UNITED SIGN GROUP

ARCHITECTURAL | ENGINEERING | DIGITAL

Outdoor-III Series

Installation Manual

Design | Project Management | Service | Technical Support

www.unitedsigns.com

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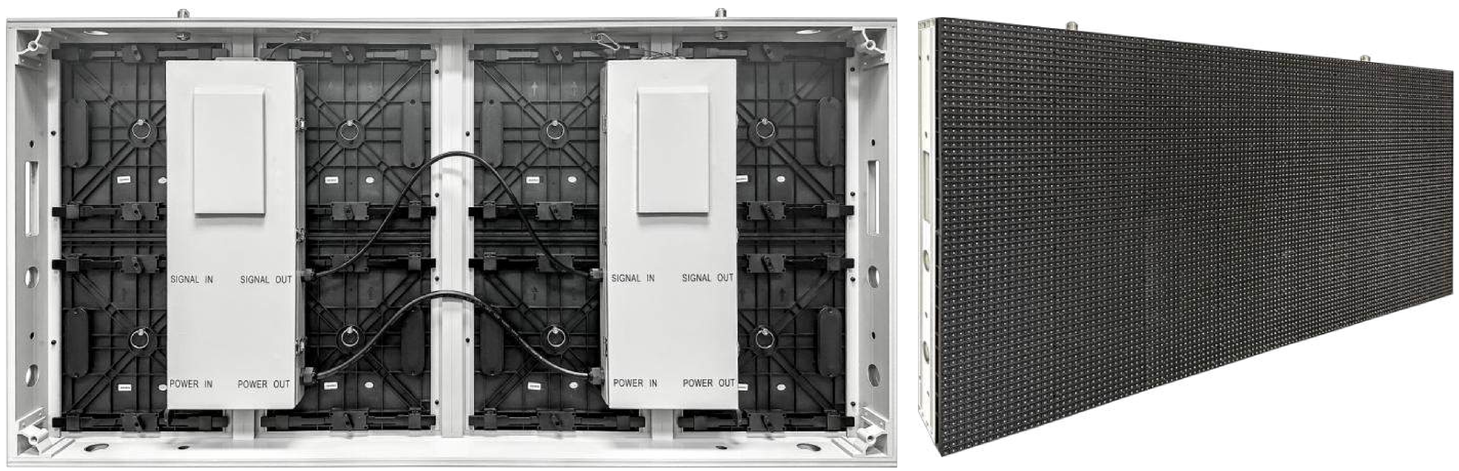
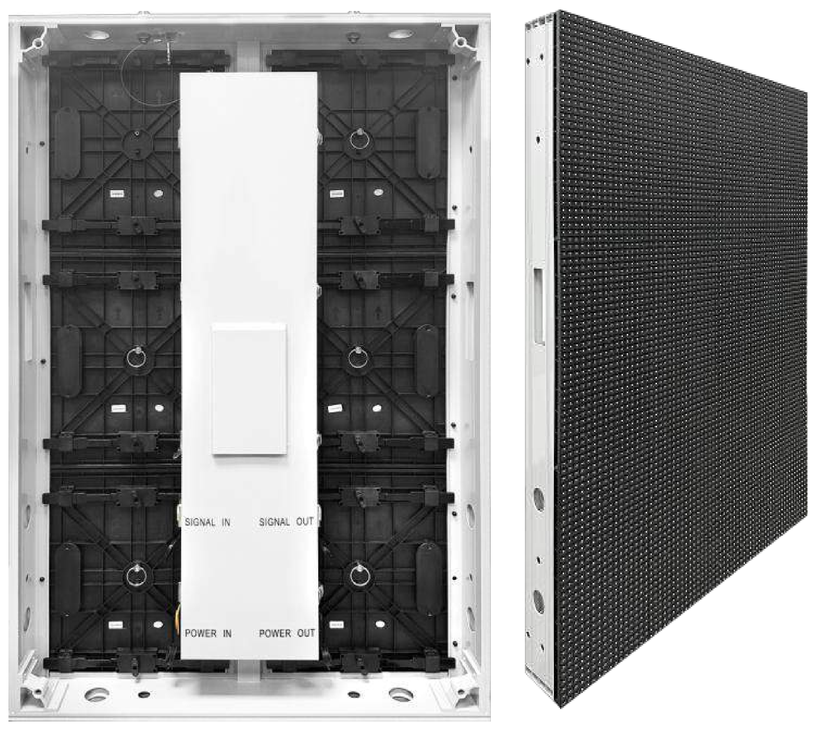
1.Product List

1.1 LED Panel



Panel Size: H 25.2″ x W 50.4″



Panel Size: H 37.8″ x W 25.2″

1.2 Asynchronous Controller TB30

Front View

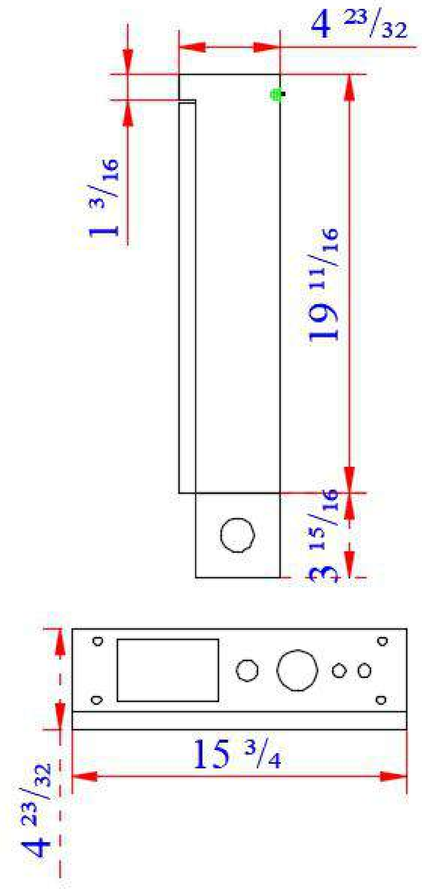
Back View

* The TB30 box, or other TB boxes, is provided upon purchase only if no power distribution box is included in the order.
* A fully waterproofed power distribution box, with a T30 card inside, can be provided upon purchase.

1.3 Power Distribution Box

Front View

Back View



Power Distribution Box Measurement

*If a power distribution box is included in the order, the controller will be a T30 card, which is pre-installed in the power distribution box, rather than in the TB30 box.
*The power distribution box specified in this manual is our standard model. Custom models with different specifications can be provided upon project request.

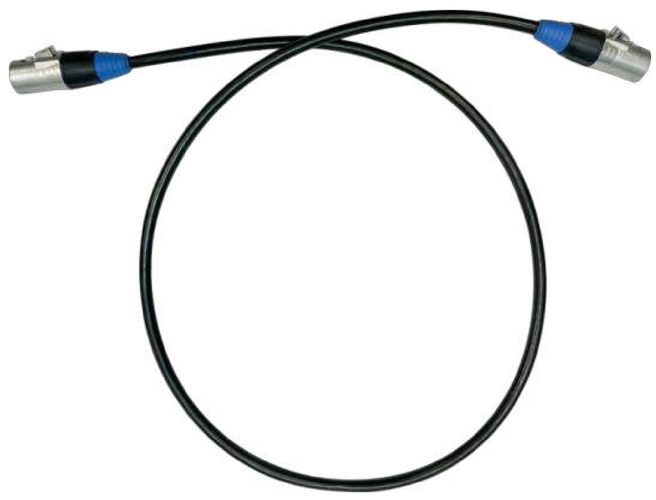
1.44 G Router

*The 4G router must be provided by the customer.
*Function of the 4G router: With a SIM card installed, the 4G router can provide a Wi-Fi signal to the T30/TB30, enabling it to be online. This is required for publishing content to the LED display via a cloudplatform.

1.5 Antenna and Antenna Extension Cord for T30/TB30

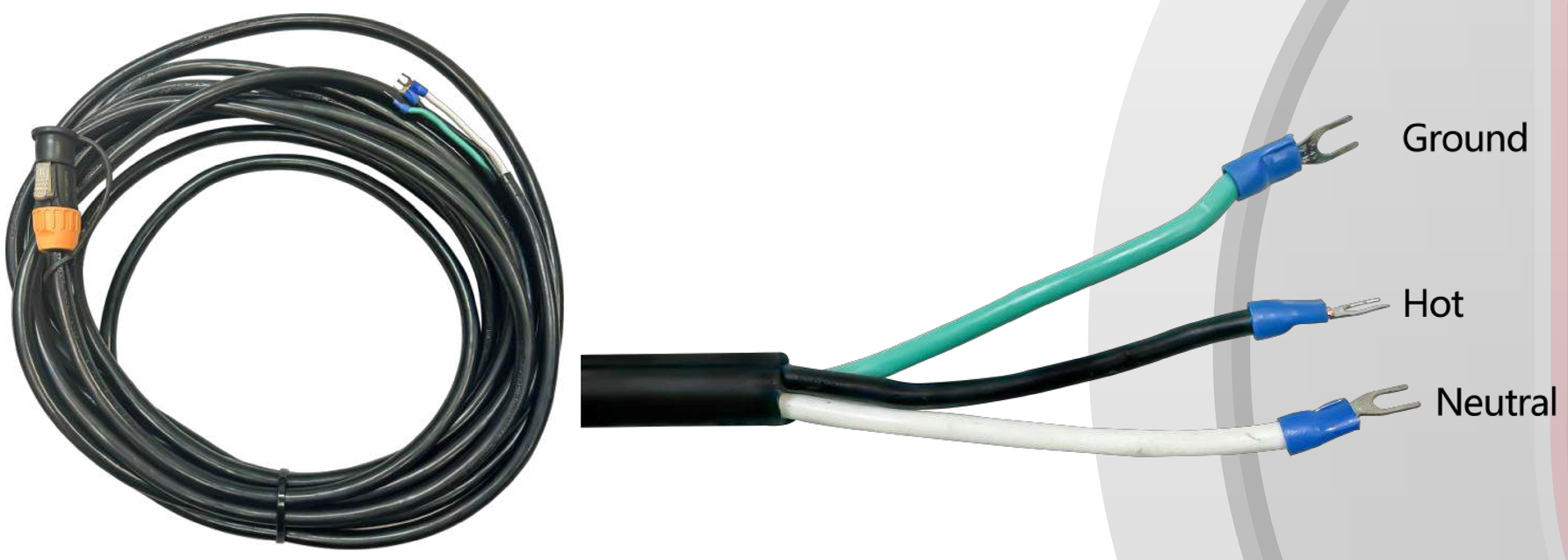
1.6 Panel Power Cable

1.7 Panel Signal Cable



1.8 Long Signal Cable

1.9 Long Power Cable



1.10 Front Maintenance Tool

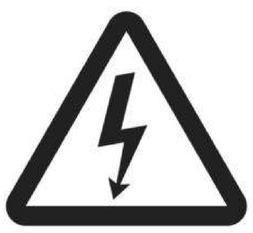
1.11 Bolt & Nut

Nut: M10 (10mm/0.398")
Bolt: M10 * 50mm, M10 * 60mm

1.12 Panel Connecting Plate

2. Safety Compliance

2.1 High Voltage Warning



Contact with high AC voltage may cause death or serious injuries. Always disconnect AC power from all units prior to servicing.

2.2 Grounding

All units must be properly earth grounded, otherwise damages to the equipment and injury/death might be caused.

2.3 Other

Other safety warnings throughout this manual.

2.4 Outdoor III series are UL and FCC certified.

3. Environmental Requirement

3.1 Both Outdoor-III series outdoor LED panels and the power distribution box are fully encapsulated and water-proof.
3.2 Outdoor-III series outdoor LED panels are engineered to operate within an ambient temperature range of -40°F to +158°F (-40°C to +70°C) and are built to endure constant direct sunlight.
3.3 The controller (TB30/T30) is engineered to operate within a temperature range of -20°F to +140°F (-20°C to +60°C).
3.4 All aforementioned water-proof components should not be subject to submersion in water.

4. Storage Requirement

4.1 LED pixels are semiconductor devices, environmental temperature and humidity can greatly affect the lifespan and rate of decay of LED pixels. It is necessary to keep LED displays away from air conditioning vents and damp areas.
4.2 For moisture prevention, the relative humidity around the LED displays should be less than 70% when the LED displays are operating at the highest working temperature.
4.3 The storage temperature for LED displays should be between-40°F to +158°F (-40°C and 70°C). The storage temperature for the controller should be between-40°F to +176°F (-40°C and 80°C).
4.4 If the LED displays remain inactive for an extended period, it is important to periodically activate and run them continuously for approximately 24 hours. Ensure that the display gradually illuminates when powering it on after a prolonged period of inactivity.

5. Warranty Terms

5.1 Warranty period

UNITED SIGNS provides a standard 3-year warranty, with the option to extend the warranty period upon purchase.

5.2 What is covered in warranty?

5.2.1 The warranty encompasses all hardware of the UNITED SIGNS LED display system and provides coverage for any defects, failures, or malfunctions.
5.2.2 UNITED SIGNS offers complimentary replacement and the return-shipping for any part found to be defective or malfunctioning after this defective part is returned to UNITED SIGNS for servicing.

5.3 What is not included in the warranty?

This warranty excludes labor expenses and damages resulting from abuse, misuse, improper installation, or unforeseeable events (often referred to as 'acts of God'). Additionally, consequential and incidental damages are not eligible for coverage under this warranty. Please note that in some states, there may be regulations that prohibit the exclusion or restriction of incidental or consequential damages, which could impact the applicability of this provision to your situation. UNITED SIGNS shall not assume responsibility for any labor charges associated with assembly, disassembly, or any other services related to part replacement.

5.4 Who is eligible for warranty from UNITED SIGNS?

UNITED SIGNS warranty is exclusively offered to our direct customers. In the event of product resale, the warranty remains applicable to the original direct customer rather than the party to whom the products were resold.

5.5 When does the warranty begin?

The warranty begins on the date of shipment for the order.

5.6 Exceptions

The following issues are excluded from the limited warranties outlined above. UNITED SIGNS shall not be responsible for providing warranty support or maintenance services for these issues, nor shall UNITED SIGNS be liable for any repairs, replacements, or additions related to them.
5.6.1 Damage or problems caused by strikes, riots, acts of sabotage, or war.
5.6.2 Damage or problems caused by accidents, fires, or water-related incidents.
5.6.3 Damage or problems caused by natural disasters such as floods, fires, lightning, earthquakes, or tornadoes.
5.6.4 Damage or problems caused by misuse, abuse, neglect, or accidental incidents.
5.6.5 Damage or problems caused by improper electrical grounding.
5.6.6 Damage or problems caused by improper utility service, including but not limited to not providing sufficient amperage for the products.
5.6.7 Damage or problems caused by external electrical faults or unusual electrical disturbances.
5.6.8 Damage or problems caused by unauthorized modification, disassembly of products.
5.6.9 Damage or problems caused by unauthorized repairs, alterations, modifications, maintenance, relocation, or reinstallation without prior written permission from UNITED SIGNS.
5.6.10 Damage or problems caused by using non-UNITED SIGNS supplied equipment or components.

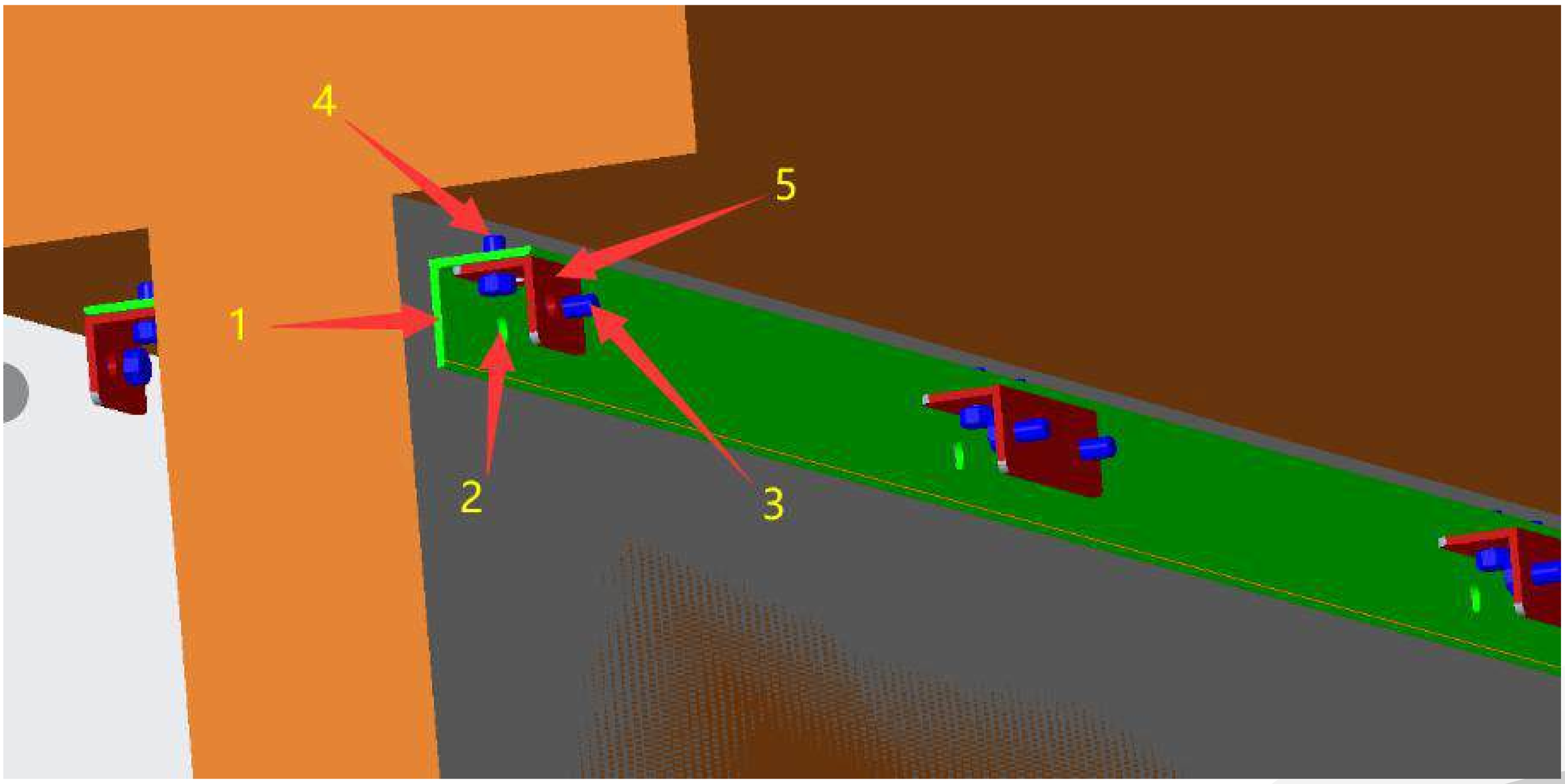
5.6.11 Damage or problems caused by improper handling of the product during transportation.
5.6.12 Damage or problems caused by failure to follow Electro-Static Discharge (ESD) precautions when handling products.
5.6.13 Theft.
5.6.14 Failure to maintain the appropriate operating or storage environment for the products, including but not limited to air conditioning, humidity control, or exposure to corrosive atmospheres harmful to electronic equipment, as outlined in the UNITED SIGNS Installation Manual.
5.6.15 Freight costs for transporting items back to UNITED SIGNS for repair/replacing.
5.6.16 Regular cleaning, or wear and tear that is considered normal.
5.6.17 Non-UNITED SIGNS-manufactured equipment, which comes with its original manufacturer's warranty and can be provided to the customer upon request.

6. Outdoor-III Series Specification Sheet

Product	P5.92	P6.67	P8	P10	P10	P16
Pitch	5.92mm	6.67mm	8mm	10mm	10mm	16mm
Density (pixel/m^2)	28476	22500	15625	10000	10000	3906
LED Type	SMD2727	SMD2727	SMD2727	SMD2727	DIP346	DIP346
Brightness	7500nits	8000nits	9000nits	10000nits	10000nits	10000nits
Scan Methode	1/6	1/6	1/5	1/2	1/4	Static
Panel Size	H25.2" X W50.4" / H37.8" X W25.2" / H37.8" X W50.4" / H37.8" X W37.8" / H25.2" X W25.2"					
Module Size	H12.6" X W12.6"					
Panel Material	Profile Aluminum					
Panel weight	5.8 lbs/SF	5.8 lbs/SF	5.8 lbs/SF	5.8 lbs/SF	6.2 lbs/SF	6.2 lbs/SF
Protection Level	Ip65					
Maintenance	Front & Rear Service					
Max Power Consumption	70W/SF	70W/SF	70W/SF	70W/SF	34W/SF	34W/SF
Ave. Power Consumption	35W/SF	35W/SF	35W/SF	35W/SF	17W/SF	17W/SF
Refresh Rate	3840Hz					
Grey Scale	16bit					
Viewing Angle	H160°, V120°			H140°, V70°		
Voltage	AC100~240V(50-63Hz)					
Working Temperature	-40°F to 158°F					
Working humidity	10% - 90%RH					
Color Temperature	3000-9500K					
Certifications	UL/EMC/CE/ROHS/CCC/FCC/BIS					

7. Product Installation

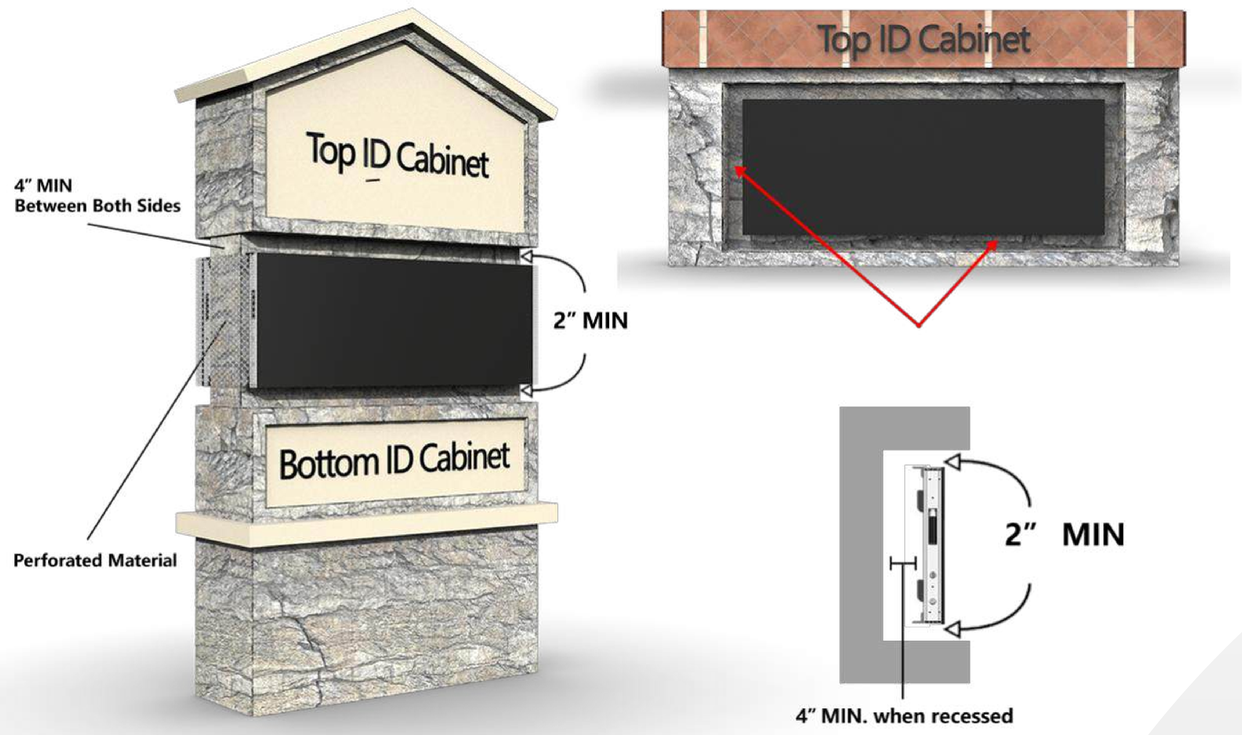
7.1 Structural Angle Iron Fixing Diagram



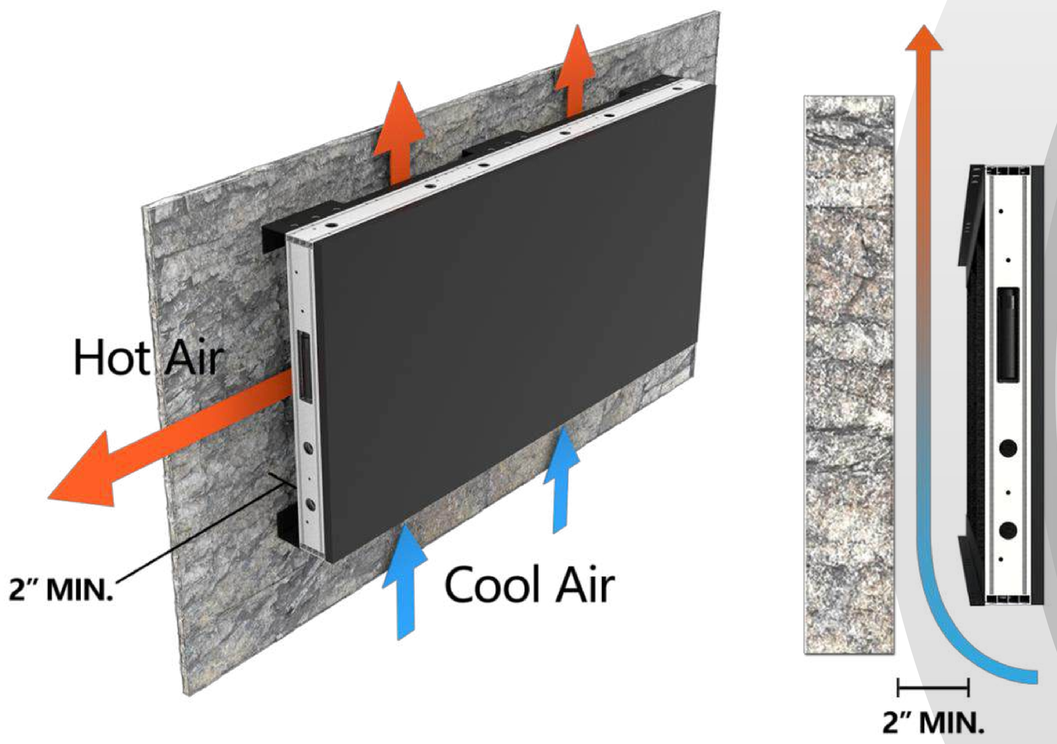
1 refers to the long installation angle iron.
2 refers to the bolt hole for securing the long installation angle iron. The bolt can be an expansion screw or explosion-proof screw, or this angle iron can be secured through welding.
3 refers to the bolt used for fixing the panel to the smaller angle iron connecting plate for panels.
4 refers to the bolt and nut used for fixing the smaller angle iron connecting plate for panels to the long installation angle iron.
5 refers to the smaller angle iron connecting plate used for securing the panels to the long installation angle iron.

8. Ventilation

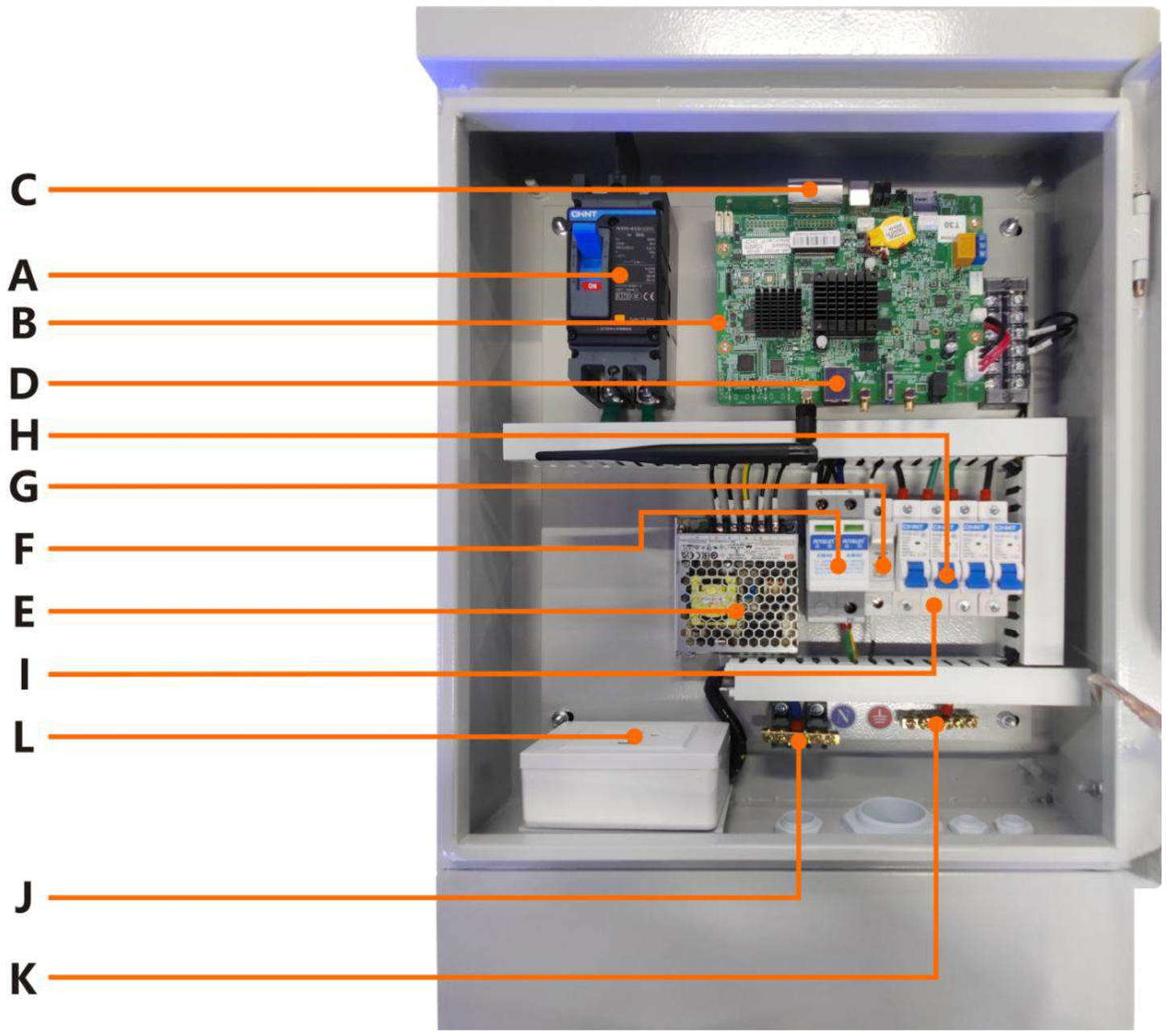
8.1 Decent ventilation is required for normal operating temperature. Damage or problems caused by overheating is not covered under warranty. The guidelines in this manual represent our standards, they may not suffice for every location or installation. Depending on the specific site conditions, additional ventilation or modifications may be necessary.
8.2 Minimum 2"of space behind each face of the LED display shall be allowed for ventilation.
8.3 Do not restrict airflow in the area behind the LED display. When using covers with mesh or louvers, the smaller the openings are, the larger the mesh or louvers should be in order to achieve the same ventilation.
8.4 Minimum 2" space is required at both the top and bottom for air convection.
8.5 Avoid placing glass or polycarbonate in front of the LED display, and ensure that there is no interference with the airflow.
8.6 Allow enough clearance at the bottom of the LED display for water drainage.
8.7 To increase ventilation, the sides of the LED displays can be left open or covered only with a perforated material.



Minimum 2" space required at both the top and bottom for air convection.



9. Power Distribution Box



Internal Configuration Diagram of the power distribution box

9.1 Introduction

The power distribution box demonstrated in this manual is a single-phase power distribution box with a capacity of 10,000 watts. power distribution boxes can be tailored to specific requirements, meaning that not all 10,000 watts power distribution boxes are identical.
Please reach out to UNITED SIGNS if an power distribution box with a higher capacity or different components is required.

9.2 Component Identification

A: Breaker
B: Novastar T30 sending card
C: Ethernet ports for signal cables between LED display and T30 card
D: Ethernet port for signal cable between PC/laptop and T30 card
E: Small power supply for T30 card and the duplex plug
F: Surge protector
G: Fuse
H: Air switches
I: Terminals for connecting power cables between power distribution box and LED panels
J: Neutral
K: Ground

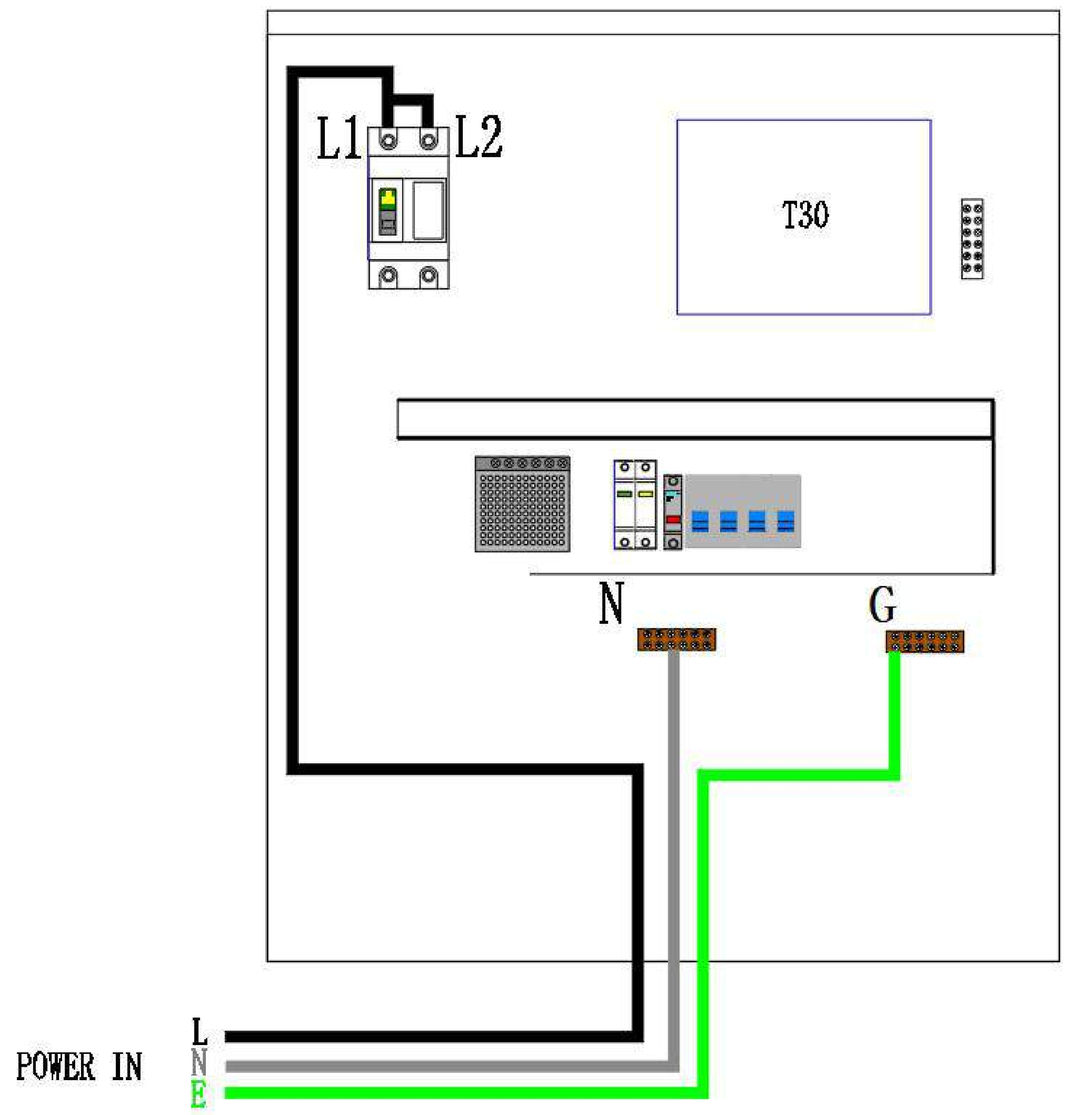
9.3 Capacity

Power distribution box watt capacity: 10,000 watts
Breaker ampacity: 63 A
Air switch ampacity (each): 32A
Input voltage: Single phase 100-240 VAC
Max quantity of output power cables to be connected on the power distribution box (power cable between power distribution box and LED panels): 4pcs

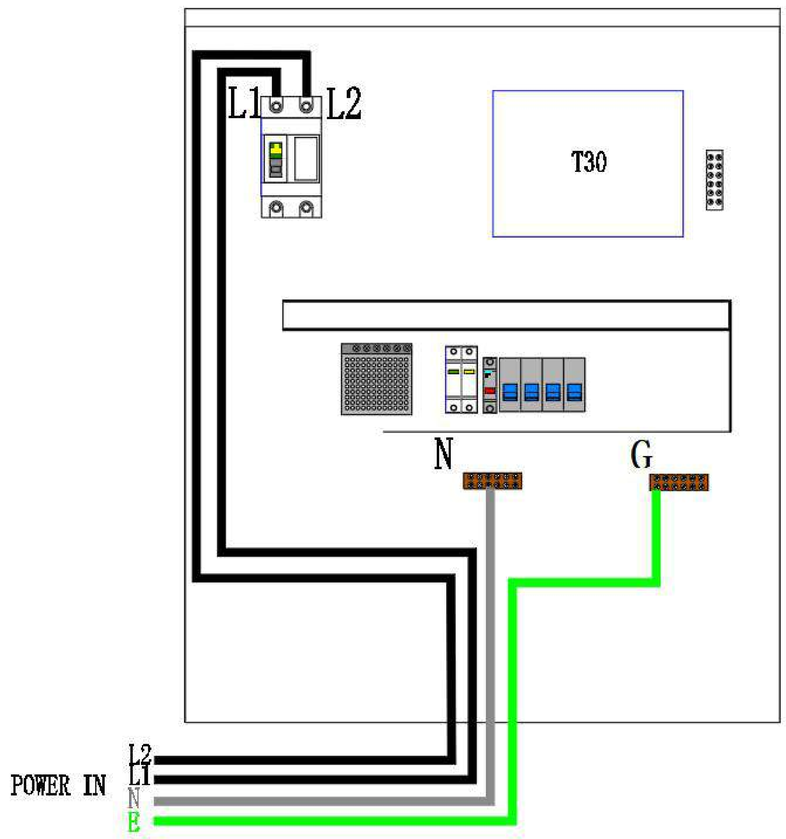
9.4 Power Cable Connection

9.4.1 Power Input

9.4.1.1 When there are three wires in the input power cable (1 hot wire, 1 ground wire, 1 neutral wire):
Hot wire: Connect the only hot wire on either L1 or L2, and **jump a cable between L1 and L2**. The size of the jumper should be no less than the input hot line.
Ground wire: Connect the ground wire on the Ground terminal (Item“K” specified in #9.2).
Neutral wire: Connect the neutral wire on the Neutral terminal (Item“J” specified in #9.2).



9.4.1.2 When there are four wires in the input power cable (2 hot wires, 1 ground wire, 1 neutral wire):
Hot wires: Connect one hot wire on L1 and another one on L2. **Do not connect both hot wires on one line.**
Ground wire: Connect the ground wire on the Ground terminal (Item“K” specified in #9.2)
Neutral wire: Connect the neutral wire on the Neutral terminal (Item“J” specified in #9.2)



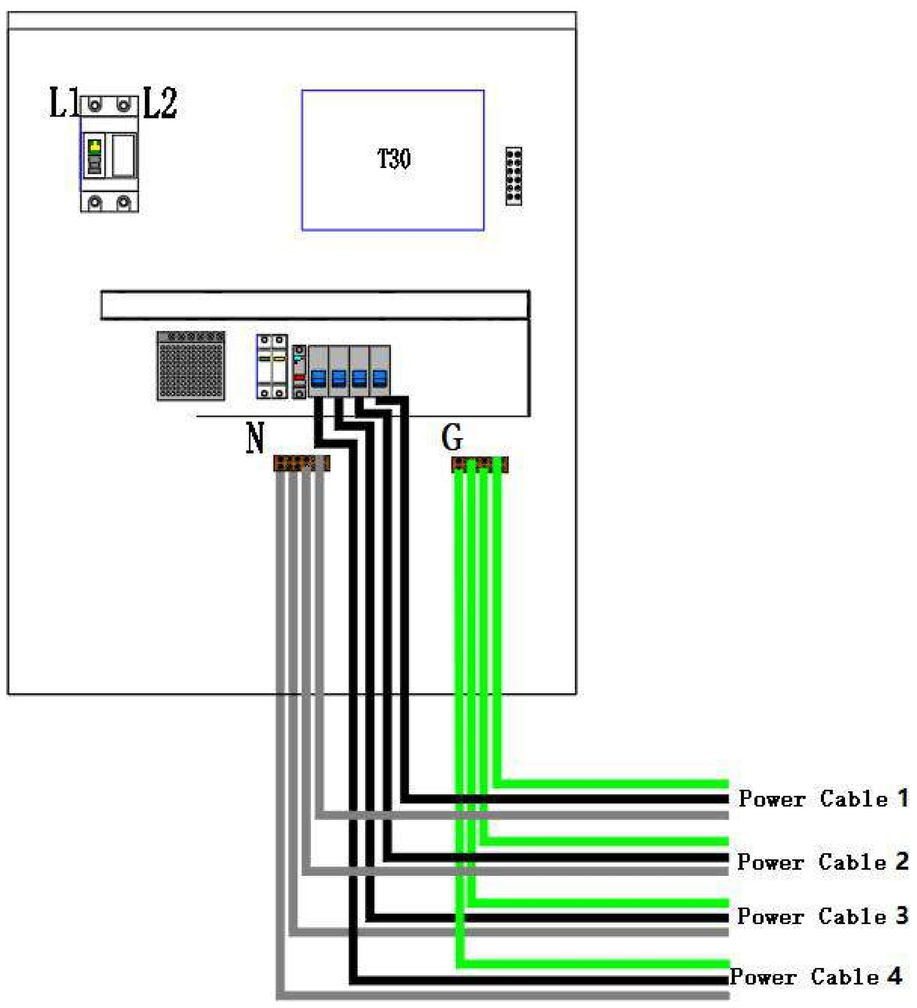
9.4.2 Power Output

The ampacity of each output power cable (long power cable between the power distribution box to the LED panels) is 18A.

The current flowing through each output power cable varies with the input voltage.

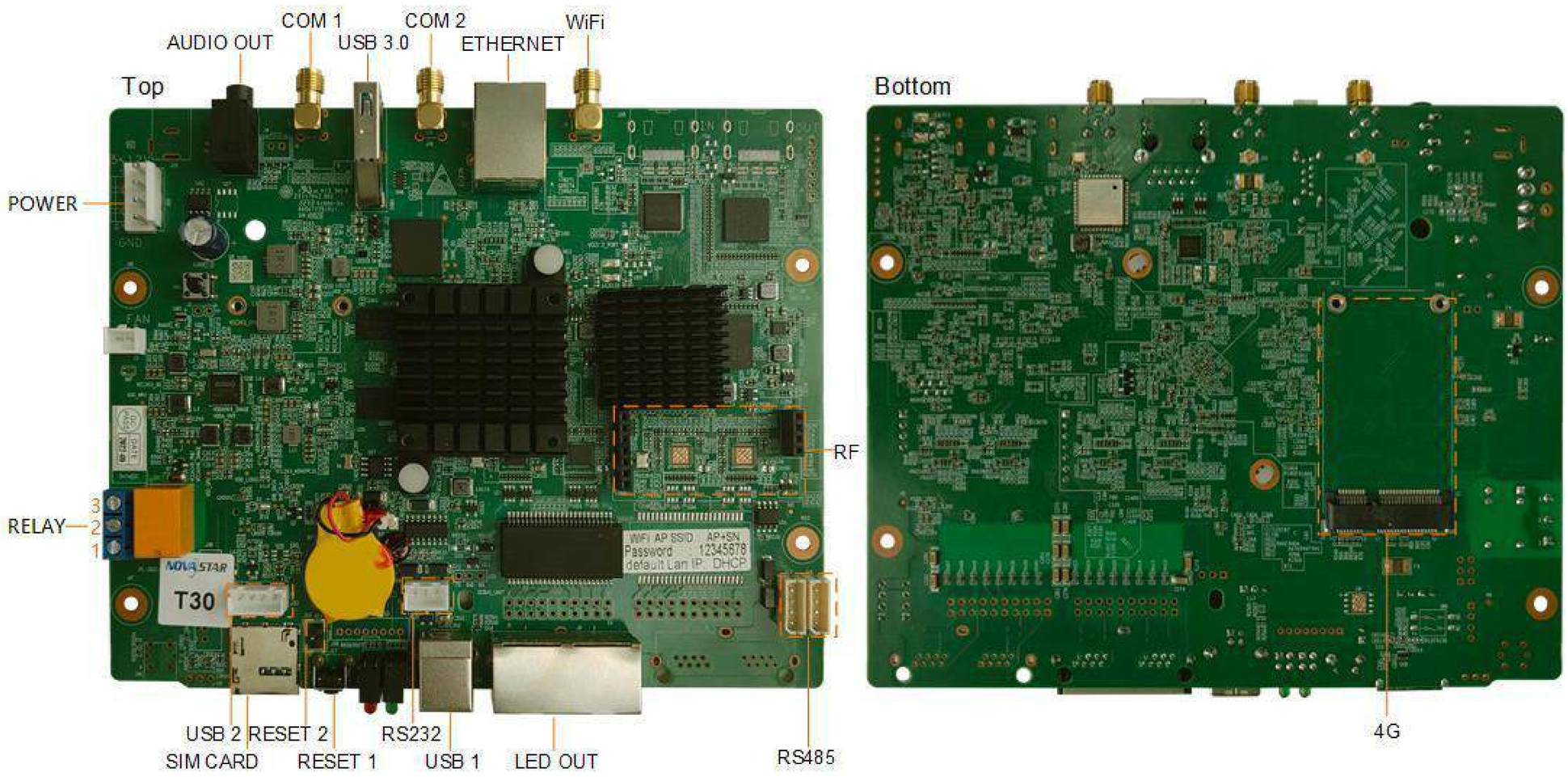
The voltage for the LED panels is the phase-to-ground voltage, not the phase-to-phase voltage.

There are three wires in each output power cable: 1 hot wire, 1 ground wire, 1 neutral wire.
Hot wire: Connect the hot wire on one of the terminals right below the air switches (Item“I” specified in #9.2)
Ground wire: Connect the ground wire on the Ground terminal (Item“K” specified in #9.2).
Neutral wire: Connect the neutral wire on the Neutral terminal (Item“J” specified in #9.2)



10. Controller

10.1 Novastar T30 Sending Card



Name	Description
SIM CARD	SIM card slot Capable of preventing users from inserting a SIM card in the wrong orientation
RESET	Factory reset button Press and hold this button for 5 seconds to reset the product to its factory settings.
USB	USB (Type B) port Connects to the control computer for content publishing and screen control.
LED OUT-1	Gigabit Ethernet outputs, primary
BACK UP	Gigabit Ethernet outputs, back-up

10.2 Novastar TB30 Sending Box

Name	Description
SENSOR	Sensor connectors Connect to brightness sensors or temperature and humidity sensors.
WiFi	Wi-Fi antenna connector Support for switching between Wi-Fi AP and Wi-Fi Sta
ETHERNET	Gigabit Ethernet port Connects to the control computer, a LAN or public network for content publishing and screen control.
COM 2	GPS or RF antenna connector
USB 3.0	USB 3.0 (Type A) port Allows for USB playback and firmware upgrade over USB. The Ext4 and FAT32 file systems are supported. The exFAT and FAT16 file systems are not supported.
COM 1	4G antenna connector
AUDIO OUT	Audio output connector
100-240V~, 50/60Hz, 0.6A	Power input connector
ON/OFF	Power Switch

Indicators on T30 Sending Card or TB30 Sending Box

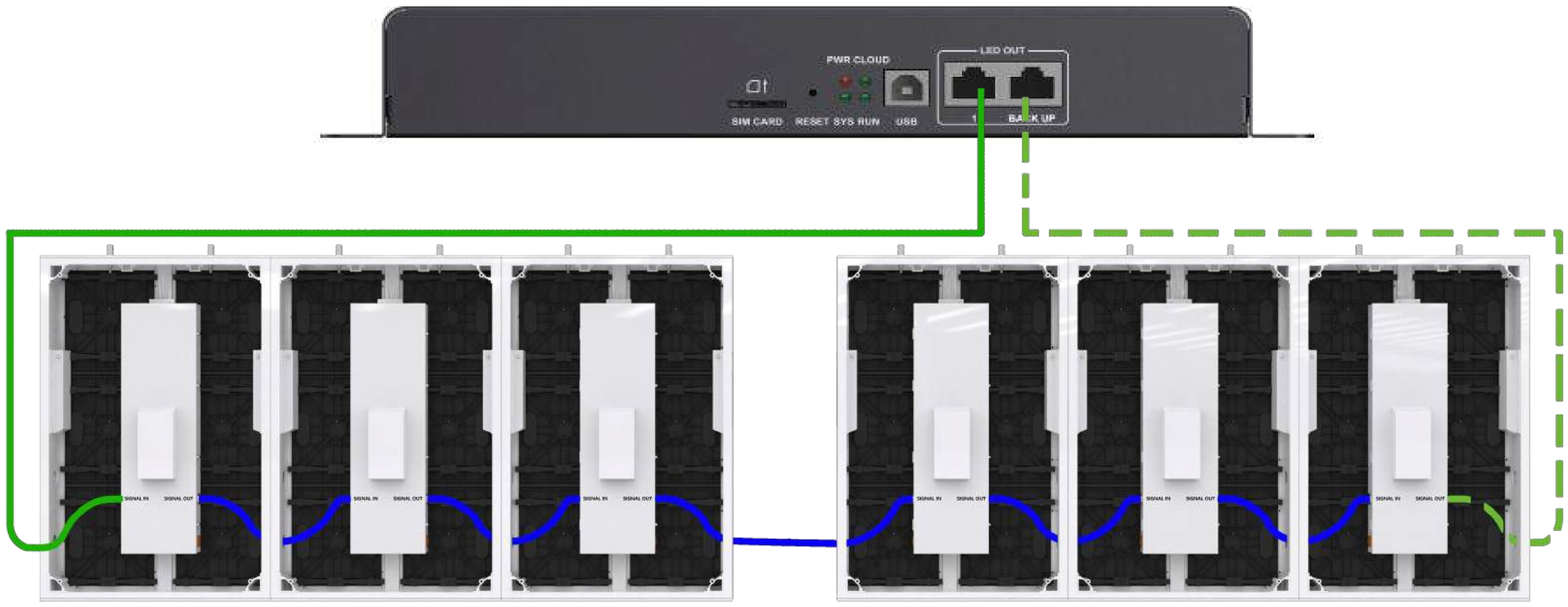
Name	Color	Status	Description
PWR	Red	Staying on	The power supply is working properly.
SYS	Green	Flashing once every 2 seconds	The operating system is functioning normally.
		Staying on/off	The operating system is malfunctioning.
CLOUD	Green	Staying on	The TB30 is connected to the Internet and the connection is available.
		Flashing once every 2s	The TB30 is connected to VNNOX and the connection is available.
		Flashing once every second	The TB30 is upgrading the operating system.
		Flashing once every 0.5s	The TB30 is copying the upgrade package.
RUN	Green	Flashing once every second	The FPGA has no video source.
		Flashing once every 0.5s	The FPGA is functioning normally.
		Staying on/off	The FPGA loading is abnormal.

*The sole distinction between the T30 card and TB30 box lies in the external enclosure. They share identical components and functionality. The T30 card is utilized within the power distribution box. In cases where an power distribution box is not included in the order, we will supply the TB30 sending box.
* All of the following demonstrations are based on TB30 box.

11. Signal Connection

11.1 Signal Cable Connection Between Controller and LED Panels

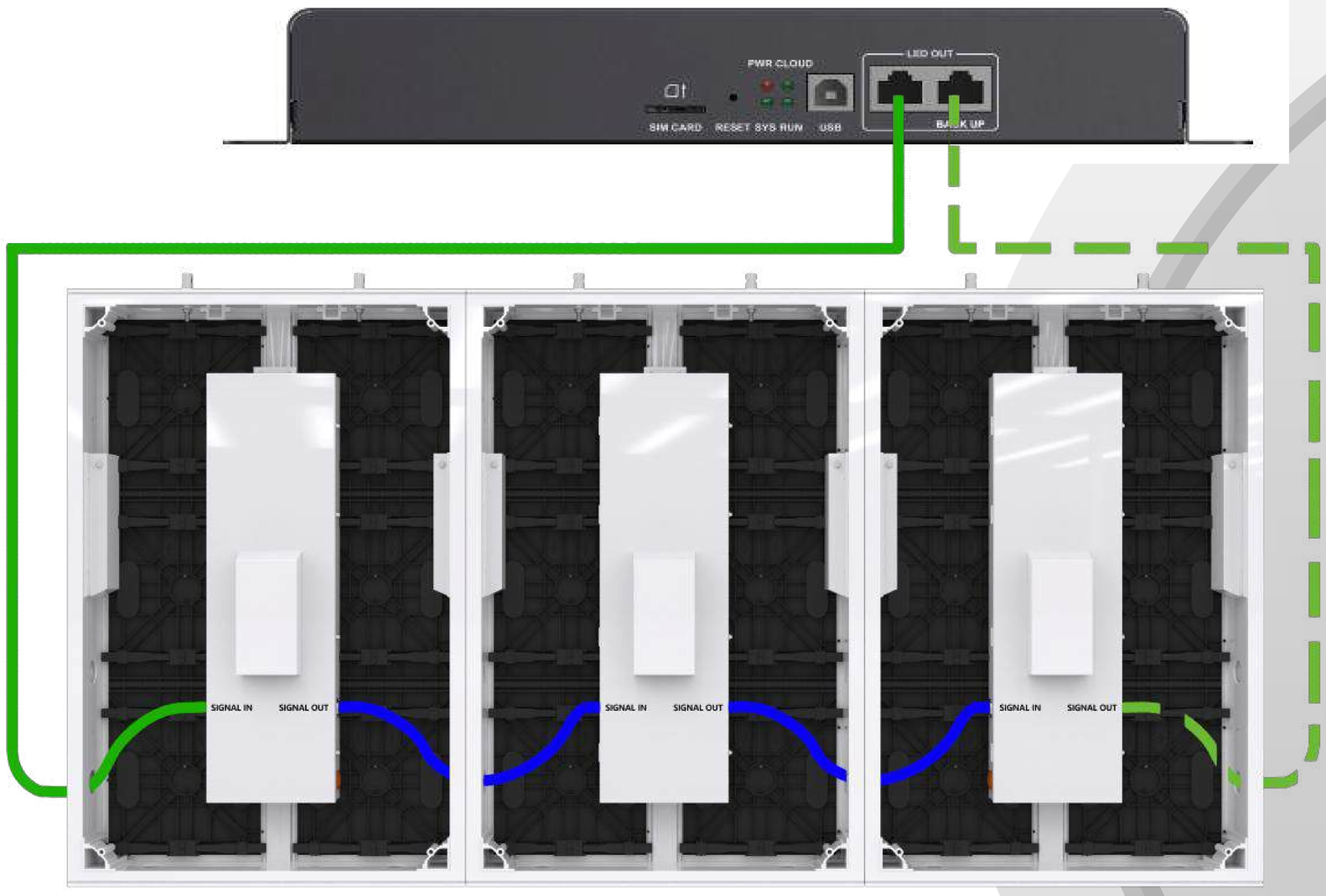
11.1.1 Diagram A: Double-sided display, 1 row of LED panels



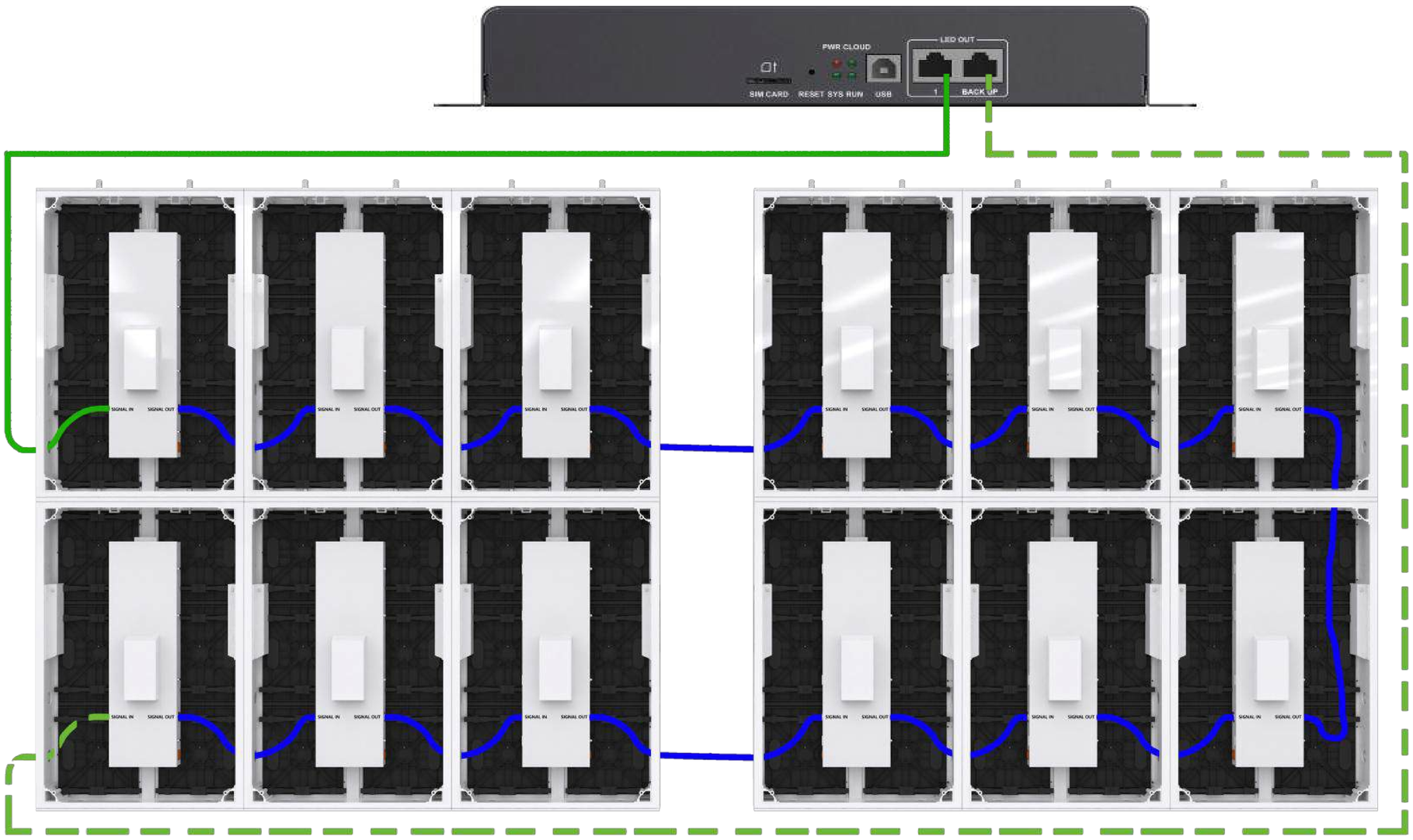
Side A

Side B

11.1.2 Diagram B:Single-sided display, 1 row of LED panels

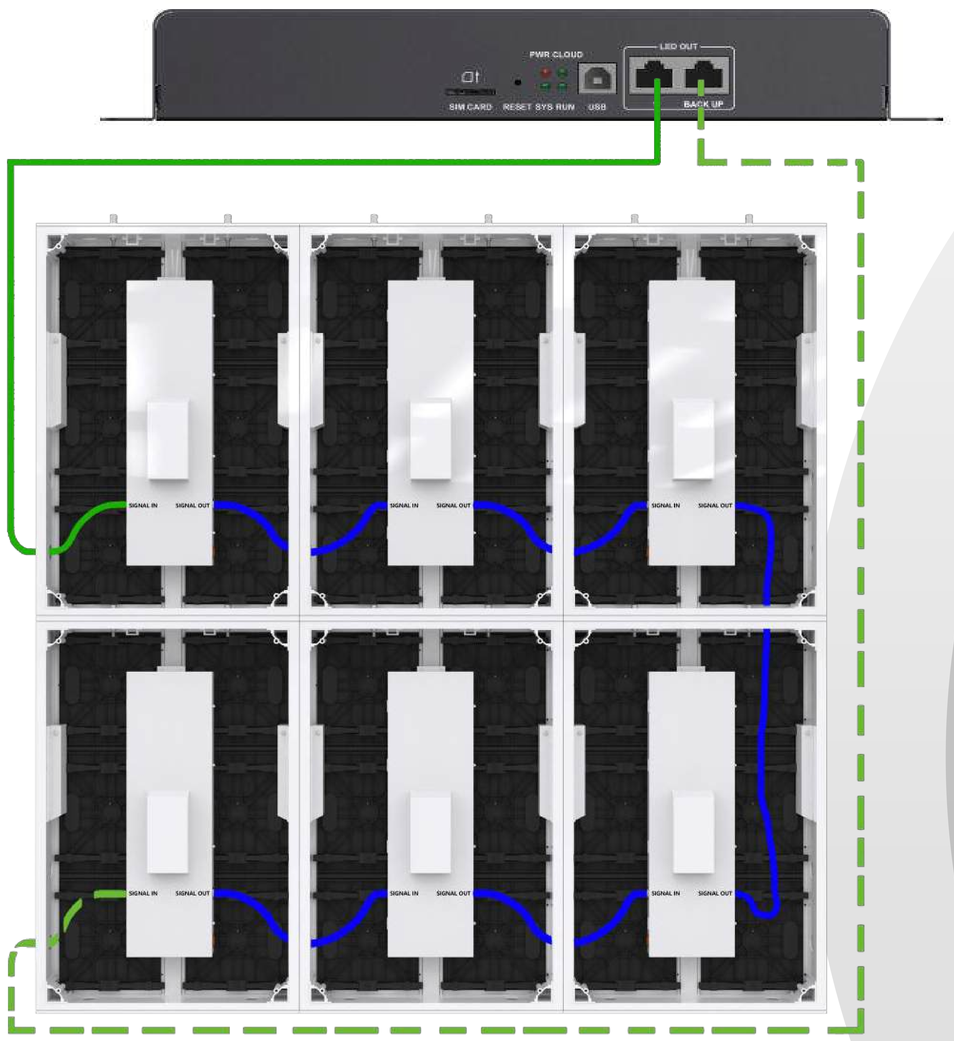


11.1.3 Diagram C: Double-sided display, 2 rows of LED panels

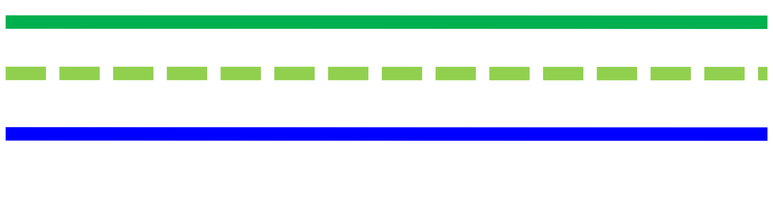


Side A Side B

11.1.4 Diagram D: Single-sided display, 2 rows of LED panels

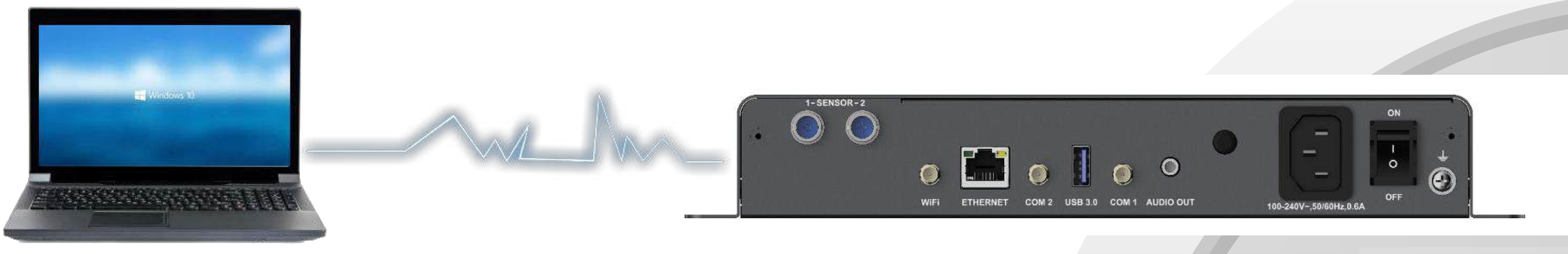


Primary long signal cable
Back-up long signal cable
Short signal cable between panels



11.1.5 How the signal cables are connected on the LED panel:

11.2 Connection Between Controller and Laptop



Option 1: Use an Ethernet cable to connect. Plug one end of the Ethernet cable into the laptop's Ethernet port and the other end into the TB30's Ethernet port marked as “Ethernet”.

Option 2: Use a USB cable to connect. Plug one end of the USB cable into the laptop's USB port and the other end into the TB30's USB port.

Option 3: AP mode. The TB30 will create a Wi-Fi network with a name starting with "AP" Connect your laptop to this Wi-Fi network. Note that the distance between the laptop and TB30 should not exceed 300 feet.

11.3 How to Get TB30 Online for Using Cloud

Option 1: Wi-Fi Station mode
Connect the TB30 with the Wi-Fi network from a nearby router. Note that the distance between the router and TB30 should not exceed 300 feet.

If a router is unavailable, you have the option to use a 4G router with a SIM card inserted, which will generate a Wi-Fi network for the TB30.

Option 2: 4G Module
You can install a Novastar 4G module with a SIM card inserted inside the TB30, enabling the TB30 to access data from the SIM card.

Option 3: Ethernet Cable
You can connect an Ethernet cable from a nearby router to the TB30. The Ethernet port on the TB30 is labeled as “Ethernet”.

Option 4: Optical Fiber
You can connect optical fiber between the TB30 and a router far away. Optical fiber converter set is required.

11.4 Software/Website

NovaLCT: Software for configuring the LED display, adjusting parameters, adjusting brightness, etc. It can only be installed on Windows PC/Laptop.

ViPlex: Software for publishing contents to the LED display. “ViPlex Express” is the version for Windows PC/Laptop, “ViPlex Handy” is the version for mobile devices which include android and iOS phones/tablets.

Vnnox: The Novastar cloud platform for publishing contents to the LED display.

All above software can be downloaded from Novastar website. Novastar regularly releases software updates, please ensure you are using the latest software version at all times.

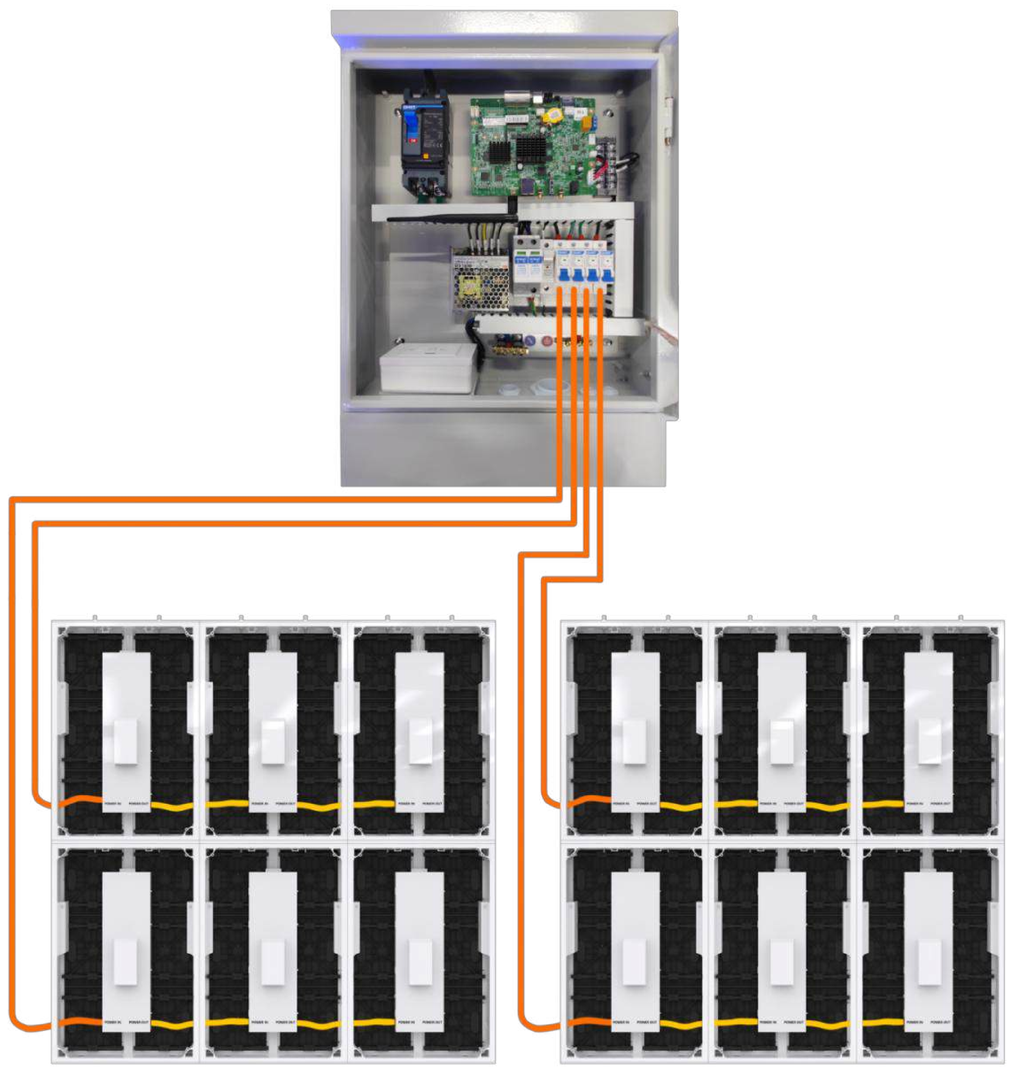
UNITED SIGNS can provide comprehensive user manuals for Novastar T30/TB30 and all associated software upon request.
Alternatively, you can download them from the Novastar website.

Novastar website: www.novastar.tech

* The T30/TB30 controller has a maximum resolution capacity of 650,000 pixels, with a width limit of 4,096 pixels and a height limit of 4,096 pixels. If you require a controller with different specifications, please reach out to UNITED SIGNS for assistance.

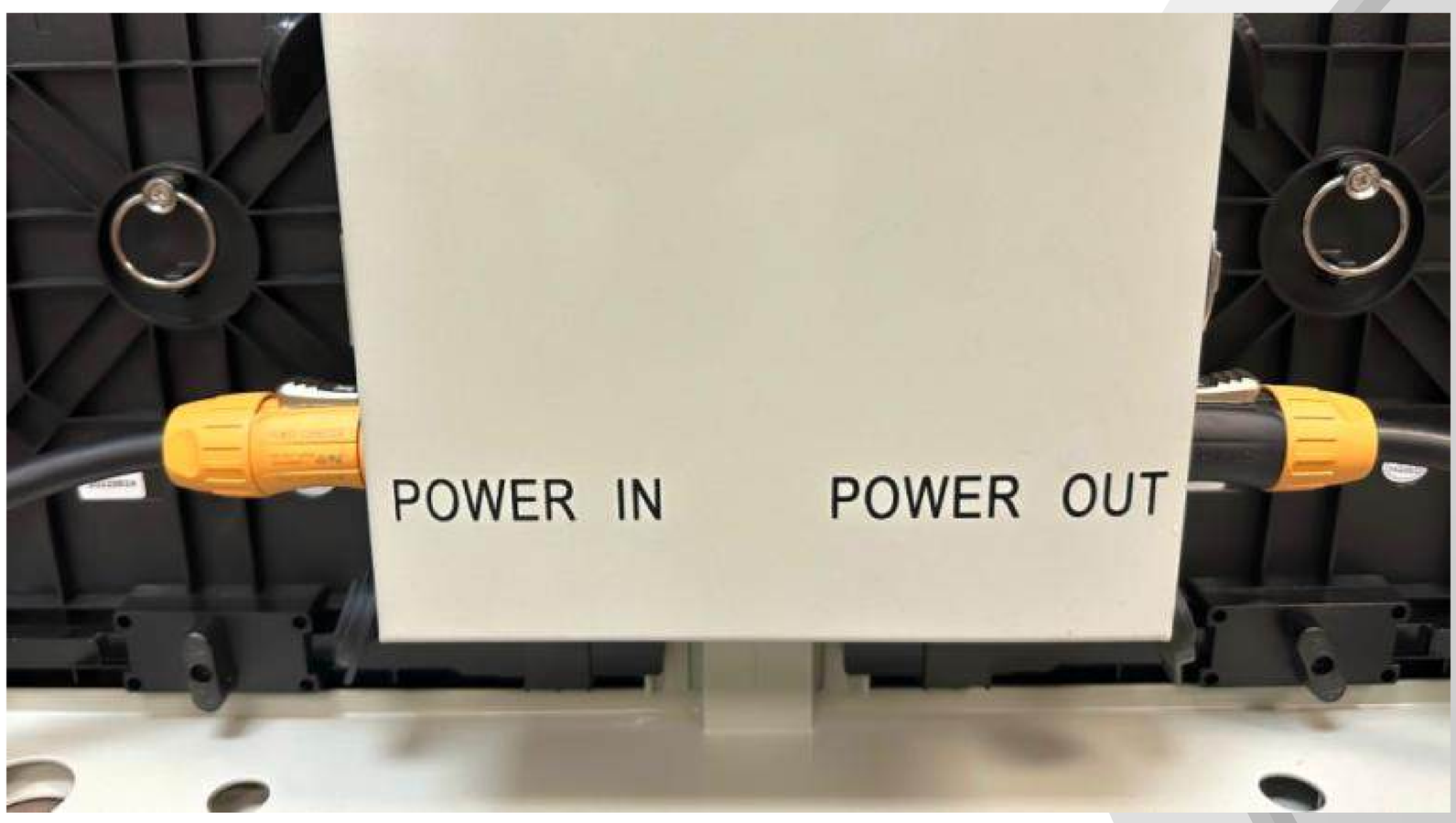
12. Power Connection

12.1 Power Cable Connection Between Controller and LED Panels



Long power cable
Short power cable between panels

12.2 How the power cables are connected on the LED panel:

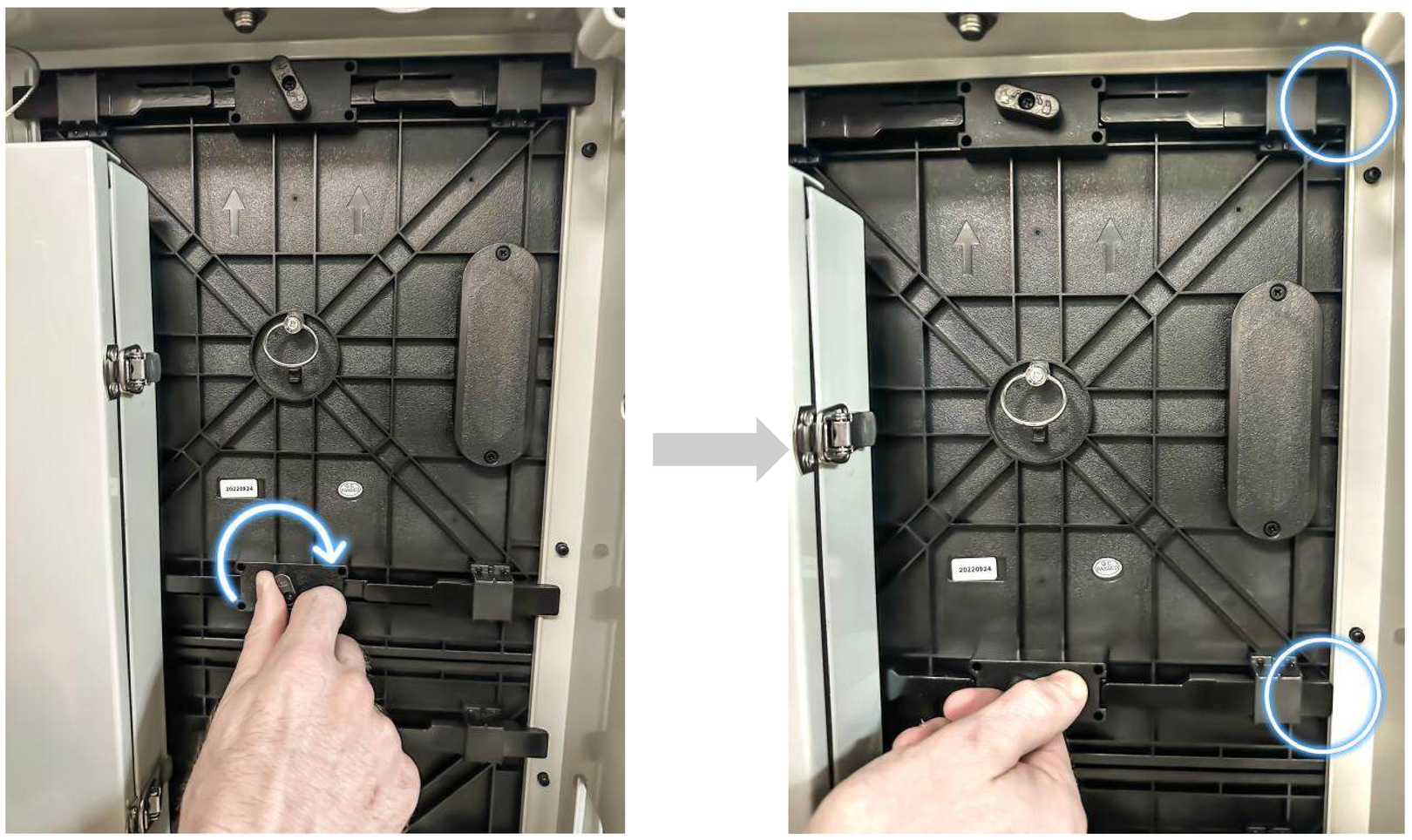


13.Panel Maintenance

13.1 Rear Service

13.1.1 Removing the modules

Step 1: On the back of each module, you will find two knobs. Rotate the knob to the right to unlock the latch.



Turn the knob to the right　　Unlocked

Step 2: Carefully push the module forward, and then disconnect both the power cable and the signal cable from the module. Exercise caution and ensure a secure grip on the module before disconnecting all cables to prevent accidental dropping.

13.1.2 Remove receiving card, HUB card, power supply

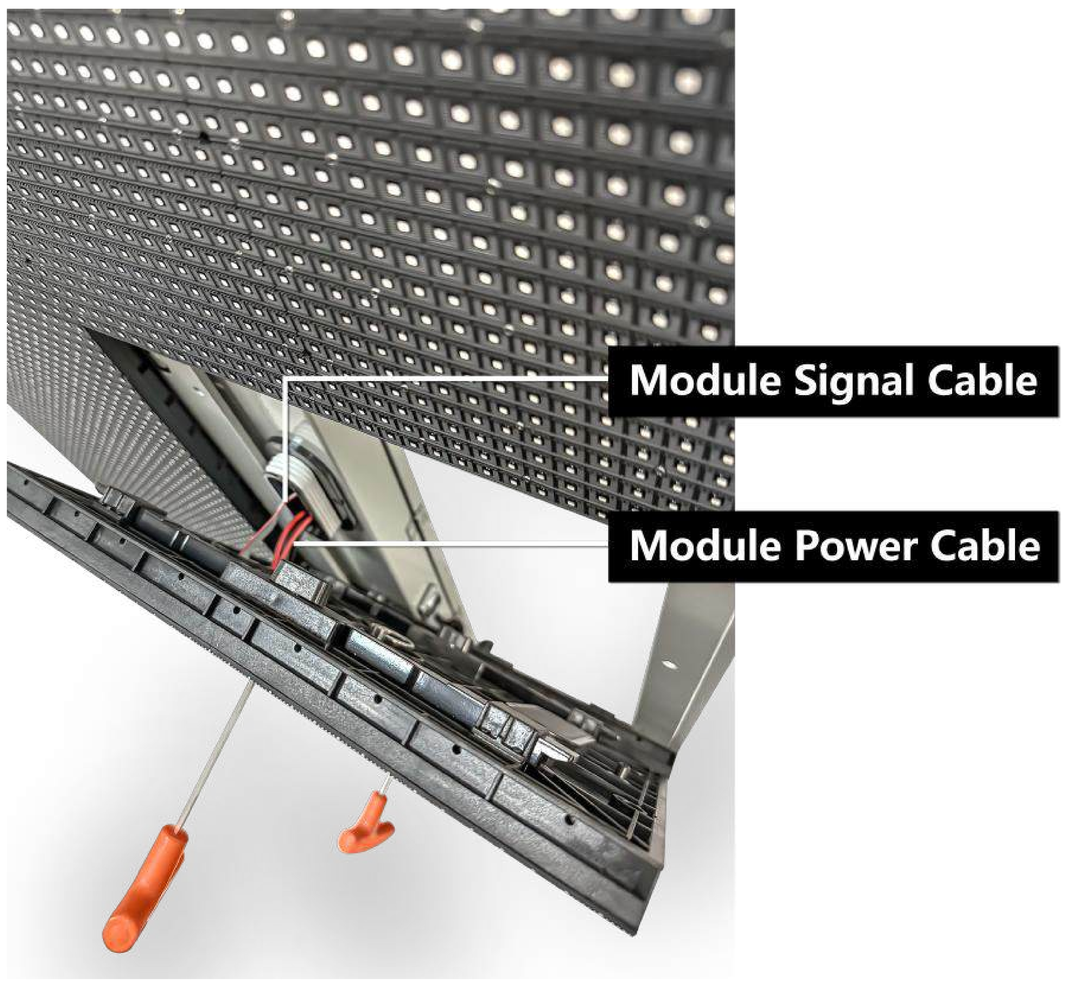
Unlock these four latches on the rear panel box to gain access to all the components inside.

13.2 Front Service

13.2.1 Removing the modules

Step 1: Each module has a total of four holes in the middle position from top to bottom. The two holes at the very top and the very bottom correspond to the locks at the back of the module. Insert two front maintenance tools into these two holes and turn them to the left to unlock the module's rear lock latch.

Step 2: Simultaneously pull outward with the two front maintenance tools to pull the module out, then disconnect both the power cable and the signal cable from the module. Exercise caution and ensure a secure grip on the module before disconnecting all cables to prevent accidental dropping.



13.2 Front Service

13.2.2 Remove the rear panel box

Step 1: Remove all modules connected with the rear panel box.
Step 2: Loosen all four screws that secure the rear panel box to the panel frame

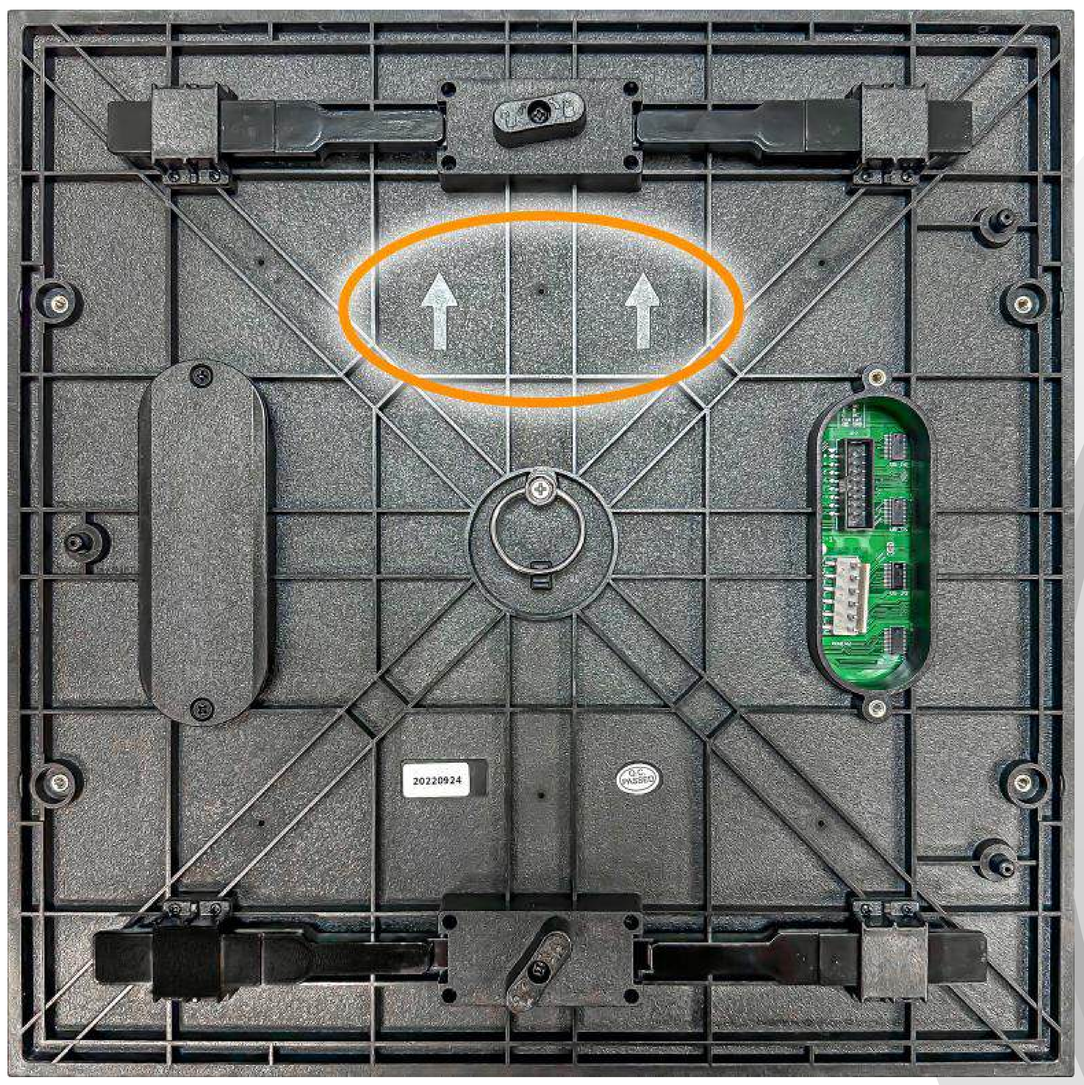
Note: The two screws at the top are secured to the power box. Therefore, these screws only need to be loosened enough to allow the power box to move upwards. Do not loosen them too much, or the screws may fall out

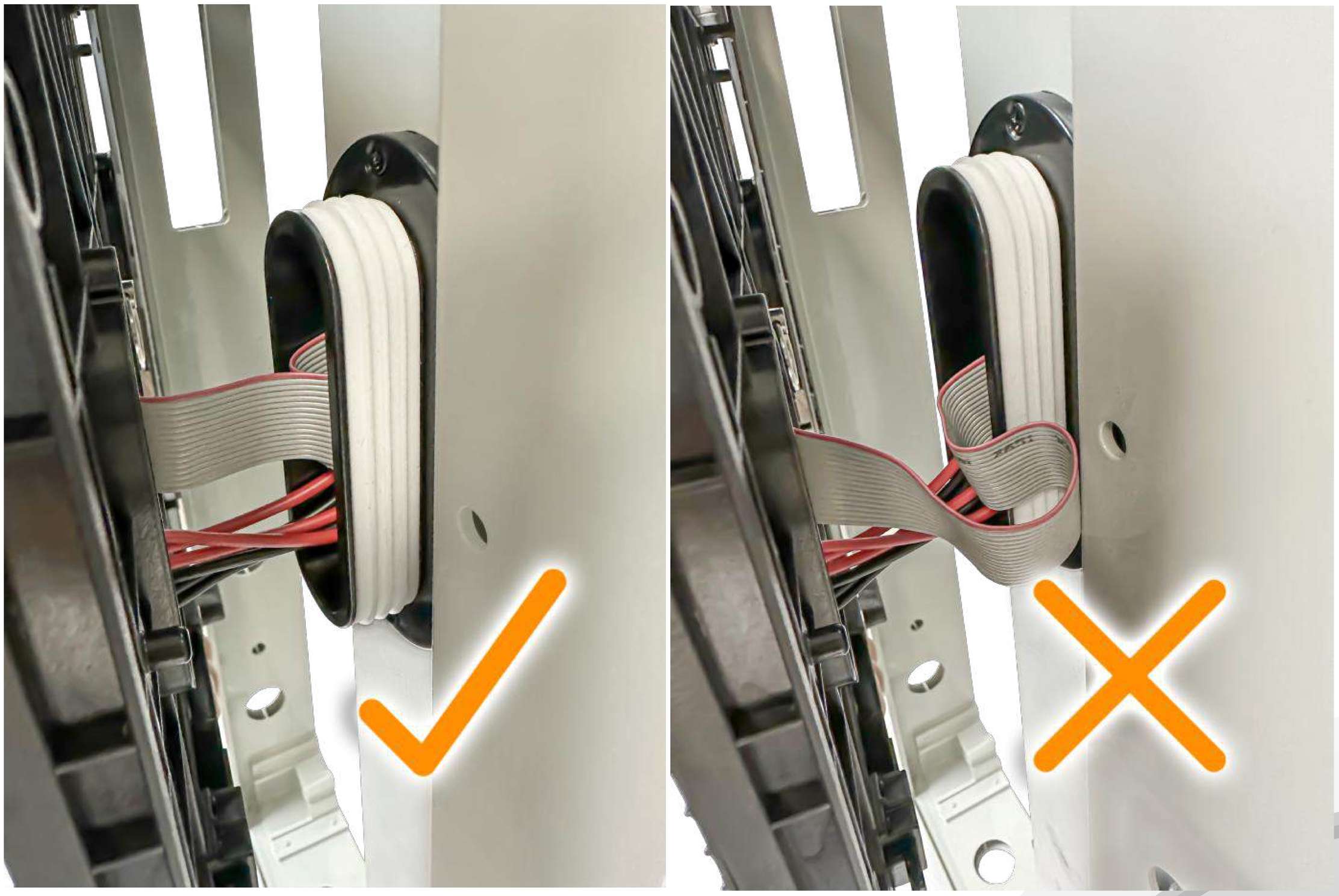



Note: The power box is equipped with a safety rope at the top to prevent the power box from falling off the enclosure after all screws have been loosened.

Note: After removing the power box, open it to maintain the power supply, receiver card, HUB card, and other components inside.

Note: When reinstalling the module, please pay attention to the direction of the module, and make sure that both the power cable and signal cable of the module are passed through the cable entry hole.





Thank You