9x1 devices.

LED SF

LED red	LED green	State	Note
off	off	no voltage supply	Check the voltage supply
off	flashes	"Node flash test", initiated by the PROFINET IO controller	-
off	on	Normal operation	-
flashes	off	Error at channel level	<ul style="list-style-type: none"> • Overload • Temperature • Internal error
on	off	Error at device level	<ul style="list-style-type: none"> • Undervoltage • Temperature
flashes	flashes	Self-test	Starting phase of the device

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	-

LED red	LED green	State	Note
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

8.2 Display elements DTE8x2 / DTE9x2

The following tables only apply to the DTE8x2 / DTE9x2 devices.

LED Mod (module status)

LED red	LED green	State	Note
off	off	no voltage supply	Verify voltage supply.
off	flashes	Ready for operation	The device is not configured. There is no exchange of data: <ul style="list-style-type: none"> ▶ 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: <ul style="list-style-type: none"> ▶ Verify voltage supply. ▶ Check the configuration of the unit.
on	off	Major error	Software / hardware error of the device: <ul style="list-style-type: none"> ▶ Reboot the device. ▷ If the error remains, send the device for service.
flashes	flashes	Self-test	Starting phase of the device.

LED Net (network status)

LED red	LED green	State	Note
off	off	No IP address or no voltage supply	<ul style="list-style-type: none"> ▶ Verify voltage supply. ▶ If DHCP is activated, check the accessibility of the DHCP server.
off	flashes	No connection	The device has received an IP address. An EtherNet/IP connection was not established. <ul style="list-style-type: none"> ▶ Check the configuration of the device via EtherNet/IP scanner.
off	on	Connection exists	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. <ul style="list-style-type: none"> ▶ Check the status of the connection in the EtherNet/IP scanner.
on	off	The IP address already exists	The same IP address as that of the device was detected in the EtherNet/IP network. <ul style="list-style-type: none"> ▶ Activate DHCP.
flashes	flashes	Self-test	Starting phase of the device.

8.3 Display elements DTE8x4/DTE8x5/DTE9x4/DTE9x5

The following tables only apply to the DTE8x4/DTE8x5/DTE9x4/DTE9x5 devices.

LED SF

LED red	LED green	State	Note
off	off	No voltage supply	Verify voltage supply.
off	on	Normal operation	-
flashes	off	Error at channel level	<ul style="list-style-type: none"> • Overload • Temperature • Internal error
on	off	Error at device level	<ul style="list-style-type: none"> • Undervoltage • Temperature
flashes	flashes	Self-test	Starting phase of the device.

LED BF

LED red	LED green	State	Note
off	off	No voltage supply	Check the voltage supply
off	flashes	Connection to the host controller is established, there is no data exchange	-
off	on	Connection to the host controller is established, data exchange takes place	-
flashes	off	Connection to the host controller is established, 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

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

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

Notes relevant for approval: → Package insert