GB

# Operating instructions
## RFID compact unit

**DTE601**
**DTE602**
**DTE604**
**DTE605**

11450406 / 00 05 / 2023

# Contents

# 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<br>Non-compliance may result in malfunction or interference. |
| | Information<br>Supplementary note |

## 1.2 Warnings used

**ATTENTION**

Warning of damage to property

## 1.3 Legal and copyright information



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# 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 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,
- can be configured via a web server,
- only DTE601: communication with the control level via PROFINET IO,
- only DTE602: communication with the control level via EtherNet/IP,
- only DTE604: communication with the control level via EtherNet TCP/IP,
- only DTE605: communication with the control level via EtherNet IoT protocols.

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.

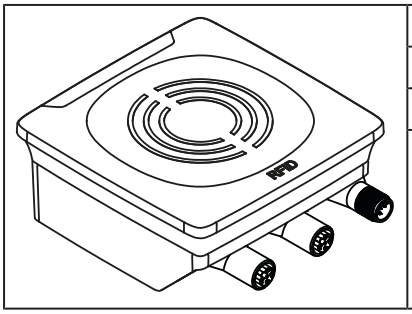
The energy is transferred via an electromagnetic wave. The receiving antenna takes up the wave and transforms it into voltage which supplies the data carrier with energy.

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

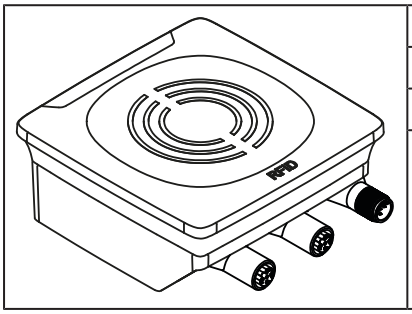
## 5.1 Device overview

**DTE601**



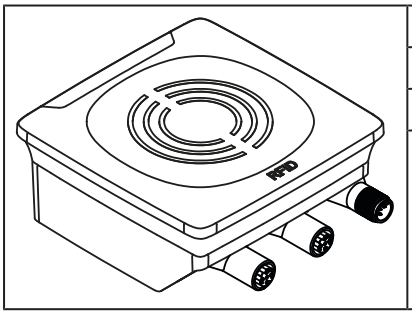
| | |
|---|---|
| Article number: | DTE601 |
| Function: | RFID compact unit |
| Type designation: | DTRHF HLRWPNUS03 |
| Type: | rectangular |

**DTE602**



| | |
|---|---|
| Article number: | DTE602 |
| Function: | RFID compact unit |
| Type designation: | DTRHF HLRWEIUS03 |
| Type: | rectangular |

**DTE604**



| | |
|---|---|
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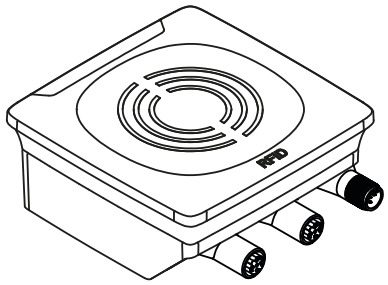
| Function: | RFID compact unit |
| Type designation: | DTRHF HLRWENUS03 |
| Type: | rectangular |

**DTE605**




| | |
|---|---|
| Article number: | DTE605 |
| Function: | RFID compact unit |
| Type designation: | DTRHF HLRWITUS03 |
| 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 with a frequency of 13.56 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.

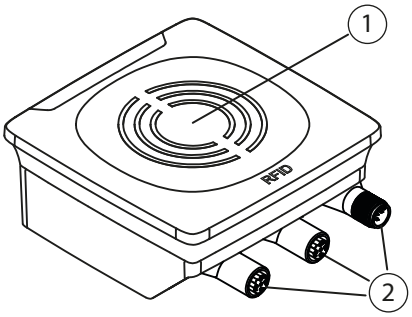
▶ Use the devices in alternating operation.

▶ 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°)

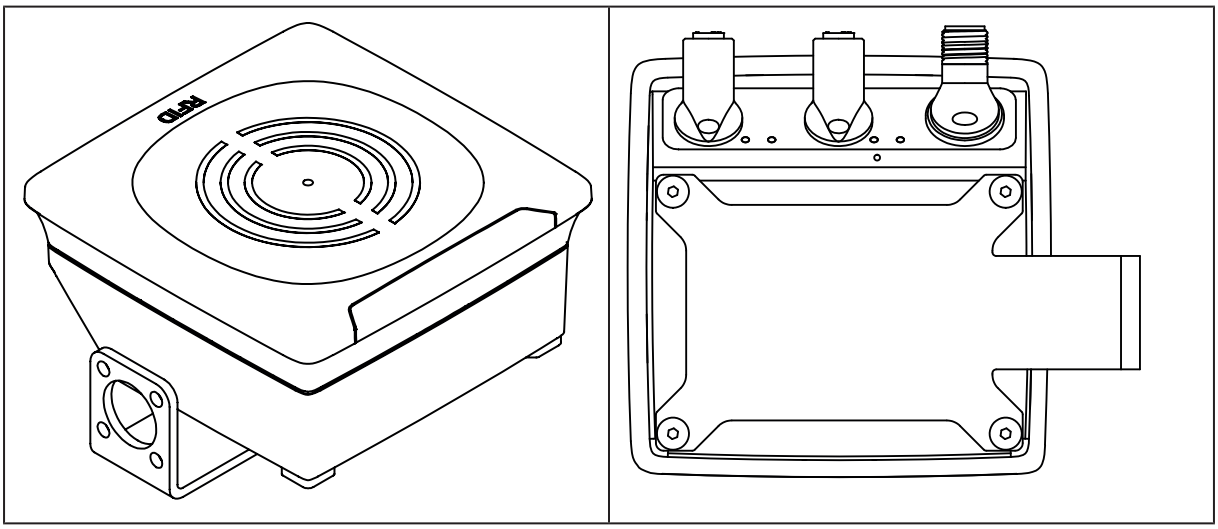
## 6.5 Mounting options

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.

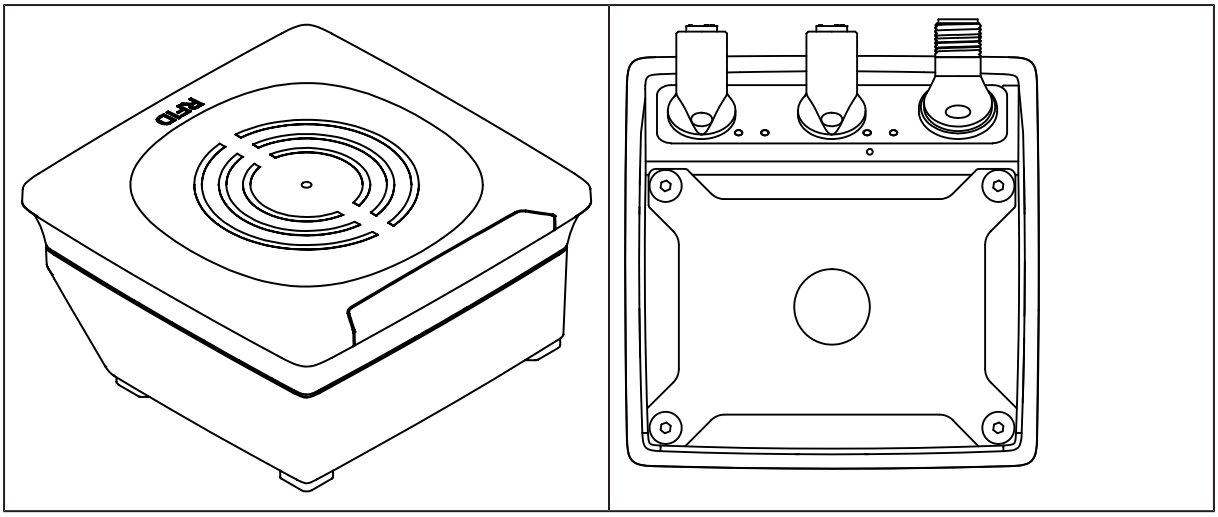
### 6.5.1 Installation with angle bracket E80335



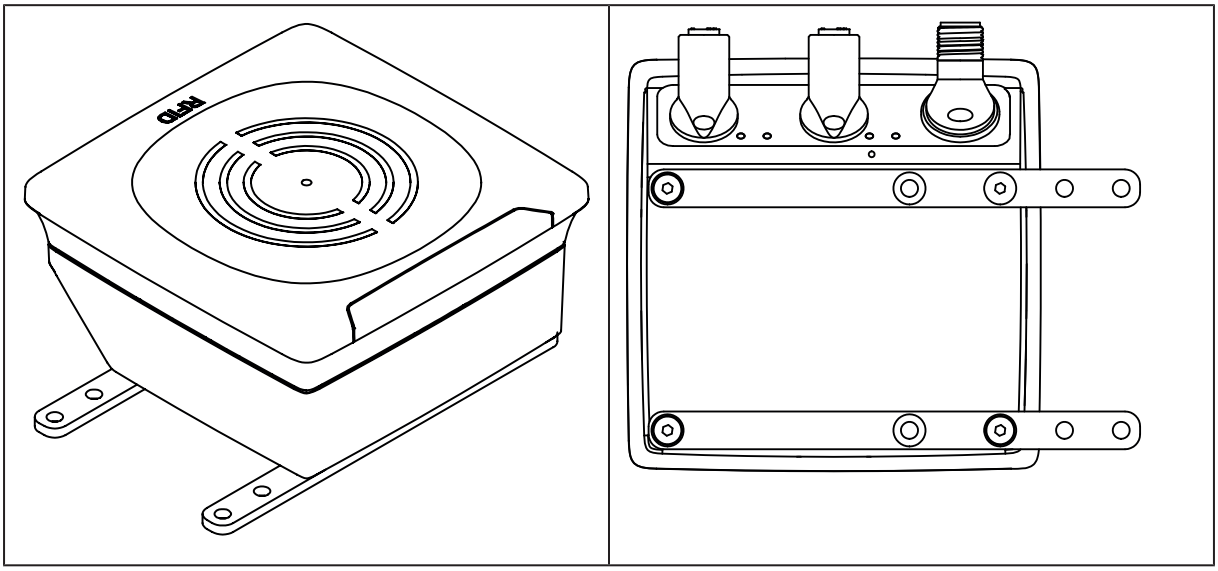

### 6.5.2 Installation with mounting device E80336

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

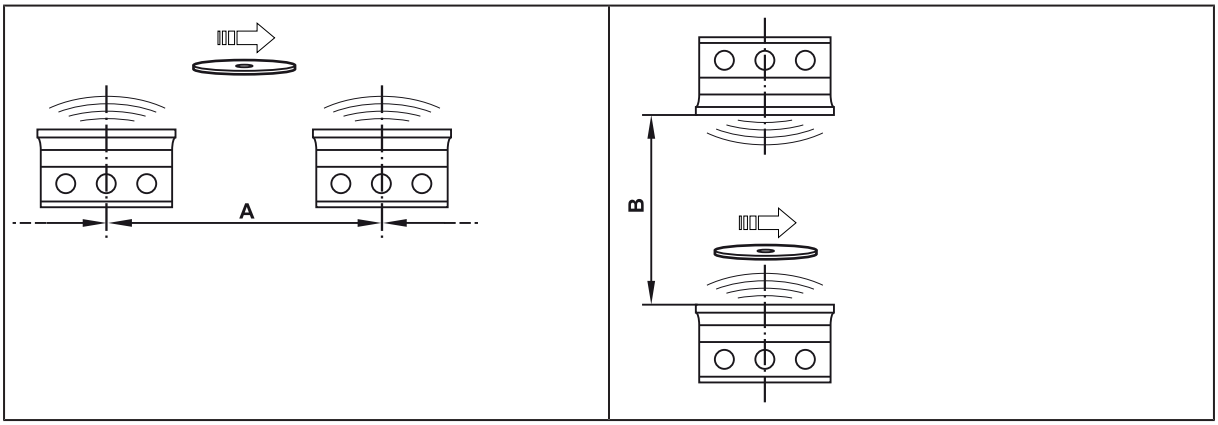
- E21110 with a rod diameter of 12 mm
- E20795 with a rod diameter of 14 mm
- E21109 with a rod diameter of 14 mm




### 6.5.3 Installation with fixing bars E80337




## 6.6 Mounting distances




| Operating mode | Distance side (A) | Distance front (B) |
|---|---|---|
| Read and write (at 100% transmitter power) | ≥ 850 mm | ≥ 600 mm |

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

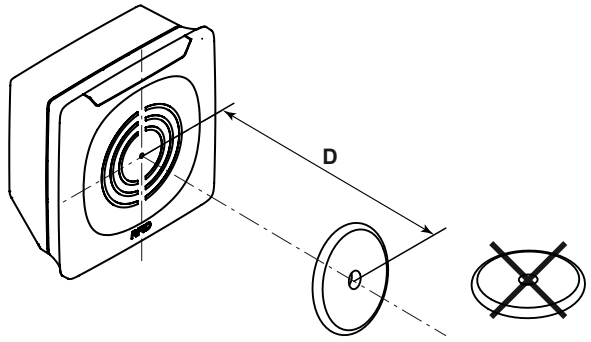



Fig. 1: Position the ID tag

- ▶ 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.**

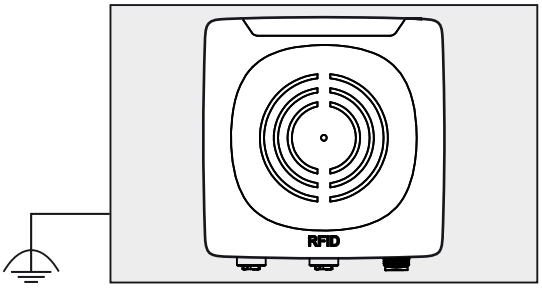



Fig. 2: Mounting plate with mounted device

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

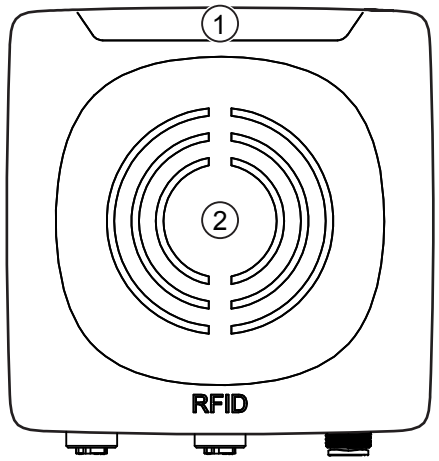



Fig. 3: Operating and display elements

1 1x LED power (green)
4x LED signal bar (yellow)
2x LED field bus (green/red)

2 Sensing face

The following table applies to all units.

| State | Power LED (green) | LED signal bar (yellow) |
|---|---|---|
| Voltage supply OK (18 V ≤ UPWR ≤ 36 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 ETH 1 / ETH 2

| 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<br><br>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<br><br>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. |

| LED | State | Note |
|---|---|---|
| Power LED (green) on<br><br>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 DTE601

The following tables only apply to the DTE601 device.

### 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 | • Overload<br>• Temperature<br>• Internal error |
| on | off | Error at device level | • Undervoltage<br>• 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 | - |
| 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 DTE602

The following tables only apply to the DTE602 device.

### 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:<br>▶ Check the connection of the Ethernet/ IP scanner.<br>▶ Check the parameter setting of the configuration assembly. |

| LED red | LED green | State | Note |
|---|---|---|---|
| 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:<br>▶ Verify voltage supply.<br>▶ Check the configuration of the unit. |
| on | off | Major error | Software / hardware error of the device:<br>▶ Reboot the device.<br>▷ 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 | ▶ Verify voltage supply.<br>▶ 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.<br>▶ 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.<br>▶ 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.<br>▶ Activate DHCP. |
| flashes | flashes | Self-test | Starting phase of the device. |

## 8.3 Display elements DTE604 / DTE605

The following tables only apply to the DTE604 / DTE605 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 | • Overload<br>• Temperature<br>• Internal error |
| on | off | Error at device level | • Undervoltage<br>• 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 |

| LED red | LED green | State | Note |
|---|---|---|---|
| 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