

# User Manual

**PRODUCT NAME : Mueller 向 Universal Node (LoRa)**

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**MODEL NAME : LORU(ETBLWLIP01)**

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## 2. Features

ETBLWLIP01 Node is intended for indoor and outdoor use as an unattended Automatic Metering Infrastructure (AMI) and control device.


It is fully self-contained and battery powered device with no user accessible controls.

- Waterproof without potting, IP68
- Battery powered : Li-SOCL2 D Cell + Auxiliary battery
- Wireless : LoRa + BLE 5.3 + NFC
- Antenna : PCB Printed (LoRa, BLE), FPCB (NFC)
- RoHS Compliance
- Size : 50.06mm x 85.86mm x 132mm

## 3. Ordering Information

Model	Description
ETBLWLIP01	Water metering Universal Node(LoRa)

## 4. Label marking



ETBLWLIP01(LoRa)  
 ST : C1E802EC  
 MD: 2303B031M00

FCC ID : XXXXXXXXXXXXXXXX  
 IC : XXXXXX- XXXXXX  
 Made In Indonesia

① LGIT Model name(Node type)

② Service Tag: Value extracted from UUID

③ Manufacture Date : 2303B031M00  
 - 23: Year, 03: Month, B : Revision No  
 03 : Date, 1: Indonesia(Prod. Country)  
 M: Production Line No.(1~9, A~...\_)  
 00: Change Revision of specification

④ FCC ID

⑤ IC ID

⑥ QR Code content  
 - LGIT Model name(Node type)  
 - uuid  
 - Service Tag

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## 5. Absolute Maximum Ratings

**Caution** : The specifications in Table 1 define levels at which permanent damage to the device can occur. Function operation is not guaranteed over these conditions.

Operating at absolute maximum conditions for extend periods can adversely affect the long-term reliability of the device.

Parameter	Min	Max	Unit
Storage Temperature	-40	+70	°C
Storage Humidity (40°C)	-	90	%

&lt; Table 1 &gt;

. Other conditions

- 1) Do not use or store in the corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are contained.

Also, avoid exposure to moisture.

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## 6. Operating Conditions

Parameter	Min	Typ	Max	Unit
Ambient Temperature	-40	-	85	°C
Ambient Humidity	0	-	100	%

## 7. Standard Test Conditions

The test for electrical specification shall be performed under the following condition  
 Otherwise this following conditions, not guaranteed this performance.  
 The test is conducted by applying external power to the auxiliary battery  
 (due to the capacity problem of the auxiliary battery).

### 7-1. Ambient condition

Temperature	$25 \pm 5^{\circ}\text{C}$
Humidity	$65 \pm 5\%$

### 7-2. Power supply voltages

Input power	Supply Voltage
Main Battery Power	$3.6\text{V} \pm 0.2$
Auxiliary Battery Power	$3.6\text{V} \pm 0.2$

### 7-3. Current consumption

Current Consumption	Min.	Typ.	Max.	Unit
Sleep	-	4	6	uA
BLE Tx	-	17	30	mA
BLE Rx	-	15	25	mA
LoRa Tx	-	400	550	mA
LoRa Rx	-	15	30	mA

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## 8. Electrical Specifications

- If there is no any comment, RF test is conducted test.

### 8-1. DC Characteristics for Metering Port

Symbol		Min.	Typ.	Max.	Unit
Valve control voltage		3.65	3.8	4.1	V
Metering supply voltage	5.2V	4.7	5.2	5.4	V
	3V	2.8	3.2	3.4	V

\* Measurement without valve or meter connection

### 8-2. RF Characteristics for LoRa

Items	Contents			
Channel frequency	902.3 ~ 927.5 MHz			
TX Characteristics	Min.	Typ.	Max.	Unit
Power Level	26	27	-	dBm
Frequency Tolerance @25°C	-25	-	25	kHz
RX Characteristics	Min.	Typ.	Max.	Unit
Minimum Input Level Sensitivity @125KHz/SF7		-123	-120	dBm

\* Normal Condition : 25°C, Vdc=3.6V.

\* Channel frequency varies by regulatory domain.

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**8-3. RF Characteristics for BLE**

Items		Contents			
Channel frequency		2400 ~ 2483.5 MHz			
Data rate		1,2Mbps			
TX Characteristics		Min.	Typ.	Max.	Unit
Power Level		-0.5	-	-	dBm
Modulation Characteristics 1 Mbps BLE	Delta F1 Avg.	225	250	275	kHz
	Ratio	80	-	-	%
Carrier frequency offset and drift	$ f_{TX} - f[n] $	-	-	150	kHz
	$ f_0 - f_n $	-	-	50	kHz
RX Characteristics		Min.	Typ.	Max.	Unit
Minimum Input Level Sens.(1Mbps)			-93	-85	dBm

\* Normal Condition : 25°C, Vdc=3.6V.

\* Channel frequency varies by regulatory domain.

**8-4. RF Characteristics for NFC**

Items		Contents			
Frequency		13.56MHz			
Data rate		106kbps			
Support protocol		NFC Forum Type NFC-A			
Characteristics		Min.	Typ.	Max.	Unit
Max. Detecting distance		1	-	-	cm

\* Normal Condition : 25°C, Vdc=3.6V.

\* Channel frequency varies by regulatory domain.



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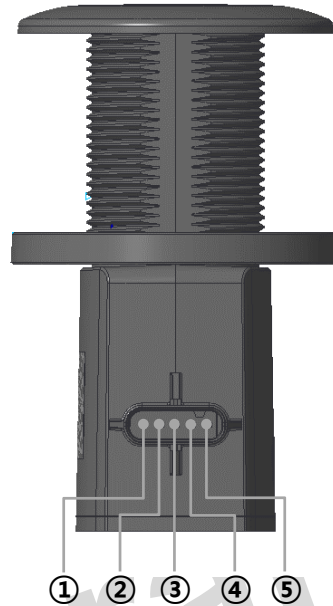
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**9. Metering Port Pin description**



Pin No.	Pin Name	Description
①	Valve Open	Power for Valve open
②	Valve Close	Power for Valve close
③	Metering Data Rx (UART RX)	Receive data from meter (Debug UART RX)
④	GND	Ground
⑤	Metering Data Tx (UART TX)	Data transmission and power supply to the meter (Debug UART TX)

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## 10. Mechanical Characteristics

### 10-1. Outline view

Item	Test Conditions
Assembly	No defects of wiring, soldering and assembling
Appearance	No dirt, rust, corrosion or foreign material

### 10-2. Appearance structure

Item	Test Conditions
Dimension	As assembly drawing
Mounting	As assembly drawing
Weight	286± 15g

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## Regulatory Statement(FCC)

### FCC Part 15.19 Statements:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

### FCC Part 15.105 statement(Class B)

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:

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

### FCC Part 15.105 statement(Class A)

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 instruction manual, 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.

### FCC Part 15.21 statement

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

### RF Exposure Statement (MPE)

The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.

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## Regulatory Statement(FCC)

### Responsible Party

Supplier's Declaration of Conformity  
47 CFR § 2.1077 Compliance Information

Unique Identifier: LORU  
Responsible Party – U.S. Contact Information  
Mueller Systems, LLC  
1200 Abernathy Road, NE, Suite 1200.  
Atlanta, GA, USA, 30328  
RZeppetelle@muellerwp.com

## Regulatory Statement(ISED)

### Licensed-exempt 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.

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.

### RF Exposure Statement (MPE)

The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.

l'exposition aux RF L' antenne (ou les antennes) doit être installée de façon à maintenir à tout instant une distance minimum de au moins 20 cm entre la source de radiation (l' antenne) et toute personne physique.