CoreTigo

TigoBridge A2

USER MANUAL

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Version Control

Author Name	Description	Revision	Date

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Acronyms and Abbreviations

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

Symbol	Meaning
FW	Firmware
HW	Hardware
IF	Interface
IOLW	IO-Link Wireless
LED	Light-Emitting Diode
SW	Software
UID	Unique ID
W-Bridge	W-Device that connects a wired IO-Link device via wireless communication interface to a W-Master.
W-Device	Single peer to a W-Master such as an IO-Link Wireless sensor or actuator.
W-Master	Peer connected through W-Ports via radio to “from one up to n” W-Devices. It provides an interface to the gateway to the upper level communication systems or PLCs.

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1. Introduction

This User Manual introduces the TigoBridge A2 (Part numbers: CT221-0058-01E/I) and enables the user to perform setup, configuration, mounting, and troubleshooting. TigoBridge A2 is an IO-Link to IO-Link Wireless convertor. TigoBridge can convert any IO-Link device to IO-Link Wireless as long as it is IO-Link certified. Read the manual carefully before using the device.

Figure 1: TigoBridge A2

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

Instructional steps are shown in list form with numbers.

1. Step 1.
2. Step 2.

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

1.3. Symbols

Symbol	Meaning
	Note: This symbol indicates a general note.
	Warning: This symbol indicates a security notice which must be observed.
	Reference: This symbol indicates a cross-reference to other documentation.

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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

The TigoBridge A2 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.

2.3. Intended Use

The TigoBridge A2 is an IO-Link Wireless Class A Bridge with an IP67 enclosure.

The TigoBridge A2 is intended for indoor use only.

The TigoBridge A2 converts IO-Link to IO-Link Wireless. The TigoBridge A2 houses internal antenna and two M12 connectors for data and power.

TigoBridge A2 is a device that connects a wired IO-Link device, via IO-Link Wireless, to an IO-Link Wireless Master. A device can be an IO-Link sensor, IO-Link actuator, or IO-Link hub.

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

2.4. Personnel Qualification

The product must 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

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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

TigoBridge A2 is implemented based on the IO-Link Wireless standard for W-Bridge devices. TigoBridge A2 is part of an IO-Link Wireless environment. It communicates with an IO-Link Wireless master.
See the illustration below:

Figure 2: TigoBridge A2 Overview

A. IO-Link Device

B. IO-Link Wireless Master

C. Power Source – 24VDC

D. Mounting Accessory – TigoBridge Cradle

E. TigoBridge A2

4. Pre-Installation

4.1. Description

An IO-Link device can be connected to a TigoBridge A2 directly or using an M12 cable. TigoBridge A2 can be connected to an IO-Link Wireless Master by TigoEngine, Integrated web server tool, or PLC.

Each IO-Link Wireless master can operate up to 16 TigoBridges A2.

4.2. Overview

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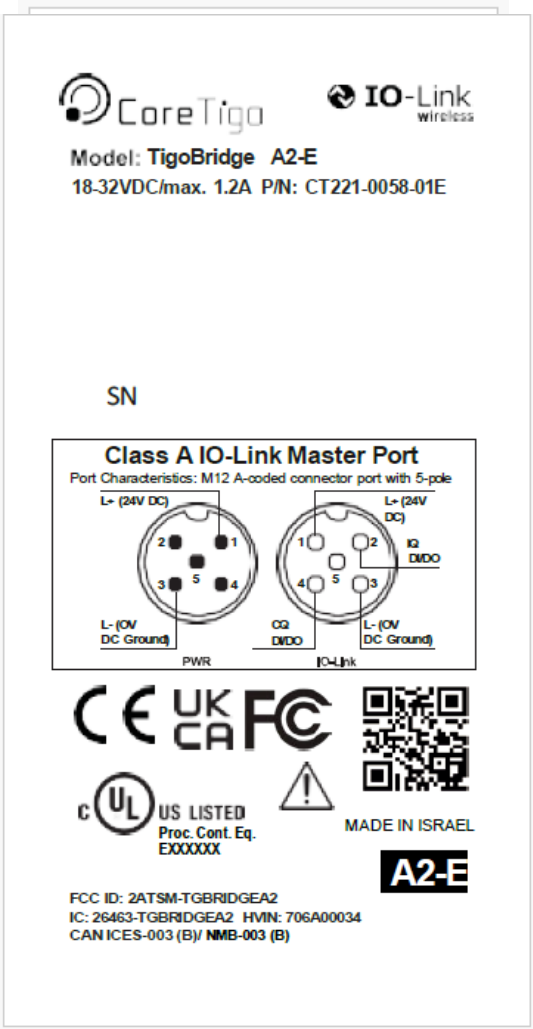

Label:

A. TigoBridge Model

B. Input Power Supply Ra

C. Product Number

D. QR CODE (URL)

E. Refer to Warning in section 2.2.

F. FCC ID

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Functional Diagram

Figure 4: TigoBridge A2 Functional Diagram

A. Device Connector

B. Pairing Button

C. Power Supply Connector

D. Power LED (**Green**)

E. Status LED (**RGB**)

4.3. LEDS

Figure 5: TigoBridge A2 LEDs

A. Status LED (**RGB**)

B. Power LED (**Green**)

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Power LED

Table 1: Power LED

LED Color	Indication
Green	Power supply connected

Status LED

Table 2: Status LED

LED Color	Indication
Magenta	Unpaired wireless
Blue	Operational wireless bridge
Green	Operational wired device
Yellow	Non-operational wired device
White	Wireless Error (see Note)
“Blinking” Green	Firmware update mode

4.4. Pairing Button

The Pairing-Button is used to replace existing TigoBridge A2 with a new one.

The Pairing-Button supports further functions, depending on the duration of the button pressed, as detailed in the table below.

Table 3: Pairing Button Function

Button Timing Press	Button Press Function
[>0…1] s	No action
[>1…5] s	Pairing by Button/Re- pairing by Button
[>5…10] s	No action
[>10…20] s	Device Reset
[>20…30] s	No action
[>30…40] s	Unpairing

An overview of Pairing by Button or Re-pairing by Button is given in chapter 6.1.

4.5. Standalone Mode

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TigoBridge is designed to work seamlessly with IO-Link Devices. It also has the capability to operate in Standalone mode.

In Standalone mode, TigoBridge can be configured and diagnosis data can be read, but process data will not be available. The ISDU mechanism behaves identically to a W-Device, allowing the TigoBridge to have device-specific ISDU parameters. This feature provides flexibility and convenience for the user in certain scenarios where a connected IO-Link Device is not necessary or available. For more information see chapter 6.2.

4.6. Electrical Wiring

TigoBridge A2 has two M12 connectors.

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

  Maximum Current supply to IO-Link device is 1A when using 24VDC.

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

  Higher voltage than 32VDC is restricted, as it can damage the TigoBridge A2.

4.7. Electrical Connection

Figure 6: Electrical Schematic Diagram

Warning: TigoBridge A2 does not have reverse polarity power connection protection.

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5. Mounting

TigoBridge A2 should be mounted safely and securely next to the device to which it is connected.
TigoBridge A2 can be mounted with screws…

6. Configuration and Setup

Commissioning Prerequisites:

- TigoEngine software installed and running on PC.
- TigoMaster/TigoGateway successfully connected to PC.

Installation:

1. Plug a 24VDC power supply to TigoBridge A2 M12 power connector via an M12 cable.
2. The Power LED lights up **Green**. If it does not, check the power connection.
3. Once the power supply is connected, a reset cycle occurs. The reset cycle duration is a few seconds and displays a **Red Green Blue** color sequence.
4. Once the reset cycle is complete, the status LED alternates between **Magenta** and **Yellow**.
5. Plug the TigoBridge A2 to an IO-Link device (sensor/actuator).
   If TigoBridge A2 cannot connect directly to the device, use an M12 cable. Once successfully connected the Status LED alternates between **Magenta** and **Green**.
6. Open the TigoEngine and scan the network for the IO-Link Wireless TigoBridge A2.

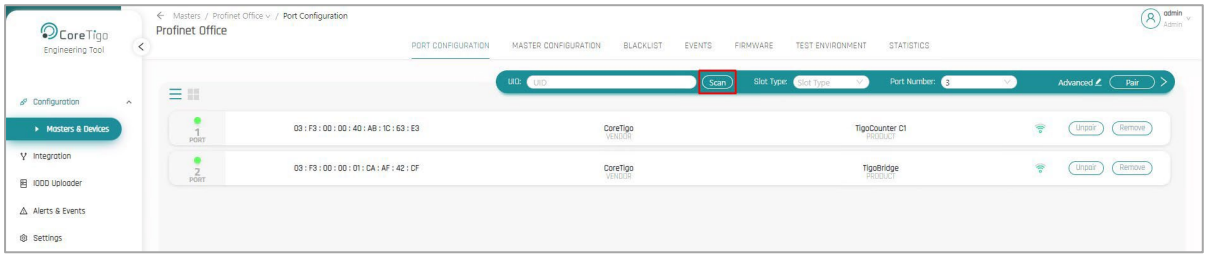

Figure 7: TigoEngine Scanning Mode

7. Identify the TigoBridge A2 using the UID.
8. Select the requested TigoBridge A2.
9. Click **OK** and click **Pair**.

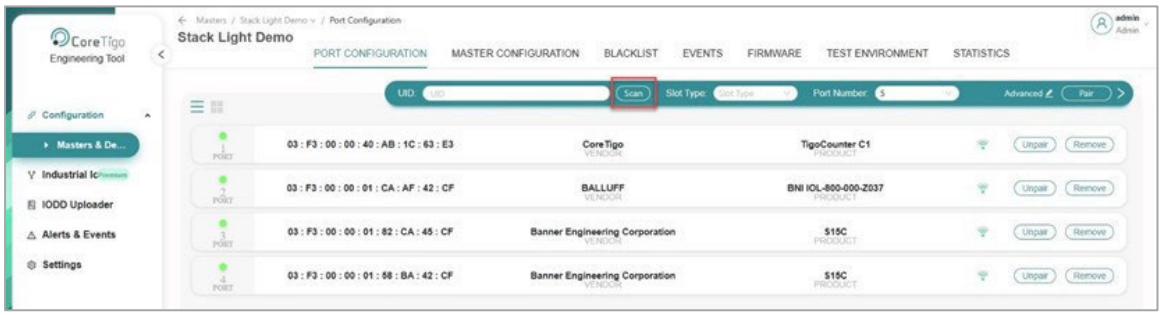

Figure 8: TigoEngine Pairing Process

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For instructions on how to set up the recommended **Advanced** IOLW Port Configuration in standalone mode, refer to chapter 6.2.

When the pairing process is complete, the TigoEngine **Port Mode** displays in **Green** and should indicate **OPERATE**. The TigoBridge A2 Status LED alternates between **Blue** and **Green**.

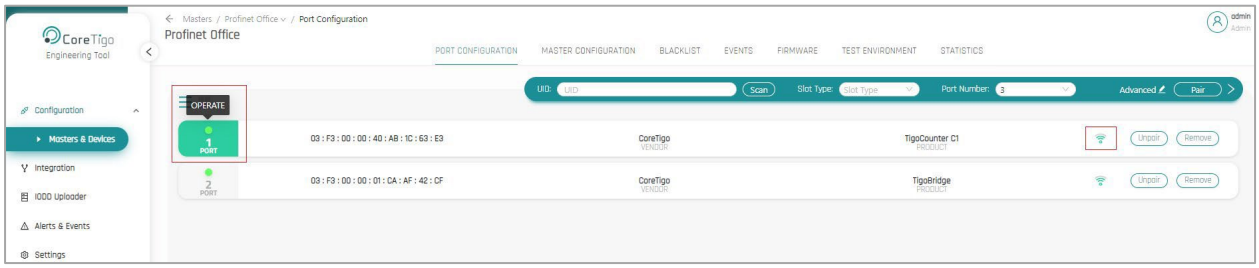

Figure 9: TigoEngine Operate Mode

10. To configure the IO-Link device, select the appropriate row in the interface.
11. Configuring the IO-Link device is done through the **Port Details** view.

Figure 10: Port Details View

12. **Unpair** – To replace a TigoBridge A2, click the **Unpair** button on the TigoEngine interface, and follow the instructions to unpair it. Once unpaired, the TigoBridge A2 status LED alternates between **Magenta** and **Green**.

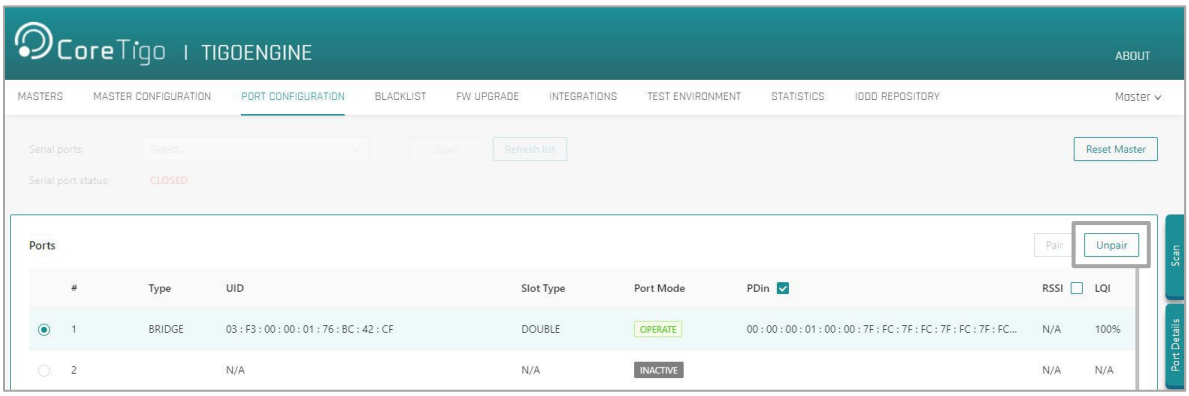

Figure 11: Unpair Button

6.1. Pairing by Button

This mechanism is for manual pairing without detailed knowledge about the TigoBridge device.

With pairing buttons activated on both TigoBridge and TigoEngine the TigoBridge can be exchanged without the need for additional configurations.

1. In the TigoEngine, go to the row of the relevant W-Device and click **Pair**.

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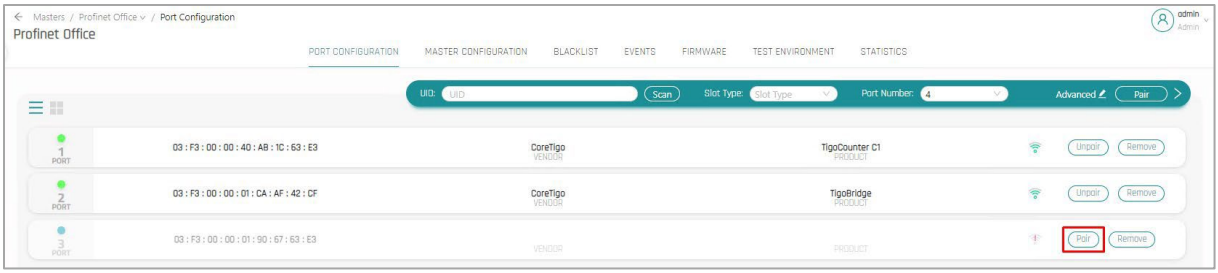

Figure 12: Pair Button

2. In the **Pairing** dialog box that pops up, set **Pairing Method** to **Pair by button**.

Figure 13: Pairing Dialog Box

3. Press and hold the Pairing Button of the W-Device for 3 secs.
4. Click **Pair** in the TigoEngine pairing window.
5. After replacement, the parameters are downloaded automatically from the Data Storage into the new W-Device.

6.2. Operation in Standalone Mode

Standalone mode is a built-in feature of the TigoBridge that can be accessed when the TigoBridge is not connected to any W-Device.

> Relevant for FW revision 11.04.1074.0 onwards

To ensure proper operation and system security, on some applications it may be necessary to halt operation if any device is disconnected from the system. The Standalone mode feature in TigoBridge allows for the application to continue functioning unless the user manually sets the **Advanced IOLW Port Configuration** of the connected device to stop when the W-Device is disconnected.

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Proceed as follows:

1. When connecting to a new TigoBridge click on the **Advanced** button.

Figure 14: Connecting to a New TigoBridge

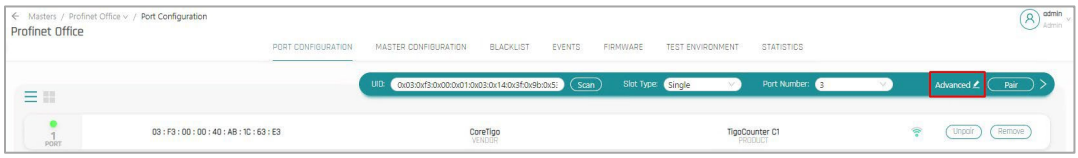

Figure 15: Setting Advanced IOLW Port Configuration

2. In the **IOLW Port Configuration** window, set the **Validation & Backup** box to **IOLW Type Compare, No Backup/Restore**.
3. Enter the Vendor ID and Device ID of the connected W-device in the corresponding fields.

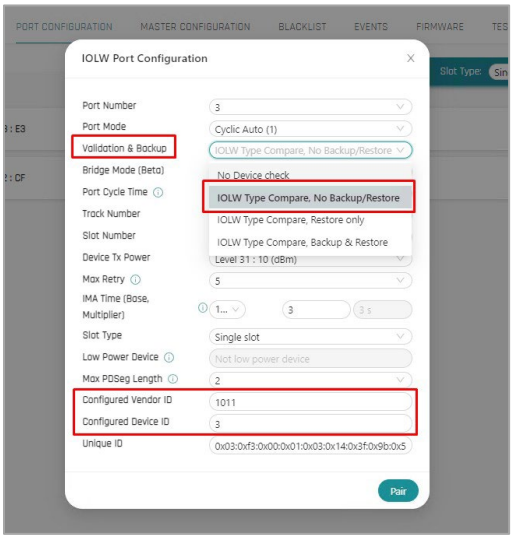

Figure 16: IOLW Port Configuration Window

4. Click **Pair**.

   When a W-device is disconnected from TigoBridge, the Standalone mode will no longer be accessible and the application will stop running.

6.3. Device Configuration

Add information regarding the port functionality – CQ/IOL

7. Firmware Update

Firmware (FW) is updated wirelessly using the TigoEngine. Refer to the *TigoEngine User Manual* for detailed instructions. Contact CoreTigo Support if needed.

8. Diagnostics and Troubleshooting

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Troubleshooting is done using the LEDs display or the TigoEngine software. Refer to the *TigoEngine User Manual* for detailed instructions.

8.1. Power LED

When a power supply is connected to the TigoBridge A2 and the Power LED is off, the power supply is not properly connected, nor is it providing a power supply different than the expected range.

8.2. Status LED

This indicates the IO-Link device connection status and the IO-Link Wireless communication status with the IO-Link Master. It alternates to show both the status of the IO-Link device connection and the IO-Link Wireless connection.

Table 4: Status LED Troubleshooting

IO-Link Wireless / Wired IO-Link	Paired	Unpaired
Operational	Alternating **Blue** and **Green**	Alternating **Magenta** and **Green**
Non-Operational	Alternating **Blue** and **Yellow**	Alternating **Magenta** and **Yellow**

Alternating Blue and **Green** – fully operational: both IO-Link device and IO-Link Wireless communication are properly functioning.

Alternating Magenta and **Green** – TigoBridge A2 is unpaired from the TigoMaster while the IO-Link device is properly connected to the TigoBridge A2. Re-Scan and Re-Pair the TigoBridge A2 to the TigoMaster through the TigoEngine.

Alternating Blue and **Yellow** – TigoBridge A2 is successfully paired to the TigoMaster while the IO-Link device is not properly connected to, or not fully functioning with, the TigoBridge A2. Check the IO-Link device connectivity with the TigoBridge A2.

Alternating Magenta and **Yellow** – Both TigoBridge A2 IO-Link Wireless communication are unpaired and the IO-Link device is not connected/functioning. Power down the TigoBridge A2 and power it back up, reconnect the IO-Link device, scan, and pair the TigoBridge A2.

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Guidelines and Regulations .9

FCC ID: 2ATSM-TGBRIDGEA2
IC: 26463-TGBRIDGEA2

9.1. RF Exposure Warnings

Warning: This device is only authorized for use in a mobile application. Maintain a separation distance of least 20 cm between the TigoBridge A2 device and the user's body.

9.2. Class B Warning

FCC / ISED Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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 try to correct the interference by one or more of the following measures:

a) Reorient or relocate the receiving antenna.
b) Increase the separation between the equipment and receiver.
c) Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
d) Consult the dealer or an experienced radio/TV technician.

CAN ICES-3 (B)/NMB 003 (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 Ltd. 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

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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.

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Wireless Notice

This device complies with FCC/ISED radiation exposure limits 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 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.

IC STATEMENT

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

1）This device may not cause interference.

2）This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;

2）L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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10. Technical Data

Table 5: Technical Data

Electrical Data	
Input Voltage	Max. Input Current 1.3 [A]*
Output Voltage on L+	Equals to Input Voltage**
Typical Current Consumption	21 [mA]***
MaxOutput SupplyCurrent	1 [A]
Max Output Peak Current	1.2 [A]****
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	• IO-Link – **RGB** three color LED • Power – **Green** color LED
Button	Pairing - external push button
Connectors	• Input connector: Plug M12, A coded, power Connector ○ Pin number 1: Input L+ Power supply ○ Pin number 3: Input L- GND • Output Connector: Socket M12, A coded, IO Link Class A Connector ○ Pin number 1: L+ positive supply to IO Link device ○ Pin number 3: L- GND supply to IO Link device ○ Pin number 4: CQ IO Link Serial Communication
Antenna	Internal isotropic antenna
Communication	
Protocols	• IO Link ○ Supported transmission types: COM1, COM2, COM3 ○ Revisions 1.0 and 1.1 ○ Class A • IO Link Wireless ○ Version 1.1
Operating Frequency Bands	2401 – 2480 [MHz]
Maximum Radio-Frequency Power	10 [dBm]

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Regulation	
CE	• EN 301489 • EN 300328 • EN 62479 • EN 61326-1
FCC	• FCC ID: 2ATSM-TGBRIDGEA1 • FCC CFR Title 47 Part 15 Subpart C Section 15.247 • FCC CFR Title 47 Part 15 Subpart B
Safety	IEC 61010-1 UL61010-1 and CSA C22.2 No. 61010-1
RoHS	Complied
Reach	Complied
Qualifications	
Shock & Vibrations	• Sine Vibration: IEC 60068-2-6 • Random vibration: IEC 60068-2-64 • Shock: IEC 60068-2-27 • Bumps: IEC 60068-2-27

* TigoBridge A2 should be supplied from a limited, Class 2, power supply or via overcurrent protective device (fuse, breacker, etc.) rated 4A max.

** Over current protection on L+

*** For 24 VDC Supply input, without IO Link device current consumption

**** For 30 minutes

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

Operating Conditions	
Operating Temperature	-25°C to 60°C
Relative Humidity Rating	Relative 90%, non-condensing
Altitude	Up to 2000 m
Pollution	Degree 3
IP Rating	IP67

Emission	• EN 61000-6-2
	  ○ EN55016-2-3 Radiated emission
	  ○ EN55022 Conducted emission

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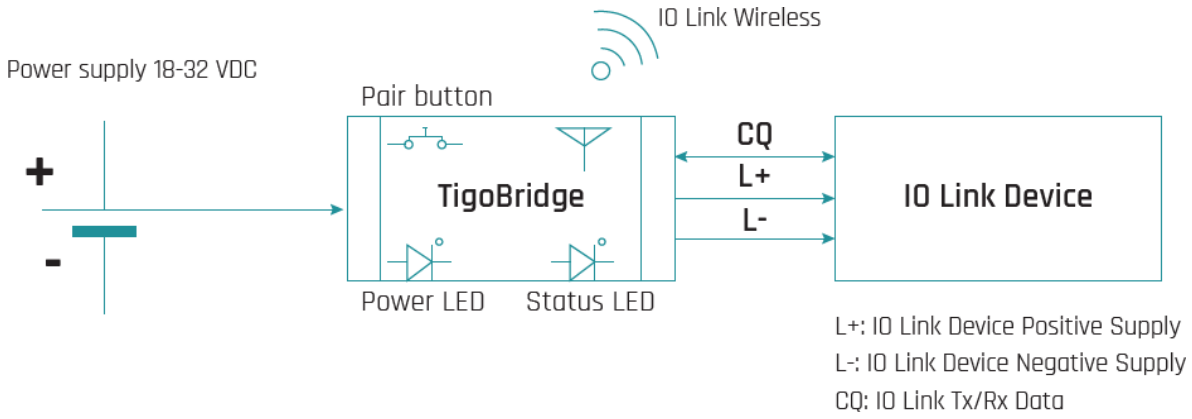
Operating Conditions	
Immunity	• EN 61000-6-2 ○ EN31000-4-2 Electrostatic discharge ○ EN61000-4-4 Fast transients/burst ○ EN61000-4-5 Surge immunity ○ EN61000-4-6 Conducted immunity

Block Diagram



Dimensions

Attach mechanical design

11. Customer Support

For any issue, question, or to report a bug, contact support@coretigo.com

Appendix A – Part Number

Part number: CT221-0058-01E/I

- Generation: 2
- Product Identifier: 2
- Product Type: 1
- Protocol: 0058
- Characters Identifier of Features
- Version: 01
- Antenna Type: E/I

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

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