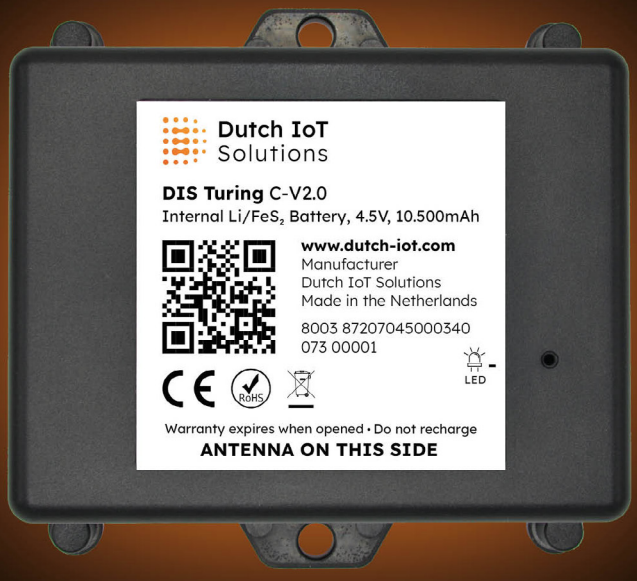
Dutch IoT Solutions

USER MANUAL & SAFETY REGULATIONS

DIS TURING C-V1.0
DIS TURING C-V2.0



1. OPERATION OF THE DEVICE

1.1 Collection and Transmission of Information

The devices (Turing C-V1.0 & Turing C-V2.0) collect and transmit information to, among other things, determine their location. They do this through sensor data. Depending on the configuration, the location can be calculated based on GNSS satellite data and network towers of surrounding masts. The Turing C-V2.0 can also do this via WiFi access points. The reception of GNSS satellite (better known as GPS) only works when the GNSS antenna is placed in close proximity to the outdoors. In practice, the antenna usually doesn't work indoors due to interference (disturbance in radio waves) caused by metal, concrete, bricks, roof tiles, or wood. The Turing C-V2.0 can, through specific commands, enable Bluetooth. Additionally, the Turing C-V2.0 also features WiFi scanning, wherein it collects device BSSID addresses. The transmission of a message works by using the telecom network. The devices are initially configured to send data over LTE Cat M1, and if that fails, they are configured to send data via NB-IoT. The Turing C-V2.0 also has an additional feature that, if the location message still can't be sent, it buffers the data and tries again at a later time.

	Sending information	**Collecting information**
Turing C-V1.0: (3 radio components)	LTE Cat M1 Narrow Band IoT	GNSS location, Network masts, t emperature indication, tamper sensor, acceleraion sensor
Turing C-V2.0 (5 radio components)	LTE Cat M1, Narrowband IoT, Bluetooth signal	GNSS location, Wi-Fi scanning, Network masts, temperature indication, tamper sensor, acceleraion sensor

Figure 1: Overview table: operation of the devices

1.2 Possible reasons for failure

There are two possible scenarios where the data wouldn't be able to transmit:

1. There is no telecom mast nearby that can handle the LTE Cat M1/NB IoT protocol.
2. The module is in a so-called 'Faraday cage'. This means that the environment disrupts the signal to such an extent that no radio signals can be transmitted to the telecom mast.

1.3 Triggers

The device only operates when so-called triggers become active. By default, the device is in 'sleep mode' (this is 99% of the time). The device 'wakes up' and is thus activated by four different types of triggers. When this happens, a message is sent containing information about the status of the device and any sensor data. This data is used to calculate the location.

The four triggers are:

1. Time

A configurable wake-up. Default is once every 24 hours;
In this example, the device wakes up every 24 hours to send a message.

2. Start movement
With a configurable definition of movement (G-forces and duration), the device sends a message;
The basic configuration is 3 events of 1.14 G within 30 seconds.

3. Stop movement
If the status of the device is 'in motion', it doesn't send a message until it has detected no movement for longer than X amount of time;
X time is default 10 minutes; it is however configurable.

4. Tamper sensor
If the magnet on the back of the casing is removed, it sends a message*.

*The device has a configurable message budget. The default is 10. If it has made 10 attempts to send something (successful or unsuccessful), it won't try again within the configured wake-up period (default 24 hours).

1.4 Receiving Data
The devices send data that can be received in three ways:

Option 1
The data is sent to the TIP (The IoT Provider) cloud. This data is accessible at http://cloud.theiotprovider.com. You can log in with your credentials. Afterward, you can manage your products, adjust configurations, view information, and utilize the HTTPS API through this platform.

Option 2 (not yet available)
The device is configured to send data to the specified IP address via MQTT. As a customer, you must set up an MQTT server yourself. There is a set of commands to update and configure the product. Refer to the documentation for details on the website, when this service is available.

Option 3 (not yet available)
A Docker container is provided, which needs to be installed on a server. The device is configured to send data to the specified IP address. There is a set of commands to update and configure the device. Refer to the documentation for details on the website, when this service is available.

2. MOUNTING INSTRUCTIONS

01 PREPARATION

- Ensure that the device is positioned in a location where it can be in connection with the outside, but remains dry. Behind your car windshield for example.
- Prepare the surface by making it dust and grease-free for proper adhesion.
- Place the device with the bottom facing up.

02 REMOVE PROTECTIVE FOIL

- Remove the protective foil from the adhesive strip on the magnet. Note that when you move the device, the magnet will remain on the surface and the tamper sensor will be reactivated.

03 PRESSING

- Press the device firmly against the surface for 5 seconds.

04 ATTACHMENT

- The flanges at the top and bottom can be used to secure the device to the surface with a screw.

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3. LIFESPAN

3.1 Device Lifespan - Base Configuration
The lifespan of the device in base configuration is developed in a way that it's capable of being active for 170.000 event seconds. A configuration that doesn't seek GNSS and is located near a telecommunication tower will be awake for approximately 8 event seconds each time. This translates to the device being able to send about 11 messages per day, over a period of 5 years.

3.2 GNSS Lifespan
However, when the device **does** search for GNSS, it has a configurable timeout of 180 seconds. This means that the product goes to sleep after 180 seconds. In practice, this implies that with one message per day, the batteries* will be depleted after 2,5 years (approximately 940 messages in total).

*Battery performance is influenced by temperature. The optimal operating temperature is 20 degrees. The device functions between -20 & +65 degrees.

4. INTENDED USE

- The device is designed in such a way that it doesn't have to be opened. This also isn't reccomended due to safety reasons.
- The code on the sticker at the top of the device must always remain visible as it serves as the unique identifier and the radiation direction of the antenna.
- The device is splash proof, but can't withstand large amounts of water.

5. DISCLAIMER

Seeing the device is normally in 'sleep mode', it doesn't retain the locations of GNSS satellites or LTE Cat M1 network towers. Consequently, it may occasionally fail to establish a connection and at other times succeed.

The device shouldn't be opened. If it is opened anyway, the warranty will be voided.