Wireless IoT Station
Analog Specification
(CTS-CISW)

*** There is a possibility of radio wave interference during the operation of this radio equipment**

Revision 1.3
2023.02.09

CanTops Co., Ltd

Approval Signatures:	☐Name (Job Position) Date:	☐Name (Job Position) Date:	☐Name (Job Position) Date:

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.

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CONTENTS

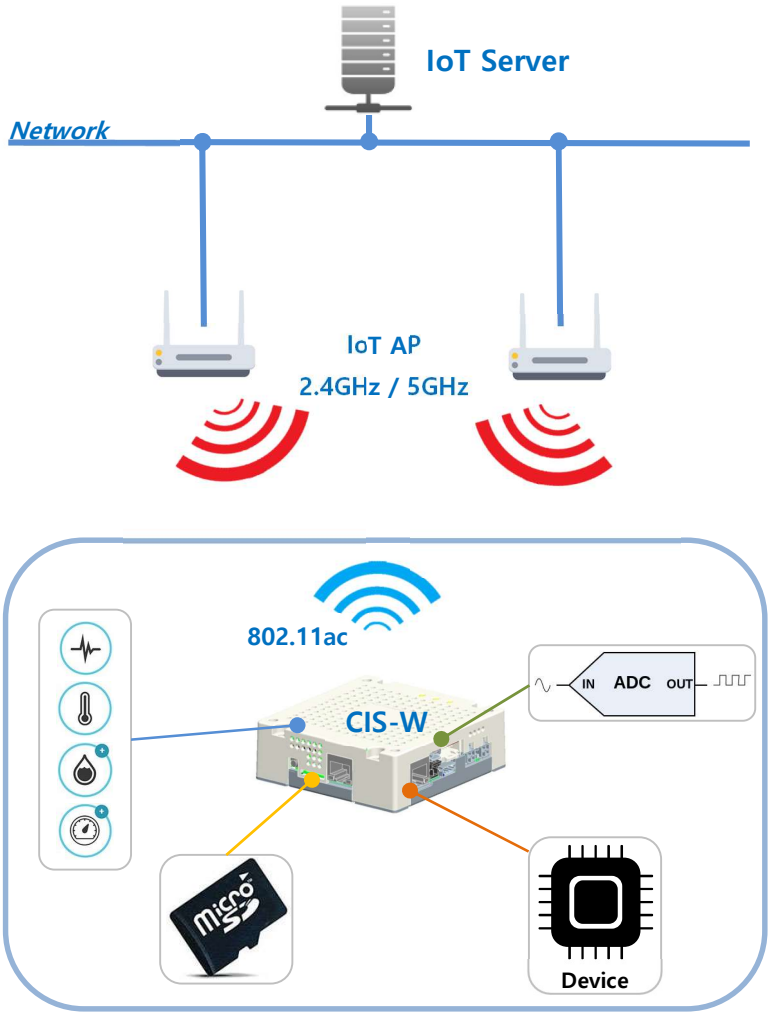
Revision History:

Rev.	Date	Location	Description of Change
1.0	2021. 08. 10	All	- First edition
1.1	2021. 01. 07		- [7.6 ADC INPUT] Pin-map revised
1.2	2021. 01. 12		- [7.6 ADC INPUT] Pin-map revised, Pin of the Molex company is arranged and applied
1.3	2023. 02. 09		- Modification of input rating notation of major product specifications - Add product code BT specification

1. INTRODUCTION

This product is a wireless IoT integrated solution (CIS-W hereafter) for the monitoring of the status and environment of the automation equipment. You can monitor the analog output of the equipment with max 20ksps of speed through the 8 channels analog input terminal and also, you can collect the environmental information such as the vibration, inclination, etc. of the equipment with max 1ksps through the acceleration sensor.

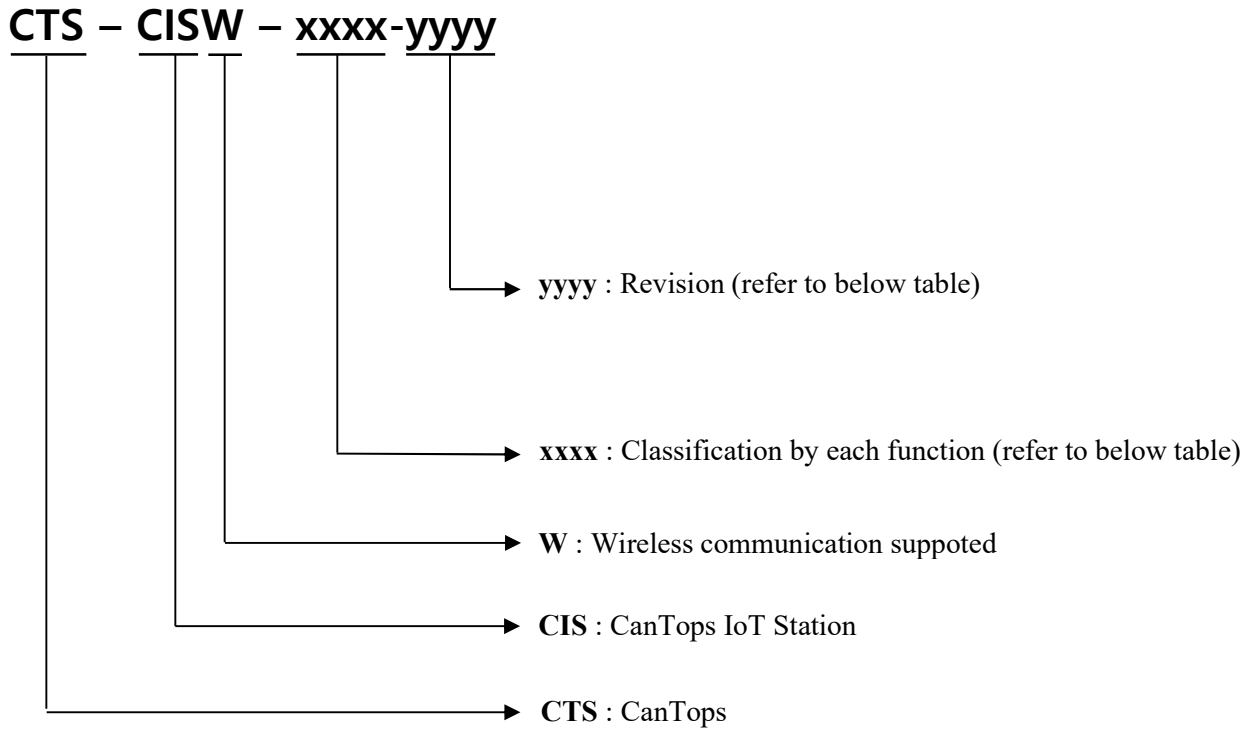
You can transmit the collected environmental information to the upper level through the Wi-Fi or wired communication (10/100Mbps, 1Gbps, RS-232C), and you can simply verify the collected environmental through the external storage device (micro SD). Roaming function is supported during the Wi-Fi communication, which searches for the adjacent AP devices and measures the received signal strength indicator(RSSI) continuously even when the equipment is moving to maintain the connection so that the environmental information of the equipment and environmental information can be transmitted to the upper level device (however, there should be no dead spot of the AP network in the path of mobile equipment).



2. CHARACTERISTICS OF THE PRODUCT

- Status and environmental monitoring solution of the automation equipment
- Supports wireless communication (Wi-Fi 2.4GHz & 5GHz / 802.11ac)
- Minimizes the dead spot of the communication through dual antenna
- Wi-Fi auto roaming function is supported
- Wired communication is supported (10/100Mbps x 1, 1Gbps x 1, RS-232C x 3)
- External memory micro SD (SDHC) is supported
- Analog monitoring function is supported through 16-Bit 8 channel Analog to Digital Converter
- Tilt / wobbling / impact of the equipment can be measures through the 6 axes motion sensor
- Various additional functions (monitoring the power source, current, temperature, humidity, pressure, etc.)
- Compact size with 92 x 88 x 30 (mm)

3. PRODUCT CODE CONFIGURATION



xxxx : Classification by each function			
x (SOM)	x (BASE)	x (DAUGHTER)	x (EXPANSION)
M : Wi-Fi only B : Wi-Fi, BT	N : normal	X : none A : analog	X : none

yyyy : Revision			
y (SOM ver)	y (BASE ver)	y (DAUGHTER ver)	y (EXPANSION ver)
1	1	1	0 (If it is None 0)

4. SPECIFICATION OF THE PRODUCT

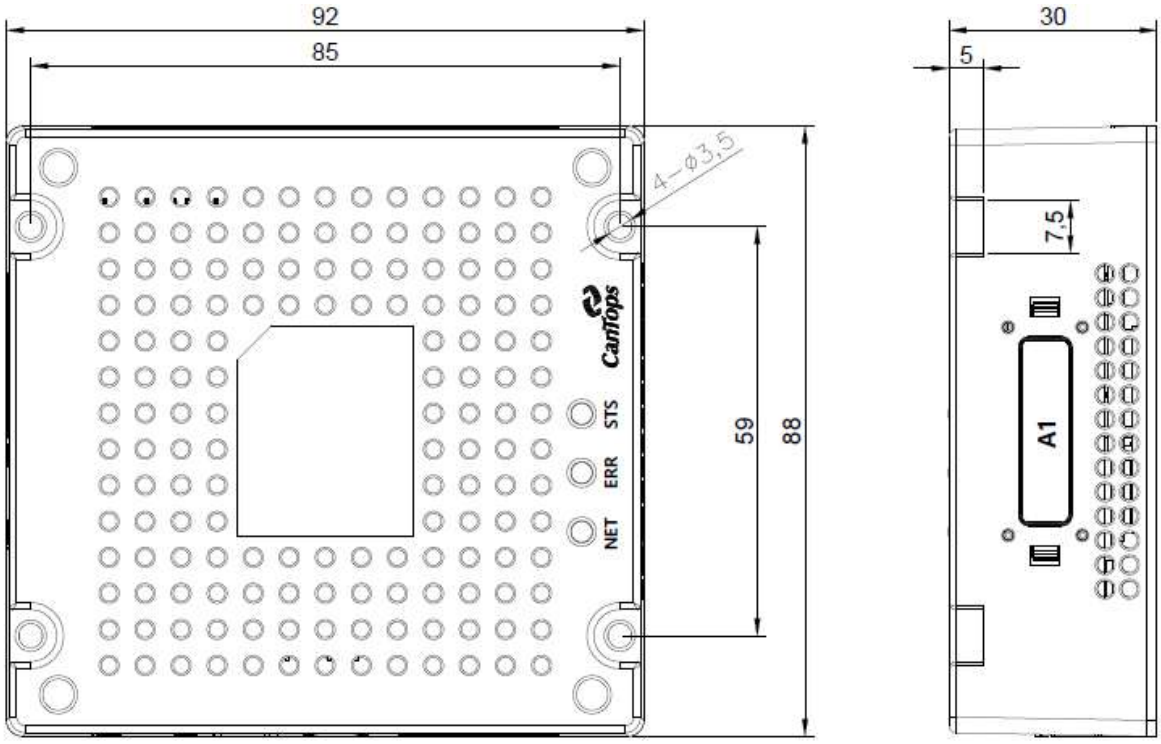
Specification of the product and installation environment of this product is as following <Table 1>.

Classification	Detailed item	Main specification
PROCESSOR	**CPU, MEMORY**	ARM Cortex-A53, Quad-Core Up to 1.8GHz 4GB RAM, 16GB Flash(eMMC) Ubuntu 18.04
COMMUNICATION	**Wireless** *1)	Wi-Fi 802.11ac, 2.4GHz & 5GHz Security : WPA2-AES Certificates : MSCHAPv2 over PEAP
	Ethernet	1Gbps : 1 10/100Mbps : 1 Automatic MDI/MDIX crossover supported
	Serial	RS-232C : 3
	USB	USB micro-B : 2
SENSOR	**Motion**	3 axis acceleration, 3 axis gyro
	Temperature	Temperature : -40 ~ 85 ℃ Humidity : 0 ~ 100 %RH Pressure : 300 ~ 1100 hPa
MEMORY	**Internal**	LPDDR4 : 4GB eMMC : 16GB
	External	micro-SD (SDHC)
INPUT PORT	**ADC**	16-Bit, 8 channel, Up to 20ksps Common and Differential mode filter Digital circuit and insulation Measure the differentiation
ENVIRONMENT and SAFETY	**Storage**	Temperature: -25 ~ 75°C Humidity: 5 ~ 95 %RH (non-condensation)
	Operation	Temperature : 0 ~ 45°C Humidity :35~85 %RH (non-condensation)
PROTECTION	**Fuse**	1.5A / 125V
POWER	**Input Rating**	DC 24 V ± 10%, 0.3 A
WEIGHT		185g
DIMENSION (Width x Depth x Height)		92×88×30mm

<Table 1> Specification

*1) It can be used in an environment where there is no frequency interference with other wireless devices (Wireless LAN, Bluetooth, etc.).

5. SIZE OF THE PRODUCT



*Unit: mm

6. PICTURES OF THE PRODUCT

7. CONNECTOR LIST

7.1. Power (POWER DC 24V)

Power to be used for the CIS-W should be DC24V. Refer to <Table 2> for the arrangement of the pins and the functions.

(a) Header : Controller

(b) Housing : Cable

Pin No.	1	2
Direction	IN	IN
Function	+24V	GND
Header	172310-1102, Molex	
Housing	172256-3102, Molex	
Max current	+24V : 1A	
Note	Fuse: 045201.5MRL, Littelfuse	

<Table 2> pin arrangement of the Power

7.2. Ethernet (ETH0, ETH1)

This is the connector to be used to connect the CIS-W and Ethernet. Refer to <Table 3> for the arrangement of the pins and the functions.

(a) Socket : Controller

Pin No.	1	2	3	4	5	6	7	8
Function	TRXP_1	TRXN_1	TRXP_2	TRXP_3	TRXN_3	TRXN_2	TRXP_4	TRXN_4
Modular jack	JXD0-0019NL, Pulse Electronics							
Cable	RJ-45							
Note	Automatic MDI/MDIX Crossover is supported							

<Table 3> Pin arrangement of the Ethernet

7.3. RS-232C (SERIAL 0)

This is the connector to be used to connect the CIS-W and RS-232C. Refer to <Table 4> for the arrangement of the pins and the functions.

(a) Header : Controller (b) Plug : Cable

Pin No.	1	2	3
Direction	-	IN	OUT
Function	GND	RxD	TxD
Header	5268-03A, Molex		
Housing	5264-03, Molex		
Note	no power		

<Table 4> Pin arrangement of SERIAL 0

7.4. RS-232C (SERIAL 1, SERIAL2)

This is the connector to be used to connect the CIS-W and RS-232C. Refer to <Table 5> for the arrangement of the pins and the functions.

(a) Header : Controller (b) Plug : Cable

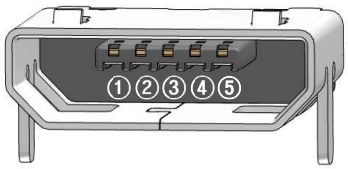
Pin No.	1	2	3	4
Direction	IN	OUT	-	OUT
Function	RxD	TxD	GND	+24V
Header	43045-0400, Molex			
Housing	43025-0400, Molex			
Note	+24V : 0.2A			

<Table 5> Pin arrangement of RS-232C

7.5. USB (DEBUG, MAINT)

This is the connector to be used to connect the CIS-W and USB micro-B. Refer to <Table 6> for the arrangement of the pins and the functions.

(a) Socket : Controller



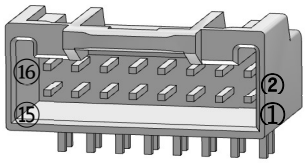
Pin No.	1	2	3	4	5
Direction	IN	-	-	-	-
Function	VBUS	D-	D+	NC	GND
Receptacle	USB3076-30-A, GCT				
Plug	USB micro-B				
Note	DEBUG: for boot loader and image download MAINT: for Serial communication				

<Table 6> Pin arrangement of USB

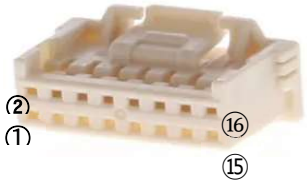
7.6. ADC INPUT (ANALOG INPUT)

This is the connector to be used to connect the CIS-W and analog signals. Refer to <Table 7> for the arrangement of the pins.

(a) Header : Controller



(b) Plug : Cable



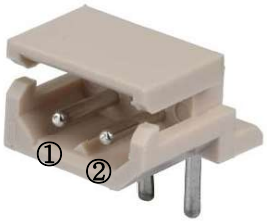
Pin No.	Direction	Function	Pin No.	Direction	Function
1	IN	IN7+	9	IN	IN3+
2	IN	IN7-	10	IN	IN3-
3	IN	IN6+	11	IN	IN2+
4	IN	IN6-	12	IN	IN2-
5	IN	IN5+	13	IN	IN1+
6	IN	IN5-	14	IN	IN1-
7	IN	IN4+	15	IN	IN0+
8	IN	IN4-	16	IN	IN0-
Header	501876-1640, Molex				
Housing	501646-1600, Molex				
Note	Measurement tolerance variation depending on the output impedance of the analog signal source (less than 100 Ω is recommended)				

<Table 7> Pin arrangement of ADC INPUT

7.7. ANALOG GND (A.GND)

This is the connector to be used for the connection of the reference potential (GND) for the measurement of analog signals. Refer to <Table 8> for the arrangement of the pins.

(a) Header : Controller



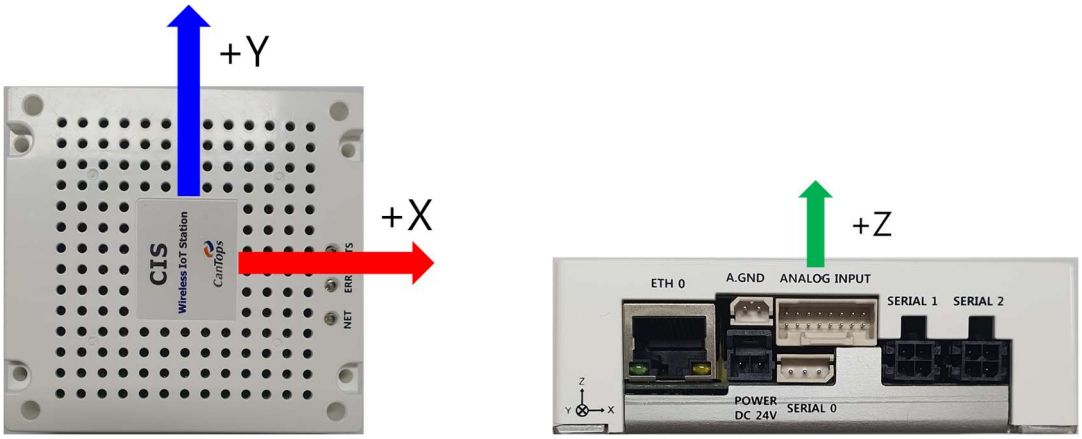
(b) Plug : Cable

Pin No.	1	2
Direction	-	-
Function	GND	GND
Header	5268-02A, Molex	
Housing	5264-02, Molex	
Others	Reference potential for the insulation layer (GROUND)	

<Table 8> Pin arrangement of ANALOG GND

8. MOTION SENSOR (TILT / WOBBLING / IMPACT)

8.1. AXIS ASSIGNMENT



※ Based on the Z axis vertical installation on the surface of CIS-W. Vertical axis to the ground is Z axis depending on the installation direction.

8.2. Motion sensor output specification

Classification	Value	Unit	Remarks
Acceleration resolution	0.122	**mg**	
Acceleration output range	±4	g	
Angular velocity resolution	0.061	DPS	
Angular velocity output range	±2000	DPS	
Angular resolution	0.01	Degree (˚)	
Angular output range	-90 ~ +90	Degree (˚)	

8.3. Precautions

- When setting horizontally, there must be no wobbling with CIS-W.
- Equipment needs to be rearranged if there is too much of tolerance with horizontal angle after the horizontal setting is completed.
- There should be no change of motion for 3 seconds for the operation stability during the initial operation.

***) Specification of this product is subject to change without notice to improve the performance of the product.**

9. Regulatory Statement (FCC)

- 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.
- 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.
- 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.