

# *CoreTigo* TigoHub i4

## USER MANUAL



**Revision 04**

**Jan 2024**

## Table of Contents

Version Control .....	4
Acronyms and Abbreviations .....	5
<b>1. Introduction .....</b>	<b>6</b>
1.1. Structure .....	7
1.2. Typographical Conventions.....	7
1.3. Symbols.....	7
1.4. Deviating Views.....	7
<b>2. Safety.....</b>	<b>8</b>
2.1. General Note .....	8
2.2. Electrical Connection .....	8
2.3. Intended Use .....	8
2.4. Personnel Qualification .....	9
<b>3. Requirements .....</b>	<b>10</b>
<b>4. Pre-Installation .....</b>	<b>11</b>
4.1. Description .....	11
4.2. Overview .....	11
4.3. Functional Diagram .....	12
4.4. LEDs .....	13
4.4.1. Power Supply LEDs .....	14
4.4.2. IO-Link Wireless LEDs .....	14
4.4.3. Ports LEDs .....	15
4.4.4. Digital Outputs LEDs .....	15
4.5. Electrical Wiring.....	15
4.6. Electrical Connection .....	16
4.7. Data Storage .....	17
<b>5. Mounting .....</b>	<b>17</b>
<b>6. Configuration and Setup .....</b>	<b>18</b>
6.1. PD (Process Data) Configuration.....	18
6.1.1. PDout Configuration Example.....	19
6.1.2. PDin Configuration Example .....	20
6.1.3. IO Link Ports Validation and Backup.....	20
6.2. Device Configuration .....	21
6.2.1. Factory Settings .....	30
6.2.2. Application Selectors.....	32
6.3. Port Configuration .....	34
6.3.1. Data Storage Support for Wireless Devices .....	34

<b>7. Firmware Update .....</b>	<b>35</b>
<b>8. Diagnostics and Troubleshooting .....</b>	<b>36</b>
8.1. Power Supply LEDs .....	36
8.2. IOLW LED .....	36
8.3. Ports LEDs .....	36
<b>9. Guidelines and Regulations .....</b>	<b>37</b>
9.1. RF Exposure Warnings .....	37
9.2. Class A Warning .....	37
9.3. Modification Statements .....	37
9.4. FCC Regulatory Notices .....	38
<b>10. Technical Data .....</b>	<b>39</b>
<b>11. Customer Support .....</b>	<b>44</b>
<b>Appendix – Part Number .....</b>	<b>45</b>

## List of Figures

Figure 1: TigoHub i4.....	6
Figure 2: TigoHub i4 Sample Connectivity.....	10
Figure 3: TigoHub i4 Back Label.....	11
Figure 4: TigoHub i4 Functional Diagram .....	12
Figure 5: TigoHub i4 LEDs.....	13
Figure 7: Electrical Schematic Diagram .....	16
Figure 8: TigoHub i4 Mountings .....	17
Figure 9: PDout Configuration Example .....	19
Figure 10: PDin Configuration Example.....	20
Figure 11: Masters View .....	21
Figure 12: Block Diagram - Power .....	42
Figure 13: Block Diagram - Ports 1 and 2.....	42
Figure 14: Block Diagram - Ports 3 and 4.....	43
Figure 15: TigoHub Dimensions .....	44

## List of Tables

Table 1: Power LEDs .....	14
Table 2: IOLW LEDs .....	14
Table 3: Ports LEDs .....	15
Table 4: Digital Outputs LEDs.....	15
Table 5: PD Configuration.....	18
Table 6: CQ Port Mode Configuration.....	18
Table 7: PDin/PDout Configuration.....	19
Table 8: PDout Configuration Example.....	19
Table 9: PDin Configuration Example .....	20
Table 10: Power LEDs .....	36
Table 11: IOLW LEDs .....	36
Table 12: Ports LEDs .....	36
Table 13: Technical Data .....	39

## Version Control

Author Name	Description	Revision	Date
Benny Zelman	Document creation	00	07.11.21
Mike Carmel	Added chapter 6	01	12.06.2022
Mike Carmel	Updates in chapters 4, 6	02	24.05.2023
Shoval Ben Shanan	Adding Wireless DS, Updating Device Configuration Chapter	03	15.08.2023
Ofir Levi	Fix table and image for PDOUT & PDIN examples (Chapter 6).	04	02/01/2024

## Acronyms and Abbreviations

Acronyms and abbreviations used in this document are listed in this table.

Symbol	Meaning
CEC	Canadian Electrical Code
DI	Digital Input
DIO	Digital Input/Output
DO	Digital Output
FCC	Federal Communications Commission
FOTA	Firmware Over The Air
FW	Firmware
HW	Hardware
IF	Interface
IO	Input/Output
IODD	Input/Output Device Description
iIODD	Internal Input/Output Device Description
IOL	Input/Output Link
IOLW	IO-Link Wireless
ISDU	Indexed Service Data Unit
LED	Light-Emitting Diode
NEC	National Electrical Code
NFPA	National Fire Protection Association
OD	On Demand
PD	Process Data
SMA	SubMiniature version A
SW	Software
UID	Unique ID

## 1. Introduction

This User Manual introduces the **TigoHub i4** (P/N: CT261-007-4P) and instructs how to perform setup, configuration, mounting, and troubleshooting.

The **TigoHub i4** is a Multiport hub for IO-Link Wireless connectivity of IO-Link and DIO devices.

It connects up-to 4 IO-Link and up to a combination of 6 IO-Link/DIO devices and converts to IO-Link Wireless.

Read this User Manual carefully before using the device.



Figure 1: TigoHub i4



### References:

- *TigoEngine – User Manual*
- *TigoMaster 2TH – User Manual*

## 1.1. Structure

The sections of this User Manual build on one another.

## 1.2. Typographical Conventions

Enumerations are shown in list form with bullet points.

- Entry 1
- Entry 2
- Entry 3

Instructional steps are shown in list form with numbers.

Step 1.

Step 2.

Step 3.

Decimal numbers are shown without additional indicators and are not spelled out (e.g.123).

## 1.3. Symbols

The following symbols are used in this User Manual:



**Note:**

This symbol indicates a general note.

---



**Warning:**

This symbol indicates a security notice which must be observed.

---



**Reference(s):**

This symbol indicates a cross-reference to other documentation.

---

## 1.4. Deviating Views

The product views and illustrations in this User Manual may deviate from the actual product. They are intended only as illustrative material.

## 2. Safety

### 2.1. General Note

This User Manual is intended for any qualified personnel using the device. All safety messages, integrated safety messages, property damage messages, and valid legal regulations must be observed by its users.



Technical capabilities on behalf of the user are presumed.

---

### 2.2. Electrical Connection

**TigoHub i4** shall be supplied by an isolated power source that meets the following requirements:

- Limited-Energy Circuit in accordance with UL/CSA 61010-1  
or
- Limited Power Source (LPS) in accordance with (UL/CSA 60950-1 or EN 62368-1, Annex Q)  
or
- Class 2 supply source which complies with the National Electrical Code (NEC), NFPA 70, Clause 725.121 and Canadian Electrical Code (CEC), Part I, C22.1.



**Warning:** Wiring of DIO devices must be according to the specified instructions. Incorrect wiring may result in damage to the TigoHub i4 and the connected devices.

---



**Warning:** Product applications other than those described in this User Manual are not permitted.

---

### 2.3. Intended Use

**TigoHub i4** is an IO-Link Wireless Device with an IP65 enclosure.

Note the following:

- TigoHub i4 is intended for indoor use only in a service area away from the public or in a panel.
- TigoHub i4 converts four IO-Link/DIO ports to a single IO-Link Wireless port.
- TigoHub i4 houses two M12 L-coded connectors for Power In and Power Out, 4 M12 A-coded connectors for sensors\actuators and an SMA connector for external antenna.



## 2.4. Personnel Qualification

The product may only be mounted, configured, operated, or demounted by qualified personnel. When working with electricity, technical skills must be demonstrated under all the following circumstances:

- Safety and health at work
- Mounting and connecting of electrical equipment
- Measurement and analysis of electrical functions and systems
- Evaluation of the safety of electrical systems and equipment



**Warning:** CoreTigo Ltd. does not assume any warranty or liability for damage caused to the product due to non-compliance with security measures or incorrect product installation.

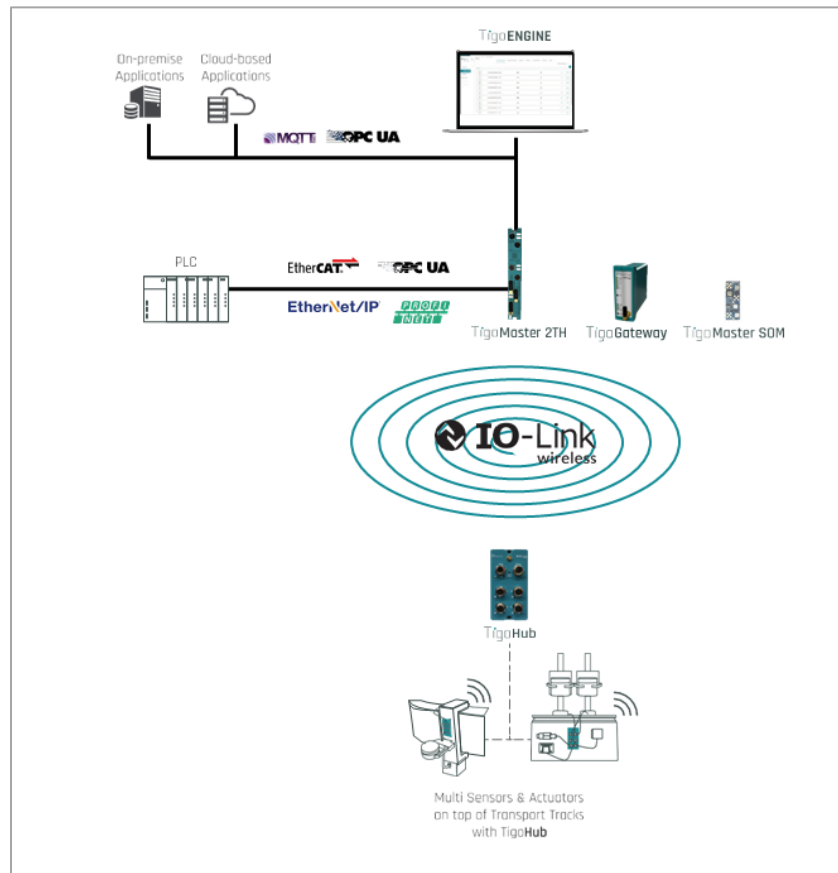
---

### 3. Requirements

**TigoHub i4** is implemented based on the IO-Link Wireless standard for W-Devices.

TigoHub i4 is part of an IO-Link Wireless environment. It communicates with an IO-Link Wireless Master. Therefore, to use it, an IO-Link Wireless Master, IO-Link and DIO devices, and a power cable are required.

Refer to the illustration below for sample connectivity:



**Figure 2: TigoHub i4 Sample Connectivity**

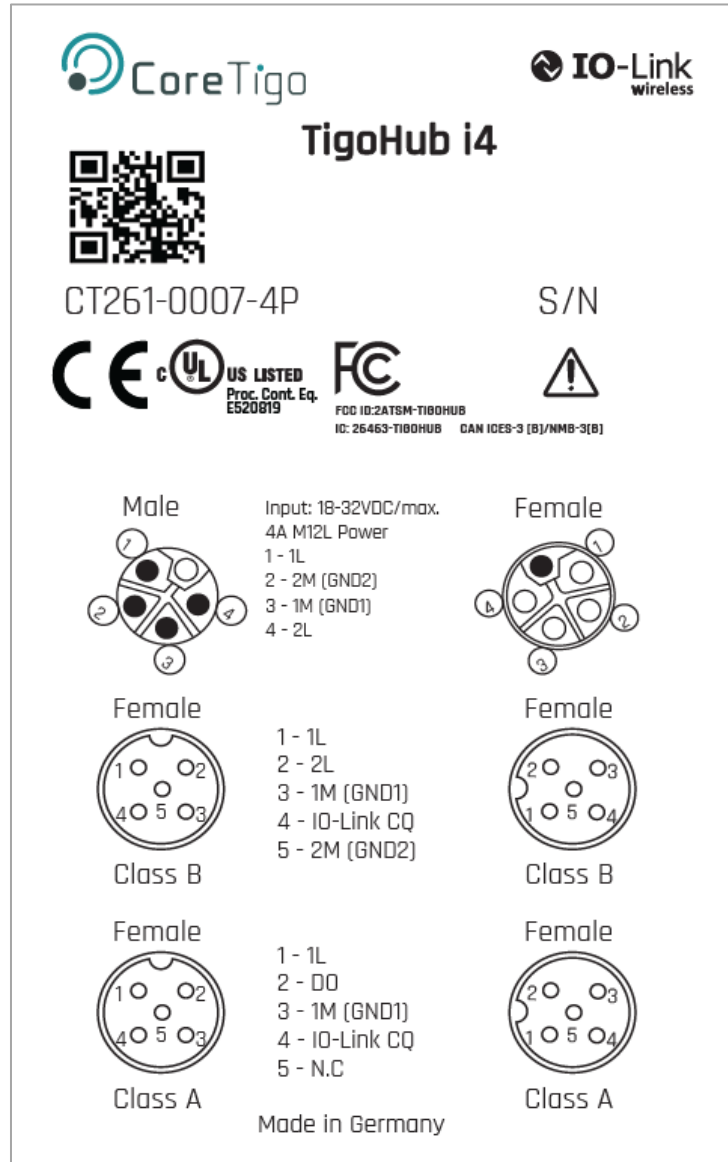
- A. IO-Link Class A Device
- B. IO-Link Class B Device
- C. DI Devices
- D. DO Devices
- E. IO-Link Wireless Master
- F. Power Source – 24VDC
- G. TigoHub i4

## 4. Pre-Installation

### 4.1. Description

IO-Link devices or DI/DO devices can be connected to a TigoHub i4 using A-coded M12 cables. The TigoHub i4 can be connected to an IO-Link Wireless Master using the TigoEngine engineering tool, the Integrated web server tool, or a PLC.

### 4.2. Overview

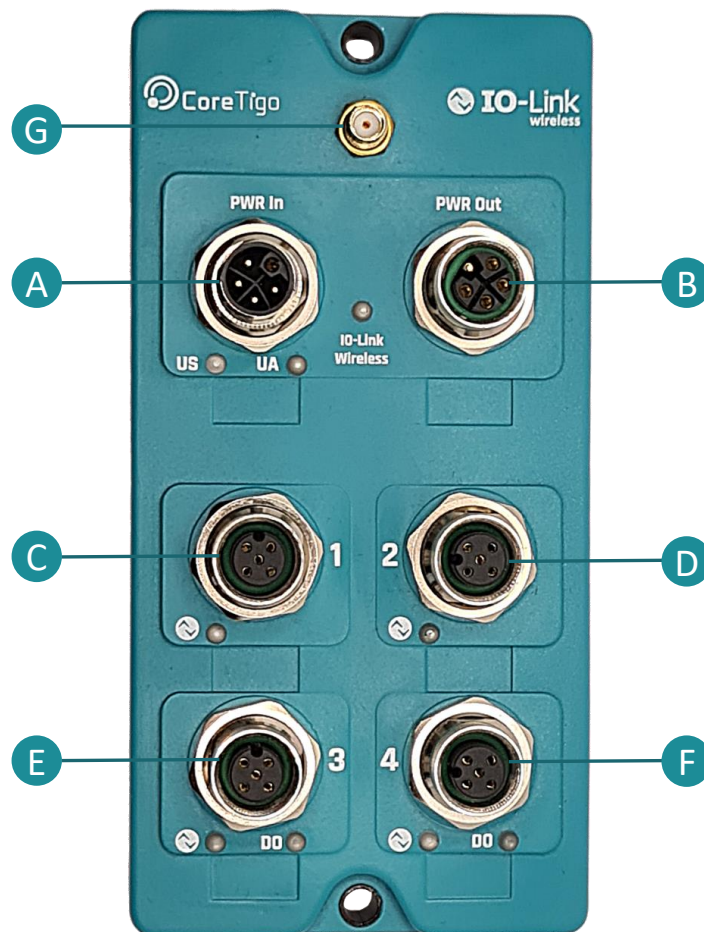


**Figure 3: TigoHub i4 Back Label**

**Label:**

- A. TigoHub i4 Model
- B. Input Power Supply Range
- C. Product Number
- D. QR CODE (URL)
- E. FCC ID
- F. Class A ports connectivity diagram
- G. Class B ports connectivity diagram

### 4.3. Functional Diagram



**Figure 4: TigoHub i4 Functional Diagram**

- A. Power input
- B. Power output
- C. Port 1
- D. Port 2
- E. Port 3
- F. Port 4
- G. Antenna connector

#### 4.4. LEDS

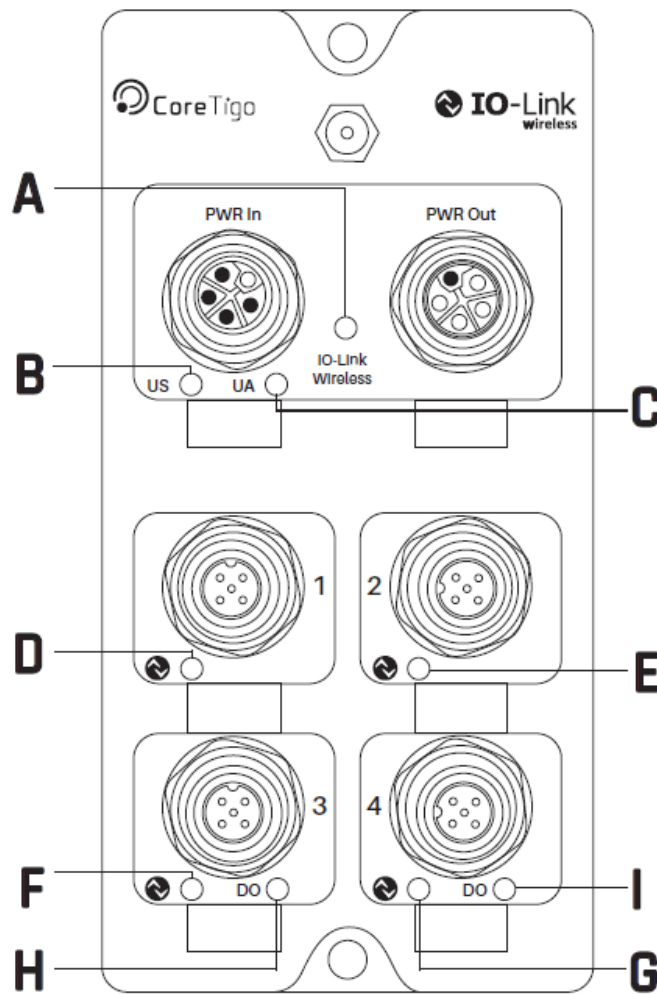


Figure 5: TigoHub i4 LEDs

- A. IO-Link Wireless Status (**Red/Green/Orange**)
- B. Power Supply 1 (**Red/Green/Orange**)
- C. Power Supply 2 (**Red/Green/Orange**)
- D. Port 1 (**Red/Green/Orange**)
- E. Port 2 (**Red/Green/Orange**)
- F. Port 3 (**Red/Green/Orange**)
- G. Port 4 (**Red/Green/Orange**)
- H. Digital Output 1 (**Green**)
- I. Digital Output 2 (**Green**)

#### 4.4.1. Power Supply LEDs

The following table describes the indication of Power Supply 1 and Power Supply 2 LEDs

**Table 1: Power LEDs**

LED Color	Indication
<b>Green</b>	Power supply voltage OK

#### 4.4.2. IO-Link Wireless LEDs

**Table 2: IOLW LEDs**

LED Color	Indication
<b>Green</b>	Device unpaired
BLINKING <b>Green</b> (350msec on, 350msec off)	Device paired
FLASHING <b>Green</b> (900msec on, 100msec off)	Device connected
<b>Orange</b>	Safe mode
BLINKING <b>Red</b>	Fault
Off	Inactive

#### 4.4.3. Ports LEDs

The following table describes the indications of Ports 1-4 LEDs.

**Table 3: Ports LEDs**

LED Color	Indication
Green	Port configured as IOL, operational, invalid data
BLINKING Green	Port configured as IOL, operational, valid data
Orange	Port configured as IO, operational, invalid data
BLINKING Orange	Port configured as IO, operational, valid data
Red	Port configured as IOL, not operational
BLINKING Red	Fault
OFF	Inactive

#### 4.4.4. Digital Outputs LEDs

The following table describes the indications of Digital Outputs 1-2 LEDs.

**Table 4: Digital Outputs LEDs**

LED Color	Indication
Green	Output set to high
OFF	Output set to low

### 4.5. Electrical Wiring

TigoHub i4 has six M12 connectors.

- **4x IO-Link Connector:** 5 pins, A-Coded female connector.



Maximum Current supply to IO-Link device is 2A for 24VDC Class A port and 4A for 24VDC class B port.

- **Power Input Connector:** 5 pins, L-Coded male connector.



Voltage higher than 32VDC is forbidden, as it can damage the TigoHub i4. Maximum current supply is 8A when using 24VDC.

- **Power Output Connector:** 5 pins, L-Coded female connector.

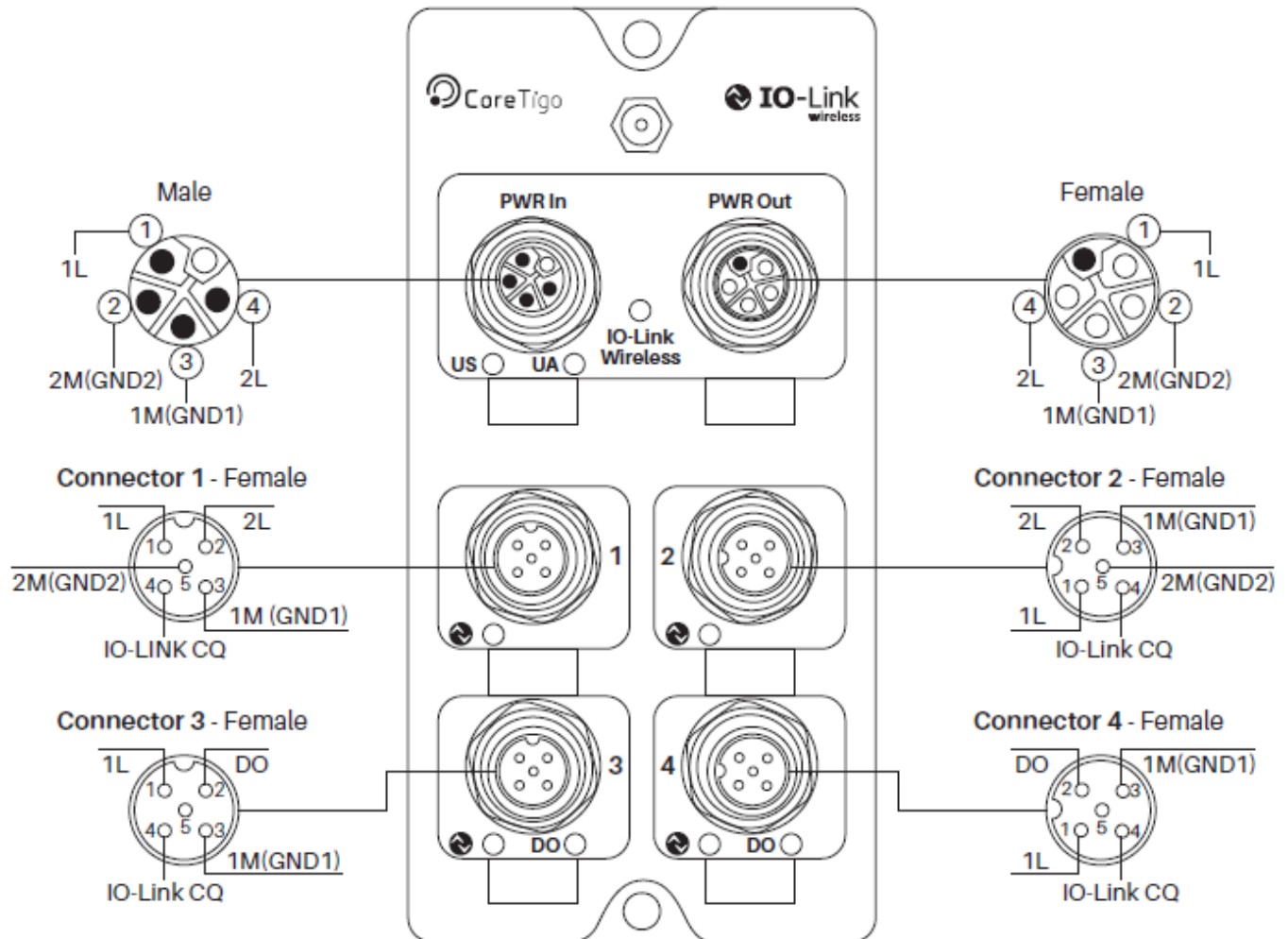


Maximum current supply for cascading power is 4A per each 1L and 2L, when using 24VDC.



**Warning:** The device has a CQ Protection mechanism wherein if the voltage exceeds 500mA on one of the wired ports, the device will automatically disconnect.

## 4.6. Electrical Connection



**Figure 6: Electrical Schematic Diagram**



**Note:**

Ports 1 and 2 are Class B and both pin #4s can be configured for DO/DI (digital output/digital input) usage.

Ports 3 and 4 are Class A. In these ports, both pin #4s, which are not used for the PWR, can be used as additional DO/DI channels. Also both pin #2s can be configured for DO or DI usage.

This makes a total of 6 channels.



## 4.7. Data Storage

In TigoHub the concept of data storage (relevant only for V11 devices) refers to **Wireless** device data storage – the Wireless Master backs up its data.

Refer to [Device Configuration](#) below to view the process for configuration of the Master to accommodate data storage capability.

## 5. Mounting

TigoHub i4 is mounted using 2 M4 screws, at the holes indicated in **red** in the illustration below:



**Figure 7: TigoHub i4 Mountings**

## 6. Configuration and Setup

The **Process Data (PD)** of TigoHub i4 can be configured to define the mapping of the PD of the various connected devices.

The configuration, through an internal-IODD (iIODD) table which describes the properties and capabilities of the device, is set through ISDU (Block Parameterization) by the TigoEngine to the TigoHub i4, where it is saved in an external flash drive.

Unlike single device connectivity units such as the TigoBridge, which do not require configuration for connectivity, TigoHub i4 requires configuration and connects to the wired devices according to the following iIODD table parameters:

- Aggregated PD length
- Port configurations

### 6.1. PD (Process Data) Configuration

TigoHub i4 acquires the PD mapping according to the following configurations.

**Table 5: PD Configuration**

PD Configuration
Aggregated PD Length
Port PD Length
Port PD Offset
<ul style="list-style-type: none"> <li>▪ Aggregated PD length must be the sum of all the ports PD length + 1Byte for DO/DI</li> <li>▪ DO/DI byte will always be the Least Significant Byte</li> </ul>

For each port, the user can configure the CQ port mode (pin #4) as either:

**Table 6: CQ Port Mode Configuration**

CQ Port Mode (Pin #4) Configuration
IO-Link
DO
DI
Inactive

For each class A port, the user can set the IQ port mode to either **Enable/Disable**.

In each port configuration, the user can configure the PDin and PDout behavior in case of a port mode “IO-Link” as:

**Table 7: PDin/PDout Configuration**

PDin/PDout Configuration for Port Mode IO Link	
PDin:	can be set to <b>Length</b> or <b>Offset</b>
PDout:	can be set to <b>Length</b> or <b>Offset</b>

The user can also configure the following parameters:

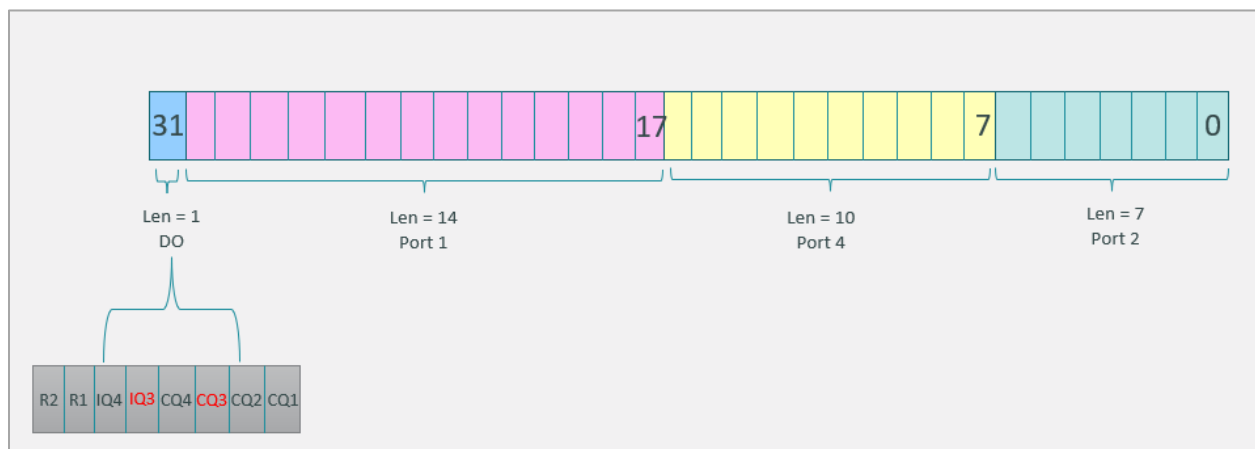
- DO initial value in case of a port mode “CQ DO” or if the IQ is enabled, can be either **Low** or **High**.
- IOL Cycle time ( $\mu\text{s}$  – quoted as a decimal number)
- Wired connection timeout (sec – quoted as a decimal number). This value states how much time the TigoHub i4 should wait for an operational response from the IOL device. Default value = 1 sec.

### 6.1.1. PDout Configuration Example

Following is an example of a PDout configuration (Process Data out from the Master).

**Table 8: PDout Configuration Example**

PDout Configuration	
Aggregated PDout Length	32 (Maximum)
Port 1	PDout Length = 14 PDout Offset = 17
Port 2	PDout Length = 7 PDout Offset = 0
Port 3	IQ (pin2) Enable as DO ; CQ (pin4) enable as DO
Port 4	PDout Length = 10 PDout Offset = 7



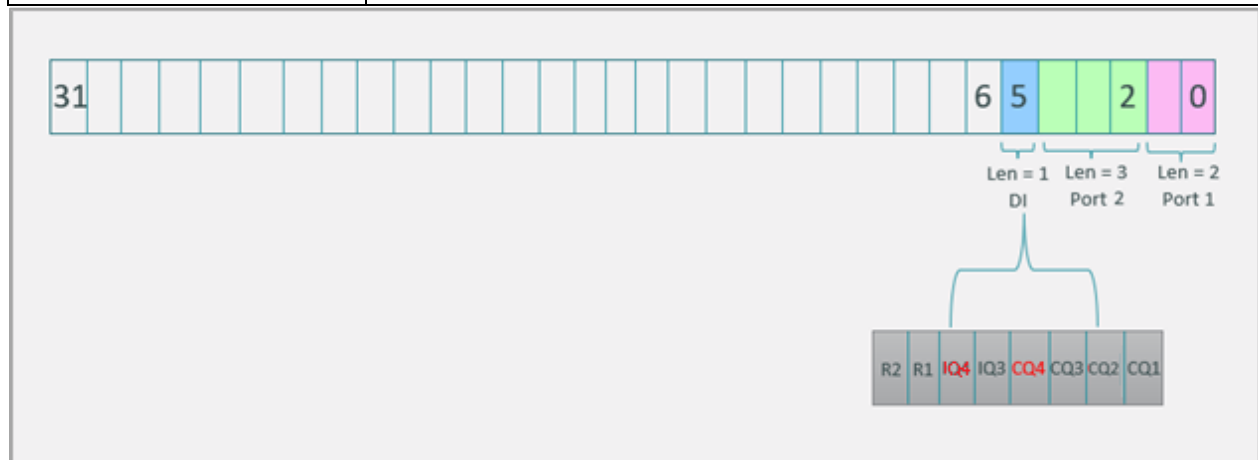
**Figure 8: PDout Configuration Example**

### 6.1.2. PDin Configuration Example

Following is an example of a PDin configuration (Process Data into the Master).

**Table 9: PDin Configuration Example**

PDin Configuration	
Aggregated PDin Length	6
Port 1	PDin Length = 2 PDin Offset = 0
Port 2	PDin Length = 3 PDin Offset = 2
c	IQ (pin2) Enable as DI ; CQ (pin4) enable as DI



**Figure 9: PDin Configuration Example**

### 6.1.3. IO Link Ports Validation and Backup

For IO Link Ports validation and backup, the following user options are available:

- NONE
- TYPE COMPATIBLE V10 – for revision 1.0 of the wired standard
- TYPE COMPATIBLE V11 BACKUP AND RESTORE – for support of wired DS
- TYPE COMPATIBLE V11 RESTORE – for support of wired DS

If one of the above “TYPE COMPATIBLE” options is selected, the user should fill the following fields for comparison with the end device:

- Device ID
- Vendor ID

If “NONE” is selected, the above fields can be left blank, optionally.

### Warnings:



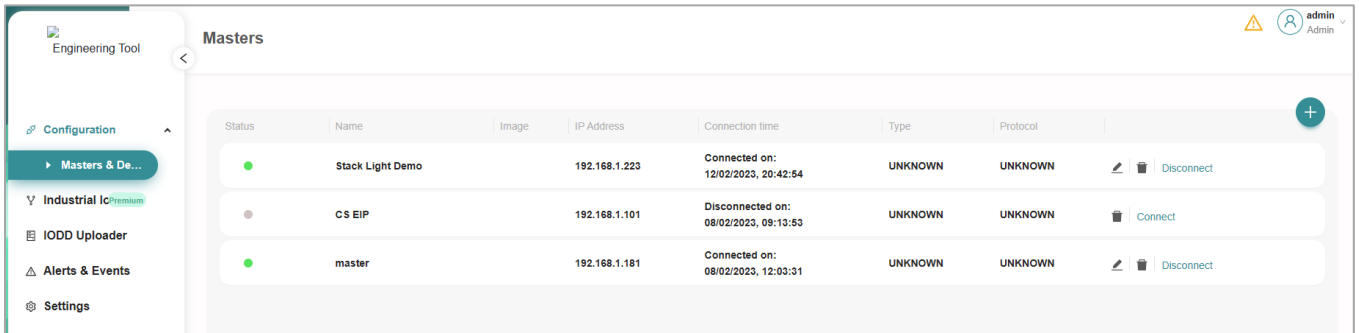
- If a mandatory port is not connected, TigoHub i4 will be set to “Safe Mode”. This means it will not communicate any PD between the wireless and the wired ports, even for connected ports. ISDU and diagnostic data will still be available.
- If an optional port is not connected, TigoHub i4 will remain in Normal Mode and PD for the rest of the connected ports will be communicated as well as the ISDU and Events.

## 6.2. Device Configuration



**Reference:** Refer to chapter 6 of the *TigoEngine User Manual* for a description of how to connect to a new **TigoMaster** in the **TigoEngine** application.

When the Master is connected its details appear in the table in the **Masters** view.



Status	Name	Image	IP Address	Connection time	Type	Protocol	
●	Stack Light Demo		192.168.1.223	Connected on: 12/02/2023, 20:42:54	UNKNOWN	UNKNOWN	Disconnect
●	CS EIP		192.168.1.101	Disconnected on: 08/02/2023, 09:13:53	UNKNOWN	UNKNOWN	Connect
●	master		192.168.1.181	Connected on: 08/02/2023, 12:03:31	UNKNOWN	UNKNOWN	Disconnect

**Figure 10: Masters View**

Proceed as follows:

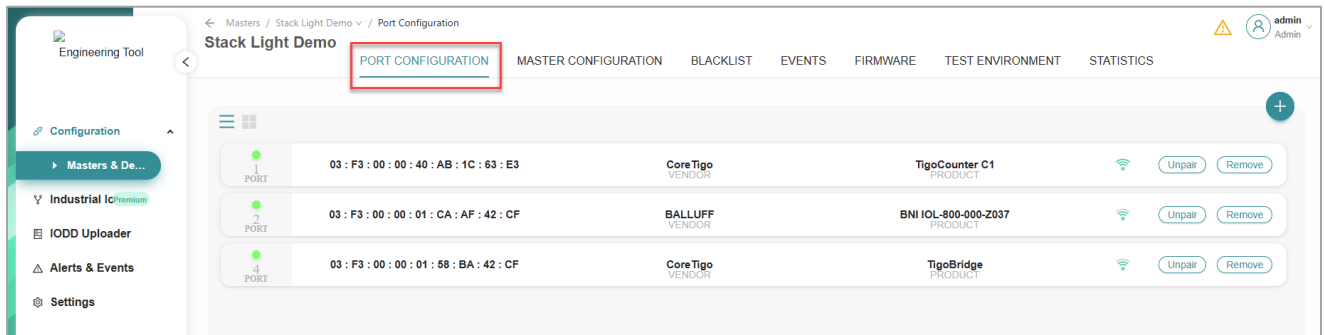
In the side panel, under **Configuration** click **Masters and Devices**.

Click on any of the parameters in a selected Master on the list.

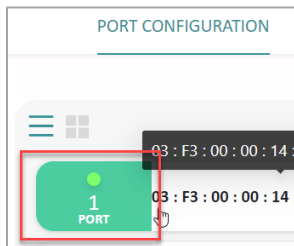
The tabs above the list become available.

Access the PORT CONFIGURATION tab.

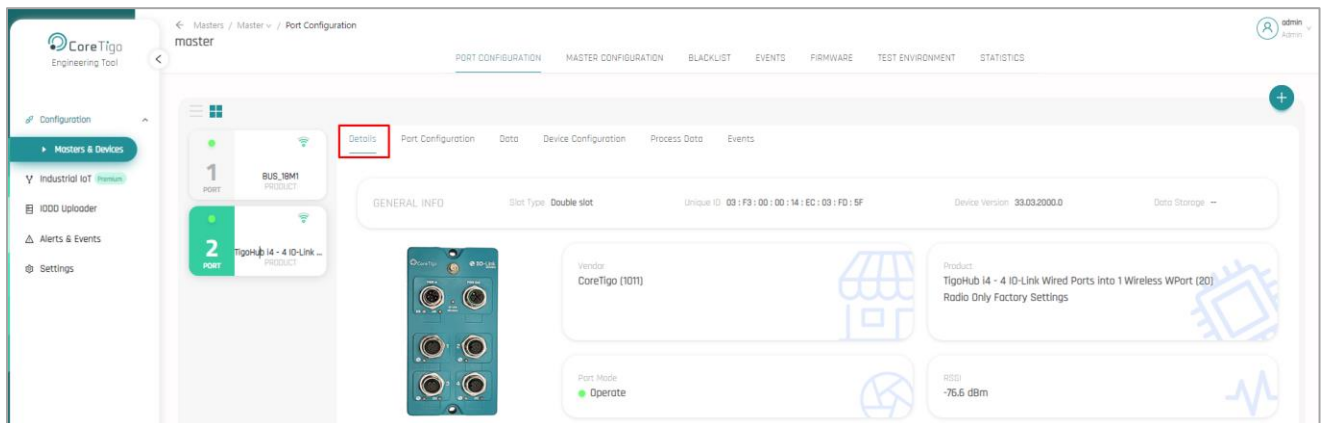
The configured ports are displayed.



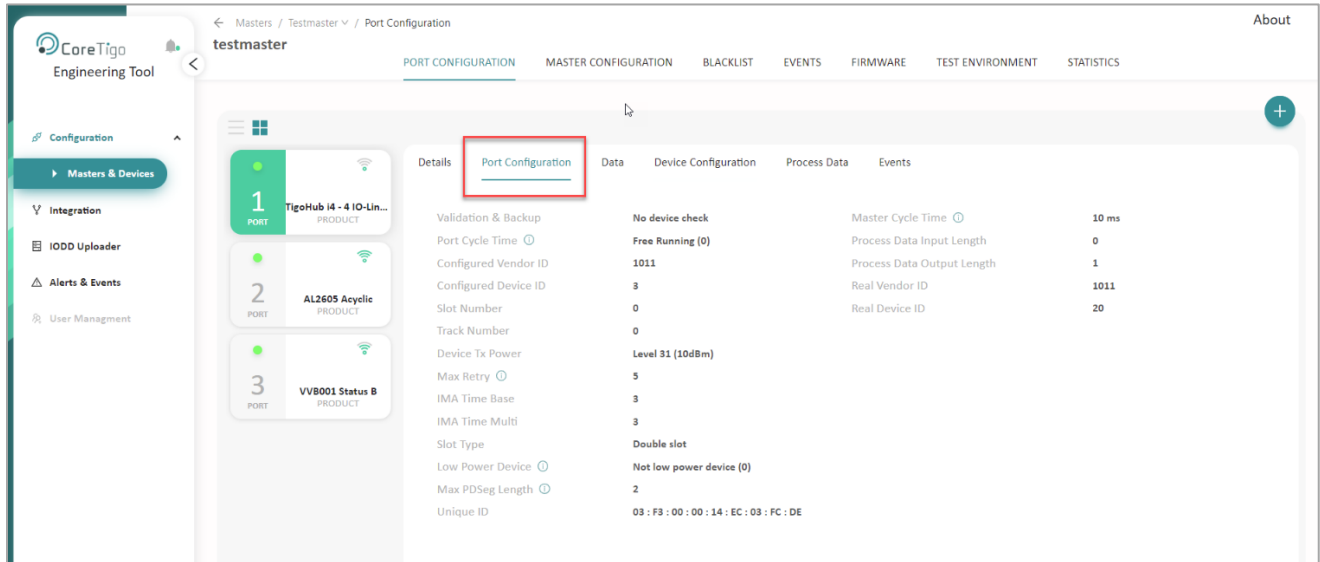
Click on the **PRODUCT** parameter on the port list to view the details of the product.



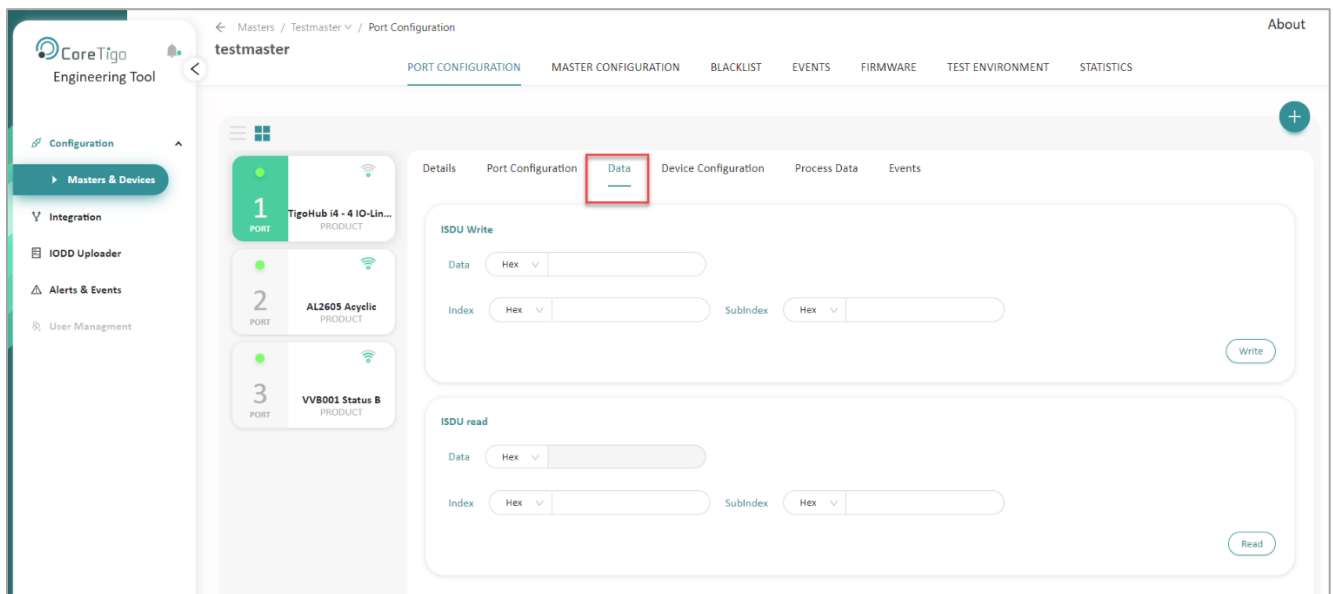
The **Details** sub-tab opens displaying the details of the device.



Click on the **Port Configuration** sub-tab to view the defined configuration parameters of this port.



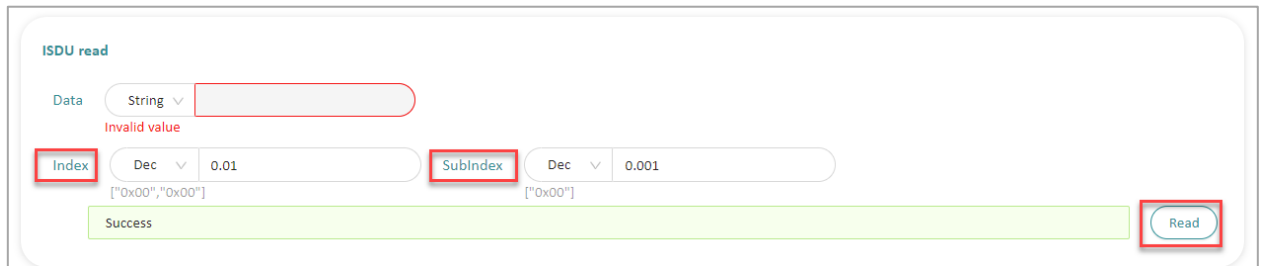
Click on the **Data** sub-tab to write and read on-demand (OD) data.



For example, to read the vendor ID of the device:

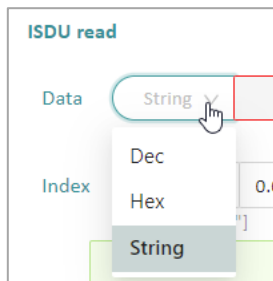
- Under **ISDU Read**, insert the relevant digits in the **Index** and **Sub-Index** fields.
- Click the **Read** button on the right-hand side of the screen.

- A **Success** notification appears.



The screenshot shows the 'ISDU read' interface. At the top, there is a 'Data' field with a dropdown menu set to 'String' and an empty input box. Below it, a red error message reads 'Invalid value'. The 'Index' field is set to 'Dec' with the value '0.01', and the 'Subindex' field is also set to 'Dec' with the value '0.001'. Below these fields, a green success notification bar displays the text 'Success' and a 'Read' button.

- In the **Data** field select from the dropdown list the display options of **Dec/Hex/String**.
- The Vendor ID is displayed in the **Data** field.



The screenshot shows the 'ISDU read' interface with the 'Data' dropdown menu open. The menu options are 'String', 'Dec', 'Hex', and 'String'. A mouse cursor is pointing at the 'String' option. The 'Index' field is set to 'Dec' with the value '0.01'.

- Similar actions can be performed in **Write** mode.



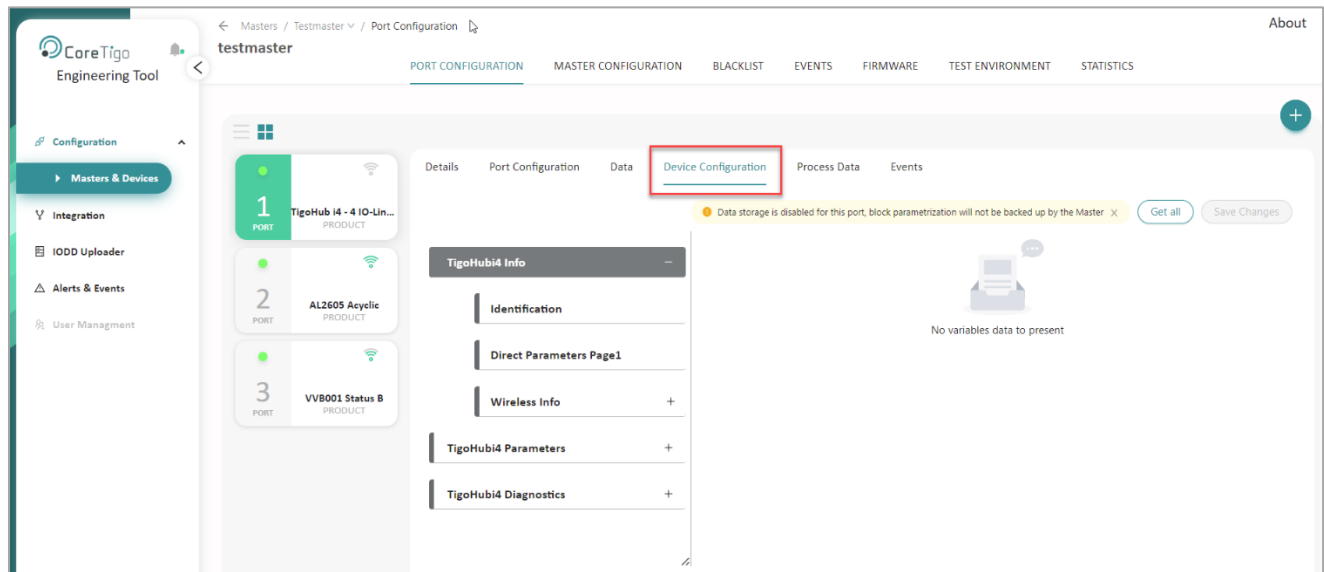
Click on the **Process Data** sub-tab to view the **PDin** and **PDout** for each device.

Click on the **Device Configuration** sub-tab to view the main **TigoHubi4** configuration setup.

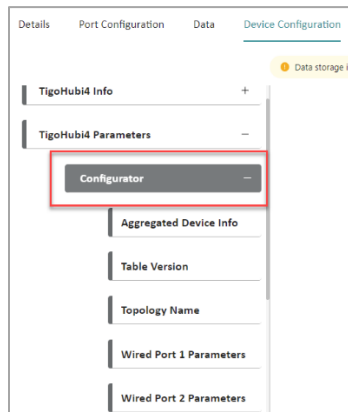
**Prerequisite:** WIODD files of TigoHub i4 should be uploaded beforehand.



**Reference:** Refer to chapter 16 of the *TigoEngine User Manual* for a description of how to upload IODD files.



Open the **Configurator** menu, accessible in the side-panel, under **TigoHub i4 Parameters**.

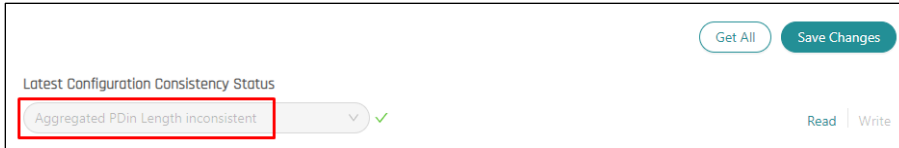


The **Latest Configuration Consistency Status** field displays information regarding any inconsistency errors that may occur during the modification of TigoHub i4 parameters.

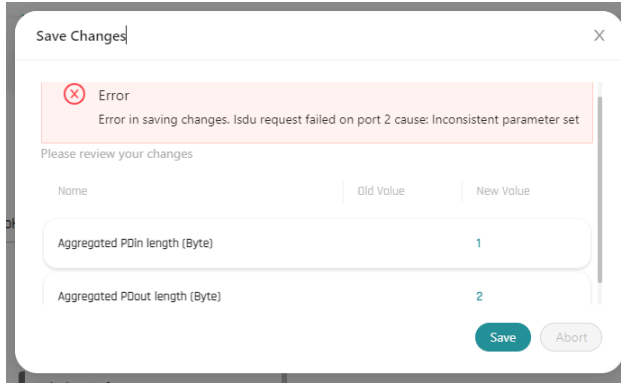
Modifying multiple parameters of the TigoHub i4 is possible, but some inconsistency errors may occur after saving the changes.

To easily identify these errors, click the **Read** button.

Any inconsistent parameters will appear in the **Latest Configuration Consistency Status** field.



In the event that more than one parameter requires modification, an error will occur and the process will need to be repeated.



The **Configurator** displays all available configuration screens. For instance, the **Wired Port 2 Parameters** screen shows information regarding Port 2 of the TigoHub i4.

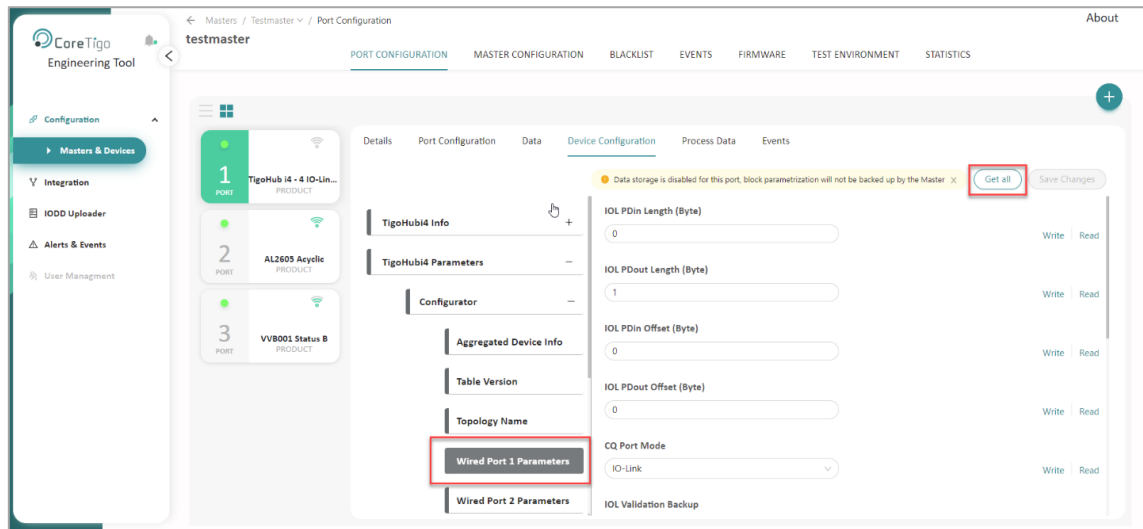
The user can configure any of the ports separately.

For example, to configure Port 1:

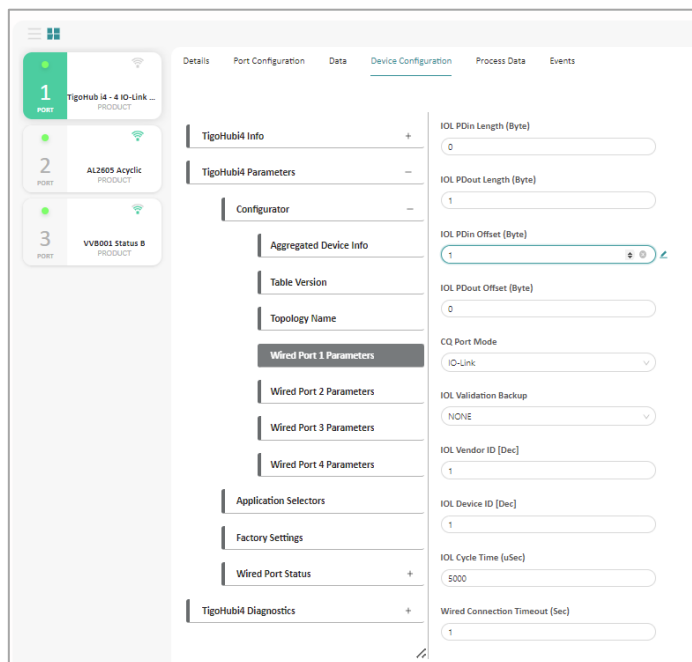
- Click the **Get All** button to retrieve all the available data for the device.
- Click on **Wired Port 1 Parameters** in the side-panel menu.
- The **Port 1 Configuration** screen opens with the retrieved data populated.

For example:

- the **IOL PDin Length** field displays zero because this device has no incoming data.
- the **IOL PDout Length** field displays one because this device has output data. In this example the relevant device is a smart light connected to the **TigoHub i4**.



- The user can select values from the dropdown lists in any field with a value greater than zero.

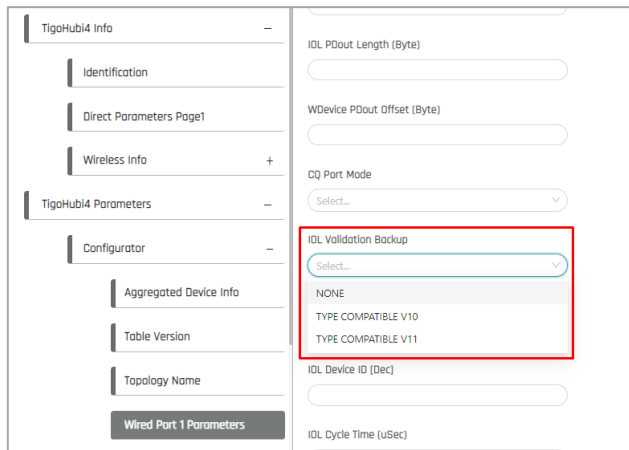


- In the different **Port Parameters** displays, the user can select Offset values for PDin and PDout.
- The **IOL PDin Length** determines the number of bytes the user wants to allocate from the IO-Link wired device, and the **Wdevice PDin Offset** determines the exact byte location from which the data will be aggregated (see the figure above).
- Note that the first device does not have to be connected to Port 1 for data aggregation and connectivity does not have to be sequential.
- The user can select the type of data for this Port 1, in the **CQ Port Mode** field from the options available in the dropdown list – **Deactivated/IO Link/DI CQ/DO CQ. (DI=Digital Input, DO=Digital Output)**.
- The user can perform a validation test on a connected device through the **IOL Validation Backup** field. Select an option from the available dropdown list. The default option here is **NONE**.

Options include:

- **TYPE COMPATIBLE V10**
- **TYPE COMPATIBLE V11**

These types refer to the IO Link versions. The connected device should match the expected type. If it doesn't the connection will fail.



The screenshot shows the TigoHub i4 configuration interface. On the left is a sidebar with navigation options: TigoHub4 Info, Identification, Direct Parameters Page1, Wireless Info, TigoHub4 Parameters, Configurator, Aggregated Device Info, Table Version, Topology Name, and a button for Wired Port 1 Parameters. The main area on the right contains several input fields: IOL PDout Length (Byte), WDevice PDout Offset (Byte), CQ Port Mode (a dropdown menu), IOL Validation Backup (a dropdown menu highlighted with a red box), IOL Device ID (Dec), and IOL Cycle Time (uSec). The IOL Validation Backup dropdown menu is open, showing the following options: NONE, TYPE COMPATIBLE V10, and TYPE COMPATIBLE V11.

- For the **IOL Validation Backup** test, select an option from the available dropdown list for **IOL Vendor ID** and **IOL Device ID**. These are only relevant for the validation test and should be left blank when not in use.
- The user can determine the **IOL Cycle Time** in microseconds - the frequency by which the device communicates with the Master (which translates to latency). Default = 0.

In any case the value for the wired cycle time will be at least the minimum cycle time of the device, even if the value the user inserts is smaller.

- The user can define the **Wired Connection Timeout** in seconds. This is a time limit within which the connected device must respond, before the port is closed.

For example, if the connected smart light does not turn on after 1 sec, the port is closed automatically as the assumption is that there is a malfunction. The default value is 1 sec.

- The user can determine that a specific port will be defined as mandatory. Use the **Is Mandatory** field for this. This is usually important for safety considerations.

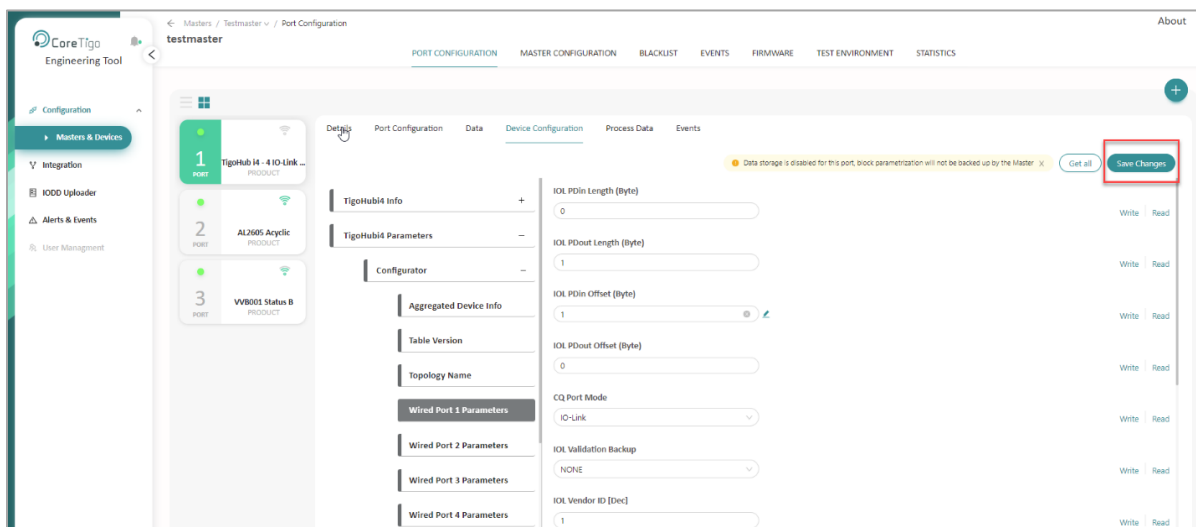
When a port is defined as mandatory and it is not connected, the **TigoHub i4** will enter Safe Mode i.e. no PDin or PDout will be available, only OD-ISDUs and Diagnostics. Select an option from the available dropdown list – **Optional/Mandatory**, for this port. Disconnection alerts can be configured in the IODD table.

Note: When a port is defined as **Mandatory** and it returns a **COMLOST** notification during operation, TigoHub i4 will issue an Event and reset itself entering Safe Mode.

- If the device is reconnected to this port, TigoHub i4 will issue another Event and reset itself entering Regular Mode.
- If the port is defined as **Optional**, TigoHub i4 will issue an Event but will not reset or enter Safe Mode.
  - The user can determine the initial value of the DO CQ in the **DO CQ Initial Value** field. These are appropriate for IO Digital devices which receive or transmit digitally (0/1), connected to the **TigoHub i4**.
  - For ports 1 and 2 there is only 1 CQ pin, and for ports 3 and 4 there are two pins each, one is a CQ and the other is an IQ. Select an option from the available dropdown list – **Low/High** – i.e. 0 or 1.

Click the **Save Changes** button at the top right-hand corner of the screen.

All changes are saved and a consistency check is automatically performed.



### 6.2.1. Factory Settings

The user can return the configured values to the factory default values. This will return the TigoHub i4 to the default values configured on its flash drive.



#### Warnings:

- Prior to initiating a Factory Reset, ensure that the device is not in Wireless DS mode.

Proceed as follows:

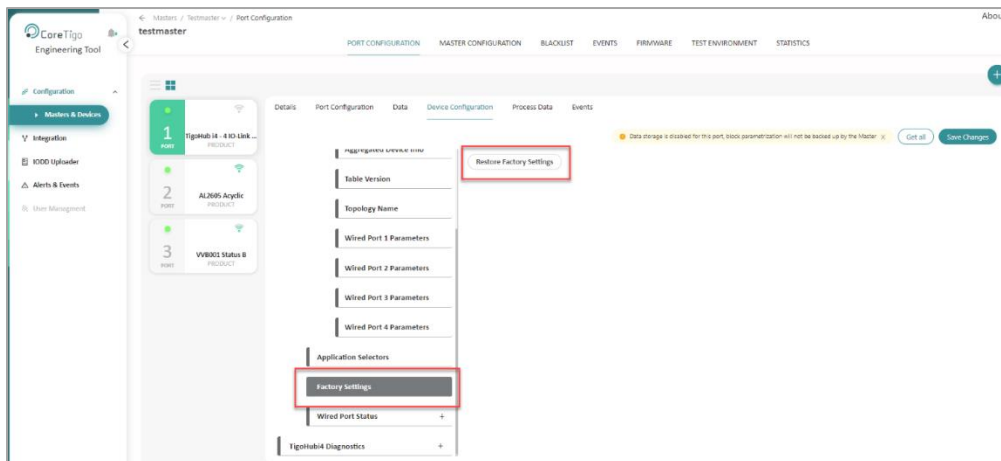
Click on the **Device Configuration** sub-tab to view the main **TigoHubi4** configuration setup.

**Prerequisite:** WIODD files of TigoHub i4 should be uploaded beforehand.



**Reference:** Refer to chapter 16 of the *TigoEngine User Manual* for a description of how to upload IODD files.

Open the **Factory Settings** menu, accessible in the side-panel, under **TigoHub i4 Parameters**.



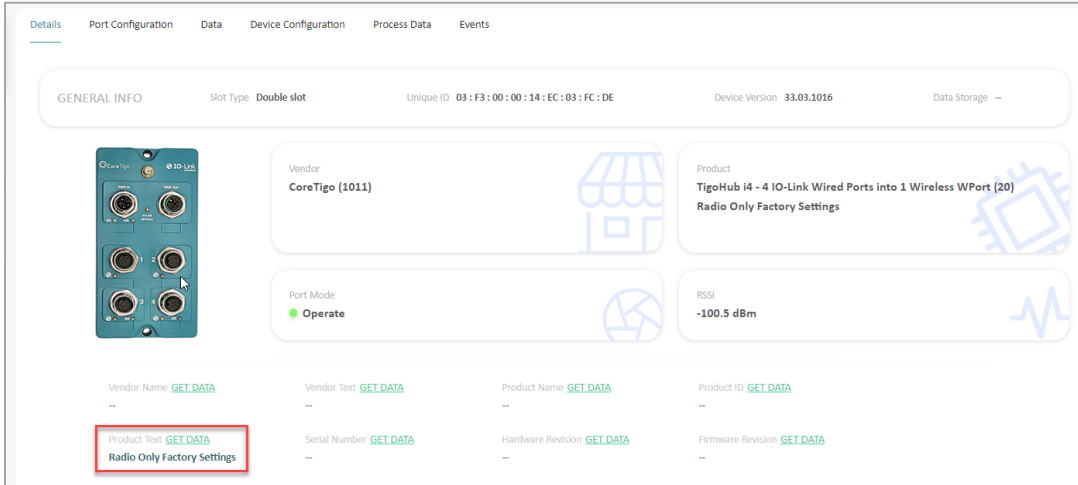
Click the Restore Factory Settings button.

A check icon appears alongside the **Restore Factory Settings** button.



The device resets to the default factory settings.

Verify this by accessing the **Details** sub-tab as shown below.



The screenshot displays the 'Details' sub-tab of the TigoHub i4 interface. At the top, there are navigation tabs: Details, Port Configuration, Data, Device Configuration, Process Data, and Events. Below these is a 'GENERAL INFO' section with the following details:

- Slot Type: Double slot
- Unique ID: 03:F3:00:00:14:EC:03:FC:DE
- Device Version: 33.03.1016
- Data Storage: --

The main content area is divided into several sections:

- Vendor:** CoreTigo (1011)
- Product:** TigoHub i4 - 4 IO-Link Wired Ports into 1 Wireless WPort (20) Radio Only Factory Settings
- Port Mode:** Operate
- RSSI:** -100.5 dBm

At the bottom, there is a grid of fields for additional information:

Vendor Name: <a href="#">GET DATA</a>	Vendor Text: <a href="#">GET DATA</a>	Product Name: <a href="#">GET DATA</a>	Product ID: <a href="#">GET DATA</a>
--	--	--	--
<b>Product Text: <a href="#">GET DATA</a></b> <b>Radio Only Factory Settings</b>	Serial Number: <a href="#">GET DATA</a>	Hardware Revision: <a href="#">GET DATA</a>	Firmware Revision: <a href="#">GET DATA</a>
--	--	--	--

## 6.2.2. Application Selectors

This enables the user to select which application is communicating with the TigoHub i4 and by definition all **Write** and **Read** actions will be appropriated to the selected device.

Proceed as follows:

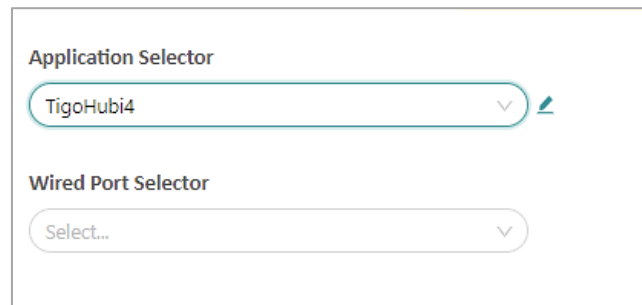
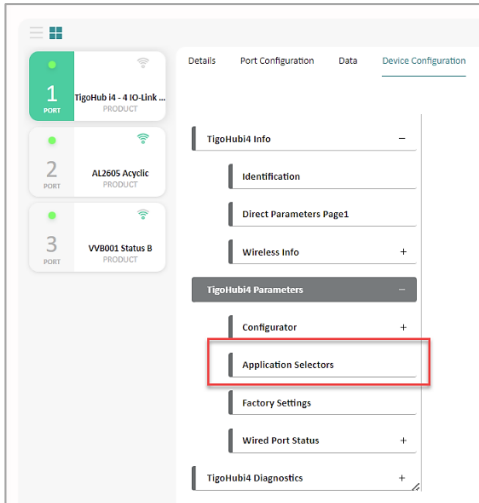
Click on the **Device Configuration** sub-tab to view the main **TigoHubi4** configuration setup.

**Prerequisite:** WIODD files of TigoHub i4 should be uploaded beforehand.



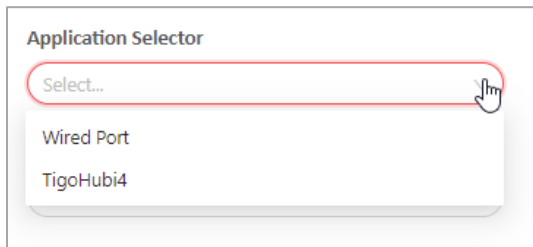
**Reference:** Refer to chapter 16 of the *TigoEngine User Manual* for a description of how to upload IODD files.

Open the **Application Selectors** menu, accessible in the side-panel, under **TigoHub i4 Parameters**.

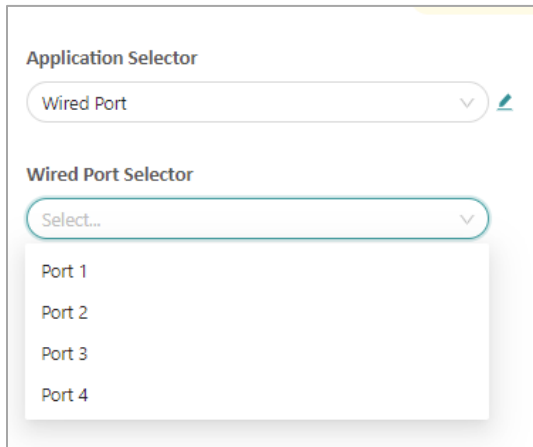




In the **Application Selector** field, select from the dropdown list, the relevant application to communicate with e.g., TigoHub i4 itself (default) or one of the Wired Ports.

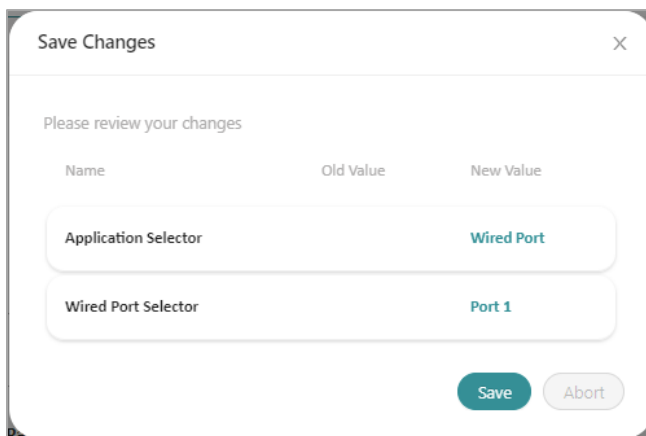


If a **Wired Port** is selected, a further dropdown list opens to select the relevant wired port.



After making the selections, click the **Save Changes** button.

A **Save Changes** confirmation box opens.



Click the **Save** button.

A **Success** notification appears.

Verify that the relevant application has been selected by accessing the **Details** sub-tab.

After selecting a specific port, all the ISDU Read/Write actions will be referred to the selected port.

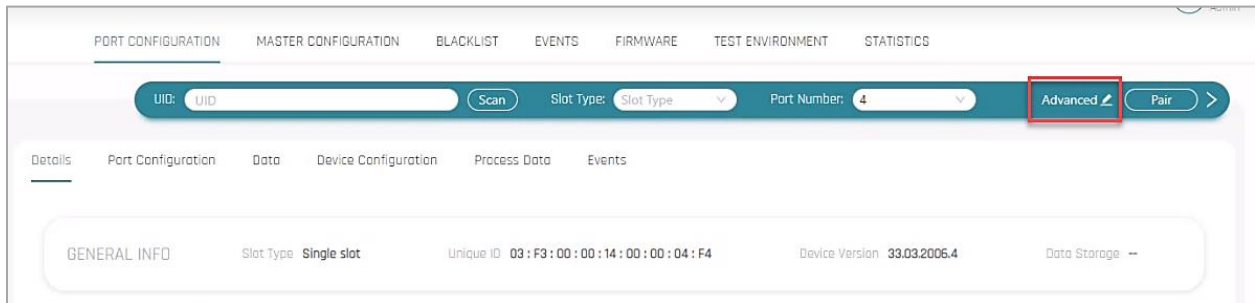
## 6.3. Port Configuration

### 6.3.1. Data Storage Support for Wireless Devices

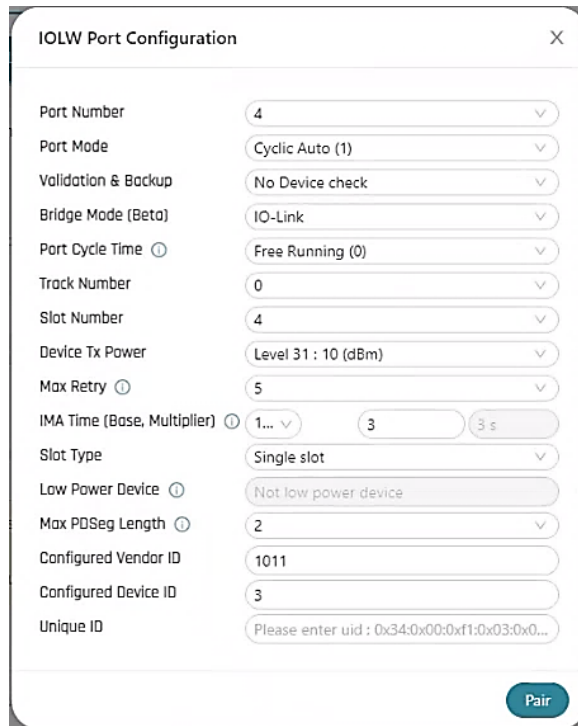
Data Storage is supported in wireless devices of V11 and up.

Proceed as follows:

1. In the **Details** sub-tab, click **Advanced** in the toolbar.



2. The IOLW Port Configuration window opens.



The screenshot shows the 'IOLW Port Configuration' window with the following settings:

Port Number	4
Port Mode	Cyclic Auto (1)
Validation & Backup	No Device check
Bridge Mode (Beta)	IO-Link
Port Cycle Time	Free Running (0)
Track Number	0
Slot Number	4
Device Tx Power	Level 31 : 10 (dBm)
Max Retry	5
IMA Time (Base, Multiplier)	1... 3 3 s
Slot Type	Single slot
Low Power Device	Not low power device
Max PDSeg Length	2
Configured Vendor ID	1011
Configured Device ID	3
Unique ID	Please enter uid : 0x34:0x00:0xf1:0x03:0x0...

A 'Pair' button is located at the bottom right of the window.

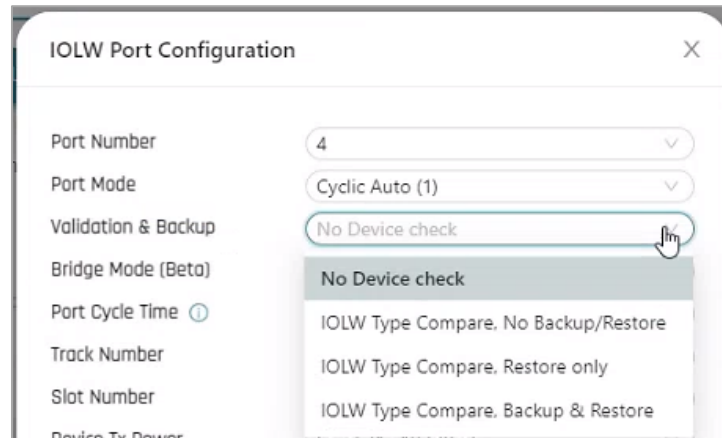
3. In the **Validation & Backup** field, select the appropriate device configuration option:
  - o IOLW Type Compare – **No Backup/Restore** (requires to set values of "Configured Vendor ID" and "Configured Device ID". If the values are different from the Real Vendor and Device ID of the device we are trying to connect, pairing operation will fail with a "Compatibility fault" error).

- IOLW Type Compare – **Restore Only** (enables restoration of device data storage as recognized by the W-Master. The configured Vendor ID and Device ID must be the same as the real Vendor and Device IDs.



This mode enables Wireless Restore DS. Activation of DS requires device compatibility – if "Configured Vendor ID" or "Configured Device ID" are different than the actual vendor and device ID, pairing will fail with a "Compatibility fault" error, same as in the No Backup/Restore mode.

- IOLW Type Compare – **Backup & Restore** (enables wireless [Data Storage](#), restoration and updates to device configuration as long as the vendor ID and the device ID remain the same).



4. Make sure that the **Configured Vendor ID** and the **Configured Device ID** fields are correct before proceeding with the device pairing.

## 7. Firmware Update

Firmware (FW) can be updated wirelessly (FOTA) using the TigoEngine.

Please refer to the ***TigoEngine User Manual*** for detailed instructions.

Contact CoreTigo Support if needed (<https://support.coretigo.com/index.php?/home/login>)

## 8. Diagnostics and Troubleshooting

Troubleshooting is performed using the LEDs display or the TigoEngine software.

Refer to the *TigoEngine User Manual* for detailed instructions.

### 8.1. Power Supply LEDs

The following table describes the indication of Power Supply 1 and Power Supply 2 LEDs

**Table 10: Power LEDs**

LED Color	Indication
Green	Power supply voltage OK

### 8.2. IOLW LED

The following table describe the indications of IO Link Wireless LEDs.

**Table 11: IOLW LEDs**

LED Color	Indication
Green	Wireless UNPAIR state
BLINKING Green (900msec on, 100msec off)	Wireless OPERATE mode
Orange	Safe mode, Wireless UNPAIR state
BLINKING Orange	Safe mode, Wireless OPERATE state
Permanent Off (900msec on, 100msec off)	No Power Supply

### 8.3. Ports LEDs

The following table describe the indications of Ports 1-4 LEDs.

**Table 12: Ports LEDs**

LED Color	Indication
Green	Port configured as IOL, operational, invalid data
BLINKING Green	Port configured as IOL, operational, valid data
Orange	Port configured as IO, operational, invalid data
BLINKING Orange	Port configured as IO, operational, valid data
Red	Port configured as IOL, not operational
BLINKING Red	Fault
OFF	Inactive

## 9. Guidelines and Regulations

### FCC

ID: 2ATSM-TIGOHUB

IC: 26463-TIGOHUB

### 9.1. RF Exposure Warnings



**Warning:** This device is only authorized for use in a mobile application. At least 20 cm of separation distance between the TigoHub i4 device and the user's body must be always maintained.

*La distance entre l'utilisateur et de produits ne devrait pas être inférieure à 20cm*

### 9.2. Class A Warning

#### The FCC Wants You to Know

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 instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to contact CoreTigo support - <https://support.coretigo.com/>

#### CAN ICES-3 (B) / NMB-3 (B)

This Class B digital apparatus complies with Canadian ICES-003.

*Cet appareil numérique de classe B est conforme à la norme canadienne ICES-003.*

### 9.3. Modification Statements

#### FCC Warning (Modification Statement)

CoreTigo LTD has not approved any changes or modifications to this device by the user. Any changes or modifications can void the user's authority to operate the equipment.

#### ISED Warning (Modification Statement)

*CoreTigo n'approuve aucune modification apportée à l'appareil par l'utilisateur, quelle qu'en soit la nature. Tout changement ou modification peuvent annuler le droit d'utilisation de l'appareil par l'utilisateur.*

## 9.4. FCC Regulatory Notices

### Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

*Le présent appareil est conforme aux CNR d'Industrie 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, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.*

### Wireless Notice

This device complies with FCC/ISED radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines and RSS-102 of the ISED radio frequency (RF) Exposure rules. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

*Le présent appareil est conforme à l'exposition aux radiations FCC / ISED définies pour un environnement non contrôlé et répond aux directives d'exposition de la fréquence de la FCC radiofréquence (RF) et RSS-102 de la fréquence radio (RF) ISED règles d'exposition.*

*L'émetteur ne doit pas être colocalisé ni fonctionner conjointement avec à autre antenne ou autre émetteur.*

## 10. Technical Data

**Table 13: Technical Data**

Electrical Data	
Input Voltage	18-32VDC. Max. Input Current 8 [A]* * TigoHub i4 should be supplied from a limited, Class 2, power supply or via overcurrent protective device (fuse, breacker, etc.) rated 8A max.
Input Current	Max. Input Current 4 [A] per each 1L, 2L.
Output Voltage on 1L	Equals to Input Voltage
Output Voltage on 2L	Equals to Input Voltage
Typical Current Consumption	30 [mA]** ** For 24 VDC Supply input, without IO Link device current consumption.
Max Output Supply Current (PWR OUT port)	Max Output Supply Current (cascading PWR out port) 4 [A] per each 1L, 2L.
Max Output Supply Current (Class A Port)	2 [A] (1L)
Max Output Supply Current (Class B Port)	2+2 [A] (1L+2L)
Mechanical Parameters	
Weight	222 gr
Mounting	2x M4 screws
Wireless Parameters	
Operating Frequency	2.4 GHz ISM Band
Communication Standard	IO-Link Wireless
Modulation	GFSK, Modulation index = 0.5
Radio Peak Output Power	10 [dBm]
Interfaces	
LEDs	<ul style="list-style-type: none"> <li>• Power Supply [1,2]</li> <li>• IO-Link Wireless Status</li> <li>• Ports [1..4] Status</li> <li>• Digital outputs [1,2]</li> </ul>

Interfaces	
<b>Connectors</b>	<ul style="list-style-type: none"> <li>• Power Input connector: Plug M12, L coded               <ul style="list-style-type: none"> <li>○ Pin number 1: Input 1L (Power Supply 1)</li> <li>○ Pin number 2: Input 2M GND2</li> <li>○ Pin number 3: Input 1M GND1</li> <li>○ Pin number 4: Input 2L (Power Supply 2)</li> <li>○ Pin number 5: Earth chassis</li> </ul> </li> <li>• Power Output Connector: Socket M12, L coded               <ul style="list-style-type: none"> <li>○ Pin number 1: Output 1L (Power Supply 1)</li> <li>○ Pin number 2: Output 2M (GND2)</li> <li>○ Pin number 3: Output 1M (GND1)</li> <li>○ Pin number 4: Output 2L (Power Supply 2)</li> <li>○ Pin number 5: Earth chassis</li> </ul> </li> <li>• Ports [1,2] Connectors: Socket M12, A coded, Class B               <ul style="list-style-type: none"> <li>○ Pin number 1: Output 1L (Power Supply 1)</li> <li>○ Pin number 2: Output 2L (Power Supply 2)</li> <li>○ Pin number 3: Output 1M (GND1)</li> <li>○ Pin number 4: IOL CQ (Data signal)</li> <li>○ Pin number 5: Output 2M (GND2)</li> </ul> </li> <li>• Ports [3,4] Connectors: Socket M12, A coded, Class B               <ul style="list-style-type: none"> <li>○ Pin number 1: Output 1L (Power Supply 1)</li> <li>○ Pin number 2: Digital Output</li> <li>○ Pin number 3: Output 1M (GND1)</li> <li>○ Pin number 4: IOL CQ (Data signal)</li> <li>○ Pin number 5: Not connected</li> </ul> </li> </ul>
<b>Antenna</b>	SMA Connector for external antenna.
Communication	
<b>Protocols</b>	<ul style="list-style-type: none"> <li>• IO Link               <ul style="list-style-type: none"> <li>○ Supported transmission types: COM1, COM2, COM3</li> <li>○ Revision 1.1.2</li> <li>○ Class A, B</li> </ul> </li> <li>• IO Link Wireless               <ul style="list-style-type: none"> <li>○ Version 1.1</li> </ul> </li> </ul>
<b>Operating Frequency Bands</b>	2401 – 2480 [MHz]
<b>Maximum Radio-Frequency Power</b>	10 [dBm]

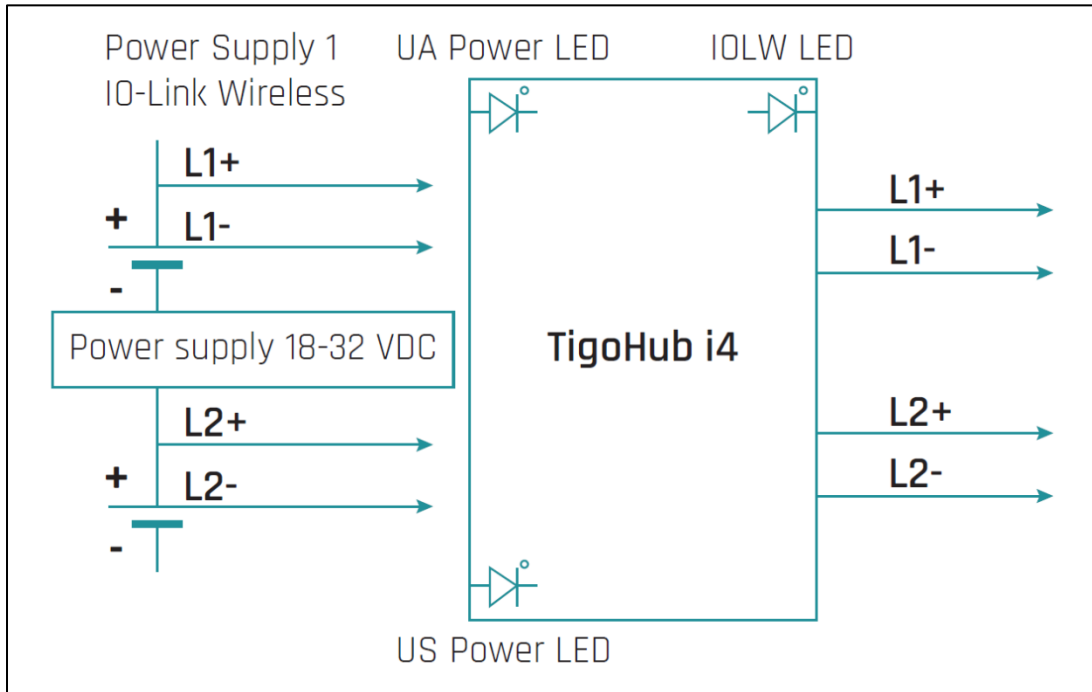


Regulation	
<b>CE</b>	<ul style="list-style-type: none"> <li>• EN 301489-17</li> <li>• EN 300328</li> <li>• EN 62479</li> <li>• EN 61326-1</li> </ul>
<b>FCC</b>	<ul style="list-style-type: none"> <li>• FCC ID: 2ATSM-TIGOHUB</li> <li>• FCC CFR Title 47 Part 15 Subpart C Section 15.247</li> <li>• FCC CFR Title 47 Part 15 Subpart B</li> </ul>
<b>Safety</b>	IEC 61010-1 UL61010-1 and CSA C22.2 No. 61010-1
<b>RoHS</b>	Complied
<b>Reach</b>	Complied
Qualifications	
<b>Shock &amp; Vibrations</b>	<ul style="list-style-type: none"> <li>• Sine Vibration: IEC 60068-2-6</li> <li>• Random vibration: IEC 60068-2-64</li> <li>• Shock: IEC 60068-2-27</li> <li>• Bumps: IEC 60068-2-27</li> </ul>

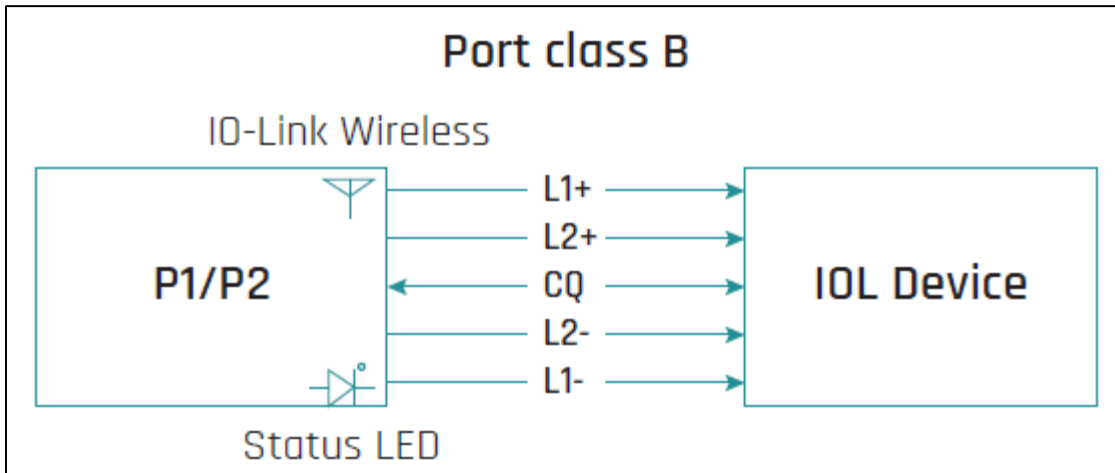
To read more about IO-Link Wireless solutions follow this link <https://www.coretigo.com/solutions/>.

Operating Conditions	
<b>Operating Temperature</b>	-20°C to 65°C
<b>Relative Humidity Rating</b>	RH 5% to 93%, non-condensing
<b>Altitude</b>	Up to 2000m
<b>Pollution</b>	Degree 3
<b>IP Rating</b>	IP65
<b>Emission</b>	<ul style="list-style-type: none"> <li>• EN 61000-6-2 <ul style="list-style-type: none"> <li>○ EN55016-2-3 Radiated emission</li> <li>○ EN55022 Conducted emission</li> </ul> </li> </ul>
<b>Immunity</b>	<ul style="list-style-type: none"> <li>• EN 61000-6-2 <ul style="list-style-type: none"> <li>○ EN61000-4-2 Electrostatic discharge</li> <li>○ EN61000-4-3 Radiated immunity</li> <li>○ EN61000-4-4 Fast transients/burst</li> <li>○ EN61000-4-5 Surge immunity</li> <li>○ EN61000-4-6 Conducted immunity</li> </ul> </li> </ul>

Block Diagrams



**Figure 11: Block Diagram - Power**



**Figure 12: Block Diagram - Ports 1 and 2**

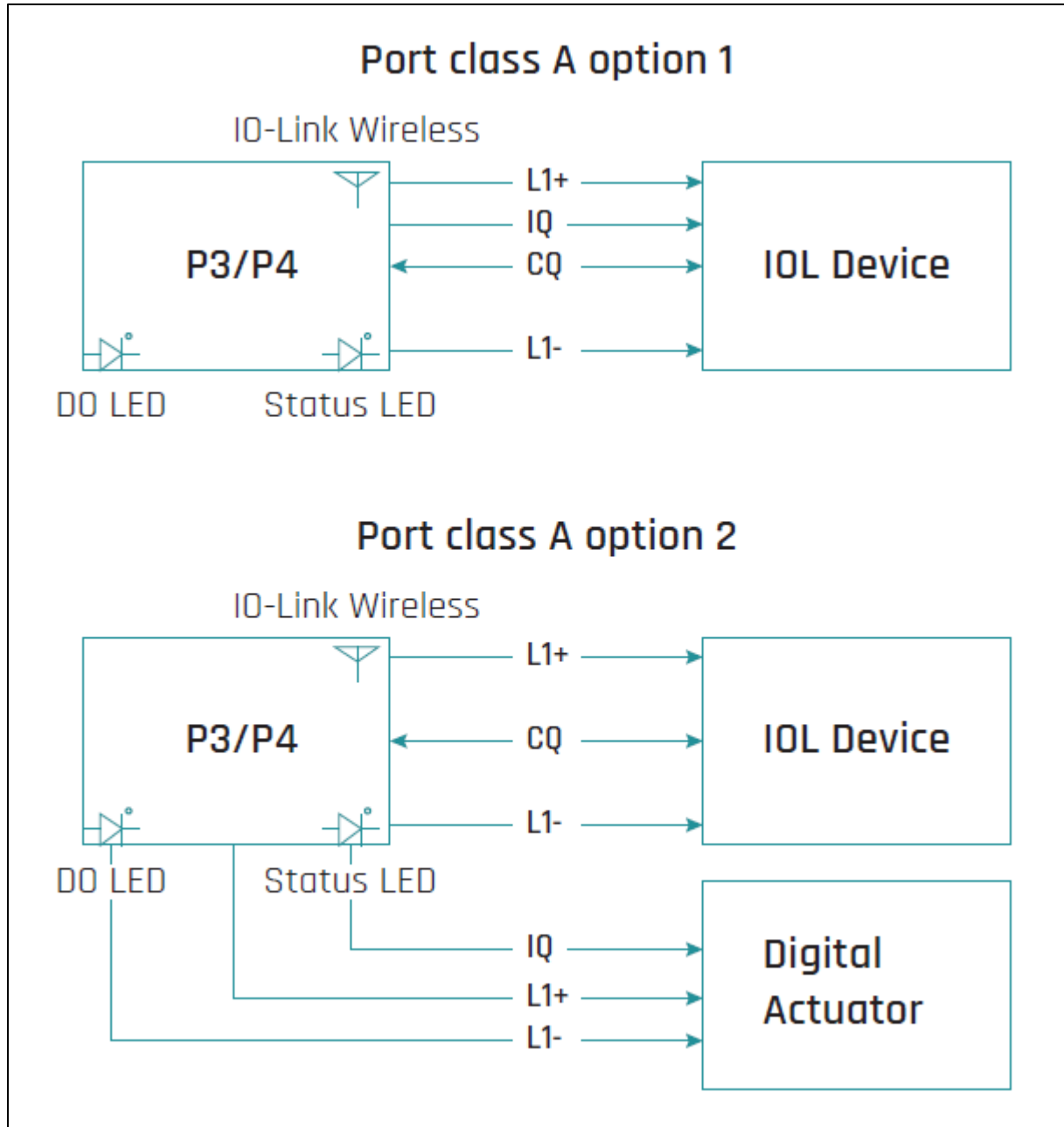


Figure 13: Block Diagram - Ports 3 and 4

## Dimensions

Units are in mm

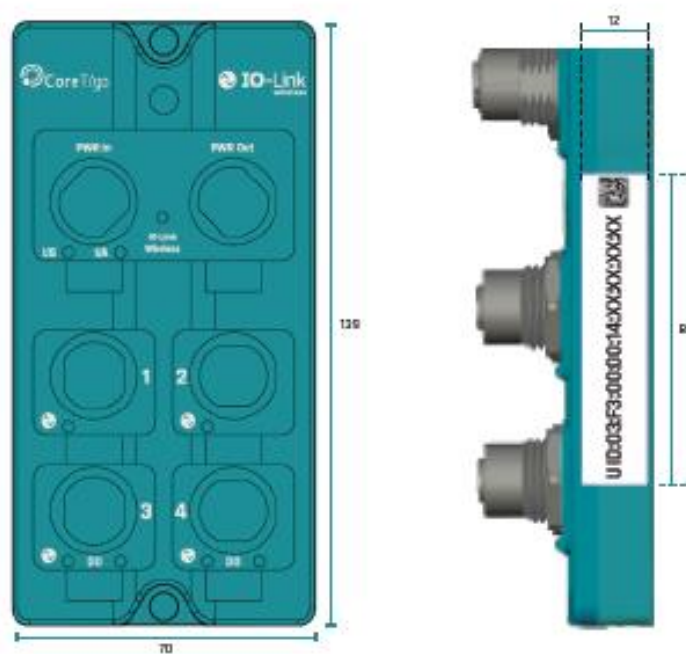


Figure 14: TigoHub Dimensions

## 11. Customer Support

For any issue, question, or to report a bug, contact [support@coretigo.com](mailto:support@coretigo.com)

Or visit our Customer Success Portal at: <https://support.coretigo.com/index.php?/home/login>

## Appendix – Part Number

Part number: CT221-0057-03

- Generation: 2
- Product Identifier: 2
- Product Type: 1
- Protocol: 0057
- Characters Identifier of Features
- Version: 03

CT(GXY-ZZZZiii-vv)					
<b>G</b>	<b>X</b>	<b>Y</b>	<b>ZZZZ</b>	<b>iii</b>	<b>vv</b>
Generation	Product Identifier	Product Type	Protocol	Feature's Character Identifier	Version