CoreTigo TigoBridge A1 Wireless Factory Automation User Manual

TigoBridge A1
USER MANUAL

Contents

TigoBridge A1 Wireless Factory Automation

Version Control

Author Name	Description	Revision	Date
Ofri Olinky	Creation	1	4/2/2019
Rob Goldman	New TigoBridge Hardware	2	23/03/2020
Amit Garay	Updates	2.1	3/4/2020
Amit Garay	Adjustments to new TigoEngine	2.2	25/03/2021
Shoval Ben-Shanan	New Format	2.3	27/04/2021
Shoval Ben-Shanan	Updates	2.4	1/7/2021

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

Introduction

This user manual introduces you to TigoBridge A1 (Part number: CT221-0057-03) and enables you to perform setup, configuration, mounting, and troubleshooting.
TigoBridge A1 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 A1

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.

1. Step 1.
2. Step 2.
3. Step 3.

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.

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.

Safety and Requirements

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 A1 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:** Input current is not limited. No fire protection.

2.3. Intended Use
The TigoBridge A1 is an IO-Link Wireless Class A Bridge with an IP67 enclosure.
The TigoBridge A1 is intended for indoor use only.
The TigoBridge A1 converts IO-Link to IO-Link Wireless. The TigoBridge A1 houses internal antenna and two M12 connectors for data and power.
TigoBridge A1 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 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.

Requirements

TigoBridge A1 is implemented based on the IO-Link Wireless standard for W-Bridge devices. TigoBridge A1 is part of an IO-Link Wireless environment. It communicates with an IO-Link Wireless master. Therefore, to use it, you need an IO-Link Wireless master, IO-Link device, and a power cable. See the illustration.

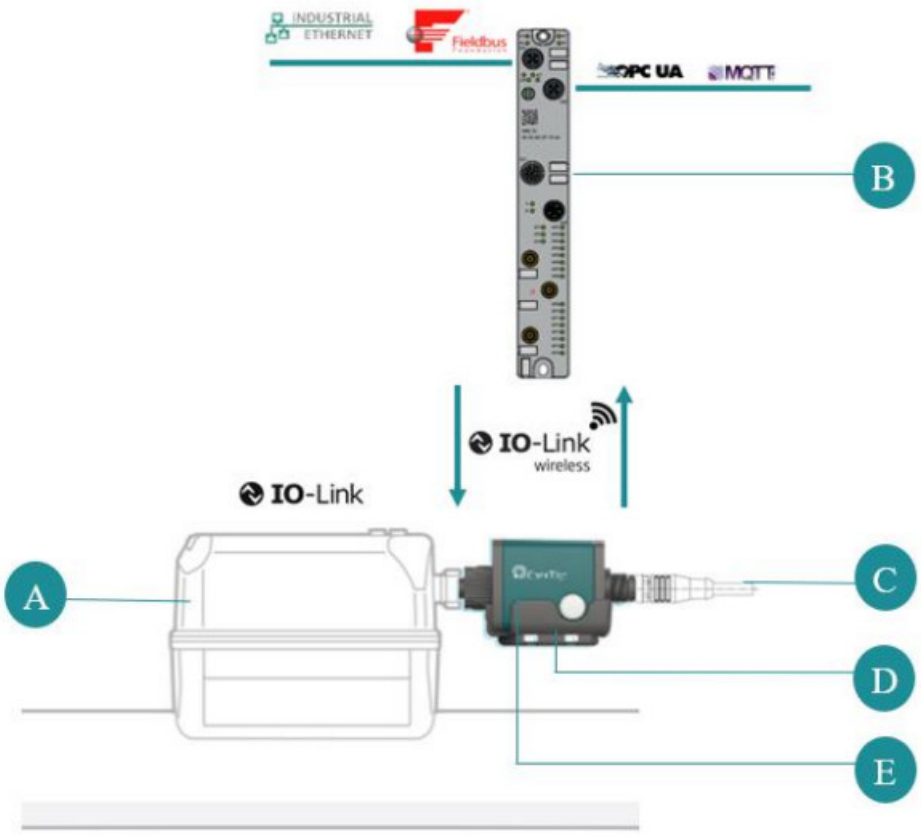


Figure 2: TigoBridge A1 Overview

A. IO-Link Device
B. IO-Link Wireless Master
C. Power Source – 24VDC
D. Mounting Accessory – TigoBridge Cradle
E. TigoBridge A1

Pre-Installation

4.1. Description

An IO-Link device can be connected to a TigoBridge A1 directly or using an M12 cable. TigoBridge A1 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 A1.

4.2. Overview

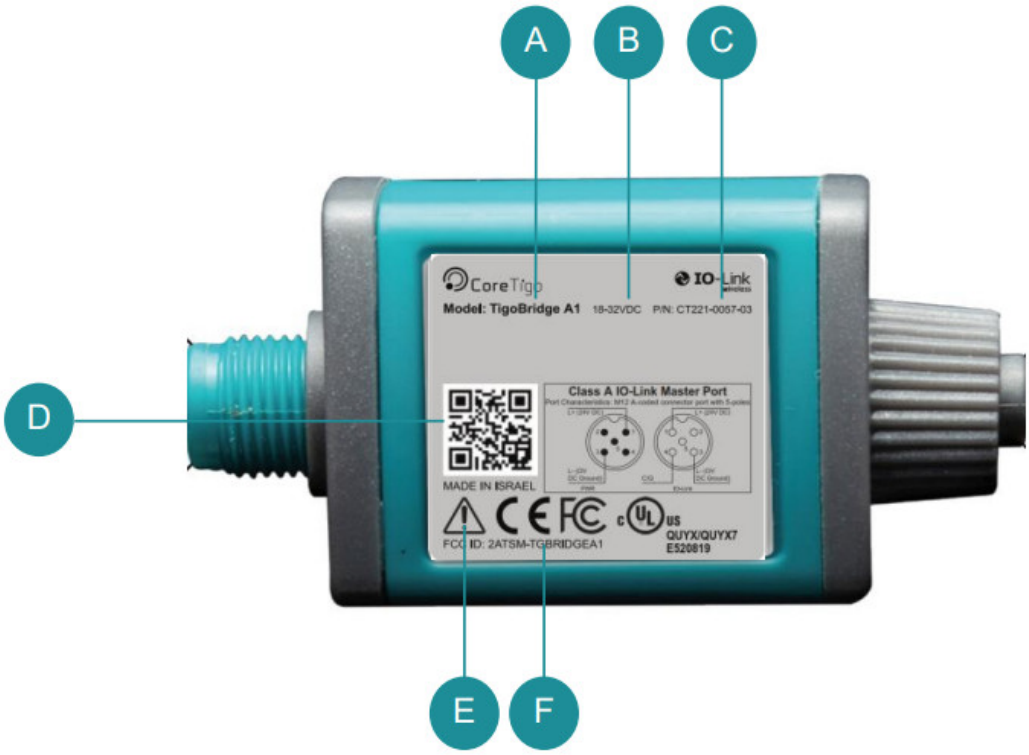


Figure 3: TigoBridge A1 Label

Label:
A. TigoBridge Model
B. Input Power Supply Range
C. Product Number
D. QR CODE (URL)
E. Refer to Warning in section 2.2.
F. FCC ID

4.2.1. Functional Diagram

Figure 4: TigoBridge A1 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 A1 LEDs

A. Status LED (RGB)
B. Power LED (Green)

4.3.1. Power LED

Table 1: Power LED

LED Color	**Indication**
Green	Power supply connected

4.3.2. 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. Pair by Button

The Pair by button is used to replace existing TigoBridge A1 with a new one.
The TigoBridge A1 must be powered off to assure that the TigoMaster disconnects before installing a new TigoBridge A1.

Pairing Button currently disabled. To enable, contact CoreTigo Support.

4.5. Electrical Wiring

TigoBridge A1 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 A1.

4.6. Electrical Connection

Figure 6: Electrical Schematic Diagram

Warning: TigoBridge A1 does not have reverse polarity power connection protection.

Mounting

TigoBridge A1 should be mounted safely and securely next to the device to which it is connected.
TigoBridge A1 can be mounted with or without the cradle accessory.

5.1. TigoBridge Cradle

The cradle is designed to simplify mounting of the TigoBridge A1 on flanges or any other surface/machine/device.
The cradle can be secured to any surface using either cable ties or M3 screws.

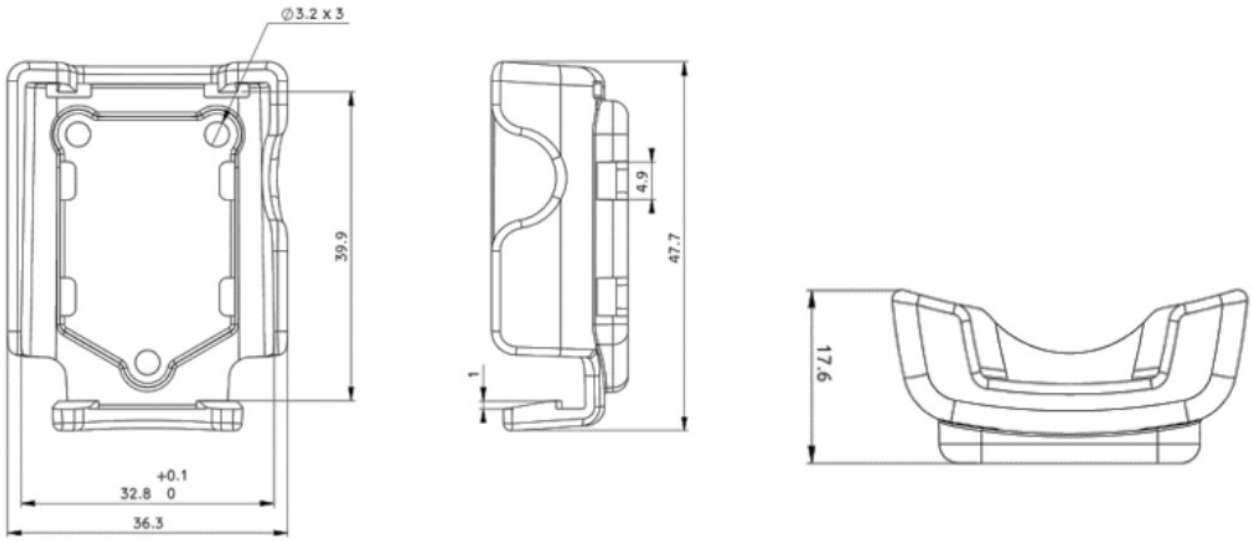


Figure 7: Cradle Dimensions

Figure 8: TigoBridge A1 and Cradle

Figure 9: TigoBridge A1 Mounted on the Cradle

Cradle Mounting Guidelines:

1. Secure the cradle on the flange (or machine or any other surface) using M3 screws or cable ties.
2. Mount the TigoBridge A1 onto the cradle by pushing it in.
3. Pull the TigoBridge A1 from the cradle to unmounting it.

Configuration & 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 A1 M12 power connector via 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 A1 to an IO-Link device (sensor/actuator).
   Note, if TigoBridge A1 cannot connect directly to the device, you may 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 A1.

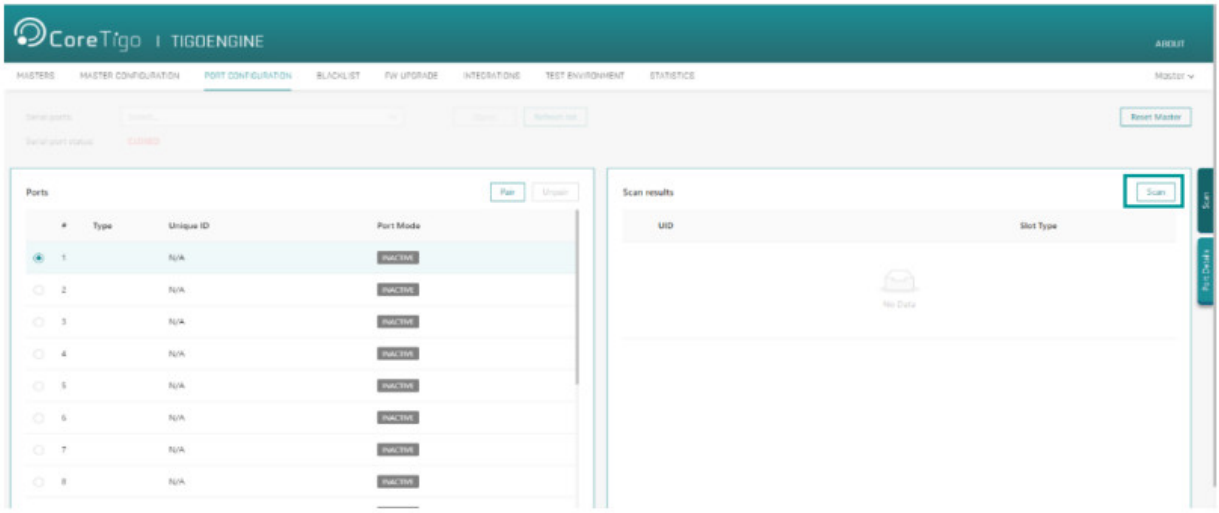


Figure 10: TigoEngine Scanning Mode

7. Identify the TigoBridge A1 using the UID. Select the requested TigoBridge A1. Select an emptyport on the Master side and click Pair.

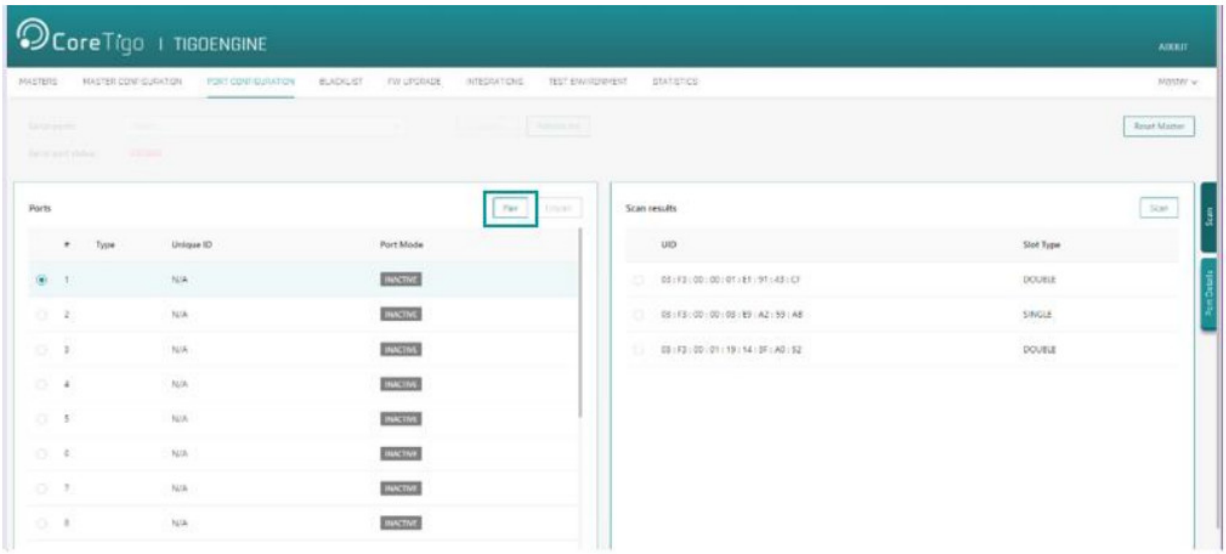


Figure 11: TigoEngine Pairing Process

8. When the pairing process is complete, the TigoEngine Port Mode should indicate OPERATE.
   The TigoBridge A1 Status LED alternates between blue and green. Configuring the IO-Link device is done through the Port Details tab.

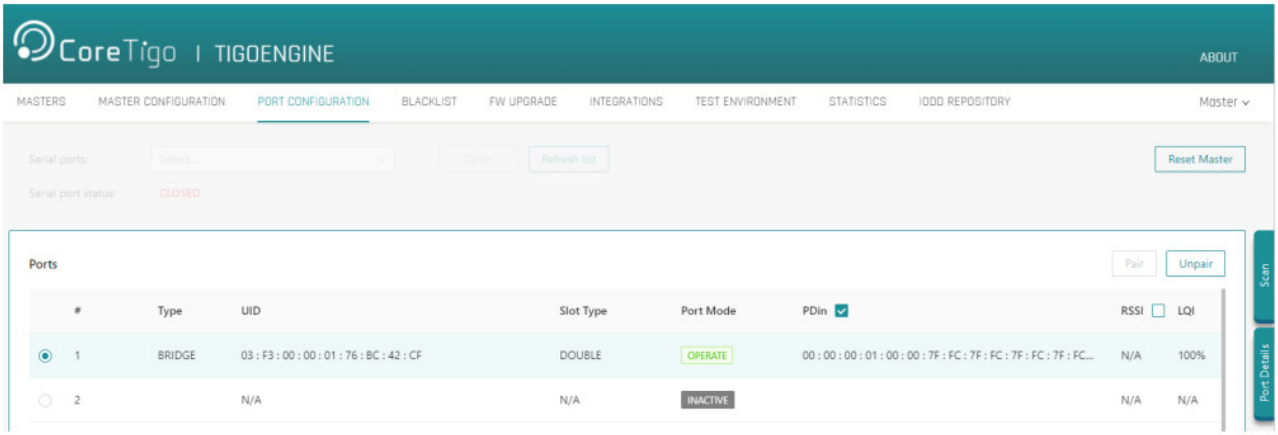


Figure 12: TigoEngine Operate Mode

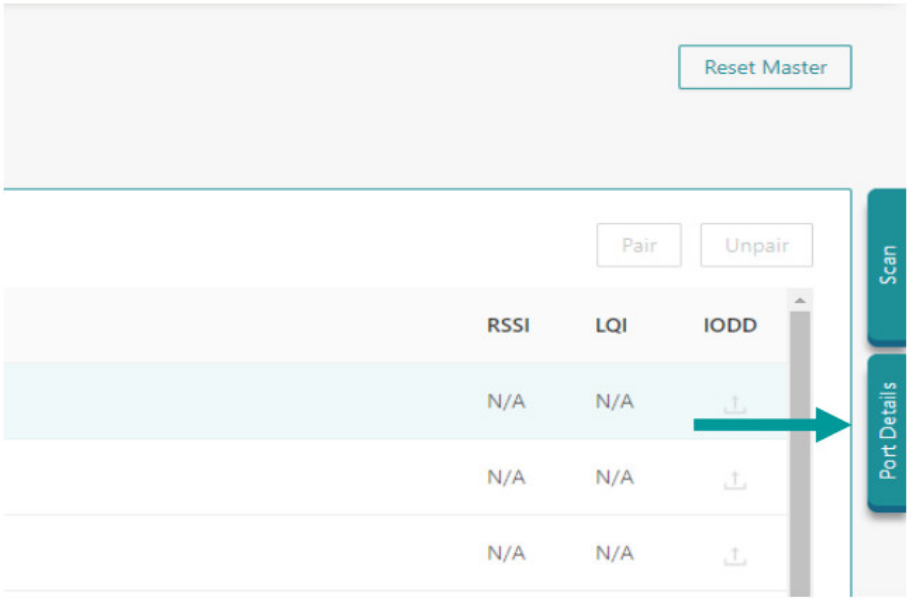


Figure 13: Port Details tab

Unpair – To replace a TigoBridge A1, click the unpair button, on the TigoEngine interface, and repeat the instructions to unpair it. Once unpaired, the TigoBridge A1 status LED alternates between magenta and green.

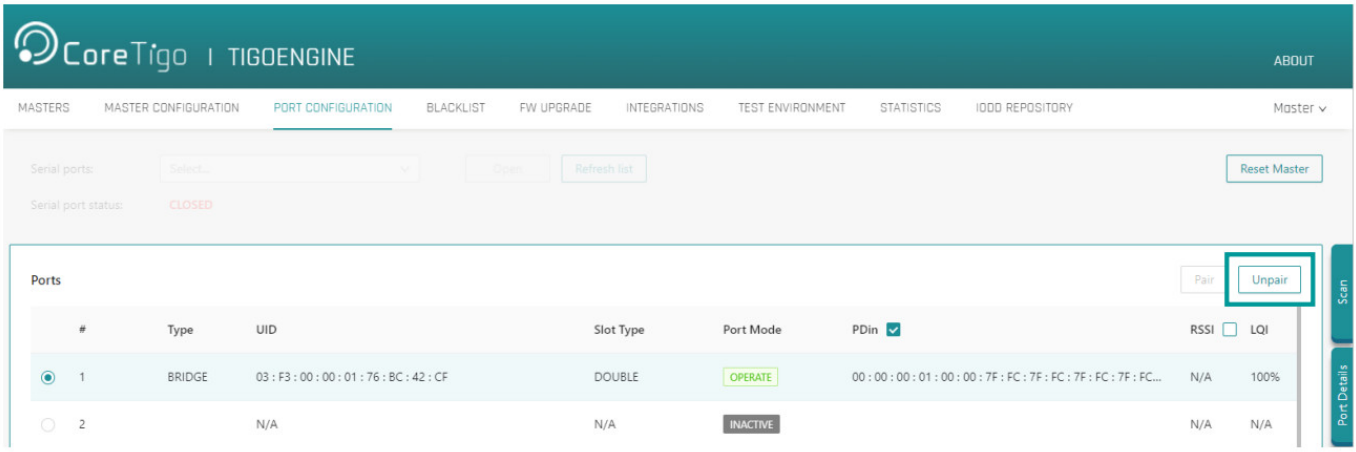


Figure 14: Unpair Button

Firmware Update

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

Diagnostics and Troubleshooting

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

8.1. Power LED

Power LED – if a power supply is connected to the TigoBridge A1 and the Power LED is off, the power supply is not properly connected, or it is providing a power supply different than the expected range.

8.2. Status LED

Status LED – indicates the IO-Link device connection status and the IO-Link Wireless communication status with the IO-Link Master. Therefore, it alternates to show both the status of the IO-Link device connection and the IO-Link Wireless connection.

Table 3: Status LED troubleshooting

IO-Link Wireless	Paired	Unpaired
Wired IO-Link		
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 properly functioning.
Alternating Magenta and Green – TigoBridge A1 is unpaired from the TigoMaster while the IO-Link device is properly connected to the TigoBridge A1. Re-Scan and Re-Pair the TigoBridge A1 to the TigoMaster through the TigoEngine.
Alternating Blue and Yellow – TigoBridge A1 is successfully paired to the TigoMaster while the IO-Link device is not properly connected to or not fully functioning with the TigoBridge A1. Check the IO-Link device connectivity with the TigoBridge A1.
Alternating Magenta and Yellow – Both TigoBridge A1 IO-Link Wireless communication are unpaired and the IO-Link device is not connected/functioning. Power down the TigoBridge A1 and power it back up, reconnect the IO-Link device, scan, and pair the TigoBridge A1.

Guidelines and Regulations

FCC ID: 2ATSM-TGBRIDGEA1

9.1. RF Exposure Warnings

Warning: This device is authorized for use in a static application only. Always keep a distance of at least 20 cm between the TigoBridge A1 device and the user's body.

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.
Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense **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.

9.4. FCC Regulatory Notices

Interference statement (if it is not placed in the device)

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.

Wireless Notice

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

Technical Data

Table 4: Technical Data

Electrical Data

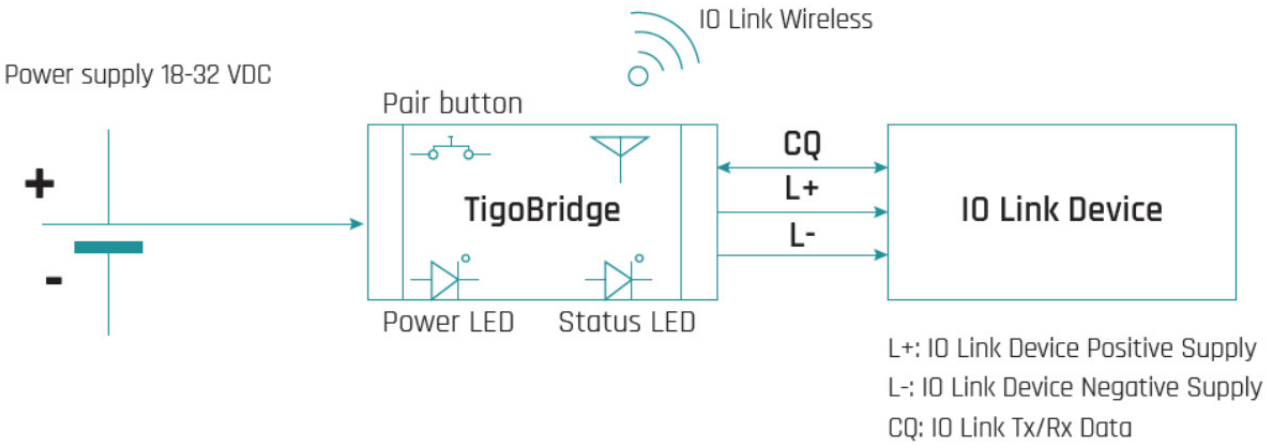
Input Voltage	18-32 [V]*
Output Voltage on L+	Equals to Input Voltage**
Typical Current Consumption	21 [mA]** *
Max Output Supply Current	1 [A]
Max Output Peak Current	1.2 [A]*** *
Wireless Parameters	
Operating Frequency	2.4 GHz ISM Band
Communication Standard	IO-Link Wireless
Modulation	GFSK, Modulation 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 o Pin number 1: Input L+ Power supply o Pin number 3: Input L- GND • Output Connector: Socket M12, A coded, IO Link Class A Connector o Pin number 1: L+ positive supply to IO Link device o Pin number 3: L- GND supply to IO Link device o Pin number 4: CQ IO Link Serial Communication
Antenna	Internal isotropic antenna
Communication	
Protocols	• IO Link o Supported transmission types: COM1, COM2, COM3 o Revision 1.1 o Class A • IO Link Wireless o Version 1.1
Operating Frequency Bands	2401 – 2480 [MHz]

Maximum radio-frequency power	10 [dBm]
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 A1 should be supplied from a limited, Class 2, power supply or via overcurrent protective device (fuse, breacker, etc.) rated 3A 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 o EN55016-2-3 Radiated emission o EN55022 Conducted emission
Immunity	• EN 61000-6-2 o EN31000-4-2 Electrostatic discharge o EN61000-4-4 Fast transients/burst o EN61000-4-5 Surge immunity o EN61000-4-6 Conducted immunity

Block Diagram



Dimensions

Customer Support

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

Appendix A – 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)					
G	X	Y	ZZZZ	iii	vv
Generation	Product Identifier	Product Type	Protocol	Feature's Character Identifier	Version

Documents / Resources

	**CoreTigo TigoBridge A1 Wireless Factory Automation** [pdf] User Manual TigoBridge A1, Wireless Factory Automation, TigoBridge A1 Wireless Factory Automation, Factory Automation, Automation

References

- Sign in to your account
- CoreTigo | Industrial Wireless Solutions