Orchestrating a brighter world

NEC

# NEC FE Series

# LED Wall Bundle

Fine Pitch LED Video Display Indoor

## USER GUIDE

For models:

LED-FE012i2-110
LED-FE019i2-110
LED-FE015i2-137
LED-FE019i2-165
LED-FE012i2-220
LED-FE025i2-220
LED-FE038i2-220
LED-FE009i2
LED-FE031i2
LED-FE012i2-E
LED-FE015i2-E
LED-FE019i2-E

2021-12-09

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# 1 ABOUT THIS USER GUIDE

Dear customer,

Thank you for choosing one of Sharp NEC DISPLAY SOLUTIONS' fine pitch direct view LED display systems.

In this NEC FE Series User Manual, you will be supplied with detailed information about your display and how to install, maintain and service it.

We hope your experience with our product meets or exceeds your expectations. Please contact us if you have any questions.

## 1.1 Safety Symbols Used in this Manual

Safety instructions emphasize potential hazards for personal injury or property damage. This manual uses the following safety notices to indicate the severity of a potential hazard:

| | |
|---|---|
|  | **⚠ WARNING!** |
| | A warning for a potentially hazardous situation that can result in death, personal injury, or property damage if not adhered to. |

| | |
|---|---|
|  | **⚠ Caution!** |
| | A recommendation for a potentially hazardous situation that may result in personal injury or property damage if not adhered to. |

| **Notice** |
|---|
| A recommendation for a potentially hazardous situation that may result in property damage if not adhered to. |

## 1.2 Service & Support in Europe

In case of questions feel free to contact us at the following address:

Sharp NEC Display Solutions Europe GmbH
Landshuter Allee 12–14
80637 Munich – Germany

Phone: +49 89 99 699 607
Fax: +49 89 99 699 500
E-Mail: LED-support@nec-displays.com

For the latest information please see
https://www.sharpnecdisplays.eu

Data is subject to change without notice.

# 2 SAFETY AND COMPLIANCE GUIDELINES

- Read the instruction manuals carefully and follow the given instructions and safety information thoroughly.
- The operating safety of the system is only ensured through its proper use.
- Only operate the system with supplied accessories and tools.

## 2.1 Qualification of Personnel

Only authorized and qualified technical personnel can perform the installation. Before the installation, the installation technician must be convinced of the completeness of the scope of supply including the required accessories. The technician may only use the prescribed network cables, please see the cabling in this manual.

There must be a security officer who is responsible for the security at diverse tasks during the installation.

Only personal qualified by Sharp NEC DISPLAY SOLUTIONS and/or respectively authorized personal may carry out repairs, service and maintenance work on the system. A case of service occurs as soon as one component is damaged in any way, is not fully functional any more.

Only trained personnel, such as electricians or NEC personnel, may connect the internal power supply to mains power supply.

## 2.2 Personal Protection

| | |
|---|---|
|  | **⚠ WARNING!** |
| | Electric shock hazards.<br>Follow the relevant legal electric requirements of the country, where the system will be mounted, installed and operated, as well as the existing regulations of the operator, such as work, operating and safety regulations. |

| | |
|---|---|
|  | **⚠ WARNING!** |
| | Suspended loads can cause severe head injuries.<br>Wear safety helmets when working with suspended loads. |

| | | |
|---|---|---|
|  | **⚠ Caution!** |  |
| | Risk of crushing and product damage due to heavy weight of the product.<br>• When assembling heavy objects, take great care to avoid crushing hands or limbs.<br>• Treat the cabinets with great care while lifting, placing or transporting them to avoid injuries and damages at the cases or LED pixel cards. | |

## 2.3 General Safety Guidelines

**⚠ WARNING!**

Risk of electric shock or fire due to high-voltage components.
- Do not expose this unit to rain or moisture.
- Do not submerge this unit partially, or completely in water, or liquids.
- Do not use this unit's polarized plug with an extension cord receptacle or other outlets unless the prongs can be fully inserted.
- Do not open the cabinet because of the high-voltage components inside. There are no user-serviceable parts are inside.
- Only qualified service personnel are allowed to service and open the unit.

**⚠ Caution!**

Risk of electric shock.
- If not in use, fully disengage the power to the unit by disconnecting the power cord from the AC outlet.
- Do not use damaged cables. Check cables regularly. Replace damaged cables immediately, they are not user-serviceable.

**⚠ Caution!**

Risk of fire and product damage by aggressive substances.
Keep the system away from aggressive substances, inflammable gases and vapors.

**⚠ Caution!**

Risk of fire, injuries and product damage.
- Keep the system away from flammable material.
- Never block the air ventilation spaces around the LED Wall. Keep them free at all times.
- Only use the supplied cables, which are fit for the system and its components.

**⚠ Caution!**

Risk of crushing and product damage due to heavy weight of the product.
The cabinets are top-heavy. Never leave them standing freely. Always use the mounting arrangement.

**⚠ Caution!**

Risk of product damage due to dusty environment.
Do not install or operate the system in a dusty environment.

**⚠ Caution!**

Risk of product damage by moisture or water.
Do not clean the system with water. Do not wipe the LED Pixel Cards with a damp cloth.

**Attention!**

The installation should be performed only after you are thoroughly familiar with all of the proper installation instructions and safety checks. This manual contains fundamental information that should be observed in connection with the installation, start-up, operation and maintenance of the LED video display. Neglect or not following these instructions will increase the risk of hazards and injury to the user.

Before work on the system, the power must be disconnected, and the system must be checked for absence of power and secured against further connection of power.

Clean the unit only with materials or chemicals that are inert, nonabrasive, noncorrosive and non-marking. Consult the manufacturer for further advice should any doubts exist regarding any cleaning procedure.

### 2.3.1 Ambient Temperature

The ambient temperature of the FE Series is maximum +40°C and minimum -20°C.

To avoid damage of the LED wall by over-heating, do not exceed the ambient temperature.

### 2.3.2 Risk of Fire

Keep flammable materials away from the installation. During operation a lot of energy is transferred into heat. The installation should be placed so that the amount of air flow required for safe operation of the equipment is not compromised.

Proper ventilation must be provided. Never block the air ventilation holes. Keep them free at all times.

To protect the power cable against overload maximum 10 cabinets shall be wired in a row at 100 V AC or 20 modules at 240 V AC. The total load must not exceed 16 A per cable.

To avoid risk of fire due to overheating of the cables, only use the supplied cables that are meant for the system and its components. Damaged cables must be replaced by new cables. The cables are not user serviceable.

## 2.4 Safety for Electricity and Power Supply

The electrical systems and their components are **not** to be opened. The parts inside modules, which are **not user-serviceable,** hold high voltages, including when these components are **not** in-use for a long time. Accessing these components may lead to serious injury, or property damage.

**Only authorized and qualified personnel may open the system and its components!** All repairs to the system may only be carried out by Sharp NEC DISPLAY SOLUTIONS and/or by respectively authorized and qualified technical personnel.

Power cables and connectors are especially designed to be used indoor according to protection class IP20. Only use the supplied cables and plugs. The usage of other manufacturers can cause property damage.

This equipment is designed to be used in the condition of the power cord connected to earth. If the power cord is not connected to the earth, it may cause electric shock. Make sure the power cord is earthed properly.

**⚠ WARNING!**

Risk of electric shock and property damage.
Ensure the system is properly grounded.

|  | **Caution!** |
|---|---|
| | Risk of overload of the power cable.<br>To protect the power cable against overload maximum 10 cabinets shall be wired in a row at 100 V AC or 20 modules at 240 V AC. The total load must not exceed 16 A per cable. |

- The limit values specified in the technical data must never be exceeded.
- Only operate the system with supplied accessories (cables, power distribution, assist grip, transport carts). However, a power cord to supply power is not included (see 3.1 Scope of Delivery).
- Do not operate or touch the system with wet hands.
- Use the provided transition ramps (cable channels). Protect the cable against kinks and sharp edges.

| **Notice** |
|---|
| Use a TN-S power distribution system with a separate neutral and grounding conductor. Due to voltage differences in the neutral conductor, large ground current loops can be avoided therewith.<br>The complete electrical system should be protected by an appropriately rated disconnect switch, circuit breakers, over voltage protector and Ground Fault Current Interrupters.<br>The power system needs to be installed according to the local electrical installation codes. For Europe, installations have to be conform to DIN-EN 60364 – the standard for electrical installation of buildings, (and related harmonized Norms). In Germany, the VDE 0100 should be followed and adhered to. |

## 2.5 Declaration of Conformity

- CE
- FCC
- RoHS
- AEEE Yönetmeliğine Uygundur
- Electromagnetic Compatibility Directive (EMC) 2014/30/EU
- Low Voltage Directive 2014/35/EU
- ETL

**CE Information**

**⚠ WARNING!**

This equipment is compliant with Class A of CISPR 32.
In a residential environment this equipment may cause radio interference.

**FCC Information (for USA only)**

**⚠ WARNING!**

- The Federal Communications Commission does not allow any modification or changes to the unit EXCEPT those specified by NEC Display Solutions of America, Inc. in this manual. Failure to comply with this government regulation could void your right to operate this equipment.
- 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.

## Supplier's Declaration of Conformity (for USA only)

This device complies with Part 15 of 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.

| | |
|---|---|
| U.S. Responsible Party: | NEC Display Solutions of America, Inc. |
| Address: | 3250 Lacey Rd, Ste 500<br>Downers Grove, IL 60515 |
| Telephone Number: | 630-467-3000 |
| Type of Product | LED MODULE |
| Equipment Classification: | Class A Peripheral |
| Model Number: | LED-FE012i2 LED-FE015i2 LED-FE019i2<br>LED-FE025i2 LED-FE031i2 LED-FE038i2<br>LED-FE009i2 |

If necessary, the user should contact the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the U.S. Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-0034.

# 3 ABOUT THIS PRODUCT

The LED Wall is a high definition LED display product in 16:9 ratio with a high contrast ratio and refresh rate.

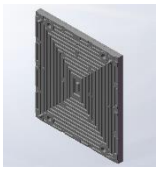
The LED Wall consists of single LED modules, which are interconnected and centrally controlled. The quantity of the modules depends on the size of your LED Wall.

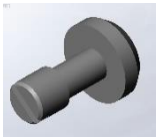
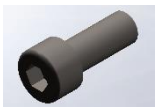
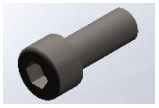
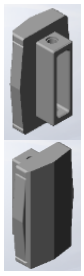
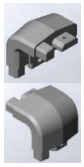
## 3.1 Scope of Delivery

- FE Series Bundle
  (LED-FE012i2-110, LED-FE019i2-110, LED-FE015i2-137, LED-FE019i2-165, LED-FE012i2-220, LED-FE025i2-220, LED-FE038i2-220, LED-FE012i2-E, LED-FE015i2-E, LED-FE019i2-E)
- User Guide
- NovaLCT manual: Download the current version at http://www.novastar.tech/download/download-software/
- NovaStar Controller MCTRL660 PRO / NovaStar Controller MCTRL4K
- Spare Parts Set
- White ESD gloves
- Internal power cables
- Internal data cables
- External data cable: LED Wall to NovaStar Controller, 20 m (FTP Cat5e)
- USB flash drive with NovaLCT software, User guide, service data (for Receiving cards), RCFGX-File (for Receiving cards)

## 3.2 List of Parts

*Table 1: Materials and Parts Delivered for Each Bundle*

| Pos | Item | Specification | Qty 4×4 | Qty 5×5 | Qty 6×6 | Qty 8×8 | Photo |
|---|---|---|---|---|---|---|---|
| 1 | Pixel card pitch 1.2, 1.5, 1.9, 3.8 | 152×171×10 mm | 128 | 200 | 288 | 512 |  |
| | Pixel card pitch 2.5 | 152×342×10 mm | – | – | – | 256 |  |
| 2 | Cabinet Type A (all rows except top row) | 608×342×39 mm | 12 | 20 | 30 | 56 |  |
| | Cabinet Type B (only top row) | 608×342×39 mm | 4 | 5 | 6 | 8 |  |

| Pos | Item | Specification | Qty 4×4 | Qty 5×5 | Qty 6×6 | Qty 8×8 | Photo |
|---|---|---|---|---|---|---|---|
| 3 | Cabinet hanger pin | Head diameter 15 mm, thickness 5 mm, M8 external dental pattern, axis length 17 mm, stainless steel color | 16 | 24 | 36 | 96 |  |
| 4 | Power bar cover plate | | 1 | 1 | 1 | 2 | |
| 5 | Power bar screw (M8×20) | Hexagon socket head screw | 8 | 10 | 12 | 24 |  |
| 6 | Power bar | | 1 | 1 | 1 | 2 | |
| | Bottom frame connecting part | | – | – | – | 1 | |
| 7 | Screw for corner frame bottom (M6×12) | Hexagon socket head screw | 2 | 2 | 2 | 2 |  |
| 8 / 9 | Corner frame bottom (left, right) | | 2 | 2 | 2 | 2 |  |
| 10 | Overframe (left, right) | | 2 | 2 | 2 | 2 | |
| 11 | Mounting bar | | 3 | 4 | 5 | 6 | |
| 12 / 13 | Corner frame top (left, right) | | 2 | 2 | 2 | 2 |  |
| 14 | Overframe (top) | | 1 | 1 | 1 | 2 | |
| 15/ 16 | Screw for overframe (M8×16) | Hexagon socket head screw | 10 | 12 | 12 | 14 |  |
| 17 | Screw for cabinet (to Power bar) (M8×16) | Hexagon socket head screw | 8 | 10 | 12 | 16 |  |
| | Adjustment plate | | 10 | 12 | 14 | 18 | |
| | Screw for connecting cabinets (M8×25) | Hexagon socket head screw | 48 | 80 | 120 | 224 | |
| | LAN cable between LED controller and module | | 12 | 20 | 30 | 56 | |

## 3.3 Framesets for Bundles

This chapter contains an overview for the setup of the wall frame for either 4×4, 5×5, 6×6 or 8×8 modules. Table 2 gives relevant information for each bundle size.

*Table 2: FE Series Bundles*

| | 4 × 4 Modules | 5 × 5 Modules | 6 × 6 Modules | 8 × 8 Modules |
|---|---|---|---|---|
| **Bundle models** | LED-FE012i2-110<br>LED-FE019i2-110 | LED-FE015i2-137 | LED-FE019i2-165 | LED-FE012i2-220<br>LED-FE025i2-220<br>LED-FE038i2-220 |
| **Display size (inch/cm)** | 110 / 279 | 137 / 348 | 165 / 419 | 220 / 559 |
| **Dimensions incl. frame (W × H)** | 2472×1488 mm | 3080×1830 mm | 3688×2172 mm | 4904×2856 mm |
| **Weight** | 182 kg | 279 kg | 391 kg | 659 kg |

See section 3.2 List of Parts for complete list of parts, names and quantities. The positions given in the following illustration refer to the List of Parts.

### 3.3.1 Frameset for LED-FE012i2-110 and LED-FE019i2-110 (4×4 Modules)

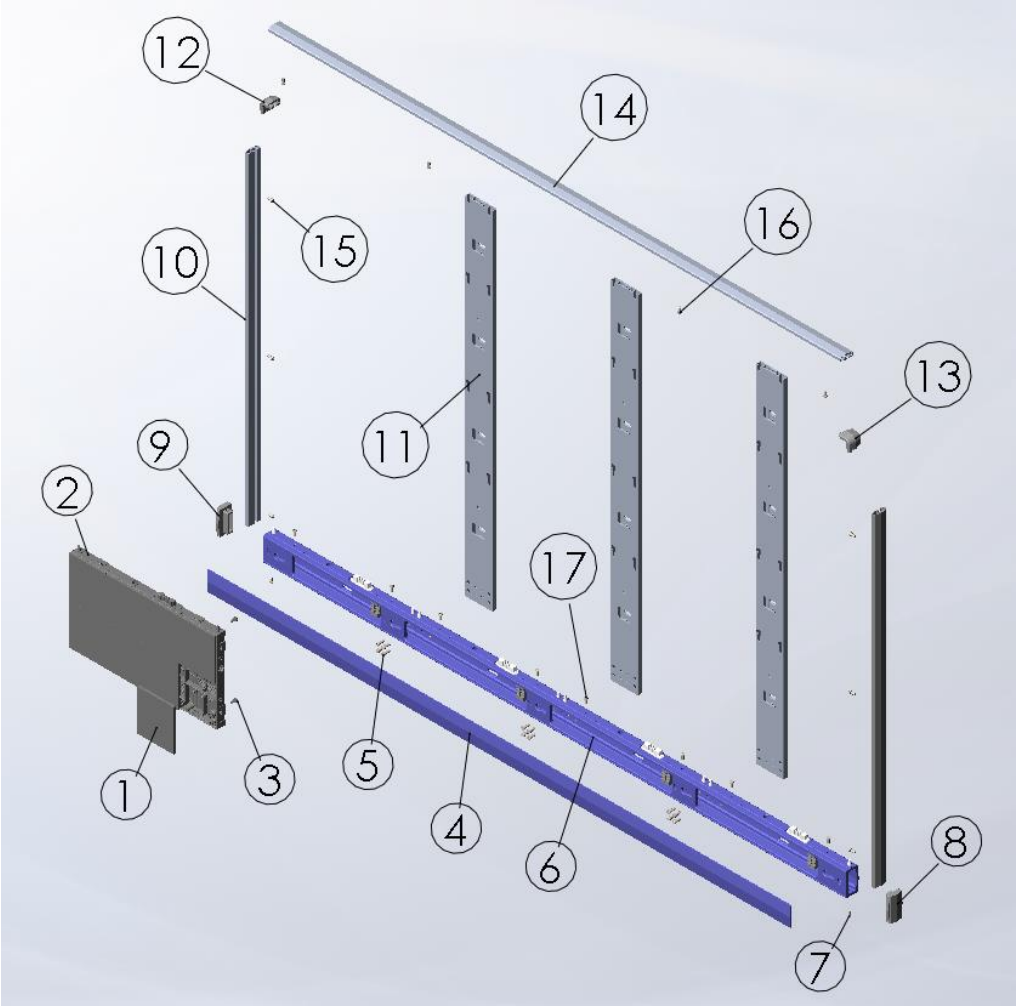



*Figure 1: Frameset for LED-FE012i2-110 and LED-FE019i2-110 (4×4 Modules)*

### 3.3.2 Frameset for LED-FE015i2-137 (5×5 Modules)

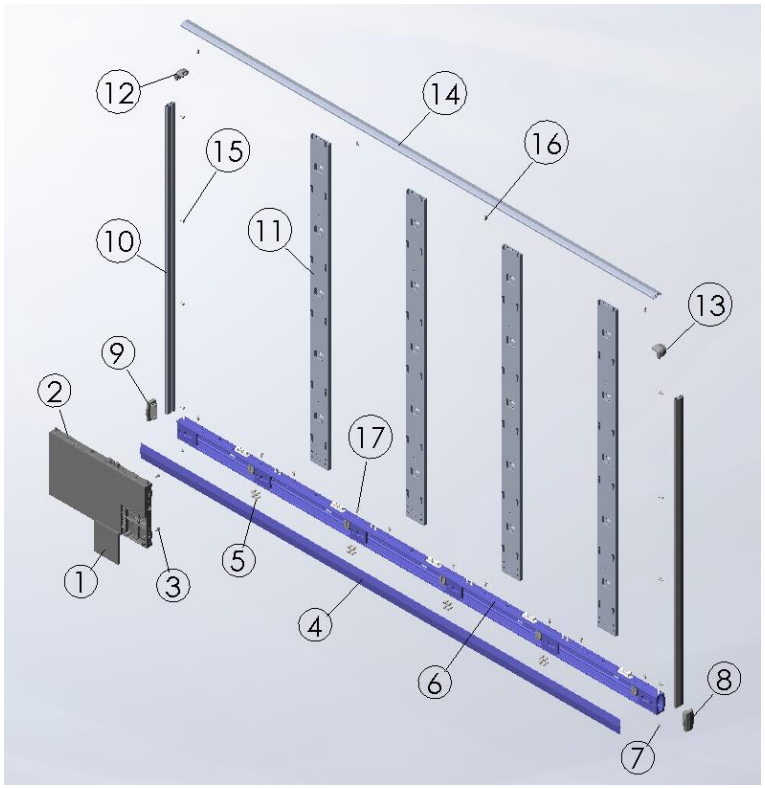



*Figure 2: Frameset for LED-FE015i2-137 (5×5 Modules)*

### 3.3.3 Frameset for LED-FE019i2-165 (6×6 Modules)

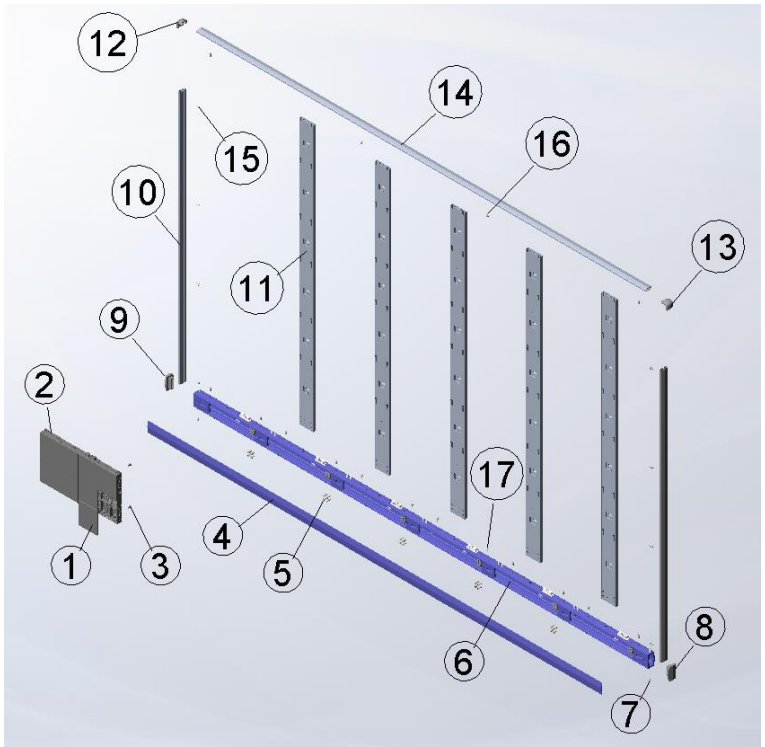



*Figure 3: Frameset for LED-FE019i2-165 (6×6 Modules)*

### 3.3.4 Frameset for LED-FE012i2-220 and LED-FE025i2-220, LED-FE038i2-220 (8×8 Modules)

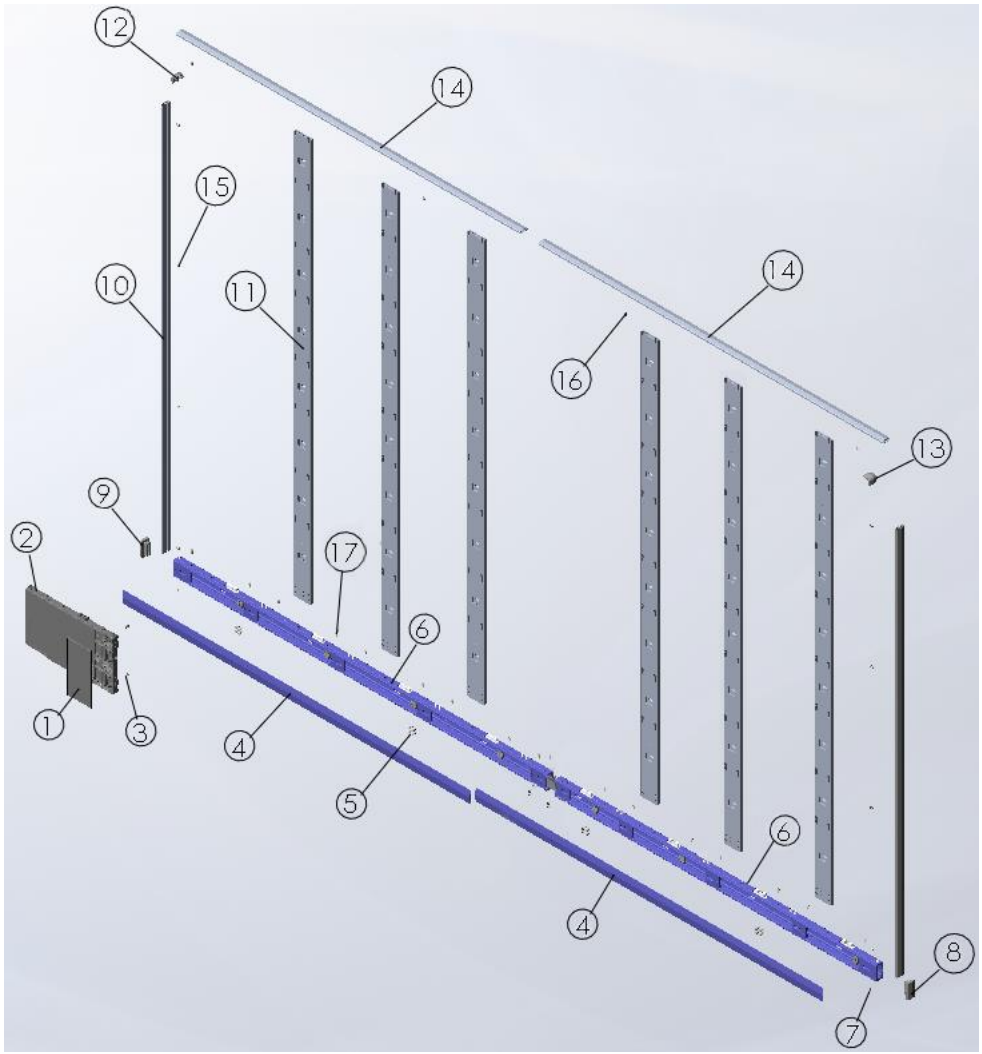



*Figure 4: Frameset for LED-FE012i2-220 and LED-FE025i2-220, LED-FE038i2-220 (8×8 Modules)*

## 3.4 Specification

*Table 3: Product Specification for Modules*

| Module model | | LED-FE012i2 | LED-FE015i2 | LED-FE019i2 |
|---|---|---|---|---|
| **LED & Pixel Card** | | | | |
| **LED configuration** | | 3in1 SMD | | |
| **Pixel pitch** | | 1.266 mm | 1.583 mm | 1.90 mm |
| **Pixels (W × H)** | | 120 × 135 | 96 × 108 | 80 × 90 |
| **Pixel card size** | | 152 × 171 ×10 mm | | |
| **Module** | | | | |
| **Pixel card configuration** | | 4 × 2 | | |
| **Resolution (W x H)** | | 480 × 270 | 384 × 216 | 320 × 180 |
| **Module area** | | 0.21 m² | | |
| **Module size (W × H × D)** | | 608 × 342 × 49 mm | | |
| **Net weight** | | 8.8 kg | | |
| **Power** | | AC 100 V to AC 240 V, 50 Hz / 60 Hz | | |
| **Type of protection** | | Front IP20 / Rear IP20 | | |
| **Service availability** | | Front service | | |
| **Displays** | | | | |
| **Power max. \| average** | | 600 W/m², 125 W/module \| 315 W/m², 66 W/module | 600 W/m², 125 W/module \| 280 W/m², 57 W/module | |
| **Viewing angle** | HOR.(L/R) | 80° / 80° | | |
| | VER.(U/L) | 80° / 80° | | |
| **Brightness** | | 700 cd/m² | | |
| **Brightness tolerance** | | ±10% | | |
| **Contrast ratio** | | 4000:1 | | |
| **Operating temperature** | | -20 °C to +40 °C | | |
| **Operating humidity** | | 10% to 80% relative humidity, non-condensing | | |
| **Strage temperature** | | -20 °C to +45 °C | | |
| **Strage humidity** | | 10% to 85 % relative humidity, non-condensing | | |
| **LED Lifetime (50% brightness)** | | 100,000 hours | | |
| **Color processing** | | 16 bit | | |
| **Refresh rate** | | up to 3840 Hz | | |
| **Frame rate** | | 50/60 Hz | | |
| **Brightness level** | | manually and automatically 256 levels (8 bit) | | |
| **Color temperature** | | 3000K to 9500K (default:6500K) | | |

| Module model | | LED-FE025i2 | LED-FE031i2 | LED-FE038i2 |
|---|---|---|---|---|
| **LED & Pixel Card** | | | | |
| **LED configuration** | | 3in1 SMD | | |
| **Pixel pitch** | | 2.533 mm | 3.167 mm | 3.800 mm |
| **Pixels (W × H)** | | 60 × 135 | 48 × 54 | 40 × 45 |
| **Pixel card size** | | 152 × 342 ×10 mm | 152 × 171 ×10 mm | |
| **Module** | | | | |
| **Pixel card configuration** | | 4 × 1 | 4 × 2 | |
| **Resolution (W x H)** | | 240 × 135 | 192 × 108 | 160 × 90 |
| **Module area** | | 0.21 m² | | |
| **Module size (W × H × D)** | | 608 × 342 × 49 mm | | |
| **Net weight** | | 8.8 kg | | |
| **Power** | | AC 100 V to AC 240 V, 50 Hz / 60 Hz | | |
| **Type of protection** | | Front IP20 / Rear IP20 | | |
| **Service availability** | | Front service | | |
| **Displays** | | | | |
| **Power max. \| average** | | 580 W/m², 120 W/module \| 230 W/m², 47 W/module | | |
| **Viewing angle** | HOR.(L/R) | 80° / 80° | | |
| | VER.(U/L) | 70° / 70° | | |
| **Brightness** | | 1000 cd/m² | | |
| **Brightness tolerance** | | ±10% | | |
| **Contrast ratio** | | 5000:1 | | |
| **Operating temperature** | | -20 °C to +40 °C | | |
| **Operating humidity** | | 10% to 80% relative humidity, non-condensing | | |
| **Strage temperature** | | -20 °C to +45 °C | | |
| **Strage humidity** | | 10% to 85 % relative humidity, non-condensing | | |
| **LED Lifetime (50% brightness)** | | 100,000 hours | | |
| **Color processing** | | 16 bit | | |
| **Refresh rate** | | up to 3840 Hz | | |
| **Frame rate** | | 50/60 Hz | | |
| **Brightness level** | | manually and automatically 256 levels (8 bit) | | |
| **Color temperature** | | 3000K to 9500K (default:6500K) | | |

| Module model | | LED-FE009i2 |
|---|---|---|
| **LED & Pixel Card** | | |
| **LED configuration** | | 4in1 SMD |
| **Pixel pitch** | | 0.95 mm |
| **Pixels (W × H)** | | 160 × 180 |
| **Pixel card size** | | 152 × 171 ×10 mm |
| **Module** | | |
| **Pixel card configuration** | | 4 × 2 |
| **Resolution (W x H)** | | 640 × 360 |
| **Module area** | | 0.21 m² |
| **Module size (W × H × D)** | | 608 × 342 × 49 mm |
| **Net weight** | | 8.8 kg |
| **Power** | | AC 100 V to AC 240 V, 50 Hz / 60 Hz |
| **Type of protection** | | Front IP20 / Rear IP20 |
| **Service availability** | | Front service |
| **Displays** | | |
| **Power max. \| average** | | 720 W/m², 150 W/module \| 380 W/m², 80 W/module |
| **Viewing angle** | HOR.(L/R) | 70° / 70° |
| | VER.(U/L) | 70° / 70° |
| **Brightness** | | 600 cd/m² |
| **Brightness tolerance** | | ±10% |
| **Contrast ratio** | | 5000:1 |
| **Operating temperature** | | -20 °C to +40 °C |
| **Operating humidity** | | 10% to 80% relative humidity, non-condensing |
| **Strage temperature** | | -20 °C to +45 °C |
| **Strage humidity** | | 10% to 85 % relative humidity, non-condensing |
| **LED Lifetime (50% brightness)** | | 100,000 hours |
| **Color processing** | | 16 bit |
| **Refresh rate** | | up to 3840 Hz |
| **Frame rate** | | 50/60 Hz |
| **Brightness level** | | manually and automatically 256 levels (8 bit) |
| **Color temperature** | | 3000K to 9500K (default:6500K) |

| Module model | | LED-FE012i2-E | LED-FE015i2-E | LED-FE019i2-E |
|---|---|---|---|---|
| **LED & Pixel Card** | | | | |
| **LED configuration** | | 3in1 SMD | | |
| **Pixel pitch** | | 1.266 mm | 1.583 mm | 1.90 mm |
| **Pixels (W × H)** | | 120 × 135 | 96 × 108 | 80 × 90 |
| **Pixel card size** | | 152 × 171 ×10 mm | | |
| **Module** | | | | |
| **Pixel card configuration** | | 4 × 2 | | |
| **Resolution (W x H)** | | 480 × 270 | 384 × 216 | 320 × 180 |
| **Module area** | | 0.21 m² | | |
| **Module size (W × H × D)** | | 608 × 342 × 49 mm | | |
| **Net weight** | | 8.8 kg | | |
| **Power** | | AC 100 V to AC 240 V, 50 Hz / 60 Hz | | |
| **Type of protection** | | Front IP20 / Rear IP20 | | |
| **Service availability** | | Front service | | |
| **Displays** | | | | |
| **Power max. \| average** | | 600 W/m², 125 W/module \| 315 W/m², 66 W/module | 600 W/m², 125 W/module \| 280 W/m², 57 W/module | |
| **Viewing angle** | HOR.(L/R) | 80° / 80° | | |
| | VER.(U/L) | 80° / 80° | | |
| **Brightness** | | 600 cd/m² | | |
| **Brightness tolerance** | | ±10% | | |
| **Contrast ratio** | | 4000:1 | | |
| **Operating temperature** | | -20 °C to +40 °C | | |
| **Operating humidity** | | 10% to 80% relative humidity, non-condensing | | |
| **Strage temperature** | | -20 °C to +45 °C | | |
| **Strage humidity** | | 10% to 85 % relative humidity, non-condensing | | |
| **LED Lifetime (50% brightness)** | | 100,000 hours | | |
| **Color processing** | | 16 bit | | |
| **Refresh rate** | | up to 3840 Hz | | |
| **Frame rate** | | 50/60 Hz | | |
| **Brightness level** | | manually and automatically 256 levels (8 bit) | | |
| **Color temperature** | | 3000K to 9500K (default:6500K) | | |

## 3.5 LED Wall Components

An LED Wall has the following components

- Modules = Cabinet + Pixel cards
- Frame structure (3.3 Framesets for Bundles)
- Power bar (3.5.7 Power Bar)

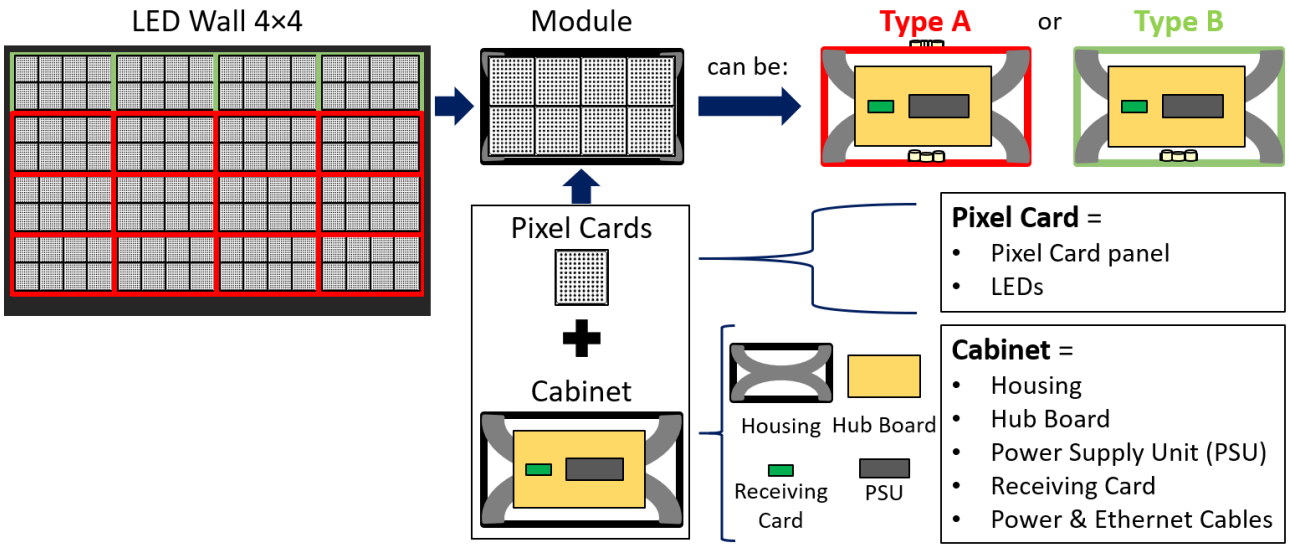



*Figure 5: LED Wall Components*

### 3.5.1 Module

The module consists of eight Pixel cards and a cabinet. For information on Type A and B modules/cabinets, see 3.5.2 Cabinet.

*Figure 6: Type A Module – Front View*

*Figure 7: Module – Back Side*

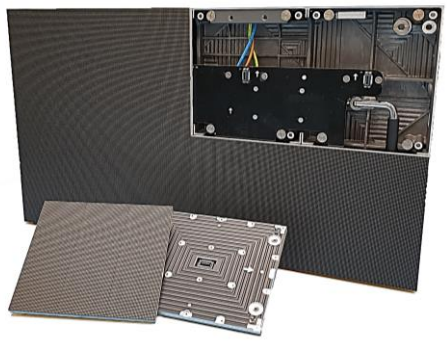


*Figure 8: Type B Module – Open*

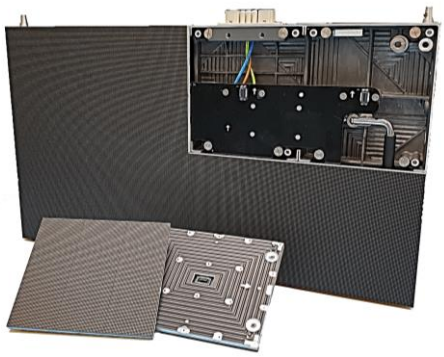


*Figure 9: Type A Module – Open*

### 3.5.2 Cabinet

Each cabinet has a combination of structural and technological functionalities that constitute a robust, stable, protective, and safe LED Wall. Additionally, the LED Wall is easy to build, maintain and service through the cabinet system.

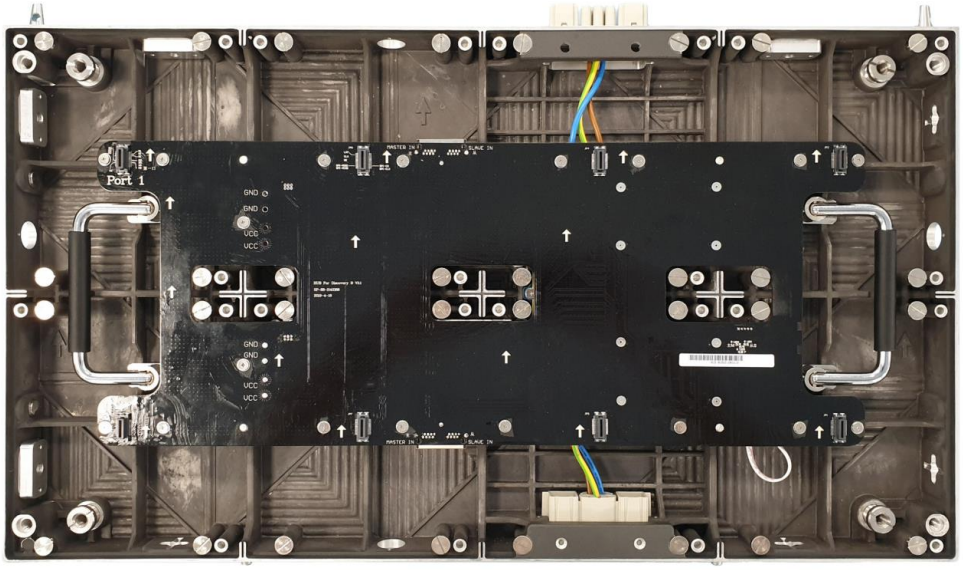



*Figure 10: Type A Cabinet – Front*

**Type A Cabinets** have two connectors for power (Power supply socket), one on the top and one at bottom of the case (see Figure 11).

**Type B Cabinets** have only one connector for power (Power supply socket) on the bottom of the case. This allows for the Overframe (top) to be placed directly on top of the housing for perfect closure of the frame.

**Backside hole Cabinets exist.**
Please see the 15.2 Backside hole cabinet.

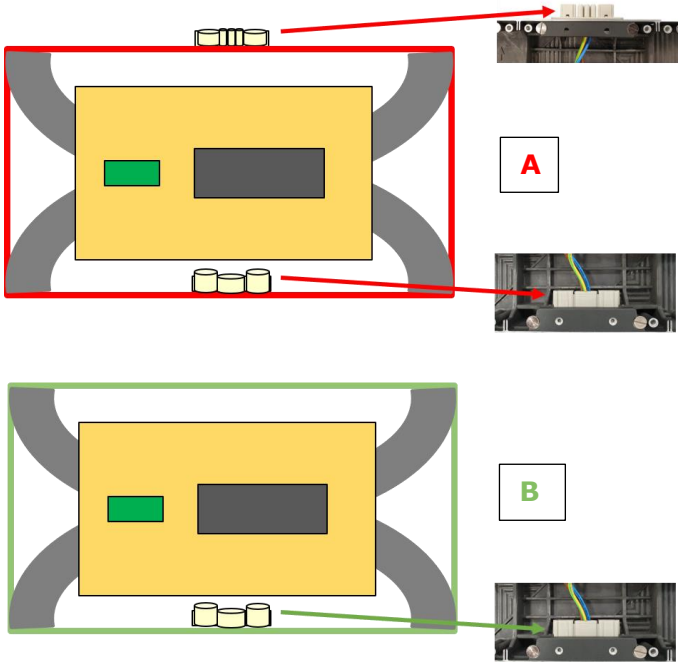



*Figure 11: Type A and Type B Cabinet*

### 3.5.2.1 Corner Alignment Pins

At the top of each FE Series cabinet are two special corner locating pins (Figure 12, A) – with a diagonal inside the corner pin. This design allows the cabinets to be securely stacked upon each other for up to 15 layers – reaching at total height of 5 meters.

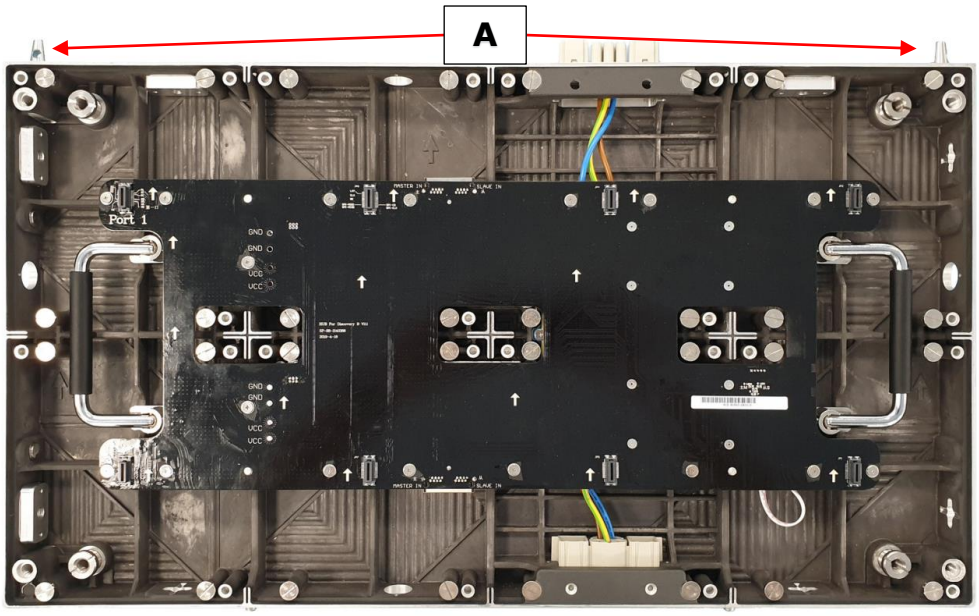



*Figure 12: Corner Alignment Pins*

### 3.5.2.2 Screw Connection for Cabinets

The Screw connections between the cabinets guarantee quick installation and easy maintenance.

Each cabinet has two sets of Screw connections:

- two sets of Allen screw anchors – right and bottom (B)
- two sets of Counter plates – left and top (C)

This design allows modules to interconnect tightly in order to create a seamless LED Wall display.

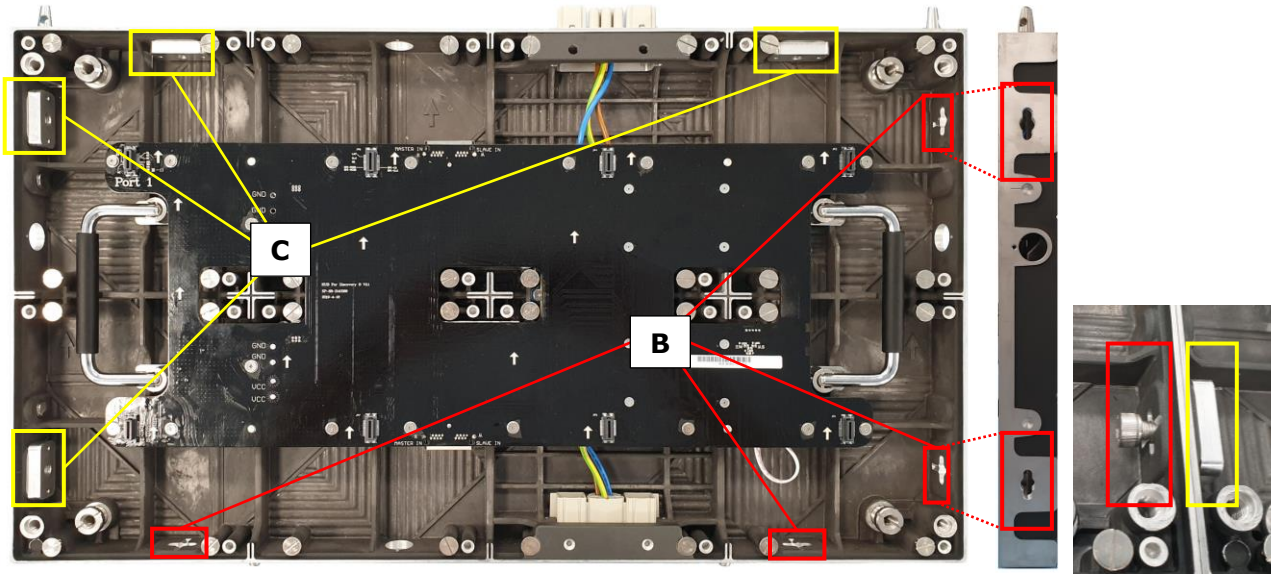



*Figure 13: Screw Connections for Cabinets: Screws and Counter plates*

Section 6.3.2 explains how to interlock two cabinets.

### *3.5.2.3 Grip Handles*

The grip handles (Figure 14) are bolted into the cabinet, middle-center, left and right from the hub board. These provide for easy handling during installation and maintenance in the open-position, and conveniently collapse into the cabinet when not in use (Figure 14, Figure 15).

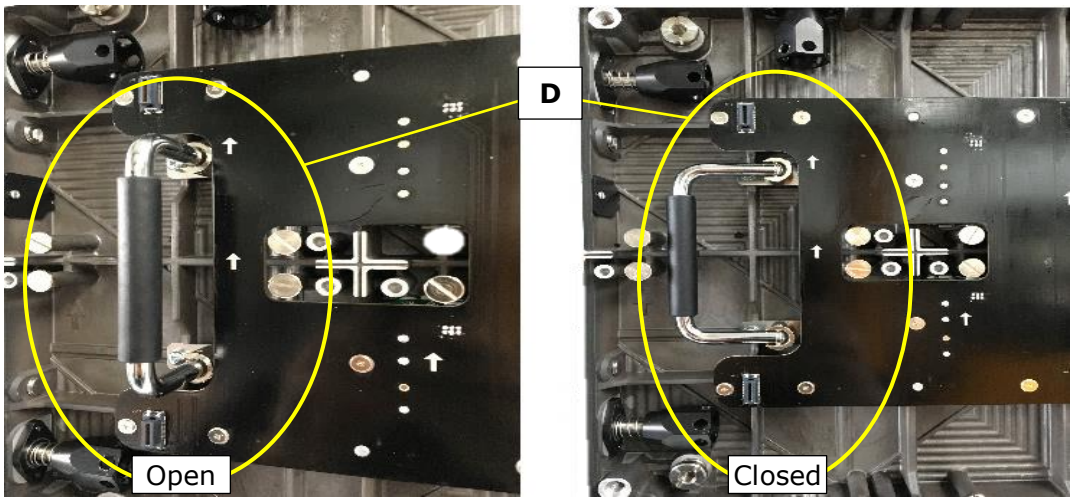



*Figure 14: Grip Handle in Open and Closed Positions*

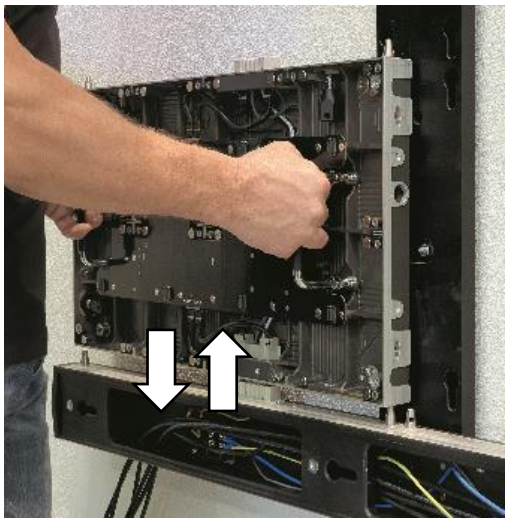


*Figure 15: Grip Handles in Use*

### *3.5.2.4 Cabinet Hanger Pins*

Cabinet hanger pins (Figure 16) are attached on the back of the cabinet (Figure 17) and secured on the inside of the cabinet (Figure 18, H).

If used as fixed installation, optional matched connectors can be adopted to connect the Corner alignment pin and support frame.

*Figure 16: Cabinet Hanger Pin*

*Figure 17: Installing Cabinet Hanger Pins*

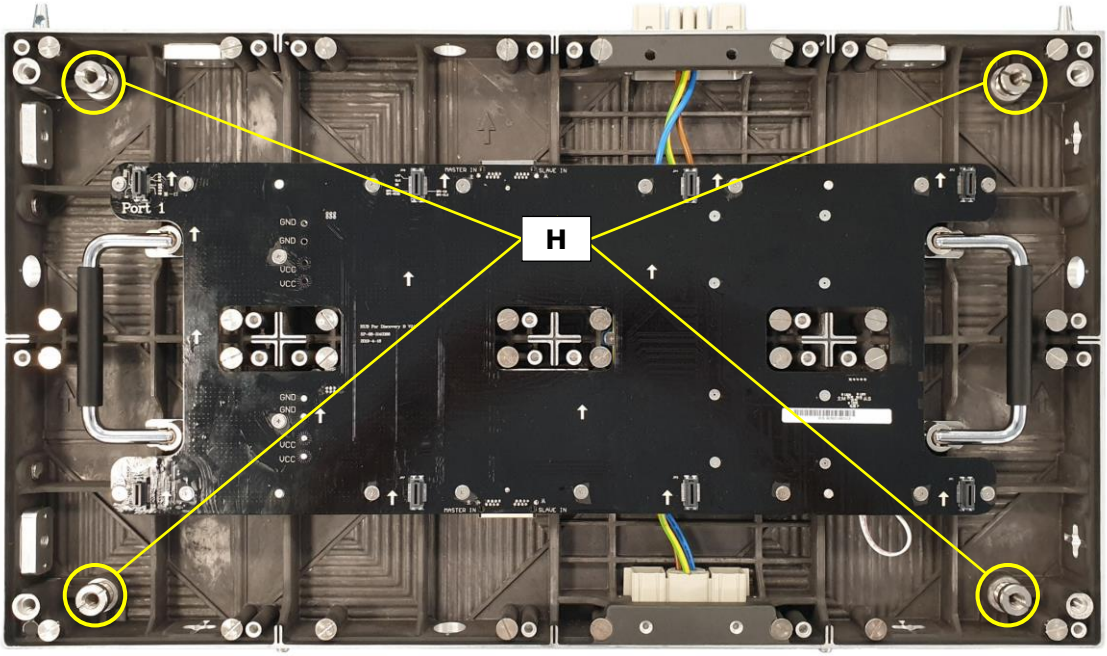



*Figure 18: Cabinet Hanger Pin Connectors*

### *3.5.2.5 Power Supply Socket*

The Power supply sockets (Figure 19, A) distribute the power for each column of modules in the LED Wall. The sockets are male and female adapters at the top and bottom surfaces of the cabinet. The sockets interconnect two cabinets of a column (Figure 20). The socket is connected to the Power distribution unit (PDU) (wiring, C).

The sockets wire to the PDU (Figure 21, D) and ground (E) on the cabinet. The PDU, in turn, connects to the Power supply unit (F) via the hub board's power supply connector (see also Figure 27, D, p. 31).

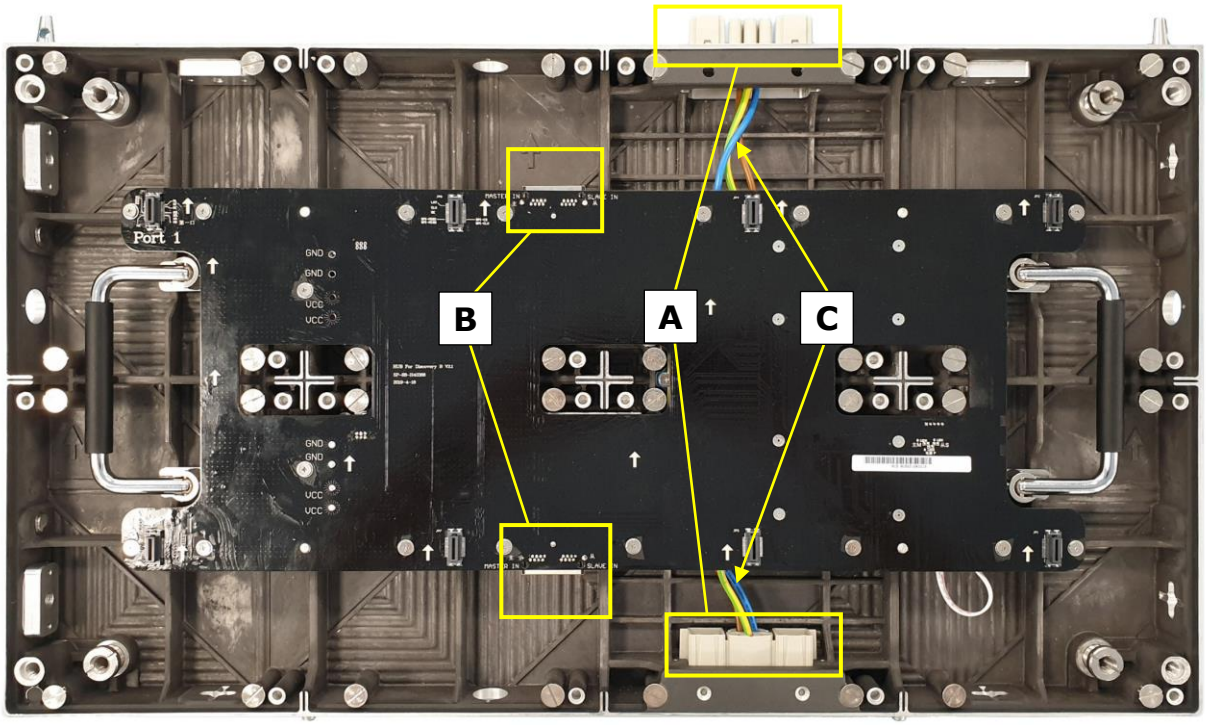



*Figure 19: Power Supply Sockets – Top and Bottom*

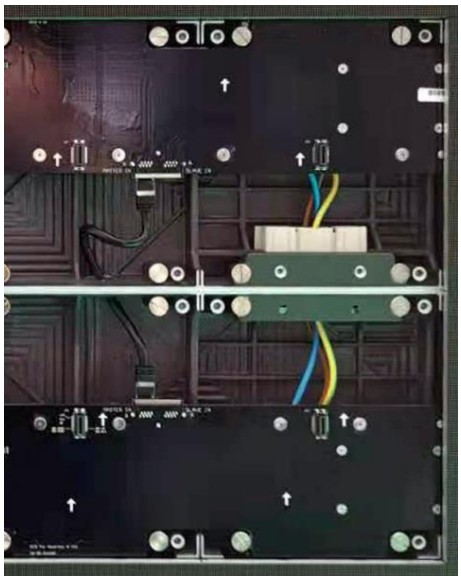


*Figure 20: Connected Sockets*

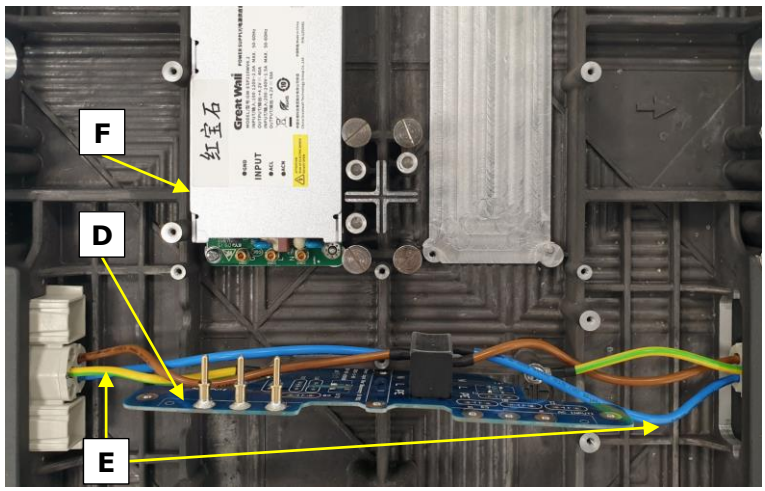



*Figure 21: Sockets Wired to PDU behind Hub Board*

### 3.5.3 Pixel Card

The Pixel cards display segments of the picture on the front. On the back, the Pixel card has three components, which keep the Pixel card in position on the cabinet:

- 3 corner click-pins (A)
- 4 magnets (B)
- 1 Pixel card connector (C)

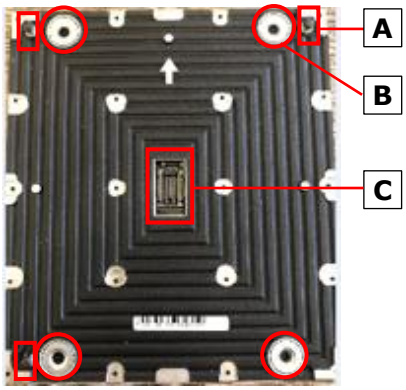



*Figure 22: Pixel Card – Back*

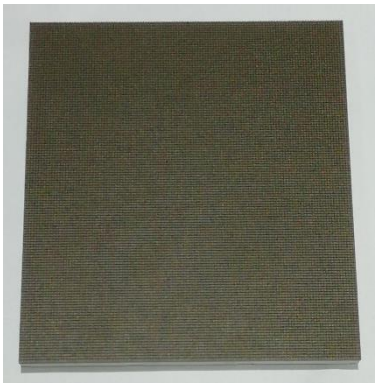


*Figure 23: Pixel Card – Front*

**Connections on the Hub board and the Cabinet**

For installation and operation, the Pixel card needs no cable connections to the Hub board or Cabinet. Three types of interfaces help to secure Pixel cards within the cabinet.

- **Click-pin interfaces** (D): counter-part to the corner click-pins on Pixel card; ensure the right position of the Pixel card on the cabinet.
- **Level screws** (E): counter-part to the magnets on the Pixel card; enable to adjust possible protrusion of the Pixel card to smoothen the surface of the LED Wall.
- **Pixel card network interface** (F): counter-part to Pixel card connector; for data transmission and power supply to the Pixel card.

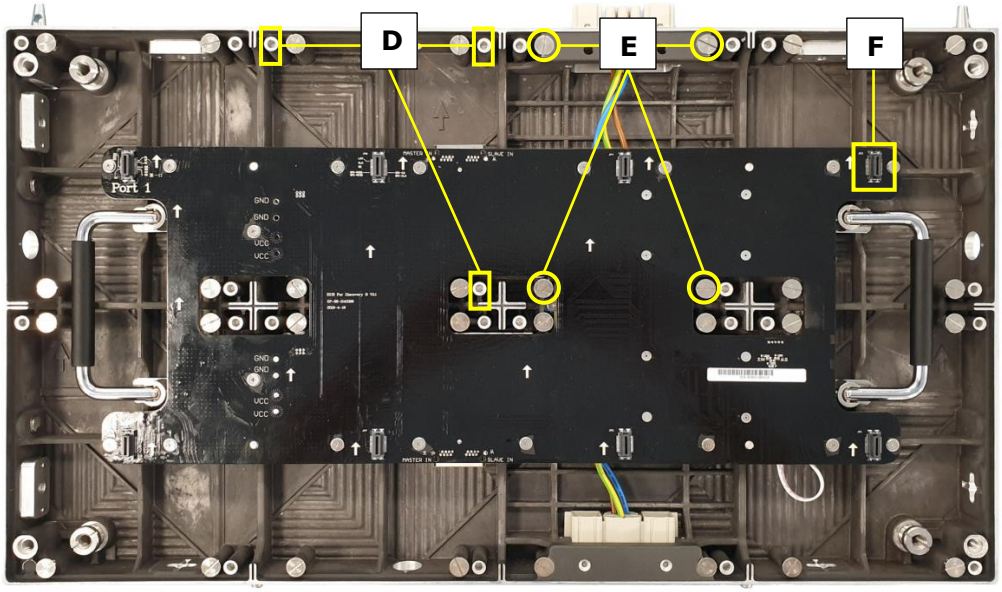



*Figure 24: Pixel Card Interfaces on Hub Board and in Cabinet*

**Black Masks**

The Black masks cover and protect the electronic surface between the LEDs of the Pixel card PCB. In combination with our high-end LED-chips (A), the mask (B) is necessary to get the best black-values, which result in a high contrast ratio of the screen.

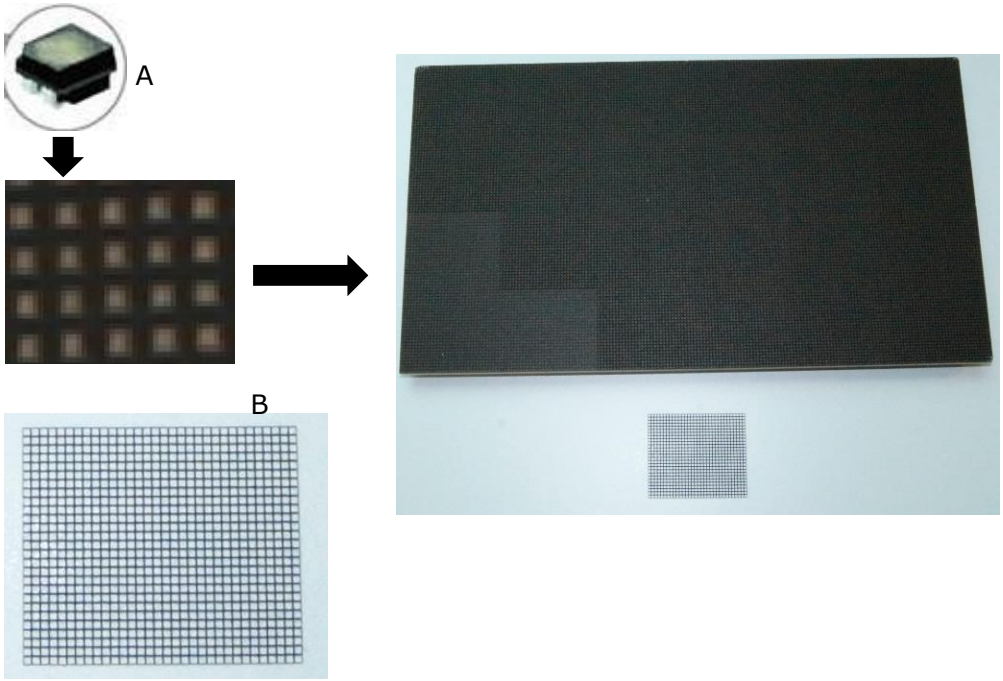



*Figure 25: LED Chip and Usage of the Black Masks*

### 3.5.4 Hub Board

The Hub board distributes the signals, data and power to other hardware components in the cabinet, such as Receiving card, power supply and Pixel cards. Each Hub board has a Power supply unit (PSU) and a Receiving card.

**Hub Board Interfaces**

The Hub board has several interfaces to distribute power and data. The **Hub Board front** (Figure 26) has the following interfaces:

- 8 Pixel card network interfaces (A): For data transmission and power supply to Pixel cards.
- 2× 2Ethernet ports (B): For data transmission from Hub board to Hub board. (Only the left Ethernet port transmits data. The right Ethernet port has no function.)
- 16 screw connections to cabinet (C): To secure the Hub board in the cabinet.

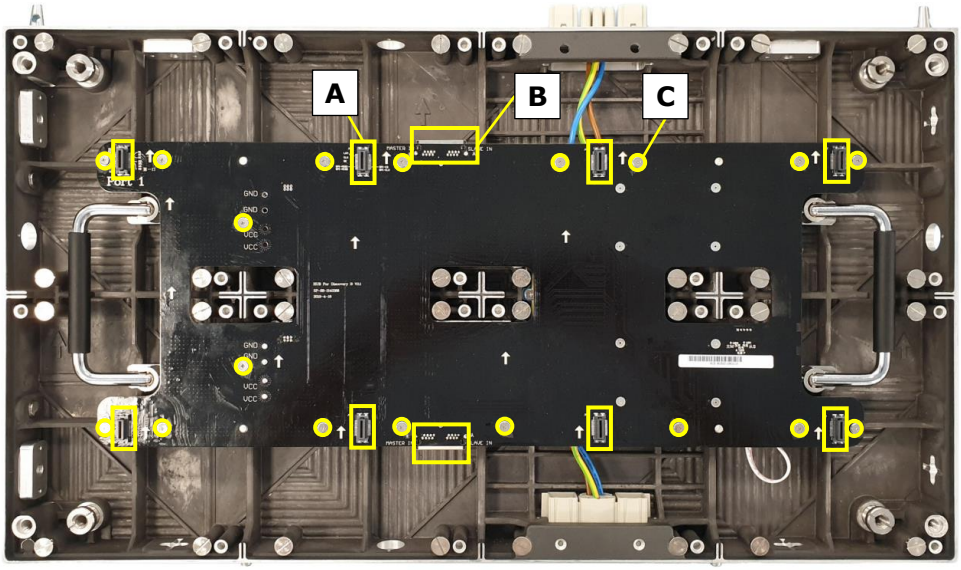



*Figure 26: Hub Board – Front*

The **backside of the Hub board** has several interfaces for data and power distribution (Figure 27):

- 4 pin connectors to Power supply unit (D): Distribute the power from PSU to the Hub board, e.g. for the Pixel cards or Receiving card.
- 1 Power-good-connector (E): Sends status of power supply to monitoring software.
  Be careful when re-assembling the module, the connectors bend easily.
- 1 Receiving card (F): Receives data and signal input via the Ethernet cable from the external controller. They process the signals and forward them to the Pixel cards.
- 1 Signal light cable (G): Forwards the status input of the module to the Signal lights on the back of the module.

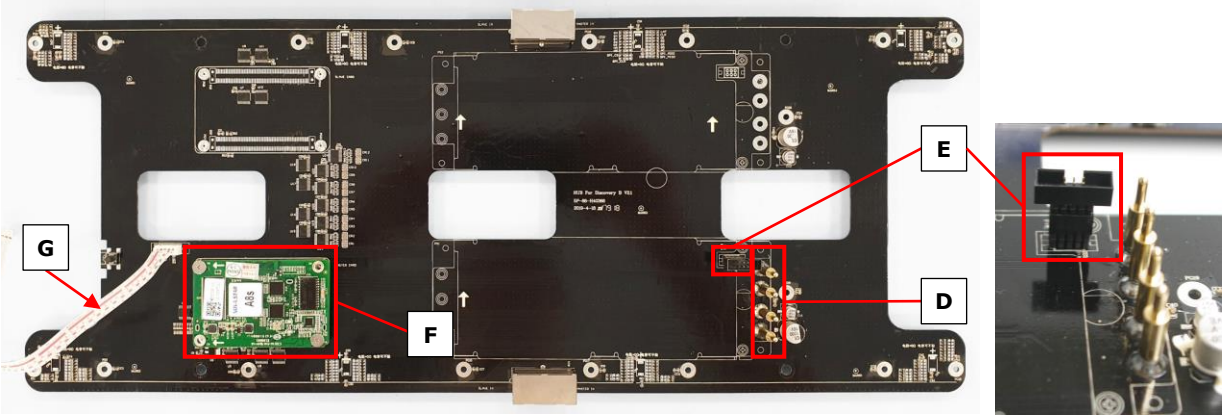



*Figure 27: Hub Board – Back*

### 3.5.5 Power Supply

In each module, one Power supply unit (PSU) connects through a Power distribution unit (PDU) to the power input.

The following components contribute to the power supply of a module:

- 1 Power supply unit (PSU) (A)
- 1 Power distribution unit (PDU) (B1) with PDU shielding (B2): The PDU shielding protects the high voltage components from being touched by accident. Do not remove while power is connected!
- 1 Power supply interface to Hub board (C): Counter-part to the Hub board's four pin connector to supply the Hub board with power.

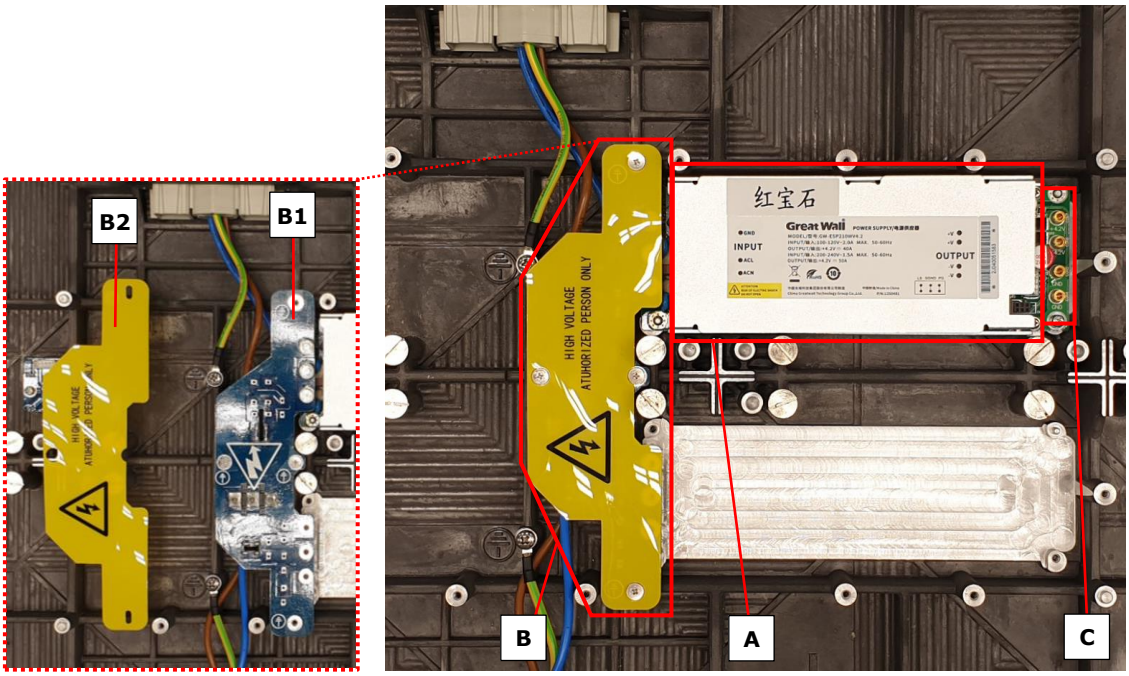



*Figure 28: Behind Hub Board –Power Supply with Wired PDU with PDU Shielding*

The PDU connects to the PSU via three pin connectors (D) for each PSU interface (E).

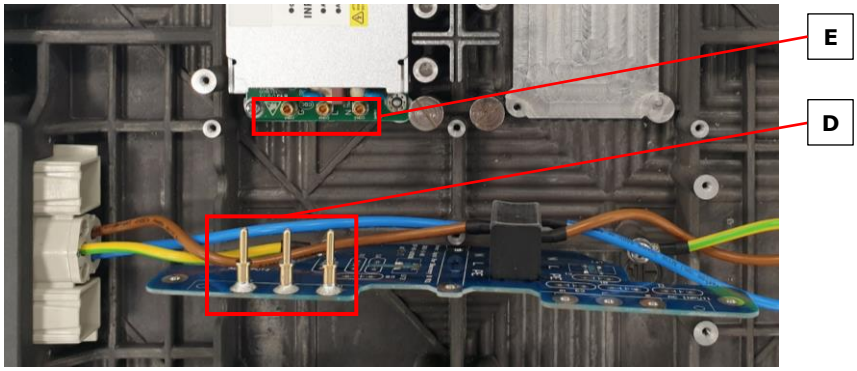



*Figure 29: Pin Connection from PDU to PSU*

### 3.5.6 Signal Lights

The Signal lights are on the back of the module (Figure 30). They indicate the status of the module. The three lights are red, green and blue.

*Figure 30: Signal Lights on the Back of the Module*

The Signal lights are fixed on a PCB (A) to the inner backside of the cabinet and connected to the Hub board with the Signal light cable (B).

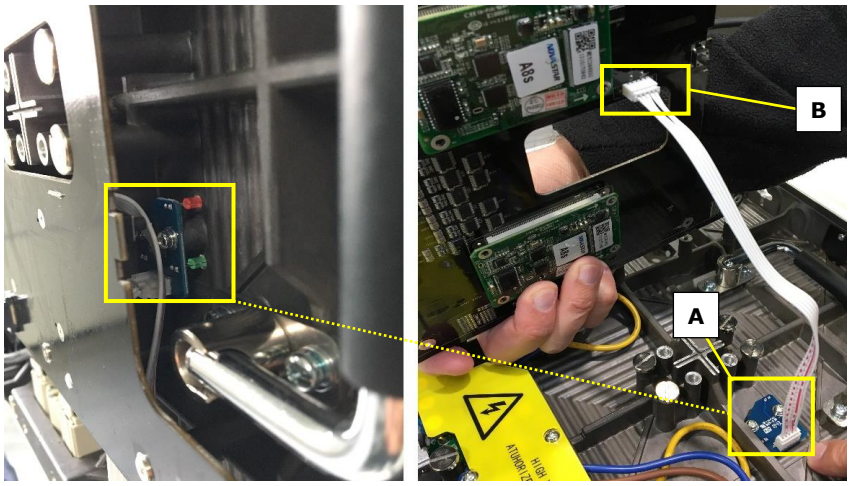



*Figure 31: Signal Light Interface Connected to Hub Board*

### 3.5.7 Power Bar

The Power bar is the LED Wall component for the distribution of data and power. It is located at the bottom of the LED Wall and connects to each row of modules via the Network and power supply socket. The Power bar also serves as cable conduit: The cables for power supply and data transmission run inside the Power bar from Hub boards and the terminals to the exit points on the back of the Power bar.

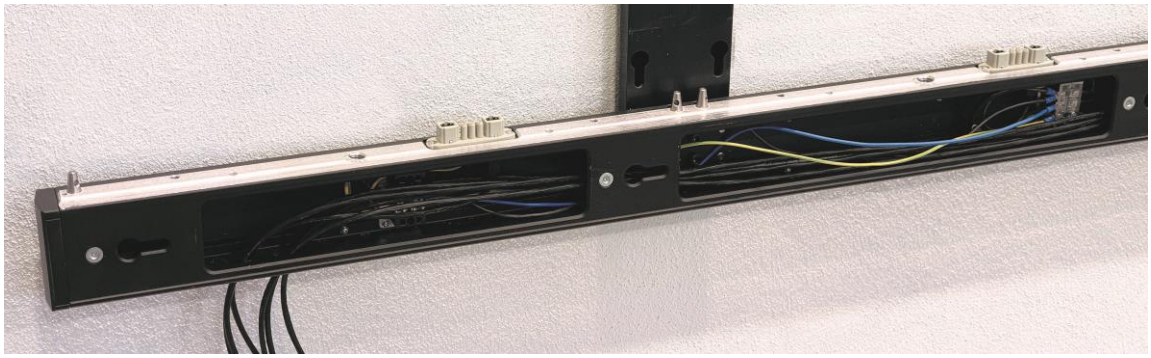


*Figure 32: Power Bar with Cable Exit Point*

## 3.6 Ventilation Requirements

| | |
|---|---|
|  | **Caution!**<br>Risk of fire, injuries and product damage due to overheating of the system.<br>• Ensure proper ventilation and air flow around the system.<br>• Never block the ventilation spaces around the LED Wall. Keep them free at all times.<br>• Never install the system air-tight into an alcove. Always leave the required minimum ventilation space. |

| **Notice** |
|---|
| The values under D and E in the table below (see Figure 33) are reference values. Make sure the room is well ventilated so that hot air generated by the product does not accumulate. Also, make sure the room temperature is within the range of the environment temperature specification. If you have questions, please contact NEC DISPLAY SOLUTIONS, see 1.2 Service & Support in Europe. |

**Minimum Ventilation Spaces for Buried Installation (in Wall Alcove)**

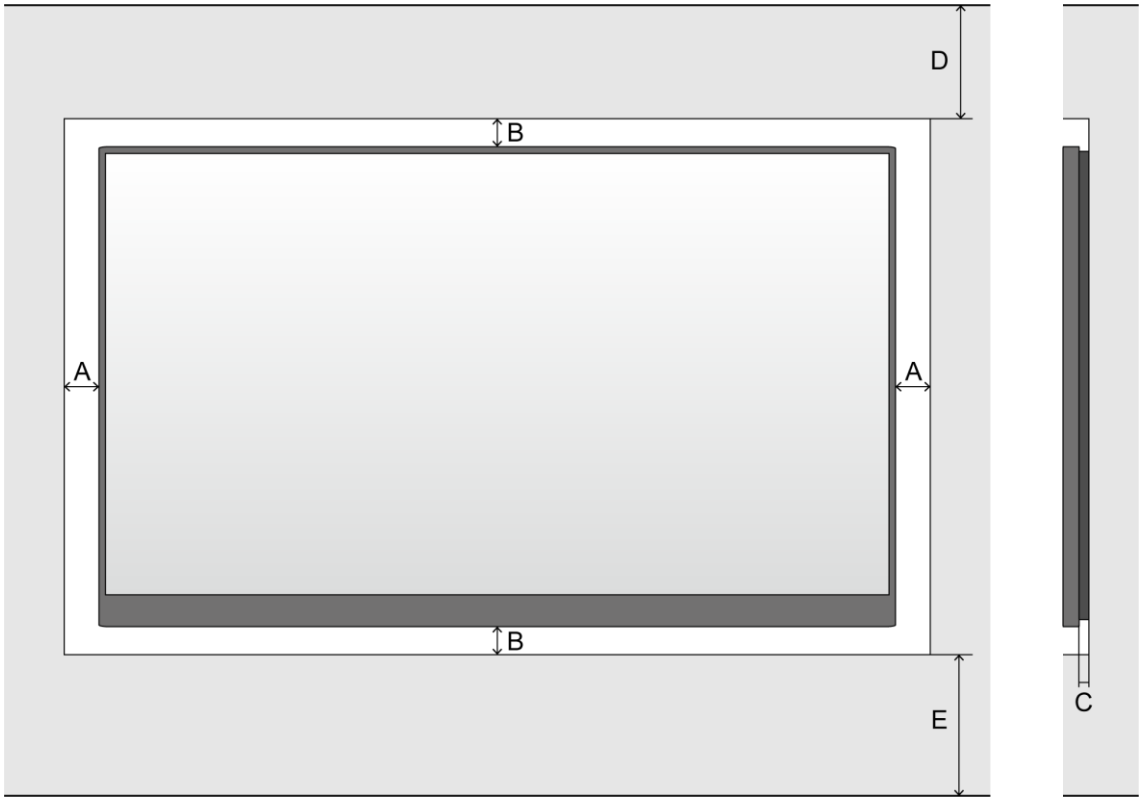



*Figure 33: Ventilation Space for Buried Installation*

| A | B | C | D | E |
|---|---|---|---|---|
| min distance to sides | min. distance to top and bottom | Distance between wall and system | min. distance to ceiling | min. distance to floor |
| 60 mm | 60 mm | 30 mm | 500 mm | 700 mm |

**Minimum Ventilation Spaces for On-Wall Installation**

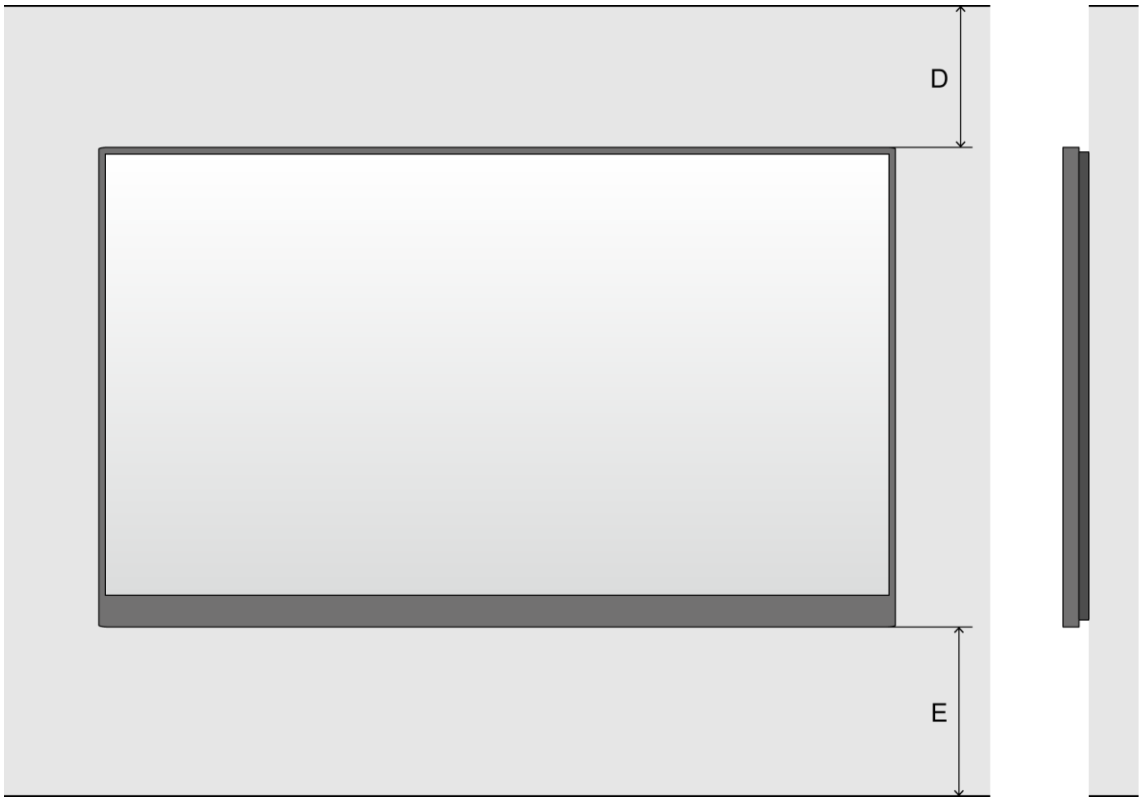



*Figure 34: Ventilation Space for On-Wall Installation*

| D | E |
|---|---|
| min. distance to ceiling | min. distance to floor |
| 500 mm | 700 mm |

### 3.6.1 Heat Dissipation

The FE Series is provided with a highly efficient LED chip to reach low power consumption, less heat production and a long working life.

The modules are designed fan-free which ensures a super quiet operation. The whole housing of the module is designed as heat sink.

### 3.6.2 Cooling

The required ventilation depends on each particular project. Depending on the structural design and environmental temperature it may be necessary to add an external cooling.

To integrate the ideal, energy-efficient air conditioner for the LED display, you have to determine the capacity or size you need. This is important for two reasons: An undersized unit will not cool adequately the LED display in extremely hot weather. An oversized air conditioner can also adversely affect your comfort. The unit may switch on and off too often, without running long enough to dehumidify the LED display properly or cool the space uniformly. And it will consume more energy than necessary.

**Info**

The ideal environment temperature for the LED display is 10 – 25 °C.

# 4 ACCESSORIES

## 4.1 Power Supply and Connecting Cables

### 4.1.1 Power Supply for Power Bar

**Internal:** The internal electricity wiring is connected to a terminal in the Power bar.

**External:** A power cord to supply power is not included. Provide a sufficient connection to mains. For more information, see 15.1 Cable Plans.

| | | |
|---|---|---|
|  | **Warning!**<br>Only trained personnel, such as electricians or NEC personnel, may connect the internal power supply to mains power supply. |  |

### 4.1.2 Signal Cable

**Internal:** The modules are connected via the delivered CAT cables between the Hub boards, which also forwards the signal to the next modules.

**External: FE Series to NovaStar Controller:** The FE Series comes with signal cables (FTP Cat5e) to connect data output of the NovaStar Controller to the Ethernet port on the first Hub board of each column. For more information, see 15.1 Cable Plans.

**External: NovaStar Controller to PC:** Signal cables to connect the NovaStar Controller and a PC are included. Refer to Table 4 to choose the correct signal cable for that task.

*Table 4: Compatible Signal Cable (Video Distributor)*

| DVI single link | HDMI | 3G-SDI |
|---|---|---|
| Cable included in delivery | Cable included in delivery | Cable **not** included in delivery |

## 4.2 Adjustment plate

When installing cabinets, the horizontal and vertical alignment for the whole LED wall is important so that the image surface is even – without image distortions or light aberrations.

During installation, the Adjustment plates help to align the cabinets across a given row and with the neighboring rows. The Adjustment plates line up the connecting edges and surfaces of the cabinets. They are used at each junction point.

After the installation of the cabinets is finished, remove the Adjustment plates. Otherwise, the Pixel cards do not fit on the cabinet.

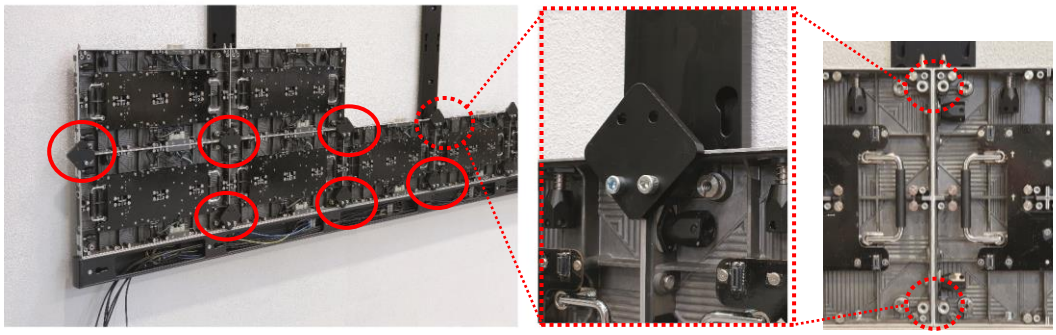


*Figure 35: Adjustment plate*

# 5 PREPARE FOR USE

## 5.1 Cabinet Packaging

One cabinet box contains the following:

- Foam cover (1)
- PE bag (2)
- Cabinet (3)
- Foam container (4)
- Cardboard box (5)

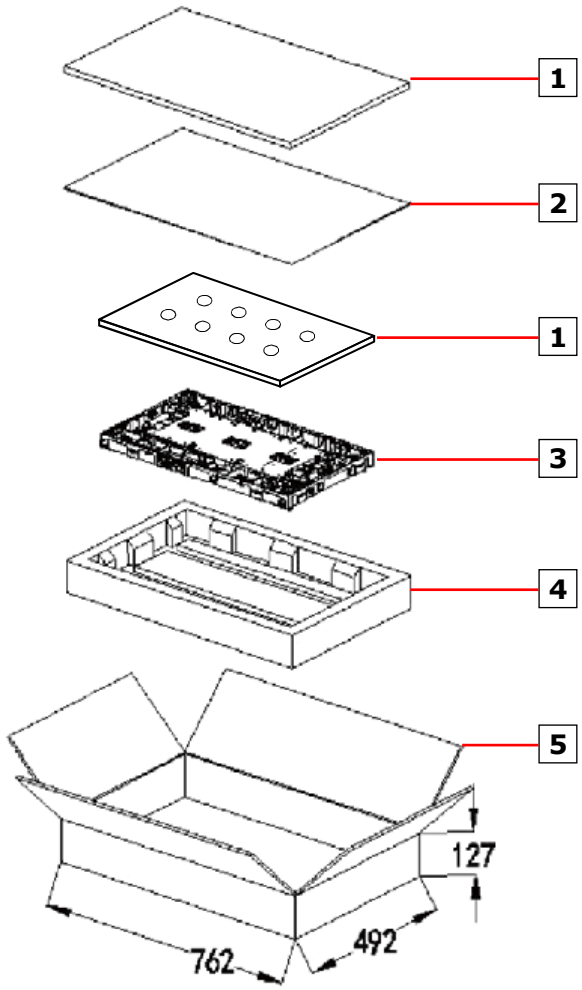



Figure 36: Package Order of Module Box

## 5.2 Pixel Cards Packaging

One Pixel card box contains the following:

- Foam cover (6)
- Antistatic bag (7)
- Pixel card (8)
- Foam container (9)
- Cardboard box (10)
- PE bag (11)

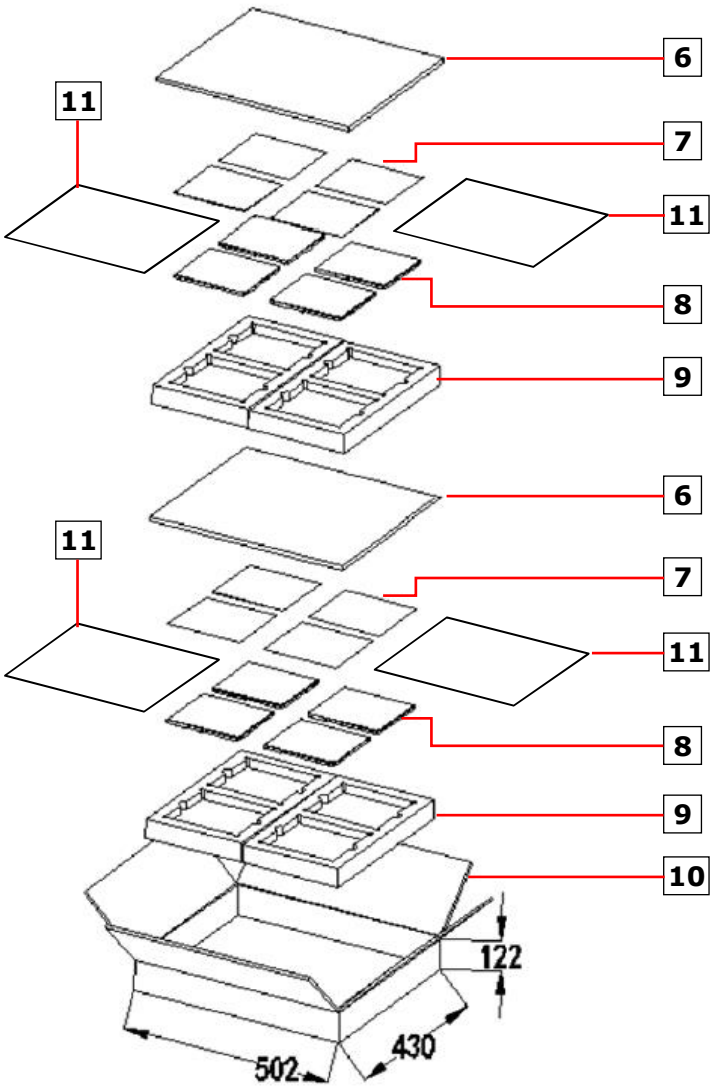



Figure 37: Package Order of Pixel Card Box

## 5.3 Installation Setup – Wall Mounting

For the limited space for installation, you may either cut a same size space as the LED display on the wall, then install the LED display in this space or fix the support structure directly onto the wall. It requires solid walls. Observe the ventilation requirements, see 3.6 Ventilation Requirements.

All additional fixation components and tools must be determined by a detailed static calculation to ensure a safe and high-performance LED system. Front maintenance will be very convenient.

See section 6.1 for detailed instructions on wall mounting.

**⚠ Caution!**

Risk of personal injury and product damage by unsuitable wall mounting equipment.
Before starting the installation:

- Ensure that the installation site is suitable for the cable routing plan. If necessary, mark important points of the plan on the wall used for the installation.
- Regarding the installation site: Analyze the wall used for the installation and the weight of the complete LED Wall (see Table 5). Choose installation equipment, e.g. tools, screws and dowels, that are suitable for the wall conditions and the weight of the LED Wall.

**Stability hazard:**
The device may fall, causing serious personal injury or death. To prevent injury, this device must be securely attached to the floor/wall in accordance with the installation instructions.

*Table 5: Dimensions and Weight for LED Wall 4×4, 5×5, 6×6, 8×8*

| | 4 × 4 LED Wall | 5 × 5 LED Wall | 6 × 6 LED Wall | 8 × 8 LED Wall |
|---|---|---|---|---|
| **Dimensions incl. frame (W × H)** | 2472×1488 mm | 3080×1830 mm | 3688×2172 mm | 4904×2856 mm |
| **Weight** | 182 kg | 279 kg | 391 kg | 659 kg |

# 6 ASSEMBLE COMPONENTS

| Notice |
|---|
| Read the safety guidelines, which are included in the delivery. Follow them strictly to ensure safety and a high-performance LED system! |

## 6.1 Install Mounting bars for Wall Mounting

This section is a guide to the mounting of the Mounting bar and describes the following in more detail:

- Prepare the support structure according to the installation site requirements.
- Prepare the wall for installation.
- Then fix the structure on its designated place according to the static requirements.

*Table 6: Mounting bar – Installation requirements*

| | | |
|---|---|---|
| **No. of People** | 2 | |
| **Tools** | Ladder/ elevated working platform | |
| | Tools for mounting (e.g. hammer, screwdriver, Allen key, jaw spanner) | |
| | Drilling equipment (e.g. drilling machine and fitting attachment/head) | depending on mounting surface, wall material/condition |
| | Mounting material (screws, dowels etc.) | depending on<br>• overall weight of chosen screen system<br>• mounting surface, wall material/condition |
| | Measurement tools (e.g. rule, spirit level) | |
| | Alignment bar | Included in delivery, flat black bar |
| **Equipment** | See for 3.3 Framesets for Bundles specifications related to:<br>• Frameset for LED-FE012i2-110 and LED-FE019i2-110 (4×4 Modules)<br>• Frameset for LED-FE015i2-137 (5×5 Modules)<br>• Frameset for LED-FE019i2-165 (6×6 Modules)<br>• Frameset for LED-FE012i2-220 and LED-FE025i2-220, LED-FE038i2-220 (8×8 Modules) | |

### 6.1.1 Prepare the Wall Surface

- Remove debris and clean the wall surface.
- Measure the dimensions for the bundle according to wall frame specifications for the target frameset: 4×4, 5×5, 6×6, 8×8.

| Notice |
|---|
| • Ensure proper ventilation of the LED Wall. For more information, see 3.6 Ventilation Requirements.<br>• Consider the cable plans, see 15.1 Cable Plans and ensure the cables can be placed properly. |

### 6.1.2 Draw and Mark the Anchor Positions on Wall

- Start from the middle and mark the positions for the anchor points to drill out. (See markings in figures below or the dimensions in Table 7.)
- Use the spirit level to check the vertical alignment of the marks before drilling.

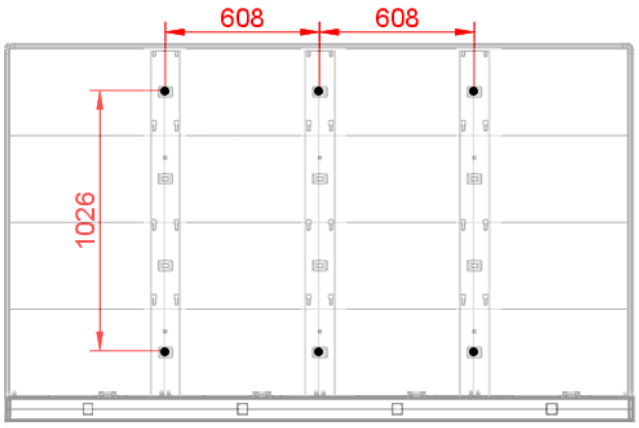



*Figure 38: Positions for Anchor Points: 4×4 Frameset*

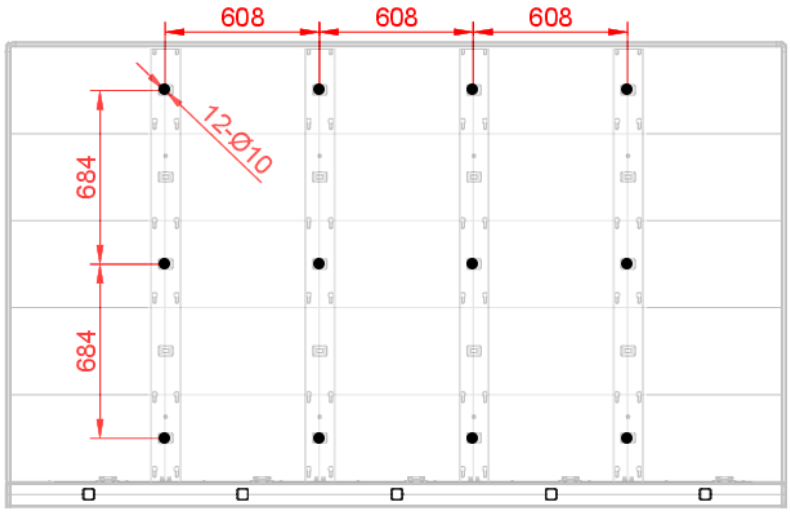



*Figure 39: Positions for Anchor Points: 5×5 Frameset*

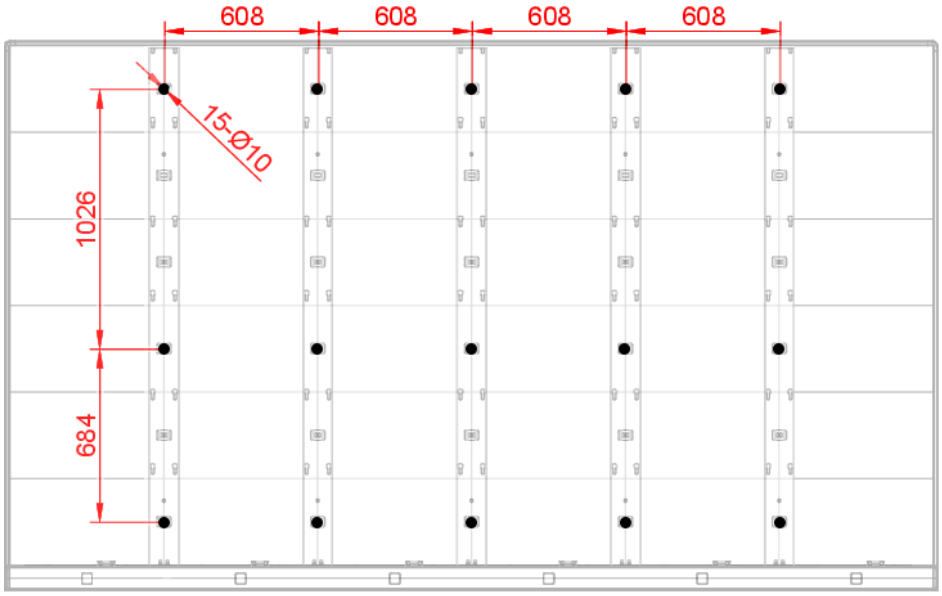



*Figure 40: Positions for Anchor Points: 6×6 Frameset*

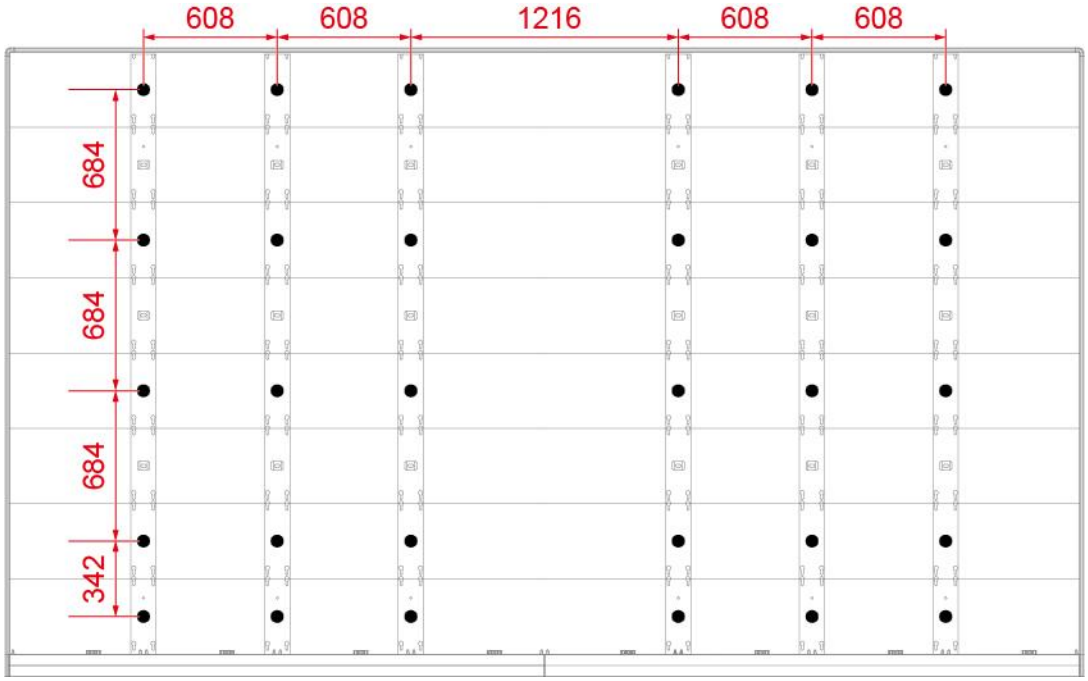



*Figure 41: Positions for Anchor Points: 8×8 Frameset*

*Table 7: Number and Position for Anchor Points*

| Frameset: | 4×4 | 5×5 | 6×6 | 8×8 |
|---|---|---|---|---|
| **Anchor Points Horizontally × Vertically** | 3 × 2 | 4 × 3 | 5 × 3 | 6 x 5 |
| **Distance Horizontally** | 608 mm | 608 mm | 608 mm | Distance center : 1216 mm<br>Others: 608 equally |
| **Distance Vertically** | 1026 mm | 684 mm equally | Distance top row – middle row: 1026 mm<br>Distance middle row – bottom row: 684 mm | Distance Bottom row: 342 mm, others 684 mm equally |
| **Anchor size** | Ø10 mm | Ø10 mm | Ø10 mm | Ø10 mm |

### 6.1.3 Drill the Positions

- Use required drilling equipment to drill on marked positions.
- If necessary, use screw anchors / raw plugs.
- Remove any debris and wipe away drill shaving and dust particles.

### 6.1.4 Attach the Mounting bars

Step 1) Attach each vertical Mounting bar onto the grid on the wall.

Step 2) Check the distance of the frame elements using the Alignment bar.

Step 3) Use the spirit level together with the Alignment bar to check the evenness (Figure 42 and Figure 43). If necessary, adjust the positions accordingly.

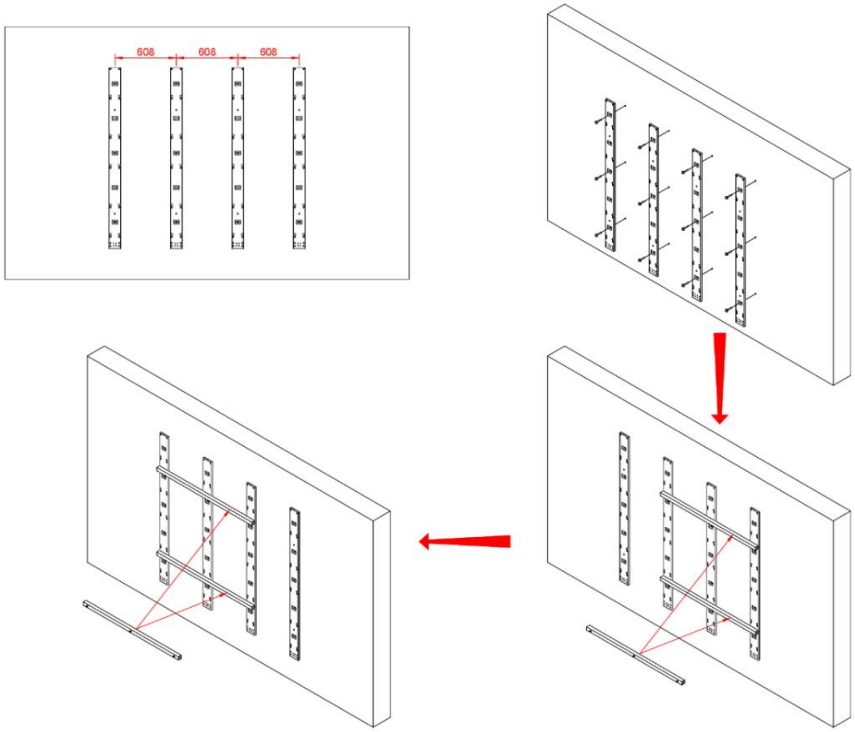



*Figure 42: Wall Mounting: Attachment of Mounting bars (5×5 Frameset)*

*Figure 43: Using Alignment Bar with Spirit Level*

## 6.2 Install Power Bar onto Mounting bars

This section is a guide to mounting the Power bar onto the Mounting bars and describes the following in more detail:

- Prepare the Mounting bars so they are level.
- Position the Power bar on the Mounting bars.
- Then fix the Power bar onto the Mounting bars.

*Table 8: Power Bar Installation Requirements*

| | |
|---|---|
| **No. of People** | **2** |
| **Prerequisites** | Mounting bar securely installed<br>Power bar/LED Wall not connected to mains |
| **Tools** | Alignment bar<br>Spirit level<br>Screwdriver |
| **Equipment** | Power bar |

### 6.2.1 Check the Evenness

Step 1) Use the Alignment bar and spirit level in combination to check the evenness between the vertical Mounting bars.

Step 2) If necessary, adjust top and bottom supports accordingly.

### 6.2.2 Bring Power Bar into Position

Step 3) Bring the Power bar into position to align interface to anchoring point.

Step 4) Align the locating pin of the Power bar to the Mounting bar interface.

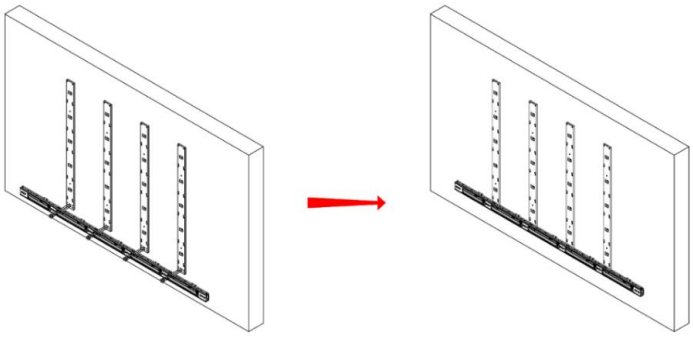


*Figure 44: Wall Mounting: Attachment of Power Bar (5×5 Frameset)*

### 6.2.3 Attach Power Bar to Mounting bars

Step 5) Use M6×12 Screws (4 per Mounting bar) to attach Power bar onto the Mounting bars.

Step 6) Check that the Power bar is level. If necessary, adjust accordingly.

Step 7) Tighten the screws.

*Figure 45: Wall Mounting: Attachment of Power Bar (Detail)*

## 6.3 Install Cabinets

This section is a guide to mounting the cabinets onto the Mounting bar and describes the following in more detail:

- Prepare the cabinets for installation.
- Install the first row of cabinets
- Fix the first row of cabinets to the Power bar.
- Install further cabinets.
- Align all cabinets of the LED Wall to achieve an even surface.

*Table 9: Cabinet Installation Requirements*

| | |
|---|---|
| **No. of People** | 2 |
| **Prerequisites** | Frameset securely installed<br>Power bar securely installed |
| **Tools** | Screwdriver<br>Allen key |
| **Equipment** | Cabinets<br>Cabinet hanger pins<br>Adjustment plate |

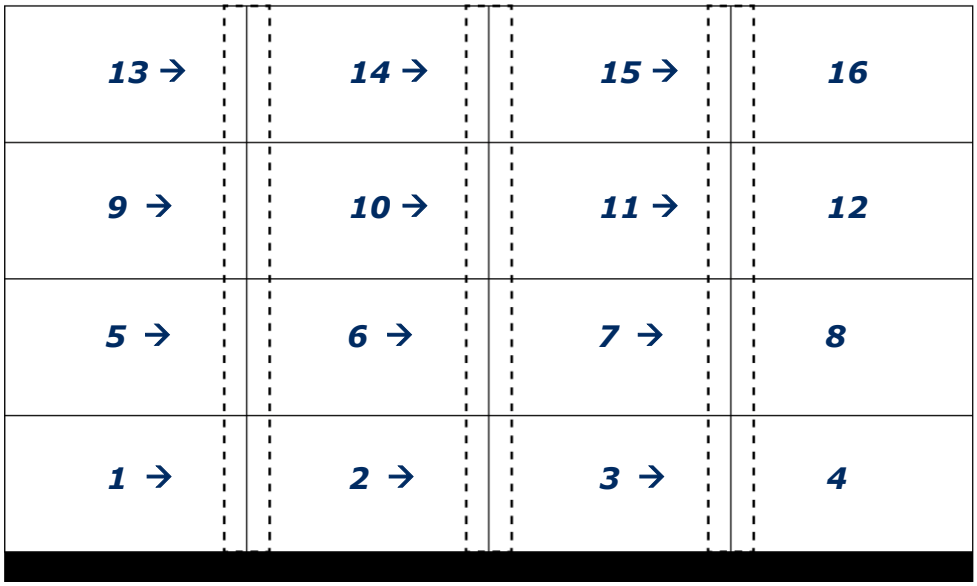



*Figure 46: Wall Mounting: Installation Order of Cabinets (4×4 Frameset)*

### 6.3.1 Install Cabinet Hanger Pins on the Backside

On the workbench, place cabinet front-side down on a protected surface.

Step 1) Install Cabinet hanger pins (2×) on top left- and right-hand corners.

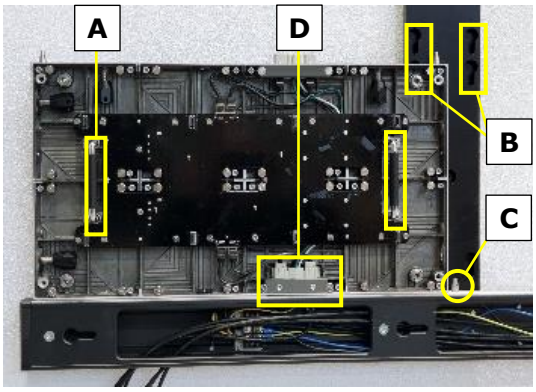
Step 2) Secure the Cabinet hanger pins firmly.

*Figure 47: Installing the Cabinet Hanger Pins*

### 6.3.2 Install Cabinets for Bottom-Row on Power Bar

Step 1) Use the grip handles on the cabinet (Figure 48, A) to bring it into position at left corner on the Power bar.

Step 2) Align together the Cabinet hanger pins with the Mounting bar sockets (B) and the Corner alignment pins on the Power bar (C). Lower the cabinet onto the Power supply socket (D), gently pressing it until it sits firmly.




| **Notice** |
| --- |
| Place the cabinet carefully and straight on top of the Power supply socket. |

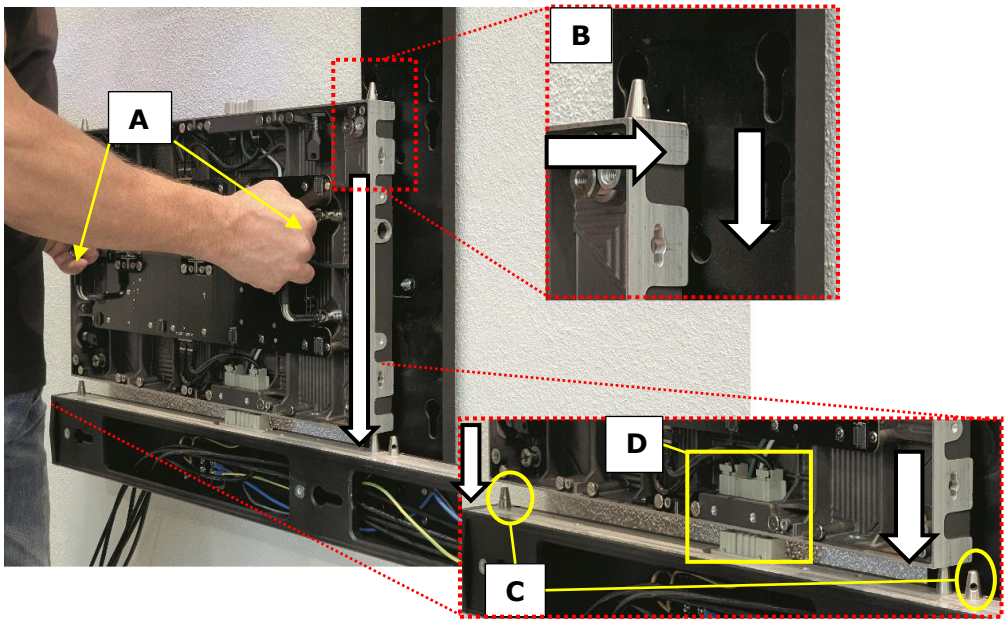



*Figure 48: Installing the First Cabinet*

Step 3) Install further cabinets until the first row is complete.

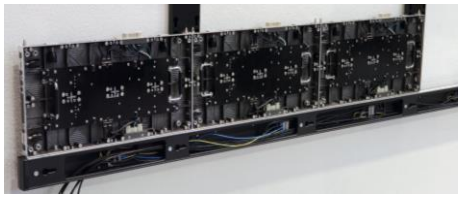


*Figure 49: Installing Additional Cabinets – First Row*

Step 4) Connect each cabinet to its adjacent cabinets with the Screw connections.

a) Place a delivered Allen screw (E) in the screw connection anchor.

b) Only finger-tighten the screw to the Counter plate (F) in the other cabinet.

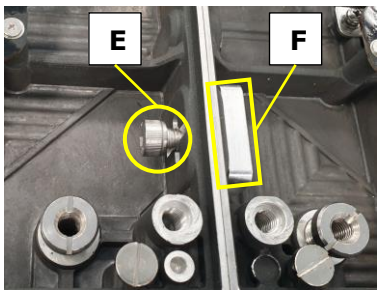



*Figure 50: Locking Two Modules*

| **Notice** |
| --- |
| Do not tighten the Screw connection too much. Otherwise the cabinets cannot be aligned later on. |

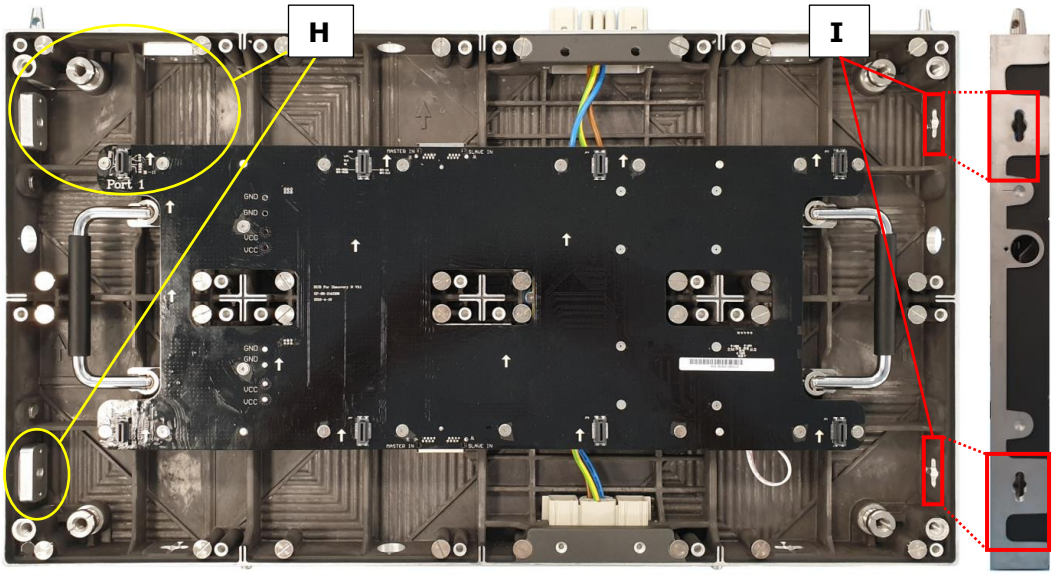



*Figure 51: Cabinet Screw Connections: Counter plates (H), Allen Screw anchors (I)*

Step 5) Adjust the vertical alignment of the cabinets using the screw in the top corner of the cabinet.

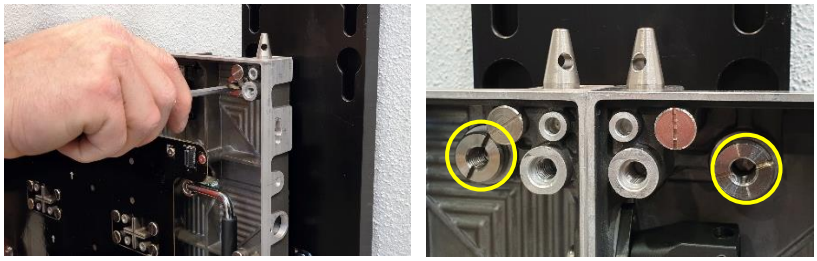


*Figure 52: Vertical Alignment of Cabinets*

### 6.3.3 Secure Cabinet to Power Bar

Step 1) Connect the cabinets of the first row to the Power bar. For this, screw a M8×16 screw in the opening for the Screw connection at the bottom of the cabinets

Step 2) Screw the cabinets of the first row onto the Power bar with M8×16 screws.

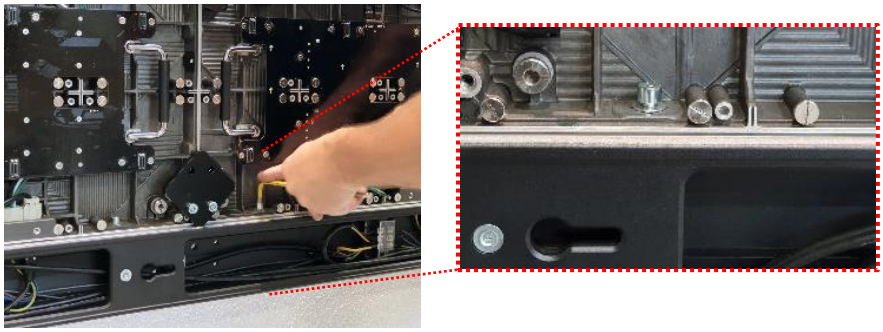


*Figure 53: Fastening of First Row to Power Bar*

### 6.3.4 Install Further Cabinet Rows

Step 1) Install the Cabinet hanger pins (see 6.3.1).

Step 2) Use the grip handles on the cabinet (Figure 48 in chapter 6.3.2, A) to bring it into position at left corner on the first cabinet row.

Step 3) Align together the Cabinet hanger pins with the Mounting bar sockets (Figure 48, B) and the Corner alignment pins on the cabinet below (Figure 48, C).
Lower the cabinet onto the Power supply socket (Figure 48, D), gently pressing it until it sits firmly.

| **Notice** |
| --- |
| Place the cabinet carefully and straight on top of the Power supply socket. |

Step 4) Install further cabinets until a row is complete.

Step 5) Connect each cabinet to its adjacent cabinets with the Screw connections.

a) Place a delivered Allen screw (E) in the screw connection anchor.

b) Only finger-tighten the screw to the Counter plate (F) in the other cabinet.

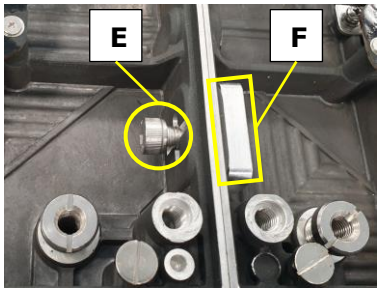


*Figure 54: Locking Two Modules*

| **Notice** |
| --- |
| Do not tighten the Screw connection too much.<br>Otherwise the cabinets cannot be aligned later on. |

Step 6) For the top row, use type B cabinets only.
Proceed as described above.

### 6.3.5 Align Cabinets

After all rows of cabinets are installed, the cabinets have to be aligned with the Adjustment plates.

Step 1) For each cabinet junction, attach one Adjustment plate (A) with four screws, one on each cabinet.

Step 2) Attach Adjustment plates also on the sides of the LED Wall (B) and at the bottom over the Power bar (C).

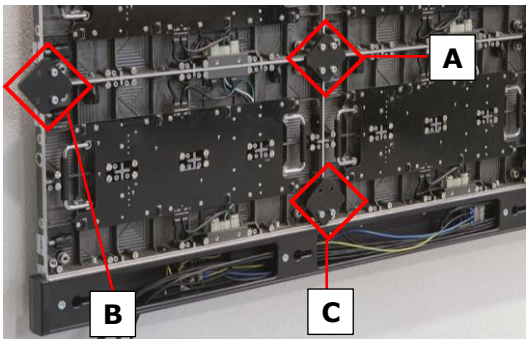
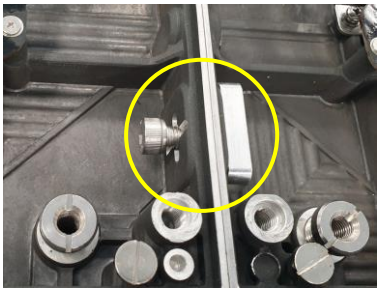


*Figure 55: Adjustment plates*

Step 3) After each cabinet junction has a Adjustment plate, tighten all Screw connections hand tight.
By tightening the Screw connections properly, the cabinets keep their aligned position.



Step 4) Remove all Adjustment plates.

## 6.4 Connect Power and Data Cables

This section is a guide to power in the Power bar and the data connection to the Hub boards

| | | |
|---|---|---|
|  | **Warning!**<br>Only trained personnel, such as electricians or NEC personnel, may connect the internal power supply to mains power supply. |  |

*Table 10: Cable Connection Requirements*

| | |
|---|---|
| **No. of People** | 1 |
| **Prerequisites** | Cabinets securely installed<br>Mains power not connected |
| **Tools** | Screwdriver |
| **Equipment** | External power cable (not included in delivery)<br>Data cables from LED Wall to NovaStar Controller (Cat cable, FTP Cat5e) |

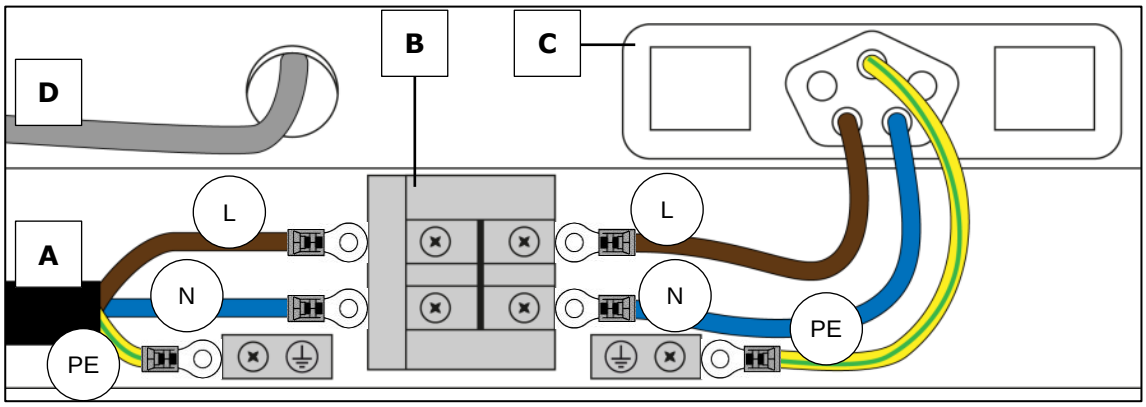



*Figure 56: Connections in Power Bar*

A External power input
B Terminal in Power bar
C Power supply socket in Power bar
D Data cable

### 6.4.1 Connect Data Cables

Step 1) Prepare the data connection according to the cabling plans, see 15.1 Cable Plans. Each column of cabinets needs one data input cable from the video controller.

Step 2) Run the data cable (see Figure 56, D) from the video controller through the Power bar to the first Hub board of a column.
Push the cable through the hole in the Power bar.

Step 3) Connect the data input to the left Ethernet ports on the Hub board.

Step 4) From the first Hub board, connect the short CAT cable to the next Hub board in the cabinet above.
Push the cable through the hole in the cabinet.

Step 5) Repeat this procedure for the rest of the cabinets and cabinet rows.

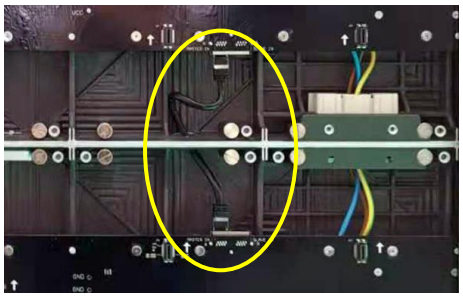


Figure 57: Connecting Two Cabinets

### 6.4.2 Connect Power Cables to the Power Bar

Step 1) Prepare the power connection according to the cabling plans, see 15.1 Cable Plans. Each column of cabinets is wired to one terminal in the Power bar.

Step 2) Connect the conductors of the external power cables (L, N, PE) to the terminals in the Power bar. See also Figure 56.
Connect each conductor (L, N, PE) to its appropriate terminal (L, N, PE). The coloring and the positions may differ from Figure 56.

**Caution!**

Risk of electric shock and product damage.
Ensure the Power bar and the whole LED Wall are properly grounded before putting it into use.

### 6.4.3 Check the Power Supply and Data Connection of the Modules

With the NovaLCT software, you can check whether the power supplies of each module work properly and whether the data transmission between the cabinets works properly.

Step 1) Install the Software, see 7.2 Install Controller Software NovaLCT.

Step 2) Load the screen files, see 7.3 Configure the Screen in NovaLCT.

Step 3) Connect the LED Wall to mains or turn it on.

Step 4) Follow 8.3 Monitoring, section 8.3.2 to 8.3.3.
If you find an error, check the wiring and the connection of the Power supply sockets.

Step 5) Separate the LED Wall from mains power to continue safely with the installation.

## 6.5 Install Overframes and Power bar cover

The Overframes protect the LED Wall from any dust or other particles that could come in through the holes on the sides and the top.

Inside the Overframes are slot nuts. The Overframes are attached to the LED Wall via screws, which go through the Screw connection anchors into the slot nuts.

**Info**

It is easier to install the Overframes first and later the Pixel cards. However, if the Pixel cards are already installed, only a few Pixel cards need to be taken out to install the Overframes. The pictures also show the procedure with installed Pixel cards.

This section is a guide through the assembly of the frame and its installation on the LED Wall.

*Table 11: Overframe and Power bar cover Installation Requirements*

| | |
|---|---|
| **No. of People** | 2 |
| **Prerequisites** | Cabinets<br>Enough space in front of LED Wall to assemble frame |
| **Tools** | Screwdriver<br>Allen key<br>Service tool |
| **Equipment** | Frame covers:<br>• Corner frame bottom (left, right)<br>• Overframe (left, right) (LED Wall)<br>• Overframe (top)<br>• Corner frame top (left, right)<br>• Power bar cover |

Step 1) Attach the Corner frame bottom (left, right) (A) to the Power bar on both sides.

Step 2) If the Pixel cards are already installed:
Place the Overframes (left, right) next to the edge of the LED Wall.
With the Service tool (Figure 101, p. 76), remove those Pixel cards that cover the Screw connection anchors (B) that connect to the Overframes (left, right).
You need to have access to the Screw connection anchors (B) from the inside of the cabinet.

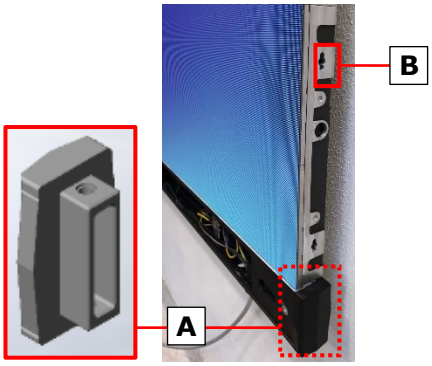



*Figure 58: Installing Corner frame bottom (left, right)*

Step 3) Before mounting the Overframes on the LED Wall, assemble the frame on the ground in front of the LED Wall.

Step 4) Attach the Corner frame top (left, right) to the Overframe (top) with the pre-installed screw (D).

Step 5) Attach the Overframes (left, right) to the Overframe (top) and links with the pre-installed screw (D)

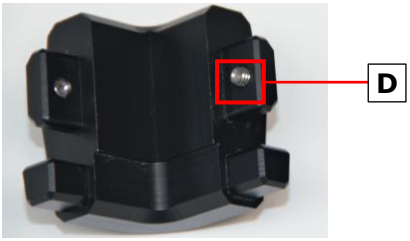



*Figure 59: Corner frame top (left, right)*

Step 6) With two people, carefully lift the Overframes and place it onto the LED Wall.

*Figure 60: Installing Overframe (top)*

Step 7) Align the slot nuts in the Overframes with the Screw connection anchors.
Ensure there is no gap between the Overframes (left, right) and the Corner frame bottom (left, right).

*Figure 61: Installing Overframe (left, right)*

Step 8) Attach the Overframes (left, right) to the LED Wall by screwing the M8×16 screws (C) through the Screw connection anchors into the slot nuts.

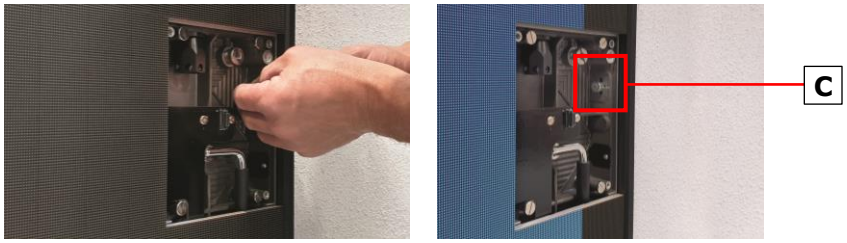



*Figure 62: Fastening the Overframe (left, right)*

Step 9) Slide the hooks on Power bar cover plate into the vertical key holes (E) on the Power bar.
Push the Power bar cover plate firmly to the right so it stays in place.

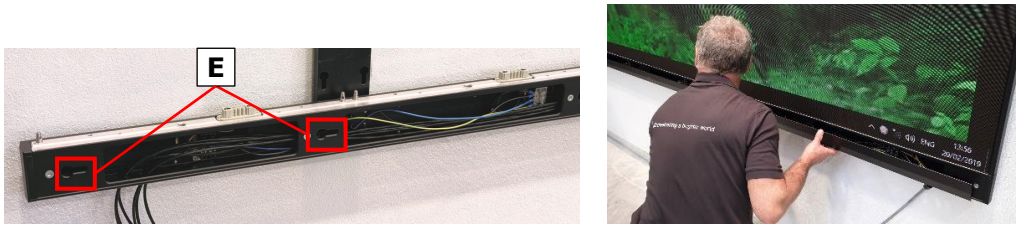



*Figure 63: Installing Power Bar Cover Plate*

## 6.6 Install Pixel Cards

This section is a guide to the installation of the Pixel cards.

*Table 12: Pixel Card Installation Requirements*

| | |
|---|---|
| **No. of People** | 1 |
| **Prerequisites** | Cabinets installed, levelled, locked and connected<br>Check to ensure Power supply & Ethernet are connected |
| **Tools** | ESD gloves<br>Service tool<br>  <br>*Figure 64: Service Tool* |
| **Equipment** | Pixel cards |

| **Notice** |
|---|
| Use the included white ESD gloves when handling Pixel cards to prevent static electricity from the human body and contamination due to finger oils, perspiration salts, flaking skin, and/or other forms of human excretory secretions.<br>The LED modules and their electrical components are sensitive to biological agents and exposure to such risks degradation of materials and performance.<br>Eliminate any static electricity from your body before touching the Pixel cards by touching an aluminum sash, a door knob, or some other metal object. |

Pixel cards use a combination of magnets (Figure 65, B), corner click-pins (A) and the Pixel card connector (C) to attach to the cabinets.

No cable connections are required to install Pixel cards.

Install the Pixel cards in the locations indicated in Figure 66. Follow the steps below.

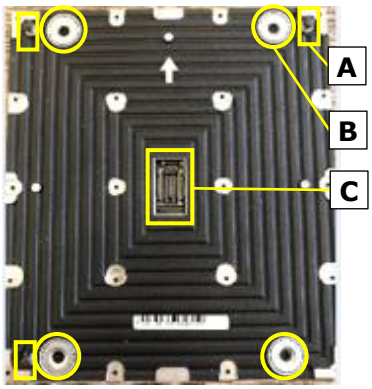



*Figure 65: Pixel Card*

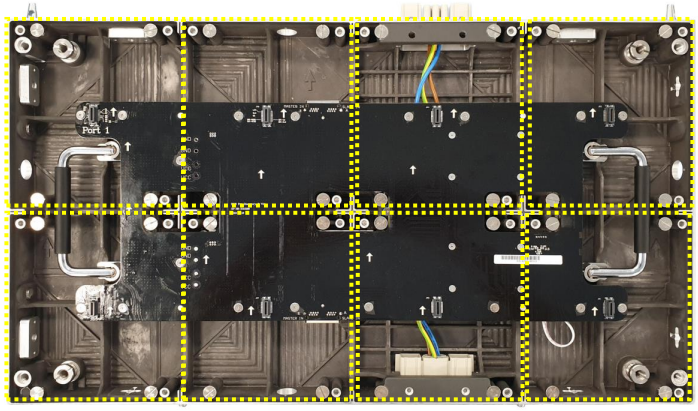


*Figure 66: Pixel Card Positions in a Cabinet*

Step 1) Remove the Adjustment plates.

Step 2) Install the Pixel cards.
Mount 4 × 2 Pixel cards onto each cabinet. Start with the bottom row, then top row.

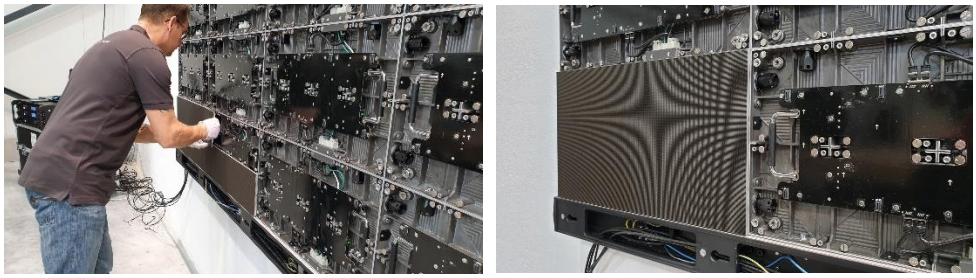


*Figure 67: Installing the Pixel Cards*

Step 3) Ensure that the surface of the LED Wall is even.

Step 4) If a Pixel card sticks out, minimize the protrusion with the level screws (A) in the cabinet.

a) Remove the Pixel card with the Service tool (Figure 101, p. 76).

b) Adjust the level screws in the cabinet.

c) Re-install the Pixel card and check if it is level to the other Pixel cards.

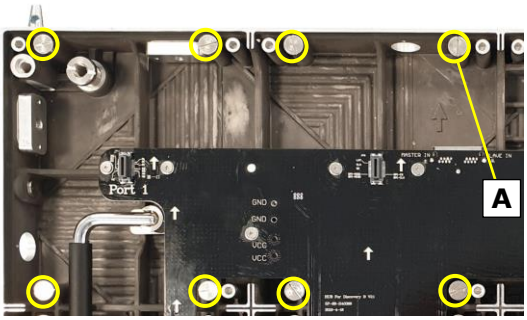



*Figure 68: Level Screws*

The LED Wall is completely installed.

# 7 GETTING STARTED

After mounting the LED Wall, check all cable connections and ensure they are connected according to 15.1 Cable Plans. The cable plans also include the connection between a computer and the NovaStar Controller.

## 7.1 Info on the Connection Setup

**Warning!**

Only trained personnel, such as electricians or NEC personnel, may connect the internal power supply to mains power supply.

Power input for the LED Wall is provided by connecting the Power bar to the electric power system of the building. Ensure there is a possibility to switch the power for the LED Wall on and off.

Data input is provided by connecting the Power bar to a NovaStar Controller. The NovaStar Controller is connected to a content computer, which provides the content data, and to a service computer, which provides data about how the content is displayed on the screen.

**Notice**

The NovaStar Controller is no product of NEC DISPLAY SOLUTIONS.
For detailed information on the NovaStar Controller, see the respective manual for NovaStar Controller MCTRL660 PRO. Download the current version at:
https://www.novastar.tech/download/download-controller/

## 7.2 Install Controller Software NovaLCT

To configure and check the functions of the controller, you need to install the software NovaLCT. The software installation package is delivered via USB flash drive.

The software allows you to perform screen configuration, brightness adjustment, calibration, display control, monitoring, etc. To install the software, follow the steps below:

Step 1) Connect the delivered USB flash drive to your computer.
Step 2) Open the USB flash drive.
Step 3) Navigate to the executable installation file **NovaLCT.exe**.
Step 4) Click the **NovaLCT.exe** file to start the installation of the software.
Step 5) Follow the instructions of the installation wizard to complete the software installation. If the firewall prompt appears, allow the installation.

**Notice**

Deactivate the antivirus software during the installation.

## 7.3 Configure the Screen in NovaLCT (Loading scr-Files)

The software installation package includes a defined Configuration setup. Before you finish the installation of the LED Wall, you have to configure the Sending cards, the Receiving cards and the Calibration Settings.

Step 1) Start the software NovaLCT.

Step 2) Click the **User(U)** register and select **Advanced Synchronous System User Login(A)** (see Figure 69).

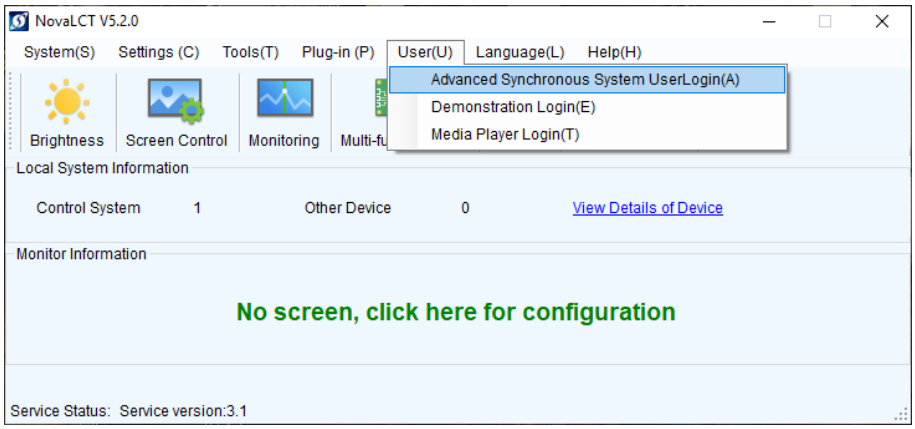



*Figure 69: Advanced User Login*

Step 3) Enter the password into the **Password** field. The default password is **admin**.

Click the **Login** button to confirm the entry (see Figure 70). The start screen refreshes automatically.

Result: If the login is successful, the interface below will appear (see Figure 71).

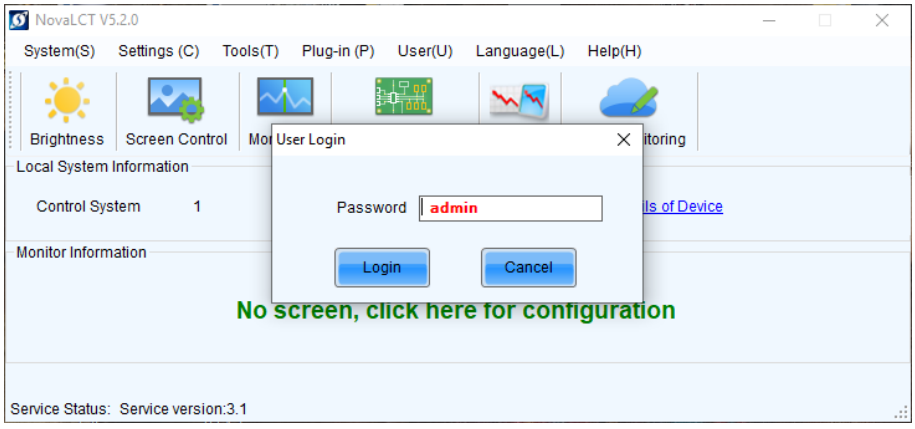



*Figure 70: Entering Password*

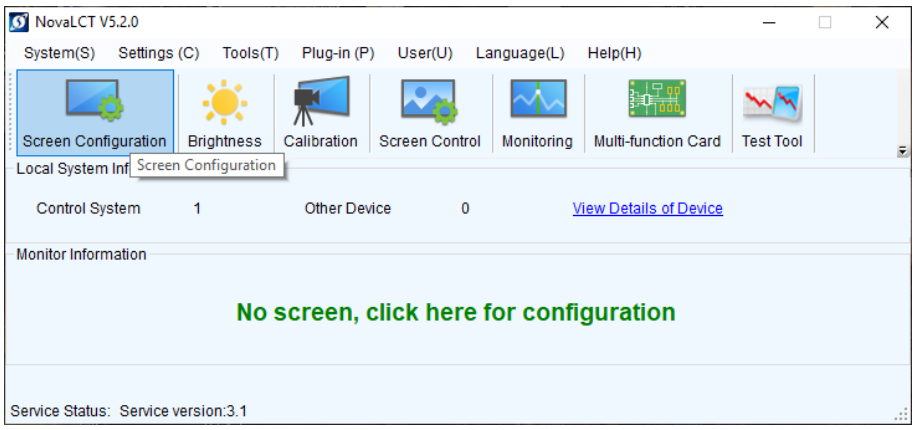



*Figure 71: Interface after Successful Login*

Step 4) Click the **Screen Configuration** menu button.
Result: Screen Configuration opens. The pop-up opens (see Figure 72):

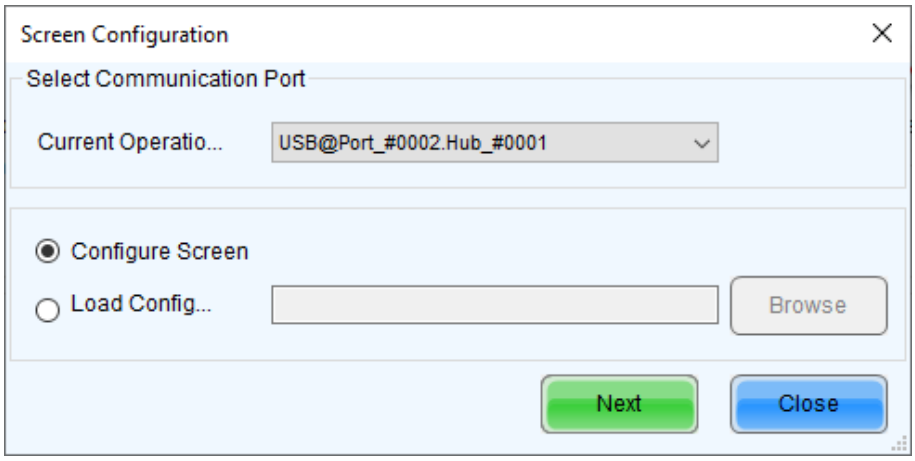



*Figure 72: Pop-Up Configurating the Screen Connection*

Step 5) Click the **Next** button. The screen refreshes (see Figure 73).

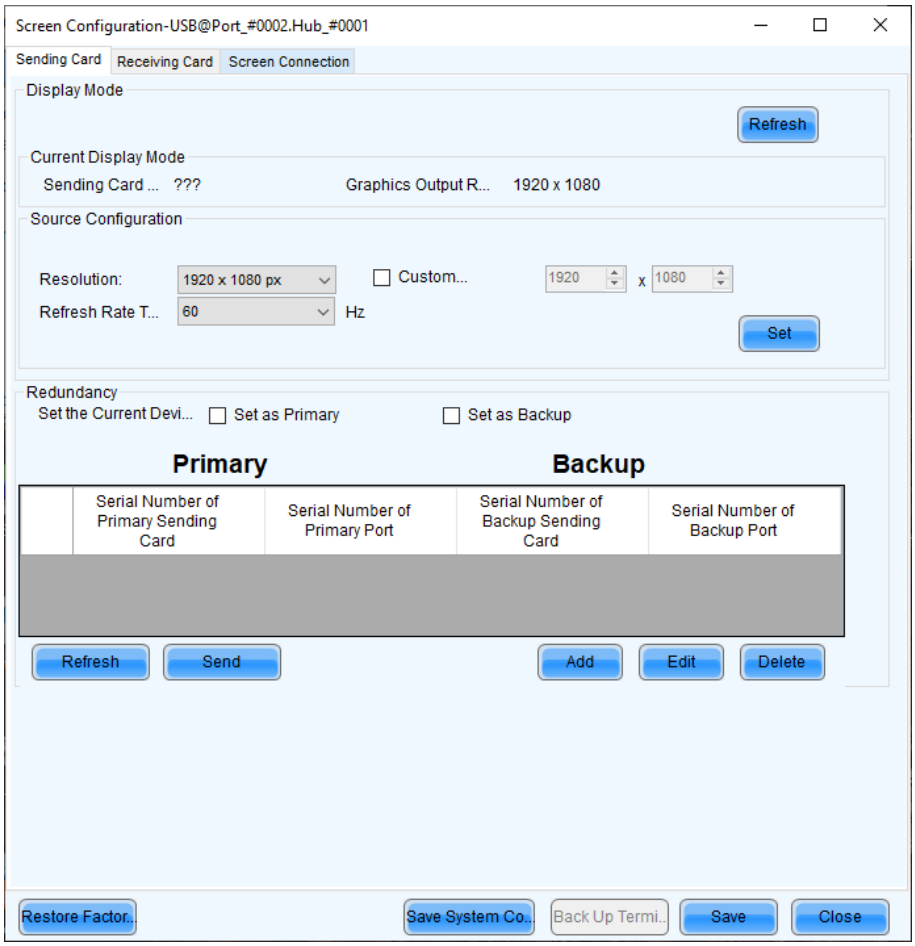



*Figure 73: Start Screen Configuration – Register Sending Card (Default View)*

Step 6) Switch from **Sending Card** tab to **Screen Connection** tab (see Figure 74).

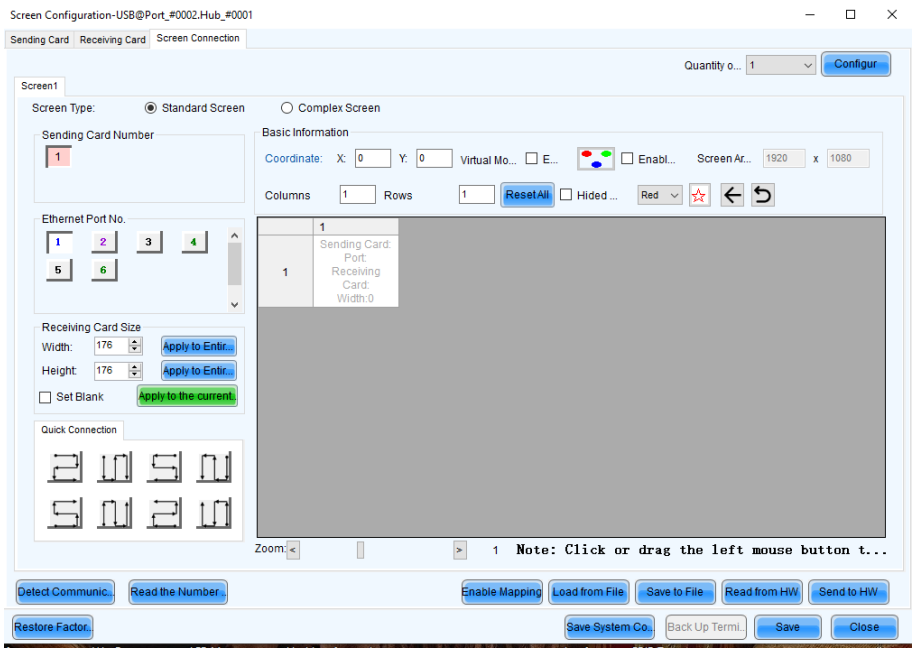



*Figure 74: Start Screen – Screen Connection (Default View) before Configuration*

Step 7) Click the **Load from file** button (see Figure 74).

Step 8) Select the **scr-file** from the delivered USB flash drive and click **Open** button, confirm the loading message with **OK** button.

Result: The scr-file will be loaded.

Step 9) Click the **Send to HW** button to save the configuration. Confirm the upcoming pop-up message with **OK**.

Result: The scr-file will be saved. After restart, the configuration is available.

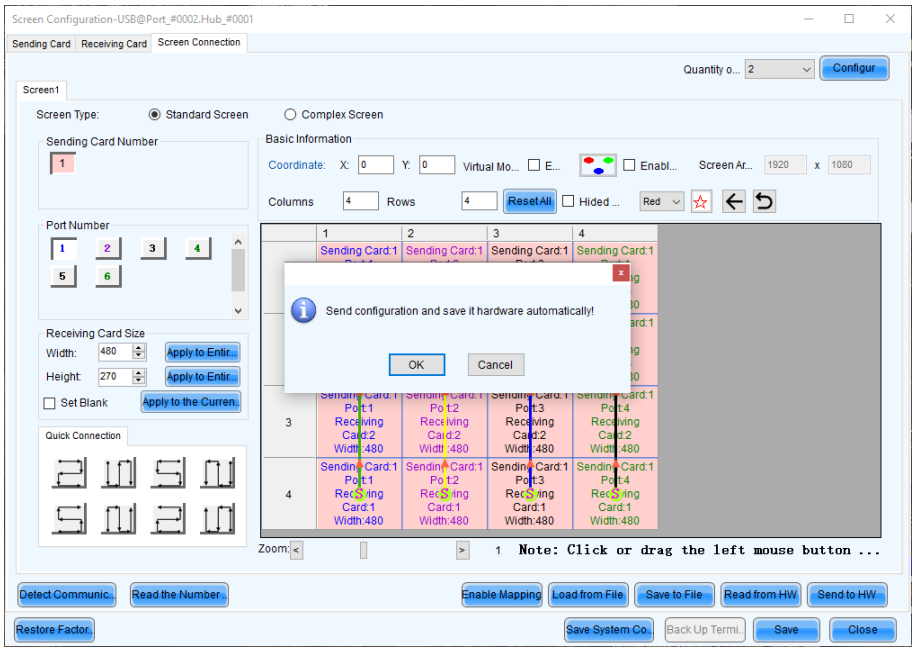



*Figure 75: Save Configuration*

| **Notice** |
| --- |
| If you do not save the configuration, the system will start with the default settings. |

Screen Setup is finished. See the settings for each bundle below (see Figure 76 and Figure 77).

Step 10) Close the software by clicking **X** button or the **Close** button.

**Settings for bundles 4×4, 5×5 and 6×6**

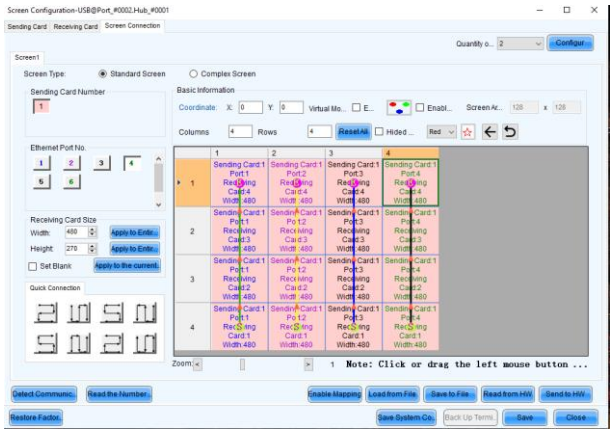


*Figure 76: Screen Settings for 4×4 Controller*

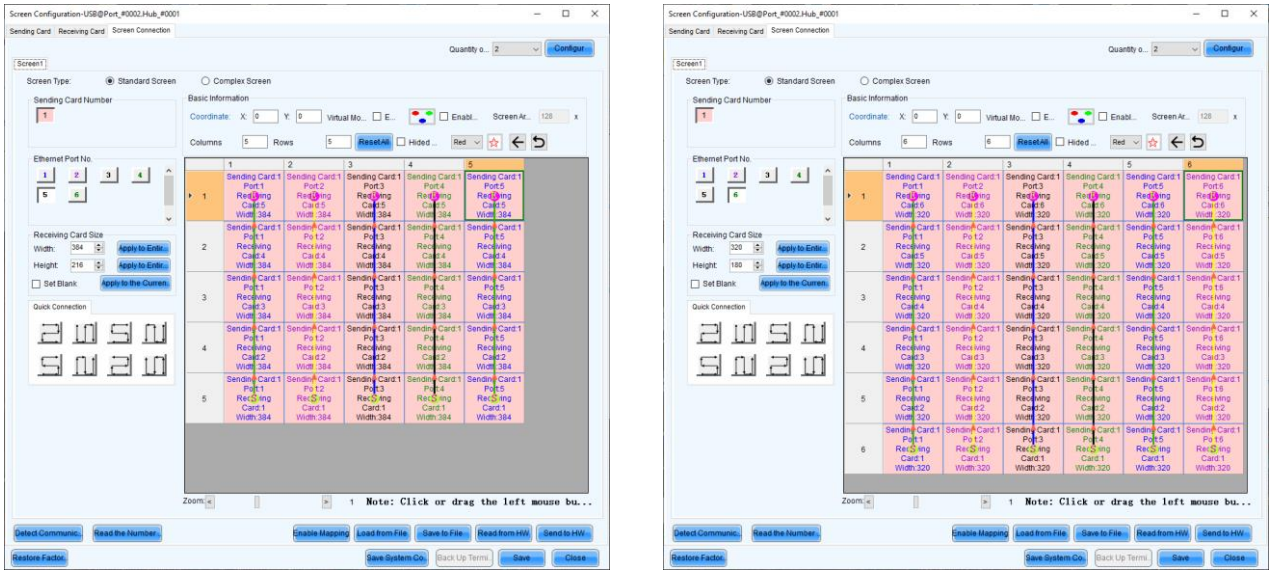


*Figure 77: Screen Settings for 5×5 Controller (left) and 6×6 Controller (right)*

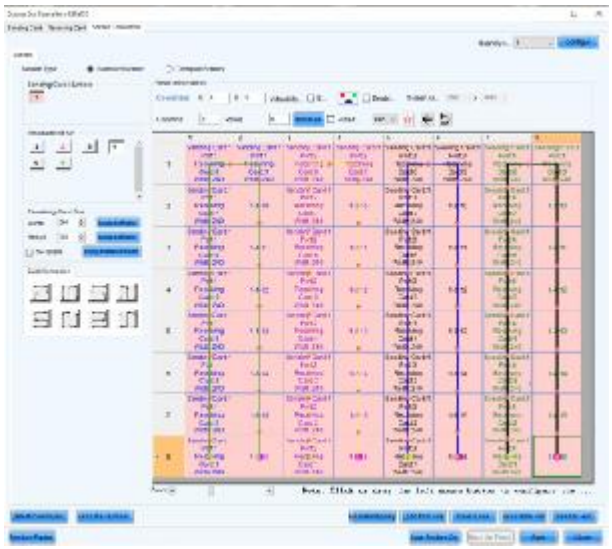


*Figure 78: Screen Settings for 8×8 Controller*

## 7.4 Update the Calibration Data after Installing All Pixel Cards

Step 1) Login as Advanced User.

Step 2) Click the **Calibration** button. The screen refreshes automatically (see Figure 79 and Figure 80).

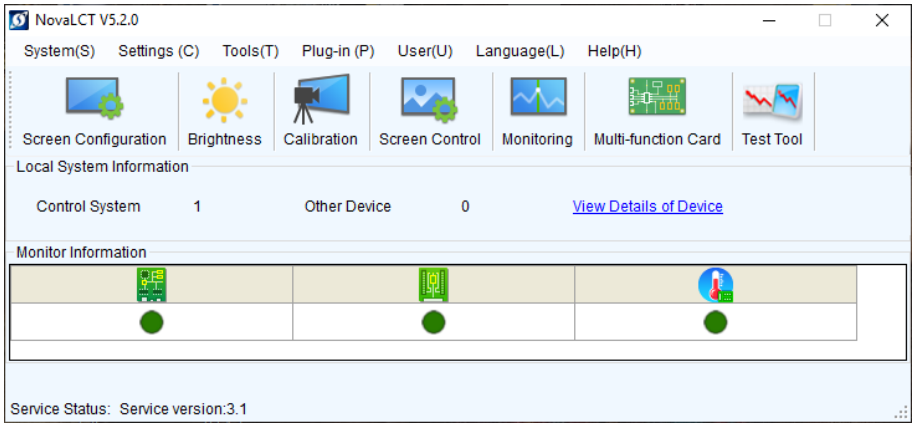



*Figure 79: Start Screen – Starting Calibration*

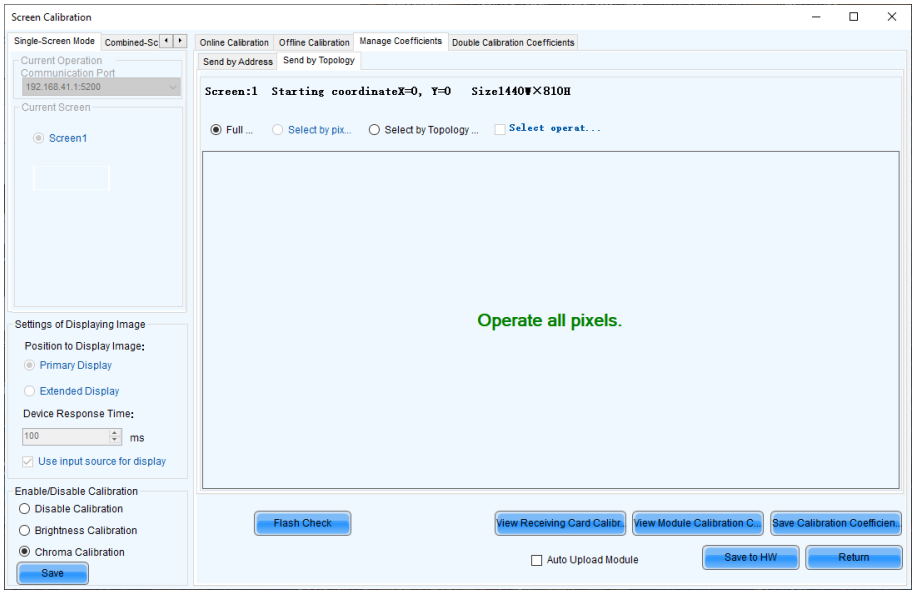



*Figure 80: Start Screen for Screen Calibration*

Step 3) Select the **Screen1** radio button.

Step 4) Click on the **Manage Coefficients** tab (see Figure 81).

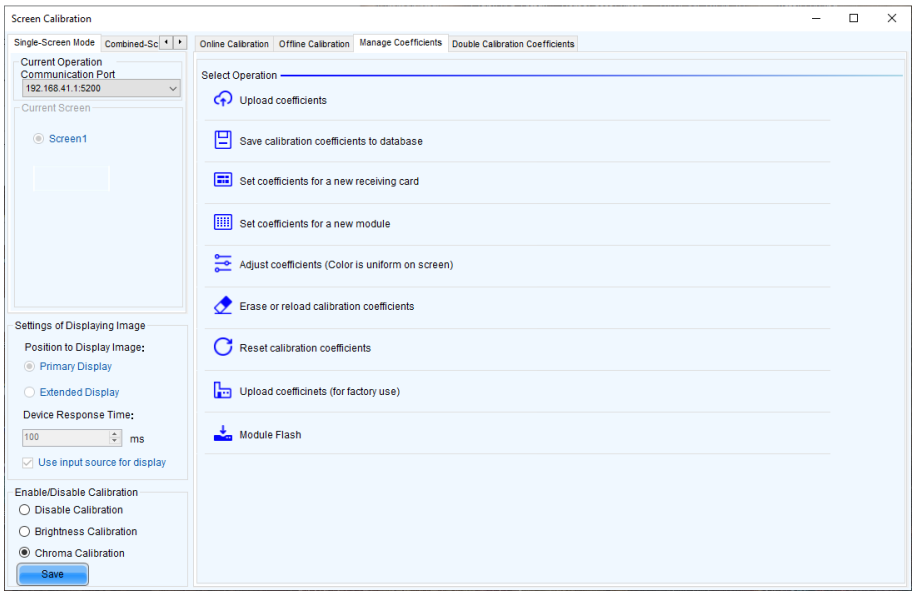



*Figure 81: Screen Calibration – Register Manage Coefficients*

Step 5) Click on **Module Flash**.
Result: The module flash options will appear (see Figure 82).

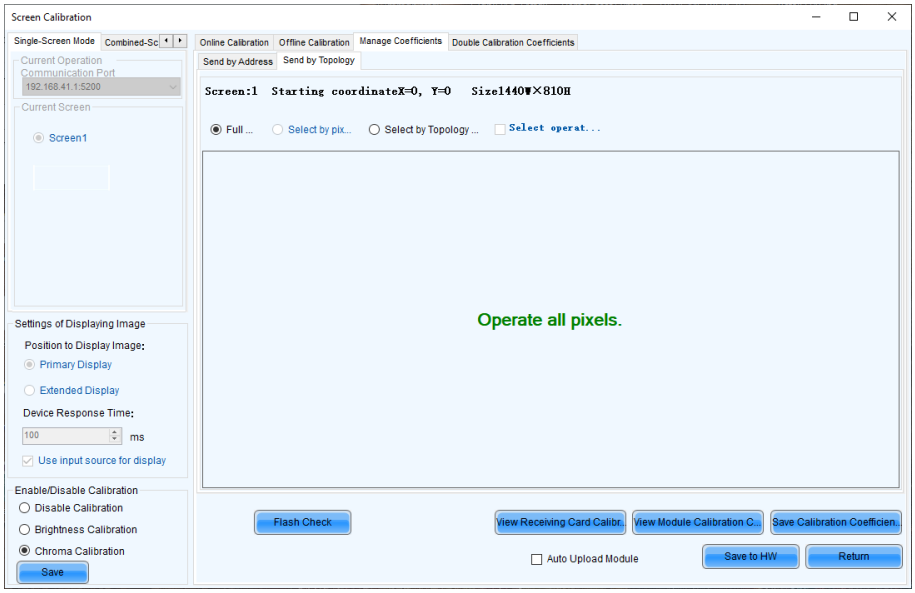



*Figure 82: Starting Screen Module Flash*

Step 6) Click the **View Module Calibration Coefficients** button.
Result: Pop-up message opens (see Figure 83).

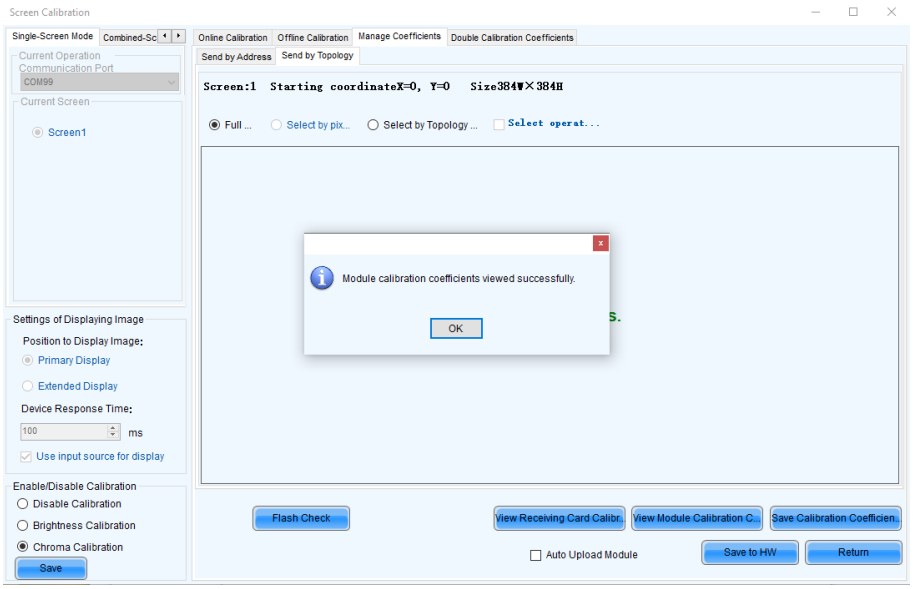



*Figure 83: Flash Module after loading Module Calibration Data*

Step 7) Click **Save Calibration Coefficients to Receiving Card**.
The pop-up message, that the data has been successfully stored to the Receiving cards, will appear (see Figure 84).
Result: The screen with the exchanged Pixel cards should look calibrated now.

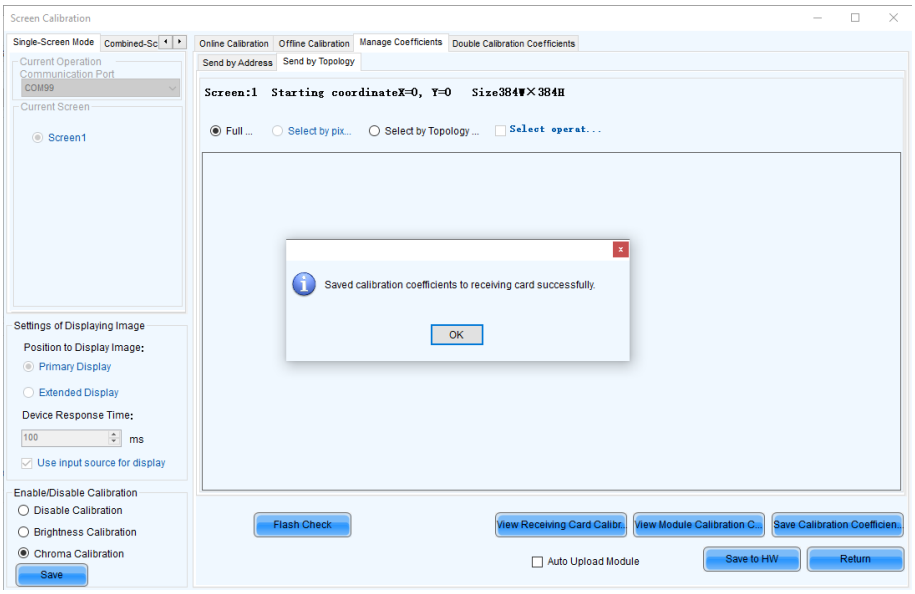



*Figure 84: Flash Module after saving Module Calibration Data*

Step 8) Click on **Save to HW** button and go back to main window by clicking **X** button.

Step 9) Repeat all steps for Screen 2. Click on the **Return** button to be able to select Screen 2 and re-open **Module Flash**

Step 10) Check the calibration-state in the bottom left corner of Screen Calibration window: Enable/Disable Calibration (see Figure 85).

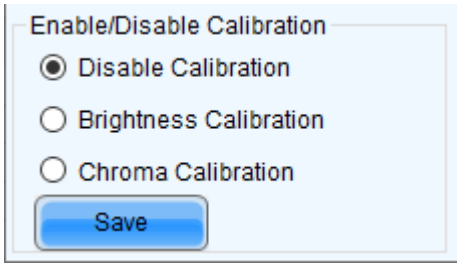



*Figure 85: Calibration is disabled*

Step 11) If calibration-setting **Disable Calibration** is chosen, switch to **Chroma Calibration** to enable calibration and click on the **Save** button (see Figure 86).

Result: While switching you will already see calibration effect.

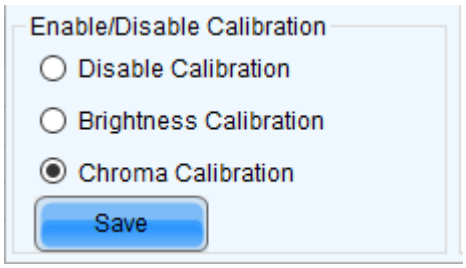



*Figure 86: Calibration is enabled*

Step 12) Close Screen Calibration windows by clicking on the X.

Result: The Screen Calibration has been finished for both screens.

# 8 SOFTWARE NOVALCT

Control, configuration and calibration of the LED Wall is managed by NovaLCT Software.

For detailed information, see the respective manual for NovaLCT Software. Download the current version at:

https://www.novastar.tech/download/download-software/

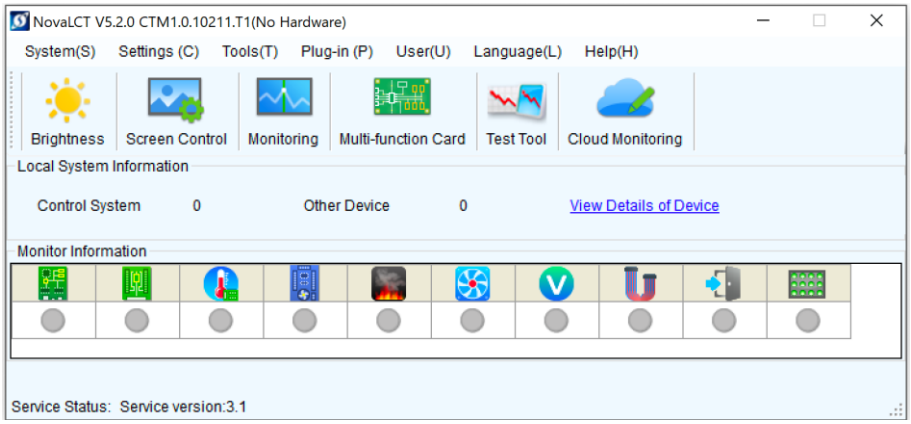
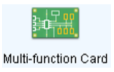



*Figure 87: Start Screen Software NovaLCT*

## 8.1 Function Overview

*Table 13: Main Menus and Functions*

| Menu | Description | | |
|---|---|---|---|
| **System** | Reconnect | | Reconnect the NovaLCT to the synchronous system. |
| **Settings** | Screen Configuration (Advanced User) |   | Configure the LED screens. |
| | Brightness |   | Adjust the brightness of the LED display. There are two ways for brightness adjustment, automatic brightness and manual brightness. |
| | Multi-function Card |   | Open the page for Multi-function card configuration. |
| | Multiple-screen Management | | Open the page for combined display configuration. The management of brightness control and monitoring of multiple LED displays is easier when these LED displays are combined together. |
| | Hardware Information | | Check the information on the current control system for the LED display. |
| | Restore Screen | | Configure the settings for the restore screen, booting screen and no signal screen (including a disconnected network cable and no DVI signal). |
| | Advanced Color Configuration (Advanced User) | | Allows to configure the settings for:<br>• Color temperature table<br>• Factory setting (current gain, RGB brightness).<br>• Configuration color space (original color space, target color space). |

| Menu | Description | |
|---|---|---|
| | Adjust Screen Effect (Advanced User) | Enable/Disable 18-bit mode and ClearView mode. |
| | Cloud Monitoring   | Register the display screen to NovaCare. |
| | Module Flash | View correction coefficients of the Receiving card and module.<br>Save correction coefficients in the Receiving card and module.<br>Test whether Flash is normal. |
| | Receiving Card Relay (Advanced User) | Set parameters for the Receiving card relay.<br>Reset the time of the Receiving card. |
| | Configure Information Management | Import/Export all the configuration files. |
| | The Main Window Starting Position | Set the initial coordinates. |
| **Tools** | Calibration   | Calibrate the screen and manage the calibration coefficients. |
| | Screen Control   | Perform the screen control functions which include "Black Out", "Freeze" and "Normal". Besides, self-test options are also provided. |
| | Monitoring   | View the monitoring results or set the monitoring parameters. |
| | LED Error Detection | Detect LED errors after the screen has been properly configured. |
| | Multi-batch Adjustment | Adjust the brightness of the display according to the batches of cabinet. |
| | Controller Cabinet Configuration File Import | Add/Delete configuration files.<br>Modify file name.<br>Save the configuration file in hardware. |
| | Quickly Adjust Dark or Bright Lines | Adjust or restore dark or bright lines caused by cabinet splicing. |
| | Video Control | Adjust the input setting, output setting and stitching management of the video processor. |
| | Module ID Setting (Advanced User) | Perform module ID configuration to make module management easier. Some modules do not support ID configuration, please contact NovaStar's technicians for details. |

| Menu | Description | |
|---|---|---|
| | More | Includes "Reset Run Time", "Brighter Pixel Correction" and "Bite Error Detection".<br>• "Reset Run Time": Reset the run time displayed on the LCD of each cabinet.<br>• "Brighter Pixel Correction": Correct the brightness so the calibrated screen is equally bright.<br>• "Bite Error Detection": Detect the data packet loss during communication between Receiving cards. |
| **Plugins** | Test Tool   | Open all test tools (test content) for LED displays testing. |
| | Calculator | Open the Microsoft Windows calculator. |
| | External Program | Add an external program. |
| | DHCP Service | Obtain the IP address assigned by the server. |
| **User** | Advanced User Login | Log in the synchronous system with the password "admin". |
| | Enter Demonstration mode | Experience the related functions of the synchronous system. No hardware connection is required. Use the password "admin". |
| | Connect Asynchronous Terminal | Log in the multimedia player. |
| **Language** | - | Support multiple user interface languages. |
| **Help** | User Documents | View software-related user documents. |
| | Update log | View software update logs. |
| | About | View software version, company name and other information. |

## 8.2 Advanced User Login

Asynchronous users need to log in to NovaLCT as Advanced Users to configure screens as required.

Step 1) Start the software NovaLCT.

Step 2) Click the **User(U)** menu and select **Advanced Synchronous System User Login(A)** (see Figure 88).

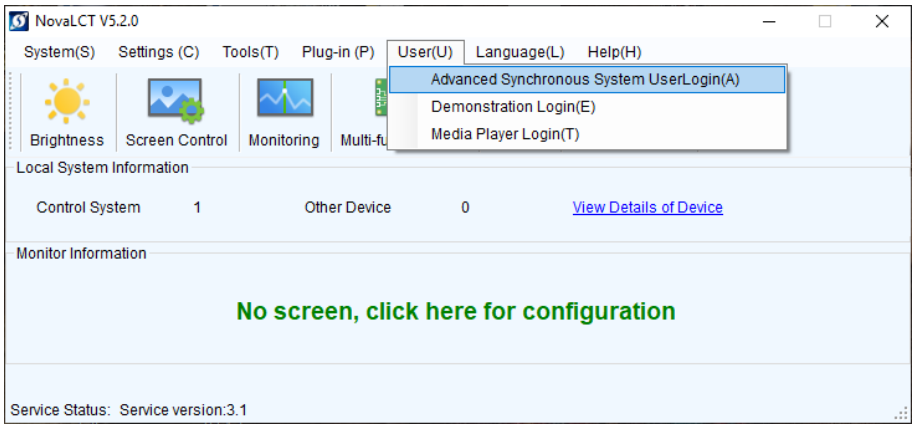



*Figure 88: Advanced User Login*

Step 3) Enter the password into the **Password** field. The default password is **admin**.

Step 4) Click the **Login** button to confirm the entry (see Figure 89).

If the Login is successful, the interface below will appear (see Figure 90).

The start screen refreshes automatically.

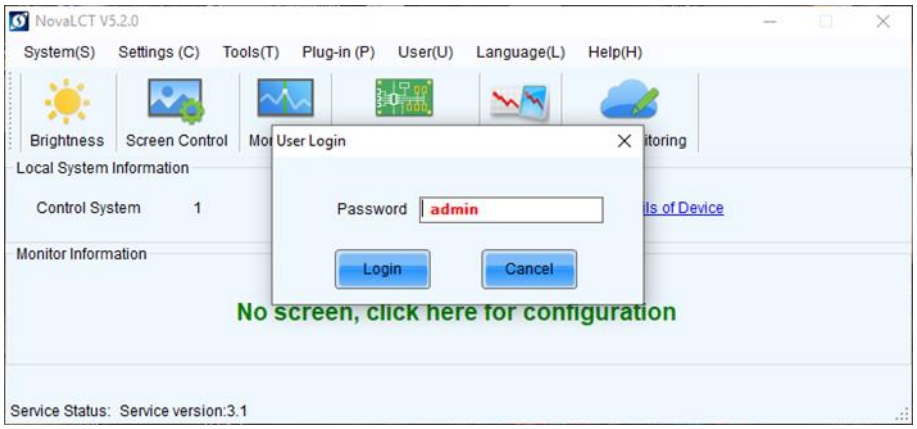



*Figure 89: Entering Password*

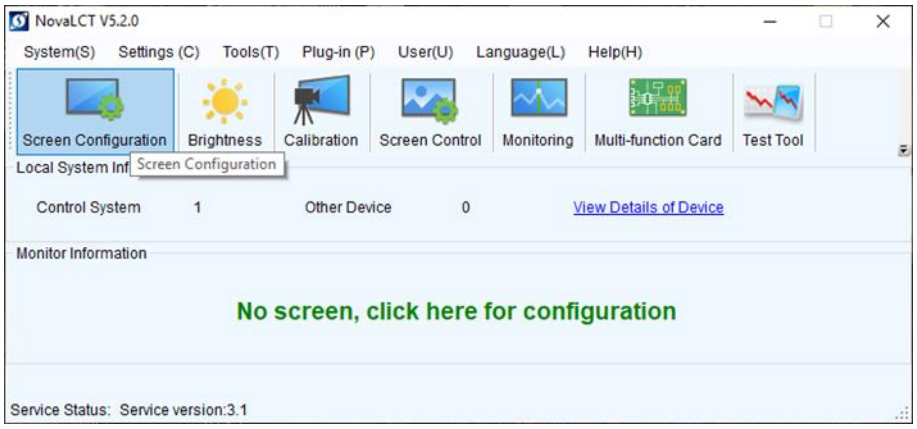


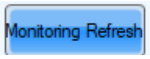
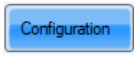

*Figure 90: Interface after successful Login*

## 8.3 Monitoring

NovaLCT supports monitoring the status of Sending cards (NovaStar Controller), Receiving cards and Monitoring cards, as well as temperature, humidity, smoke, fan, power supply, ribbon cable, cabinet door and smart module. NovaLCT is applicable to both ordinary screen and combined screen.

### 8.3.1 Function Overview

*Table 14: Monitoring – Main Functions*

| Menu | Description | | |
|---|---|---|---|
| **Start screen** | Sending Card |  | Check the connection of the Sending cards. |
| | Receiving Card |  | Check the wiring of the Receiving card and the Power supplies. |
| | Temperature |  | Check the temperature of each module and the Operating status of each individual Power supply solution. |
| | Monitoring Refresh |  | Update the monitored data.<br>Modify refresh period and re-read times when reading the status "failed" at the refresh period interface, where in the period is the period of refreshing the monitoring data. |
| | Configuration |  | Edit the contents to be monitored and set rules for alarm. |

### 8.3.2 Start Monitoring Function

Step 1) Click the **Monitoring** button to open the monitoring interface (see Figure 91).

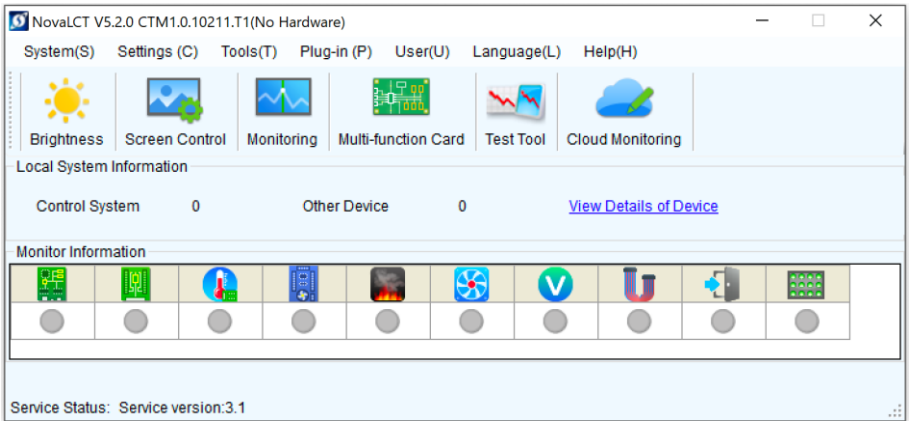



*Figure 91: Starting the Monitoring function*

Step 1) The Monitoring interface will open. By default, the Monitoring view for the Receiving cards is opened (see Figure 92).

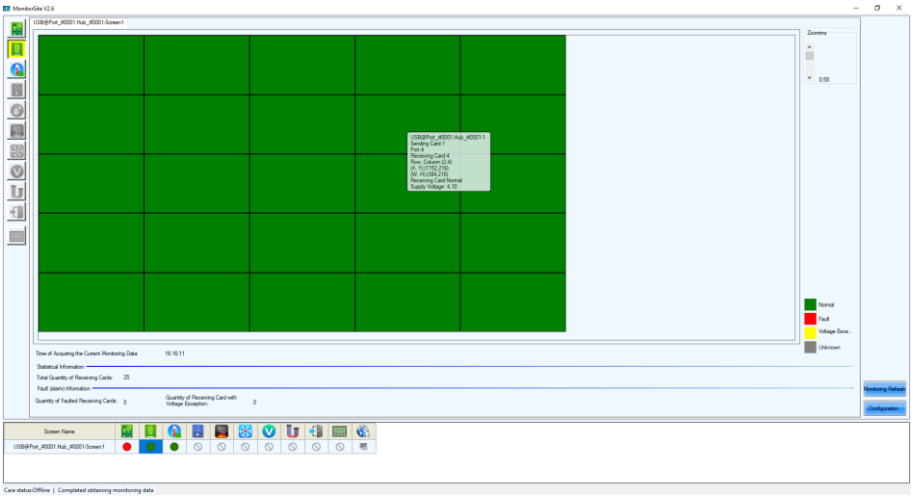


*Figure 92: Start Screen Monitoring*

### 8.3.3 Receiving Card and Power supplies

The Monitoring view of the Receiving card and the Power supplies offers checking the wiring. Errors will be shown in colored surfaces. The color codes are defined in the interface itself.

Step 1) Click the **Monitoring** button to open the monitoring interface (see Figure 93).

Result: The Monitoring interface will open. By default, the Monitoring view for the Receiving cards is opened (see Figure 94).

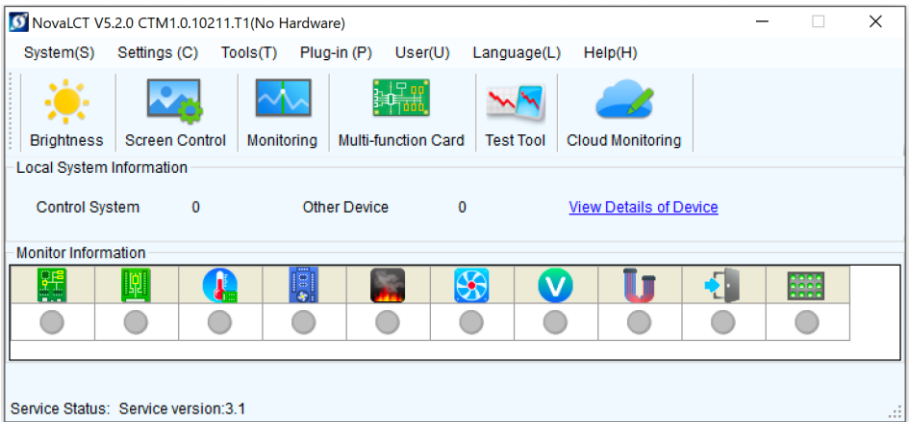



*Figure 93: Starting the Monitoring Function*

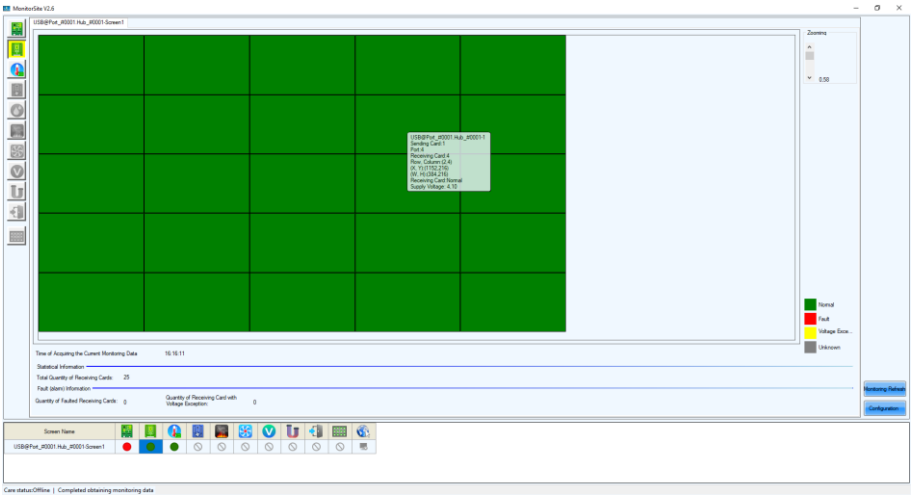


*Figure 94: Start Screen Monitoring Receiving Cards and Power Supplies*

### 8.3.4 Sending Card

The Monitoring view of the Sending card offers checking the connection of the Sending cards. Errors will be shown in colored surfaces. The color codes are defined in the interface itself.

Step 1) Click the **Monitoring** button to open the Monitoring interface (see Figure 95).

Result: The Monitoring interface will open. By default, the Monitoring view for the Receiving cards is opened (see Figure 96).

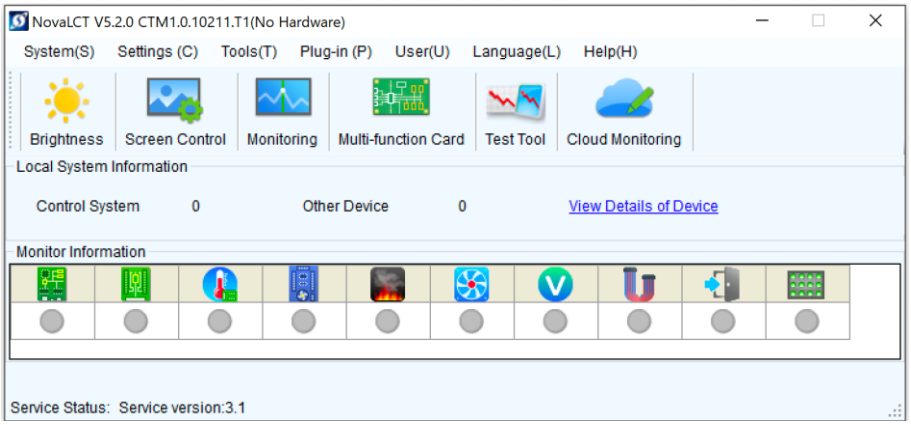



*Figure 95: Starting the Monitoring Function*

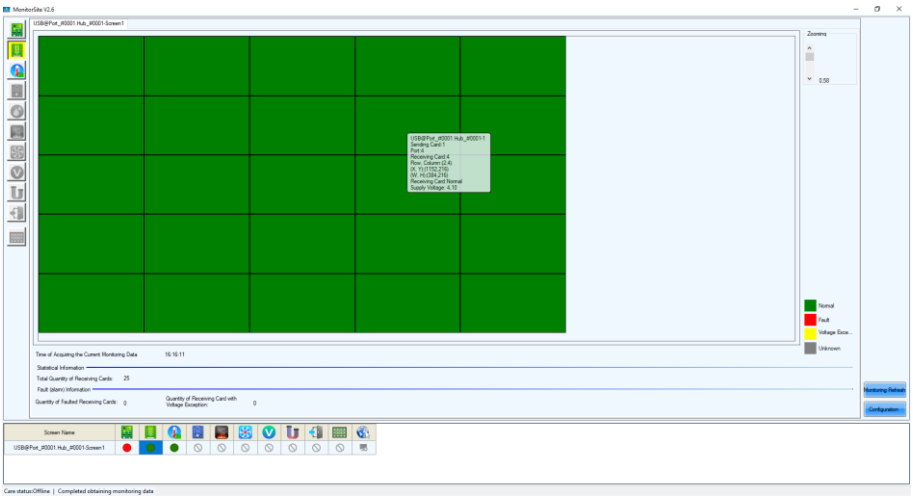


*Figure 96: Start Screen Monitoring Receiving Cards and Power Supplies*

Step 2) Click **Sending Card** button to switch to the Monitoring view for the Sending card (see Figure 97).

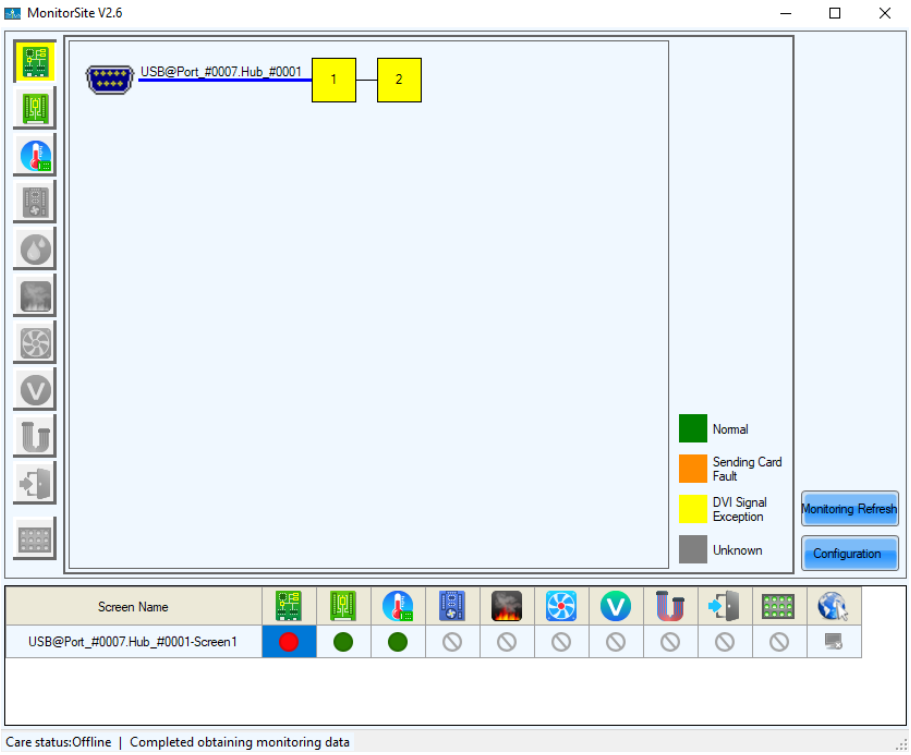



*Figure 97: Start Screen Monitoring Sending Card*

### 8.3.5 Temperature

The Monitoring view Temperature offers checking the temperature of each module and the Operating status of each individual power supply solution. Errors will be shown in colored surfaces. The color codes are defined in the interface itself.

Step 1) Click the **Monitoring** button to open the monitoring interface (see Figure 98).

Result: The Monitoring interface will open. By default, the Monitoring view for the Receiving cards is opened (see Figure 99).

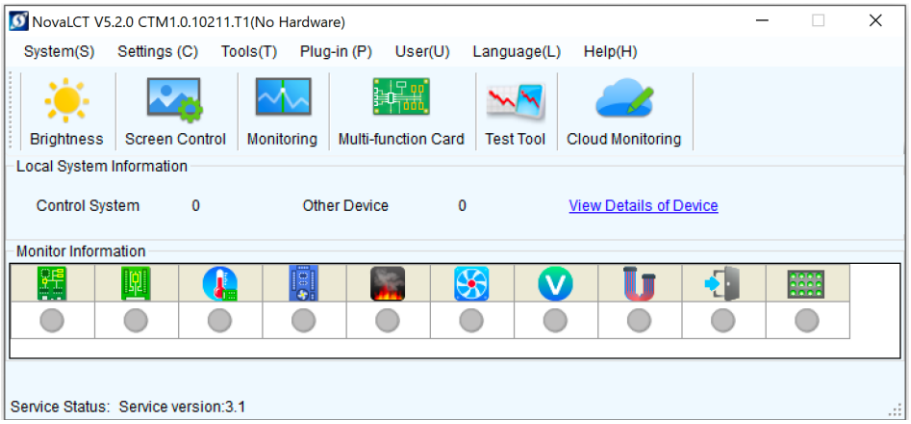



*Figure 98: Starting the Monitoring Function*

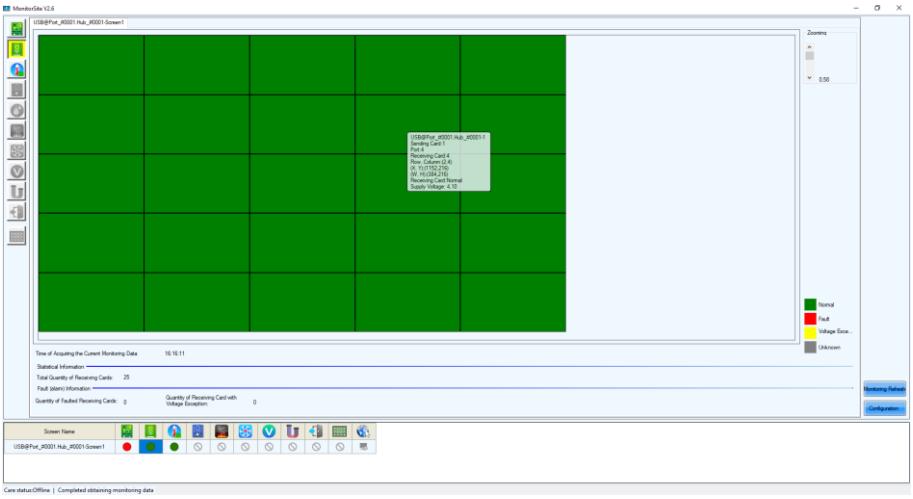


*Figure 99: Start Screen Monitoring Receiving Cards and Power Supplies*

Step 2) Click the **Temperature** button to switch to the Monitoring view for the temperature (see Figure 100).

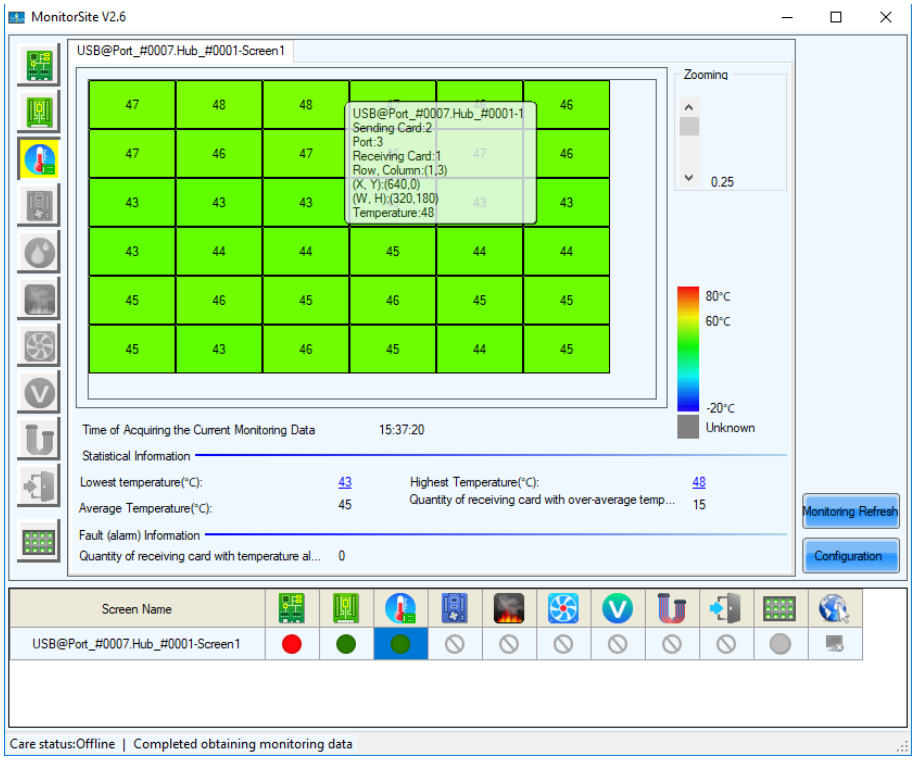
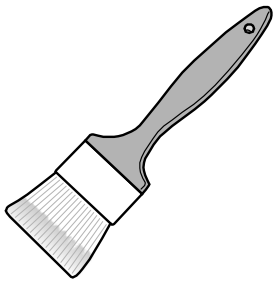



*Figure 100: Start Screen Monitoring Temperature*

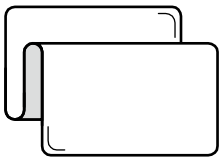
# 9 CLEANING

The screen brightness may decrease if dust or another foreign material is adhering to the surface of the pixel card.
The magnet used to install the pixel cards also attracts magnetic metal particles, such as iron powder.
Therefore, magnetic metal particles may adhere to areas near the magnet of the pixel card and the brightness homogeneity of the screen may decrease.
Cleaning should be performed regularly depending on the installation environment.

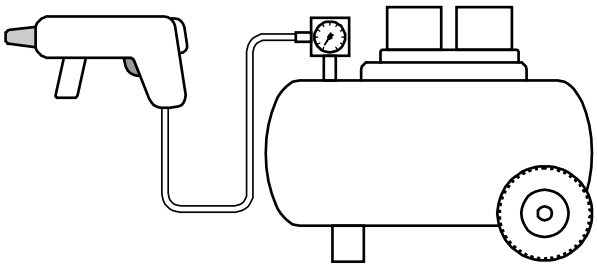
Required tools (example)



Soft brush
(animal hair brush to prevent static electricity)



Soft cloth
(that does not generate static electricity)



Air blower (compressor)

1. Cleaning method
   a) Turn the LED displays off.
   b) Use the soft brush to remove any dirt on the LED lamps and the masks. If these parts are very dirty, use the air blower to remove the dirt.
   c) Use the soft cloth to remove the dirt on the screen surface.
   d) Repeat the steps (b) and (c) to remove all the dirt.

**⚠ Caution!**

- Do not use water or any other liquid.
- Do not use a stiff brush.
- Pay attention not to damage the LED lamps when using the soft brush, the air blower, or the soft cloth.

# 10 MAINTENANCE

## 10.1 Routine Maintenance

|  | **Caution!** |
|---|---|
| | Risk of electric shock.<br>Always disconnect the FE Series LED Wall from the power outlet before performing any maintenance work. |

**Regular use**

After you put the LED Wall into use, use it 25–30 h and 5-times a month so the LED Wall stays dry and delivers a stable performance.

**Daily**

Check the LED Wall visually for physical damages.

## 10.2 Regular Cleaning

|  | **Caution!** |
|---|---|
| | Risk of product damage by moisture or water.<br>Do not clean the system with water. Do not wipe the LED Pixel cards with a damp cloth. |

| **Notice** |
|---|
| Clean the components of the LED Wall very carefully to avoid damaging the surfaces. Do not alter the cleaning procedure, otherwise pixels or Pixel cards can be permanently damaged. |

Under normal conditions the recommended cleaning interval of the LED display is every six months.

Before cleaning:

- Disconnect the LED Wall from mains power.
- Lock electric power supply against re-closure.
- If the cabinets are still warm from their latest usage, wait with cleaning until they are completely cooled down.

Cleaning:

- Use a dry, anti-static brush to sweep from right to left, means only horizontally.
- Blow-dry only the front of the cabinets with compressed air and only from a large distance.

## 10.3 Power System Maintenance

| | |
|---|---|
| | **Caution!** |
| | Risk of electric shock.<br>Do not use the LED Video Display if you detect any faults in the power supply. |

**Daily**

Check all cables visually for physical damages.

**Every six months**

| | |
|---|---|
| | **Caution!** |
| | Risk of electric shock.<br>Only qualified personnel with an electrician certificate are allowed to perform maintenance work. |

Clean the interior of the power distribution cabinet and fasten screw connections.

## 10.4 Maintenance Tools

To guarantee a smooth and easy maintenance, use the following special tools provided in the delivery package:

**Pixel Card Service Tool with Charger:**

Use the Service tool to remove the Pixel cards in a safe and easy way.

The Service tool comes with a battery and charger for wireless usage.

Ensure the Service tool is charged properly before using it.

**Usage:**

- Set the air pressure regulator on the Service tool to Max.
- Push the Service tool on a Pixel card and hold the red button (A).
- The Service tool creates a vacuum that will suck out the Pixel card.
- When it holds the Pixel Card, pull the Service tool horizontally from the LED wall towards you.

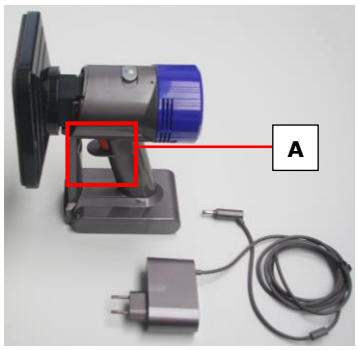



*Figure 101: Pixel Card Service Tool*

| **Notice** |
|---|
| Always put one hand below the removed Pixel card to prevent it from falling down in case the Service tool's battery dies or it releases the Pixel card too early. |

**Mask Roller:**

This roller is used to smooth the edges of the masks on the display.

*Figure 102: Mask Roller*

## 10.5 Front Service

The following instruction will guide through the exchange of all replaceable parts.

All replacements require the removal of the Pixel cards first. Replacement of power supply and Receiving cards require additionally the removal of the hub board.

| **Notice** |
|---|
| • It is essential to wear a glove at least at the hand that might touch the front of the LED cabinet, because the LEDs are very sensitive to the greasy film on the skin, and ensure ESD protection.<br>• Ensure the Service tool is charged properly before using it. |

| | |
|---|---|
| **No. of People** | 2 |
| **Prerequisites** | LED Wall is disconnected from mains power |
| **Tools** | Screwdriver PH1<br>Service tool<br>White ESD gloves<br>Foam packing material and anti-static plastic bag for the Pixel cards<br>Heat conducting paste (for servicing the power supply) |

### 10.5.1 Change the Pixel Cards

The Front service takes only 10 seconds to exchange a pixel module. This convenience is due to the unique magnet interfaces (A), corner click-pins (B) and Pixel card connector (C).

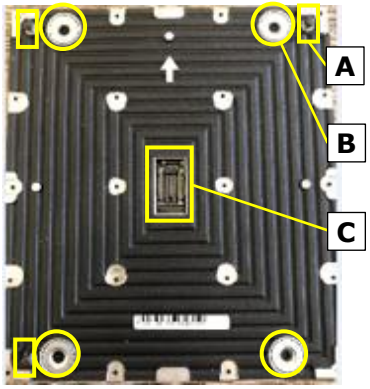



*Figure 103: Pixel Card*

| **Notice** |
|---|
| During the removal process, put your free hand below the Pixel card removal position, ready to catch it.<br>By this, you can prevent the Pixel card from falling down in case the tool's battery dies or it releases the Pixel card too early. |

Step 1) Set the air pressure regulator on the Service tool to Max.

Step 2) Place Service tool centered on the Pixel card.

Step 3) Push the Service tool on a Pixel card and keep the red button pressed so the Service tool holds the Pixel card firmly.

Step 4) Carefully pull the Service tool with the Pixel card horizontally and steady out of the LED Wall.

Step 5) Put the removed Pixel card into its foam form.

*Figure 104: Foam Forms for Pixel Cards*

After removing all Pixel cards, the cabinet looks like shown in Figure 105.

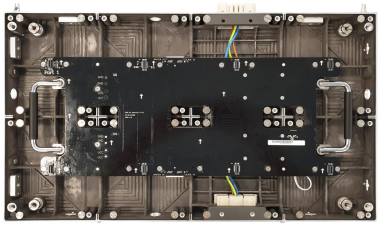


*Figure 105: Cabinet without Pixel Cards*

**Install new Pixel cards**

Step 6) Take the Pixel cards out of the spare part package.

Step 7) Place the Pixel card carefully by hand or Service Tool to the screen.

Step 8) Load the calibration data on the new Pixel card (see 7.4 Update the Calibration Data after Installing All Pixel Cards).

### 10.5.2 Remove the Hub Board

For servicing the Hub board, you need to remove the Pixel cards first (see 10.5.1).

Step 1) Disconnect the Ethernet connections (A) from the Hub board.

Step 2) Remove the 16 screws (B), which connect the Hub board to the cabinet.

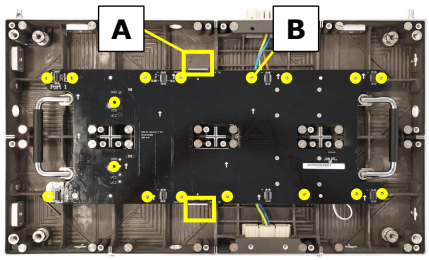



*Figure 106: Screws on Hub Board*

Step 3) Pull the Hub board straight off the cabinet. Be careful not to damage the Power supply interface (C) on the Hub board and the PSU.


Step 4) Disconnect the Signal light cable (D) from the cabinet.

Step 5) Now you can access the power supply in the cabinet and the Receiving card on the Hub board.

Step 6) Re-install the Hub board in reverse order. Take great care not to bent any connectors.

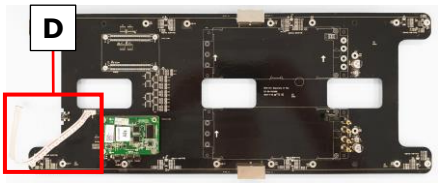
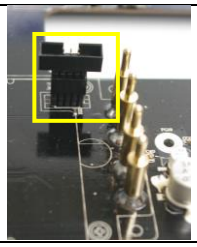



*Figure 107: Removal of Hub Board*

| | | |
|---|---|---|
| | **Caution!**<br>Risk of damaging the Hub board.<br>When reinstalling the Hub board, do not bent the two Power-good-connectors.<br>With bent connectors, the whole module cannot work properly. |  |

### 10.5.3 Change the Receiving Card

For servicing the Receiving card, you first need to remove the Pixel cards (see 10.5.1) and the Hub board (see 10.5.2).

Step 1) Pull the Receiving card straight off the Hub board. Be careful not to damage their connectors.

Step 2) Replace the Receiving card.

Step 3) To replace the Receiving card, follow the instructions in reverse order.

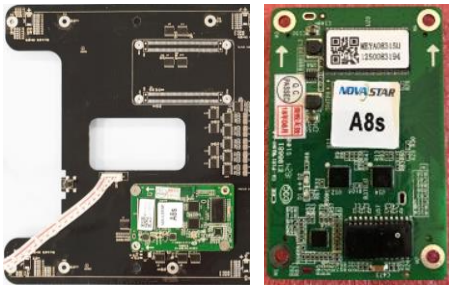



*Figure 108: Replacing the Receiving Card*

### 10.5.4 Change the Power Supply System

For servicing the power supply, you first need to remove the Pixel cards (see 10.5.1) and the Hub board (see 10.5.2). Now the power supply in the cabinet is accessible.

The following components contribute to the power supply of a module:

- 1 Power supply unit (PSU) (A)
- 1 Power distribution unit (PDU) (B1) with PDU shielding (B2)
- 1 Power supply interfaces to Hub board (C)

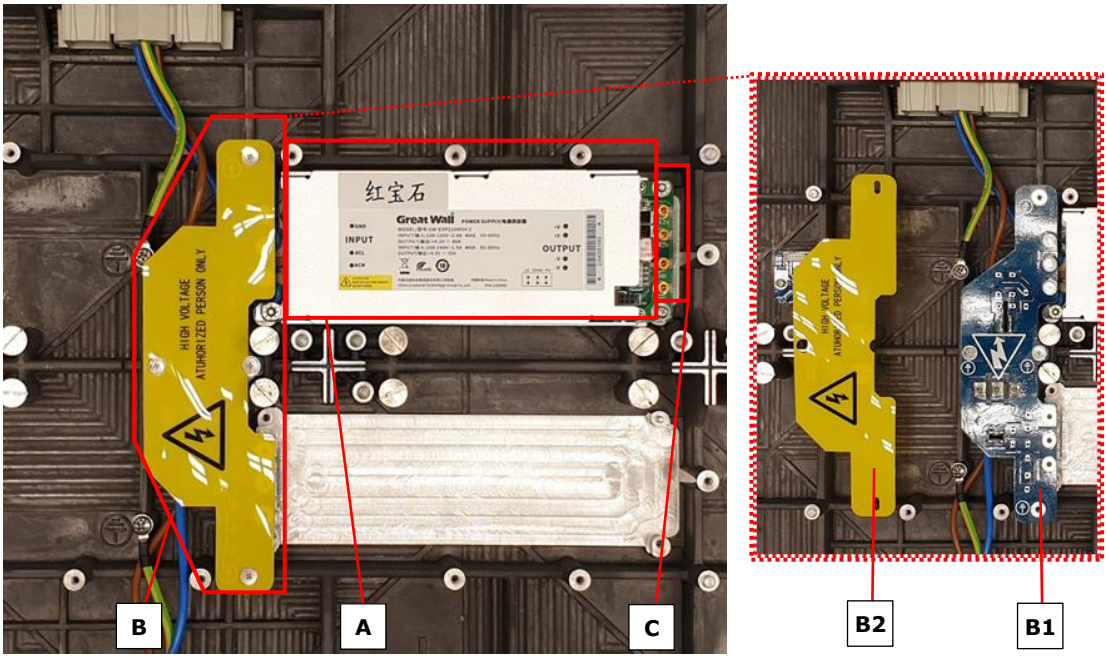
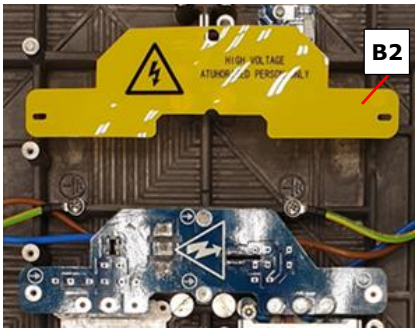



*Figure 109: Behind Hub Board –Power Supply and PDU with PDU Shielding*

**Replace the Power Distribution Unit**

Step 1) Loosen the four screws (D).


Step 2) Remove the PDU shielding (B2).




Step 3) Pull the PDU straight and carefully. Be careful not to damage the connectors to the PSU or the wiring (E).

Step 4) Disconnect the cables from the PDU's terminal (F).

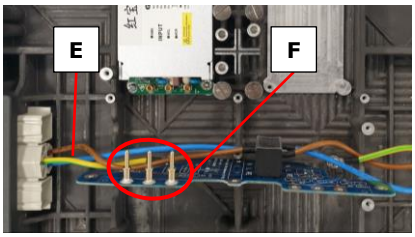



*Figure 110: Removing Shielding & PDU*

Step 5) Replace the PDU.

Step 6) To reinstall the replaced PDU, follow the steps in reverse order.

**Replace the Power Supply Unit**

To replace the PSU, remove the Power distribution unit (PDU) first. See above for instructions.

Step 1) Remove the two screws (G).


Step 2) Take the PSU carefully off.

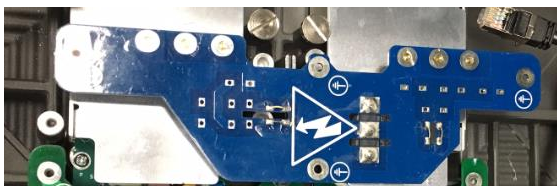
Step 3) Place the PSU upside down so the heat-conducting paste shows upwards and no other parts become dirty from it.

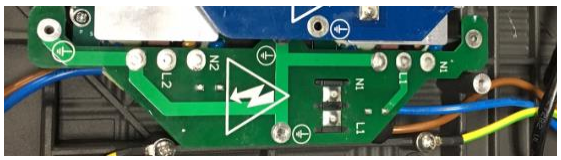
Step 4) Before replacing the PSU, distribute some heat-conducting paste on the bottom.

Step 5) Carefully place the new PSU in its dedicated spot.

Step 6) Screw in the two screws (G).

# 11 SPARE PARTS

| Part Name | |
|---|---|
| Pixel Card |  |
| Pixel Card (For 2.5 mm only) |  |
| Receiving card A8S |  |
| Receiving card A10S Plus(For 0.9 mm only) |  |
| Power supply |  |
| Power supply (For 0.9 mm only) |  |
| Data hub |  |
| Data hub (For 0.9 mm only) |  |
| AC terminal Hub |  |

| | |
|---|---|
| AC terminal Hub (For 0.9 mm only) |  |
| CAT cable |  |
| Mask (For 1.5/1.9/2.5/3.8 mm only) |  |

# 12 TROUBLESHOOTING

Table 15 summarizes the most common problems you could encounter with the appliance.

If you are unable to solve the problem with the information below, contact the NEC DISPLAY SOLUTIONS service team: LED-support@nec-displays.com

*Table 15: Troubleshooting Solutions*

| Problem | Solution |
|---|---|
| No power | Check if electric power is switched on. |
| | Check if screen is connected properly to the electric power system. |
| No picture | Adjust the contrast and brightness settings. |
| | Check if the screen saver is activated. |
| No signal input | Check the green LED of the Receiving card is flickering regularly or not (fast flickering means no signal). |
| | 1. Check if the cable connector assembly is stable. |
| | 2. Check whether the cable is short-circuited. |
| | 3. Check the power of the Receiving card. |
| | In case the above three points do not fix the problem, please exchange the Receiving card. |
| Module not working | Use a multimeter to test the module. The voltage should be 4.2 V. |

*Table 16: Signal Light Codes*

| Light | Meaning | Signal Interval [in sec] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **green** | Power supply on | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Power supply off | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| **red** | Data connection ok | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| | Data connection bad | ● [1 ms] | ● | ● | ● | ● [1 ms] | ● | ● | ● | ● [1 ms] |
| | Signal on Controller lost | ●●● | ● | ●●● | ● | ●●● | ● | ●●● | ● | ●●● |
| **blue** | not relevant | | | | | | | | | |

# 13 DISPOSAL

## 13.1 Within the European Union

**WEEE Mark (European Directive 2012/19/EU and amendments)**

**Disposing of your used product: In the European Union**
EU-wide legislation as implemented in each Member State requires that used electrical and electronic products carrying the mark (see on the left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you dispose of such products, please follow the guidance of your local authority or ask the shop where you purchased the product, or if applicable, follow applicable legislation or agreement you may have. The mark on electrical and electronic products my only apply to the current European Member States.

## 13.2 Outside the European Union

If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority and ask for the correct method of disposal.

# 14 COPYRIGHT AND DISCLAIMER

## 14.1 Copyright



## 14.2 Disclaimer

All instructions and specifications in this manual are based on information available at the time of publishing for the features and safety guidelines of the described products.

Technical specifications, measurements, weights and properties are not guaranteed.

The manufacturer reserves the right to make product alterations within legal provisions as well as changes to improve product quality.

Sharp NEC DISPLAY SOLUTIONS shall not be liable for personal injury or damage to materials caused by failure to observe this warning and safety information of this manual. Furthermore, Sharp NEC DISPLAY SOLUTIONS cannot be held responsible for damage or injury, caused by incorrect, inadequate or unsafe use, maintenance or installation of the entire system. The liability as well as the effects of the same will become void if other than genuine parts are used.

**LOCAL REGULATIONS**

**This product and assembly variants that are shown in these instructions for assembly and use may be subject to local regulations, guidelines and norms.**

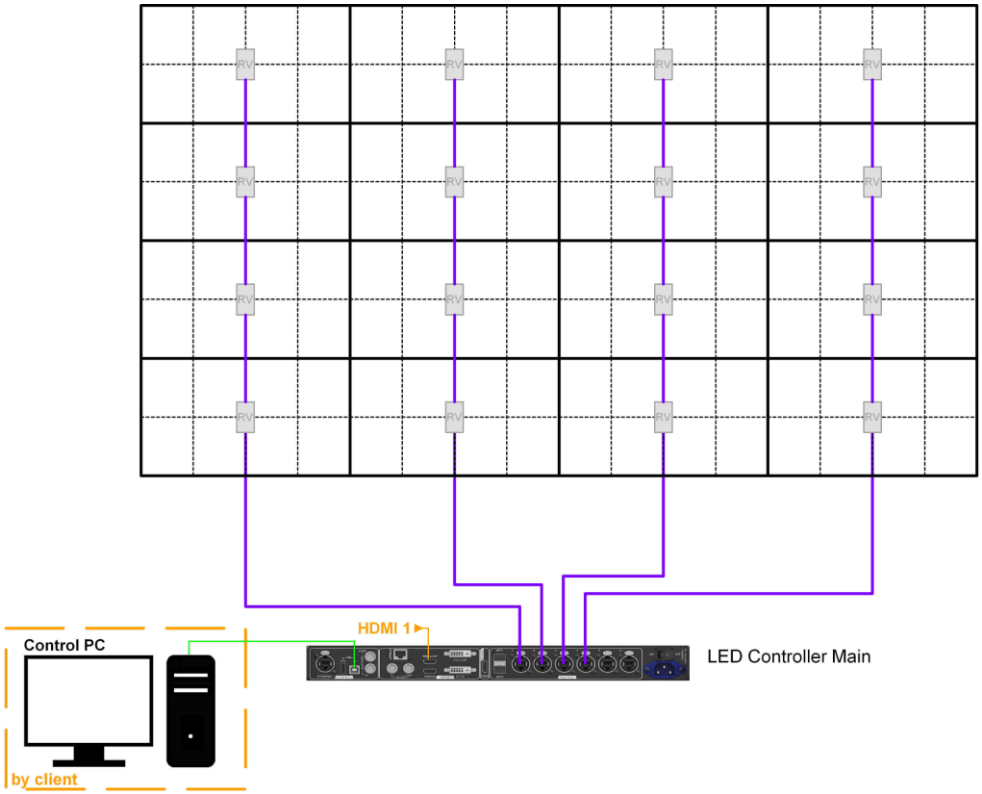
**The product use bears the responsibility for compliance to and with such regulations.**

**Subject to local regulations, we reserve the right not to supply all products illustrated here.**

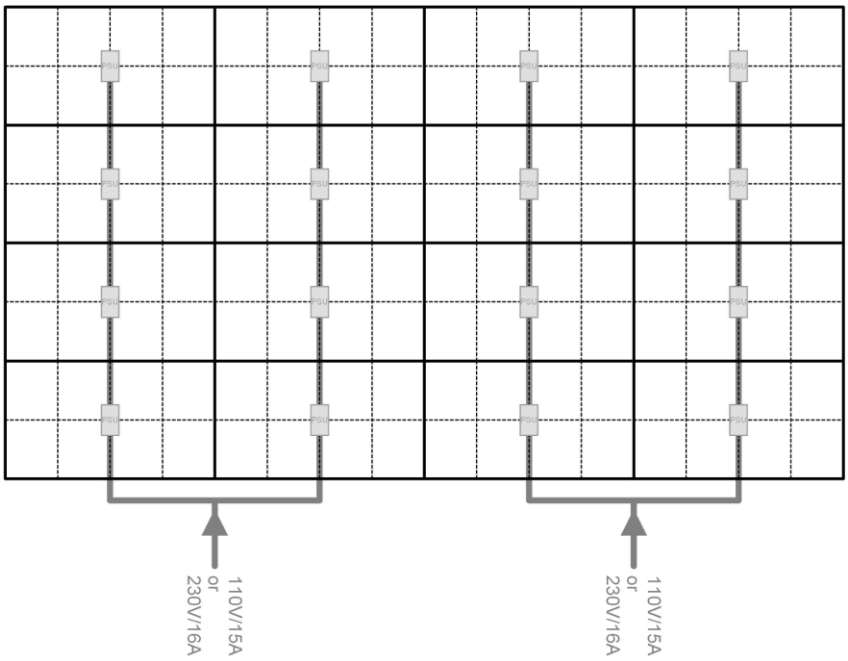
# 15 APPENDIX

## 15.1 Cable Plans

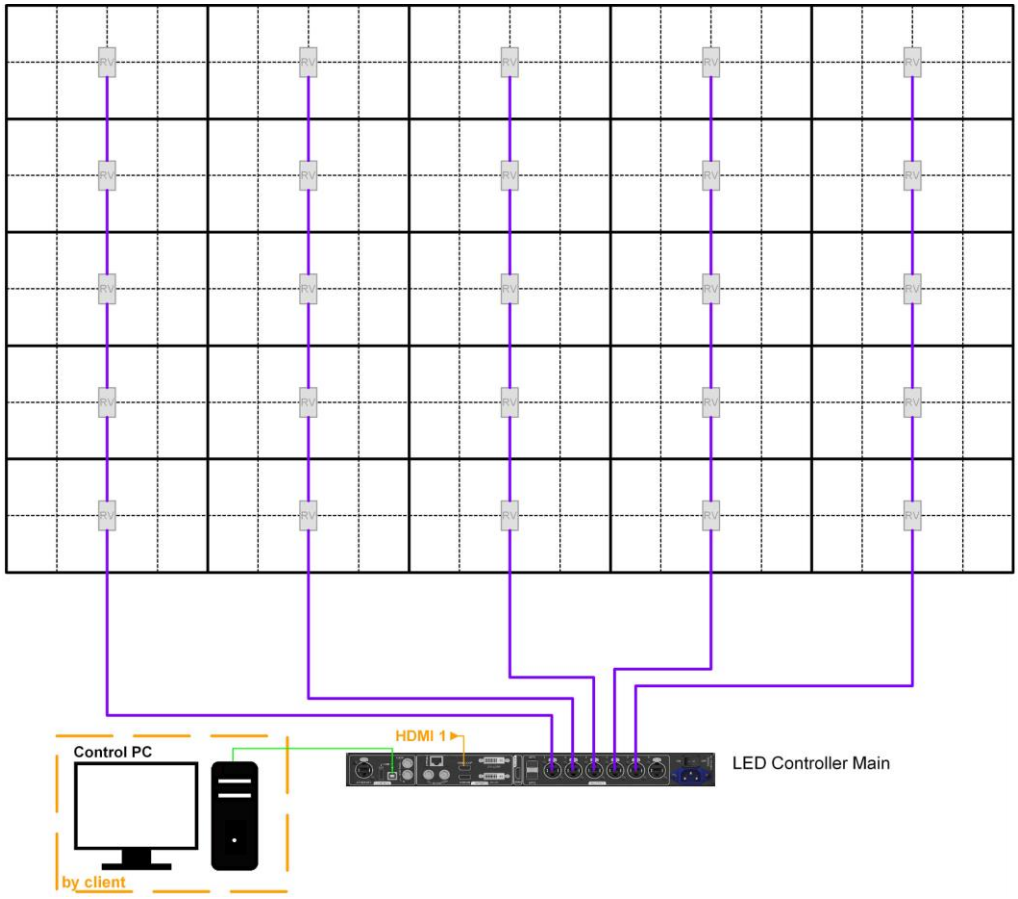
### 15.1.1 LED-FE012i2-110, LED-FE019i2-110: Data Connections



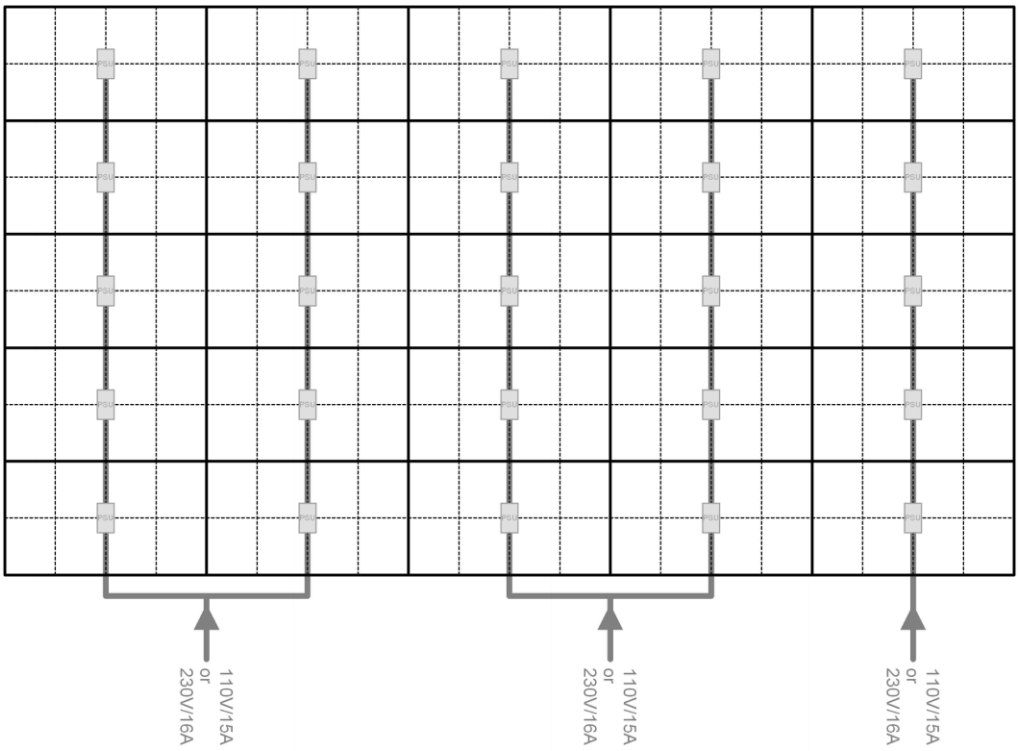

### 15.1.2 LED-FE012i2-110, LED-FE019i2-110: Power Connections



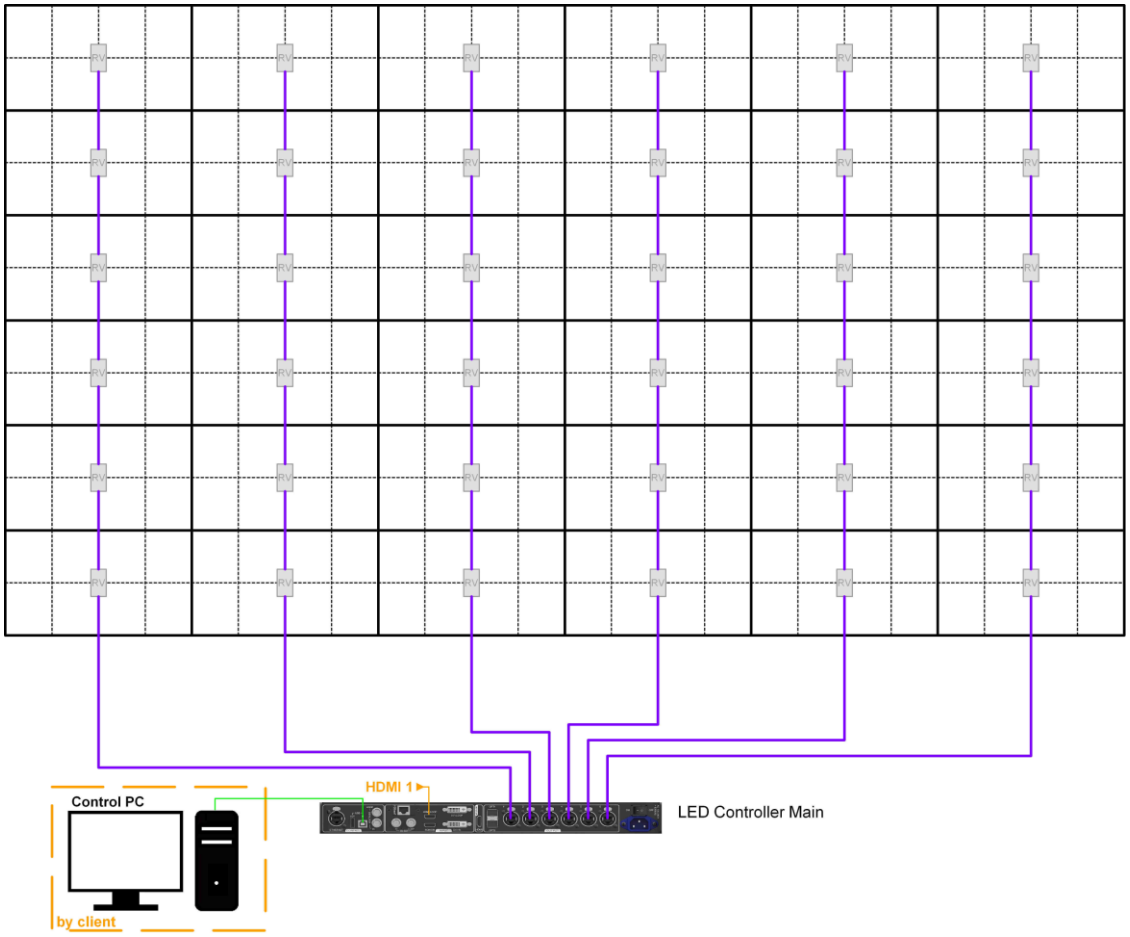
### 15.1.3 LED-FE015i2-137: Data Connections



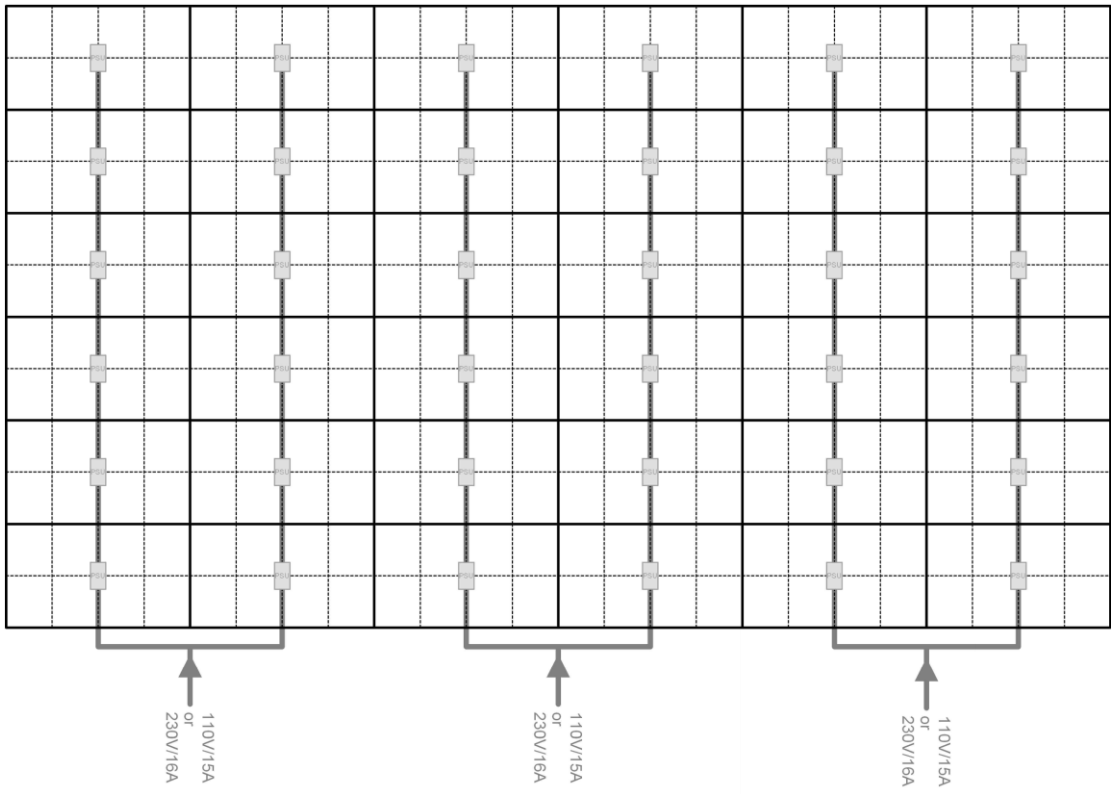

### 15.1.4 LED-FE015i2-137: Power Connections



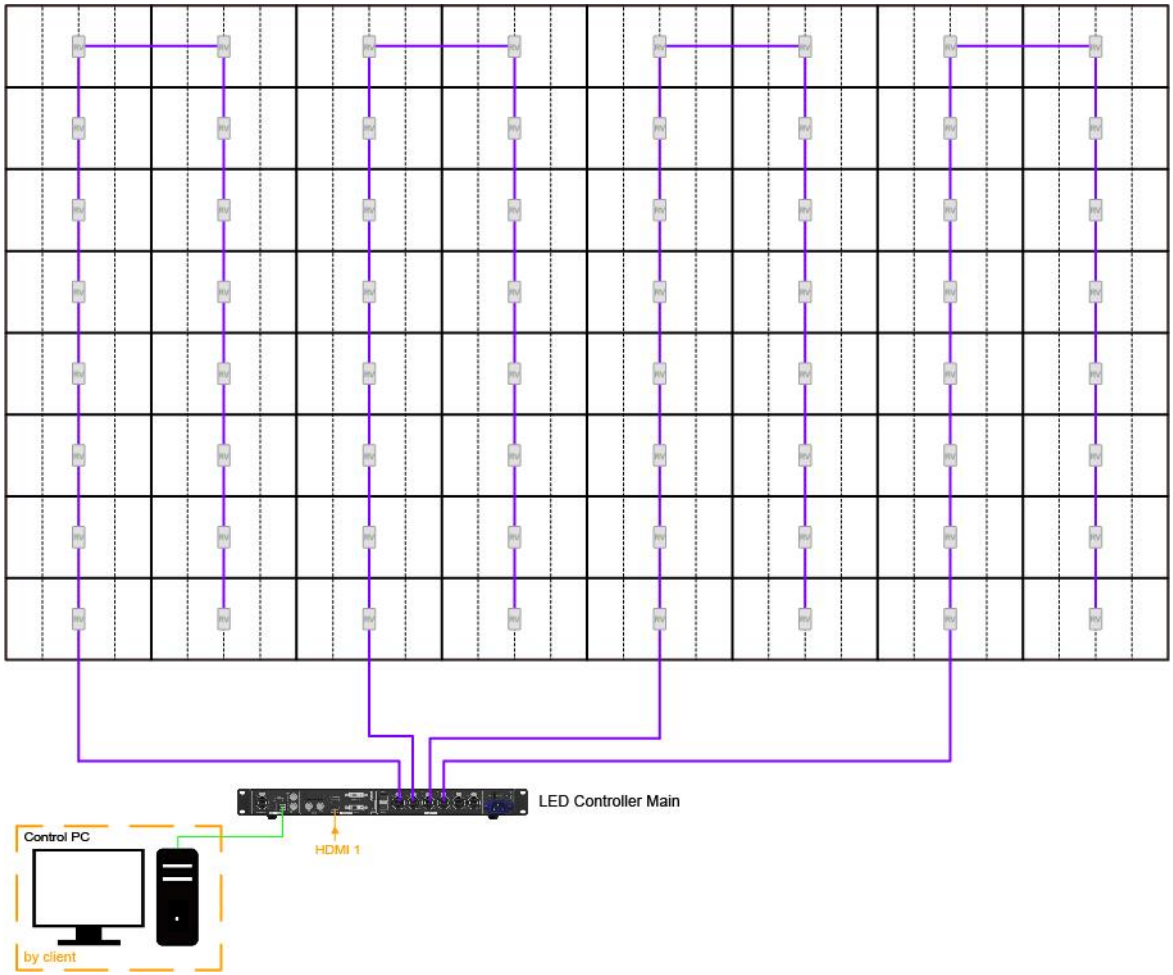
### 15.1.5 LED-FE019i2-165: Data Connections



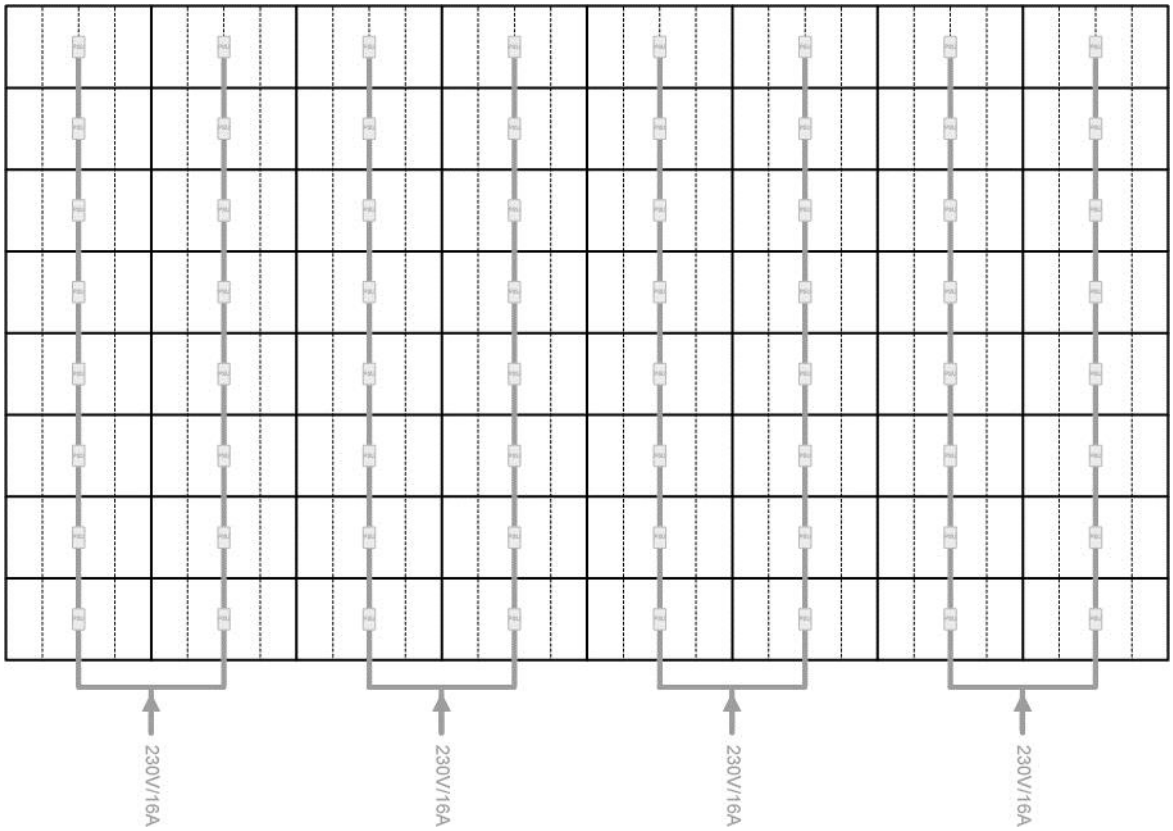

### 15.1.6 LED-FE019i2-165: Power Connections



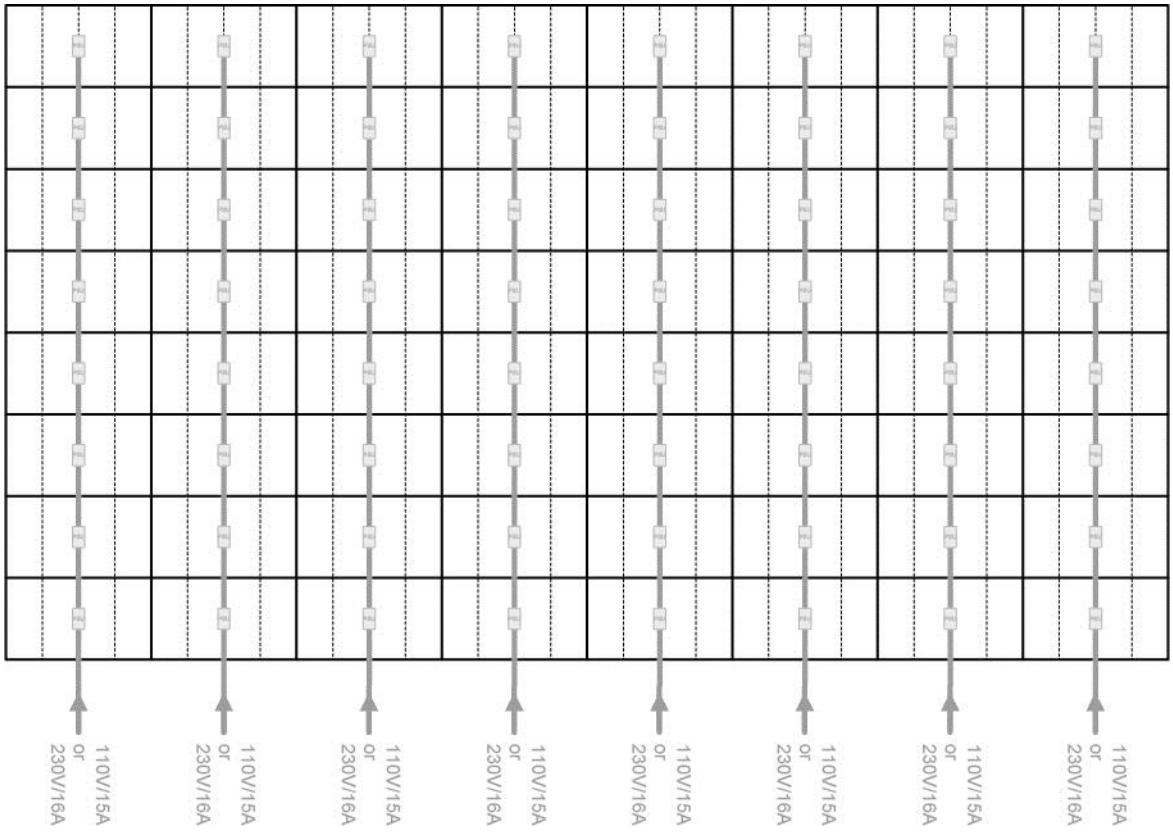
### 15.1.7 LED-FE025i2-220, LED-FE038i2-220: Data Connections



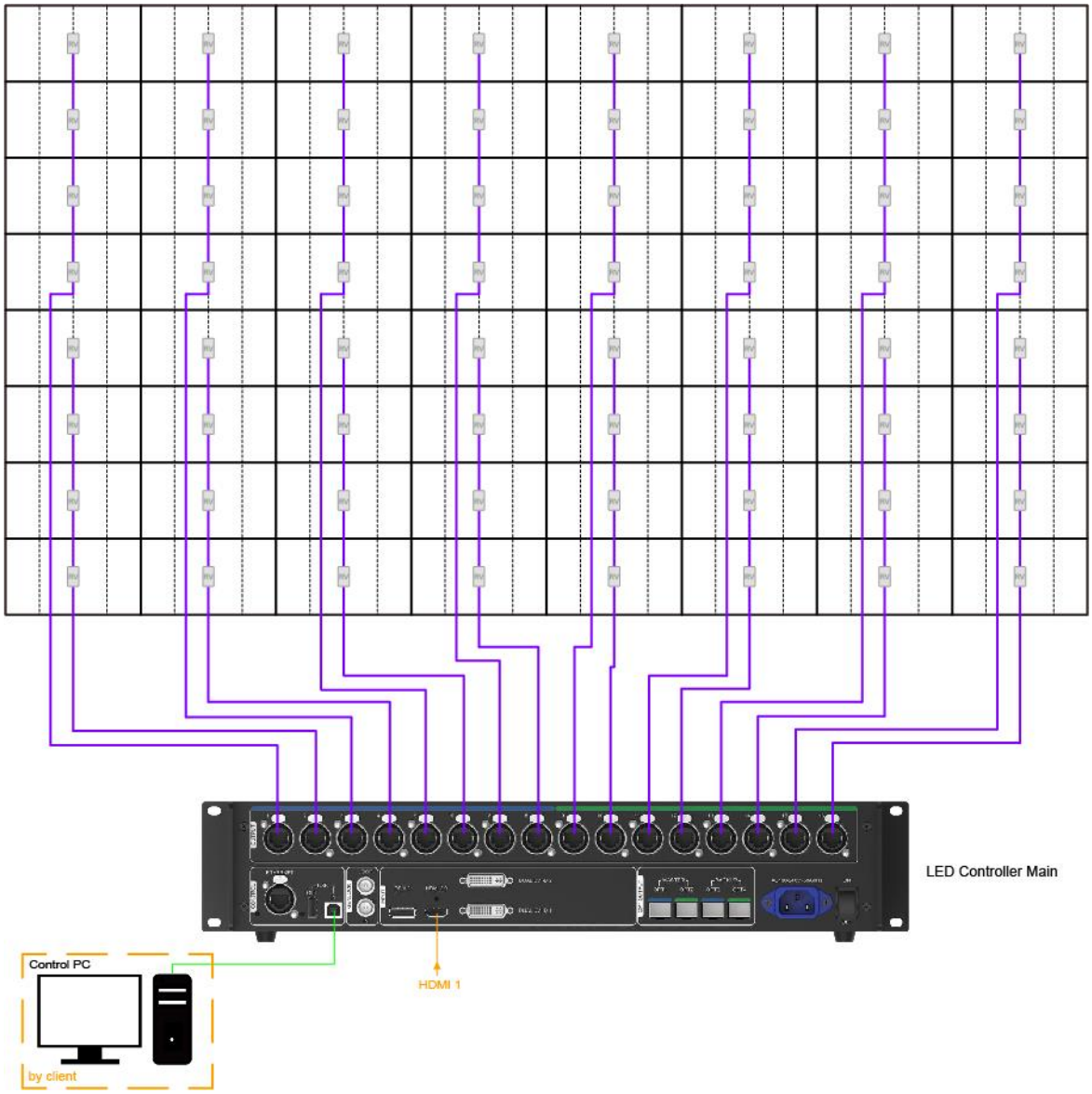
### 15.1.8 LED-FE025i2-220, LED-FE038i2-220: Power Connections



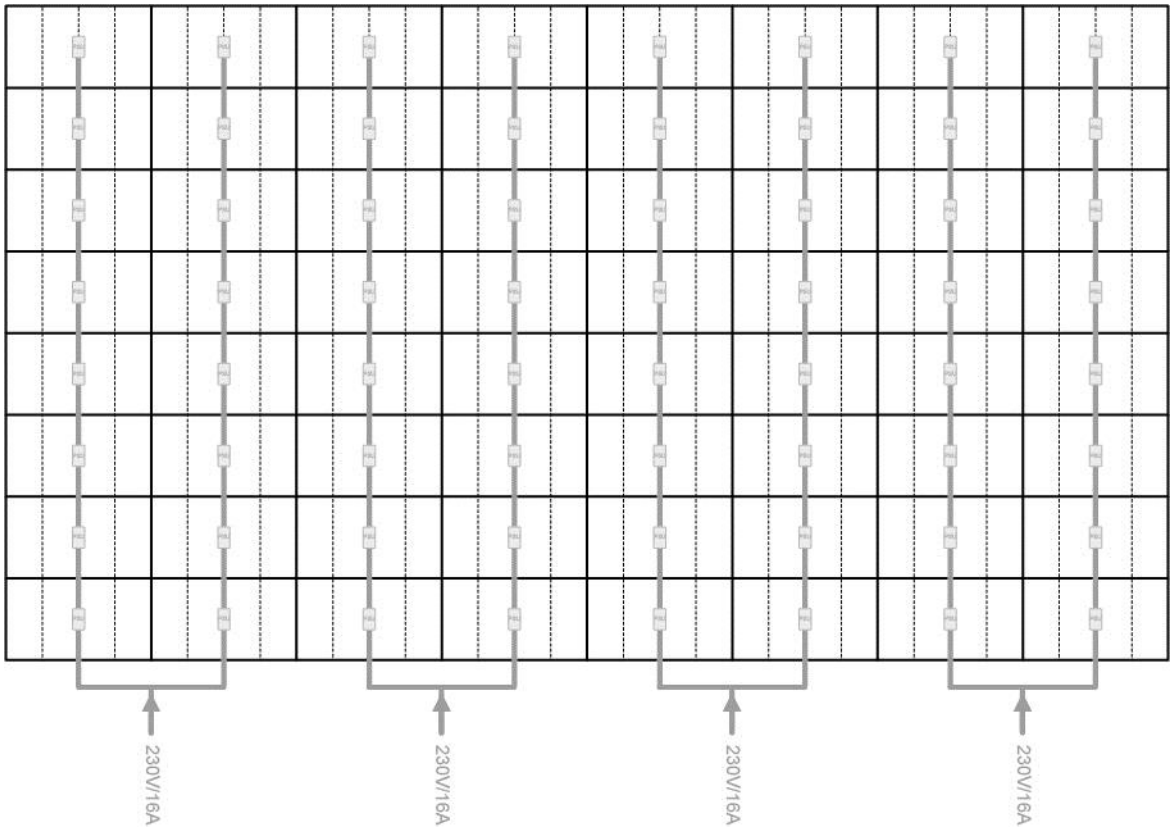

### 15.1.9 LED-FE025i2-220, LED-FE038i2-220: Power Connections



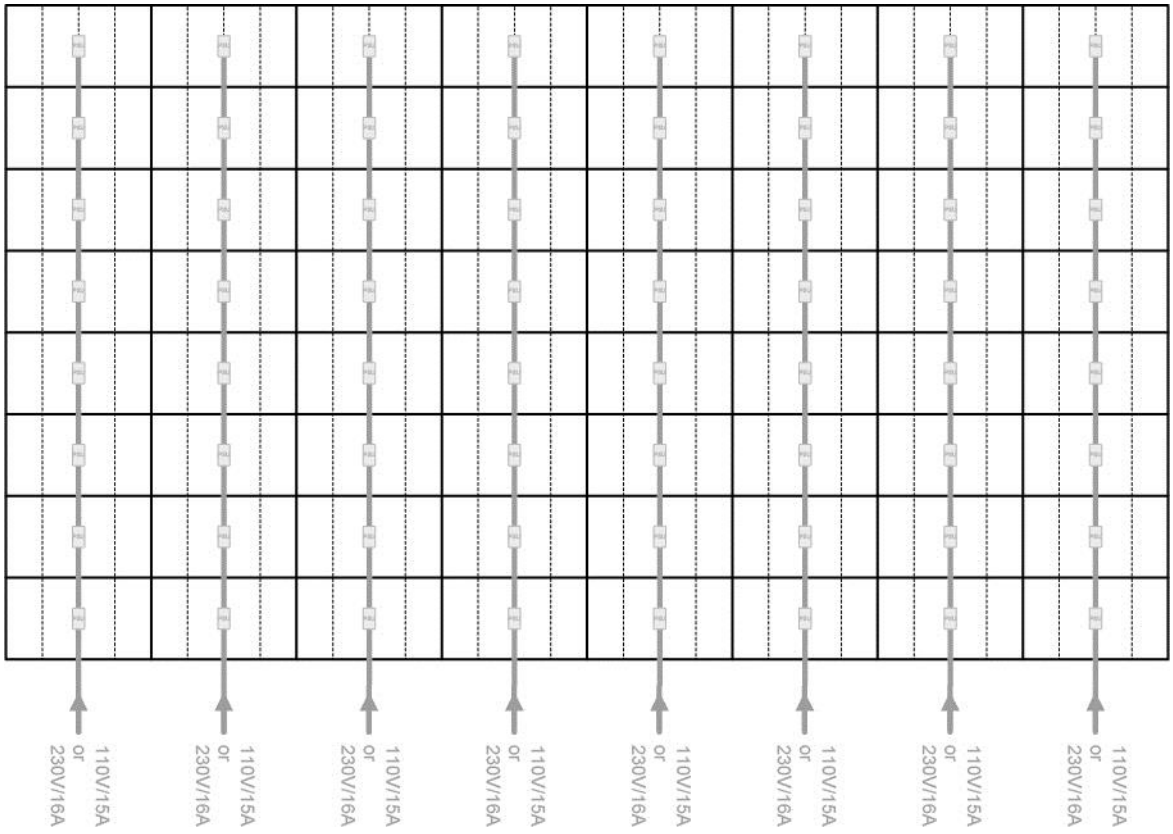
### 15.1.10 LED-FE012i2-220: Data Connections



### 15.1.11 LED-FE012i2-220: Power Connections



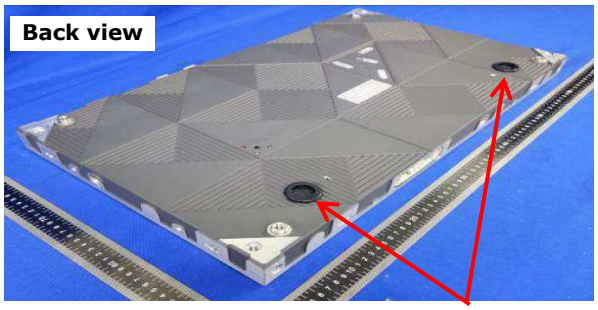

### 15.1.12 LED-FE012i2-220: Power Connections



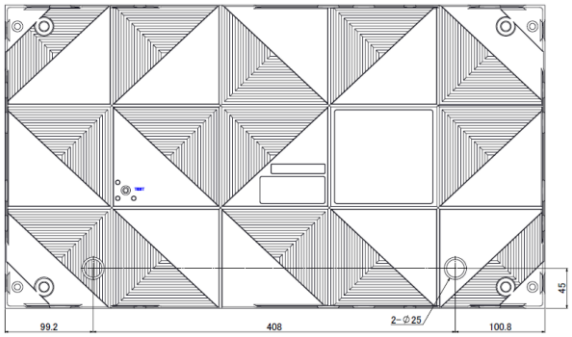
## 15.2 Backside hole cabinet

**LED-FA-FE series can choose "backside hole cabinet"**

Backside hole cabinet




**Backside hole**




*** Backside hole size : Φ25 mm**

**Connect Power cable & LAN cable to use the following components.**

Option parts : LED-FAFE2-BHCK

**Cable feed sleeve**

**Cable fastening buckle**

**Screw(M3 x 8)**

**Cable fastening tie lap**

**Connection method**

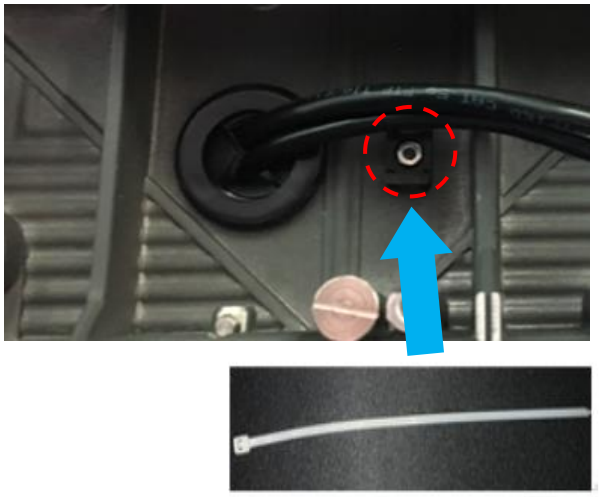
Step 1) Attach the feed sleeve to the cabinet.

Step 2)  Insert the cables

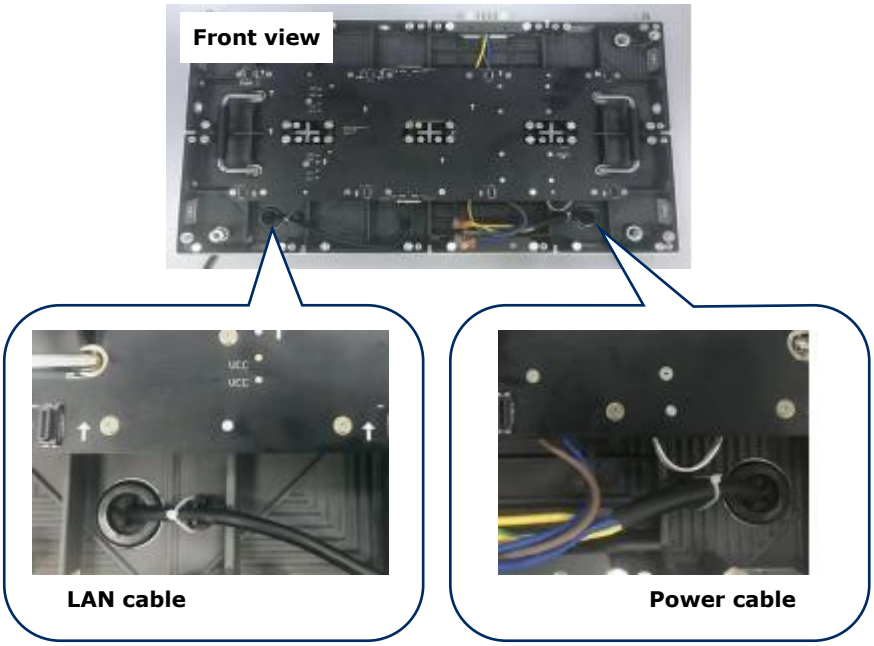
**Power cable** **LAN cable**

Step 3)  Attach the buckle by screw.

Step 4)  Through the fastening tie lap

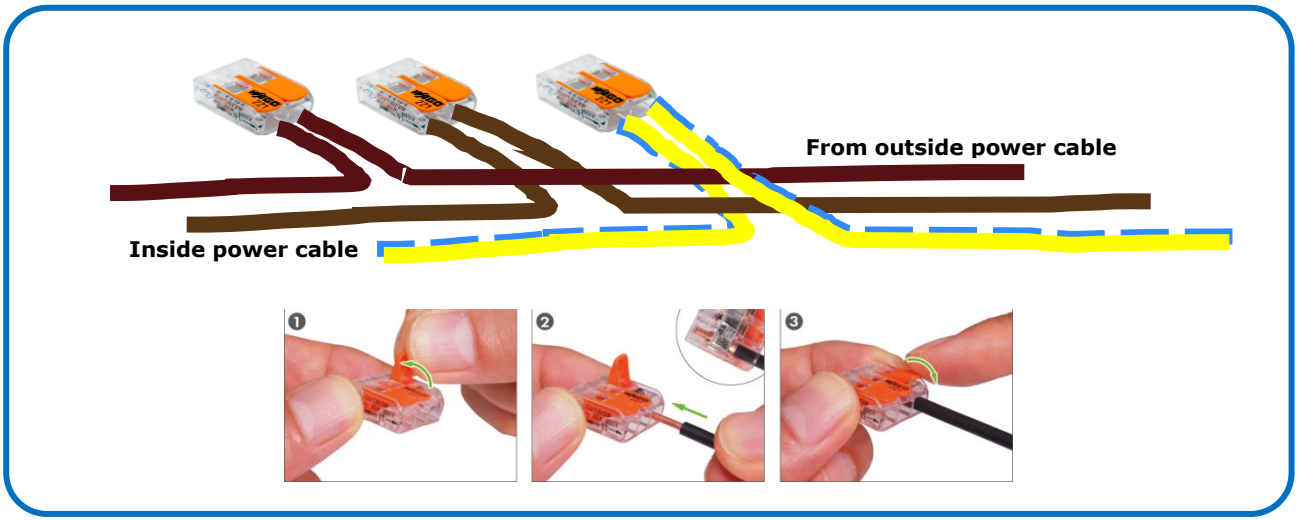


Step 5) Fix the cable to use fastening tie lap



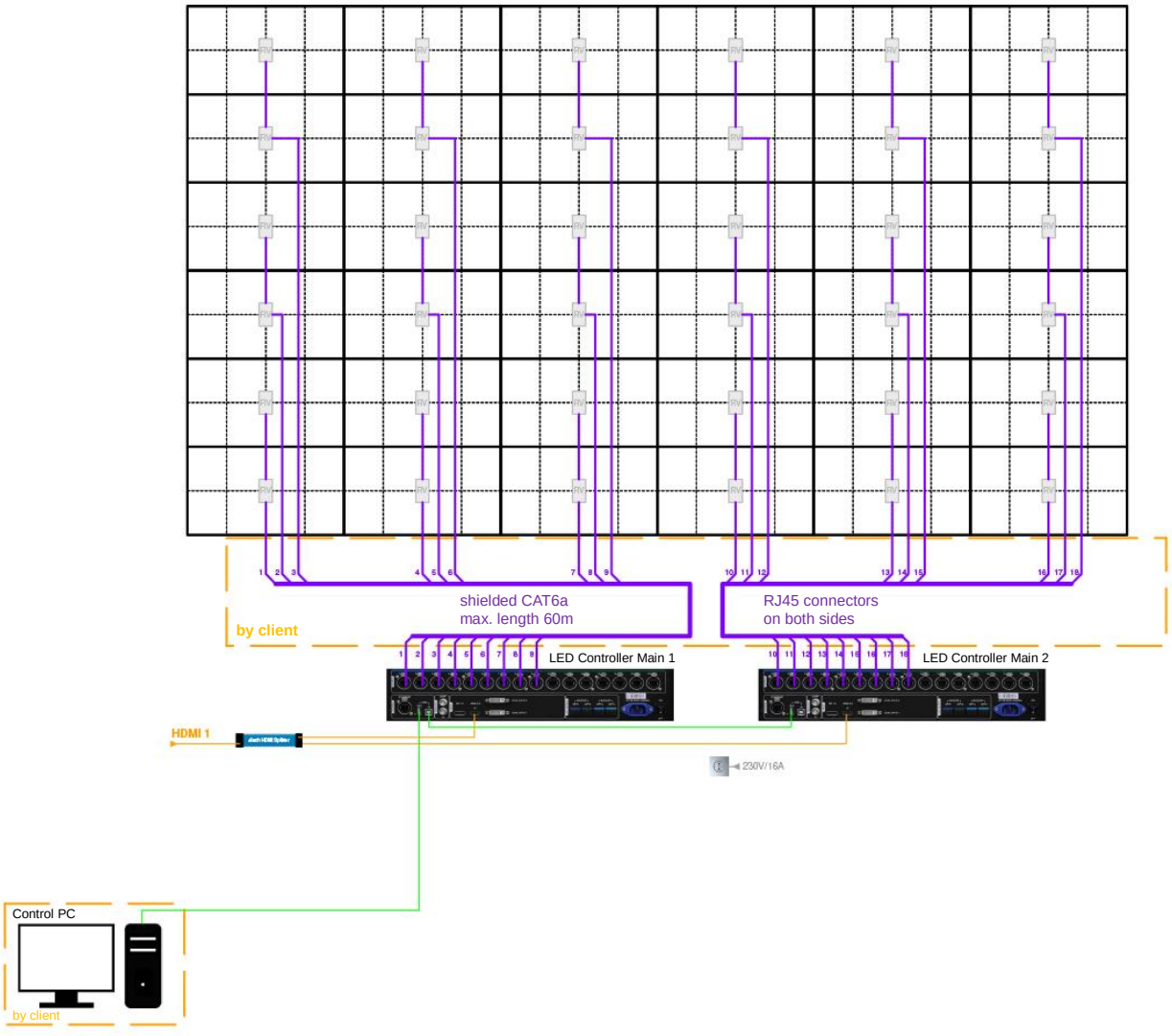

Step 6) Connect the Power cable (inside & outside) like bellows.
WAGO (221) is just example to connect the cable. Please arrange on your side.

WAGO 221

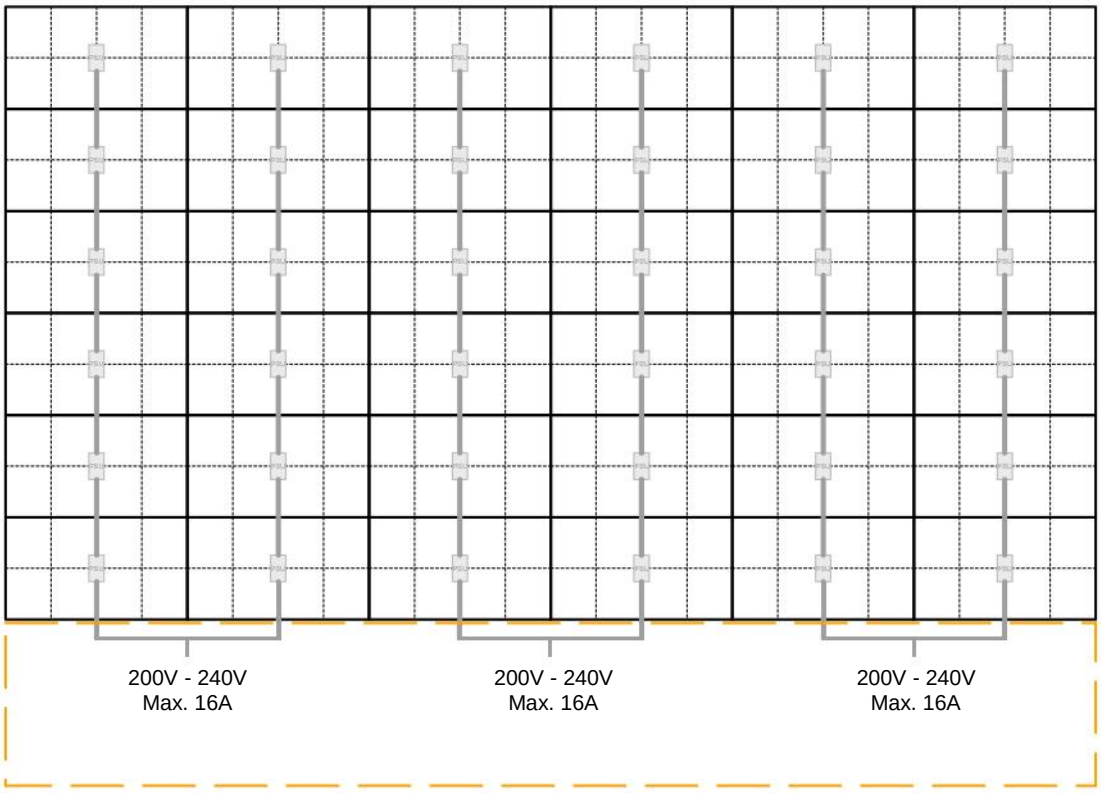


## 15.3 Cable Plans - LED-FE009i2

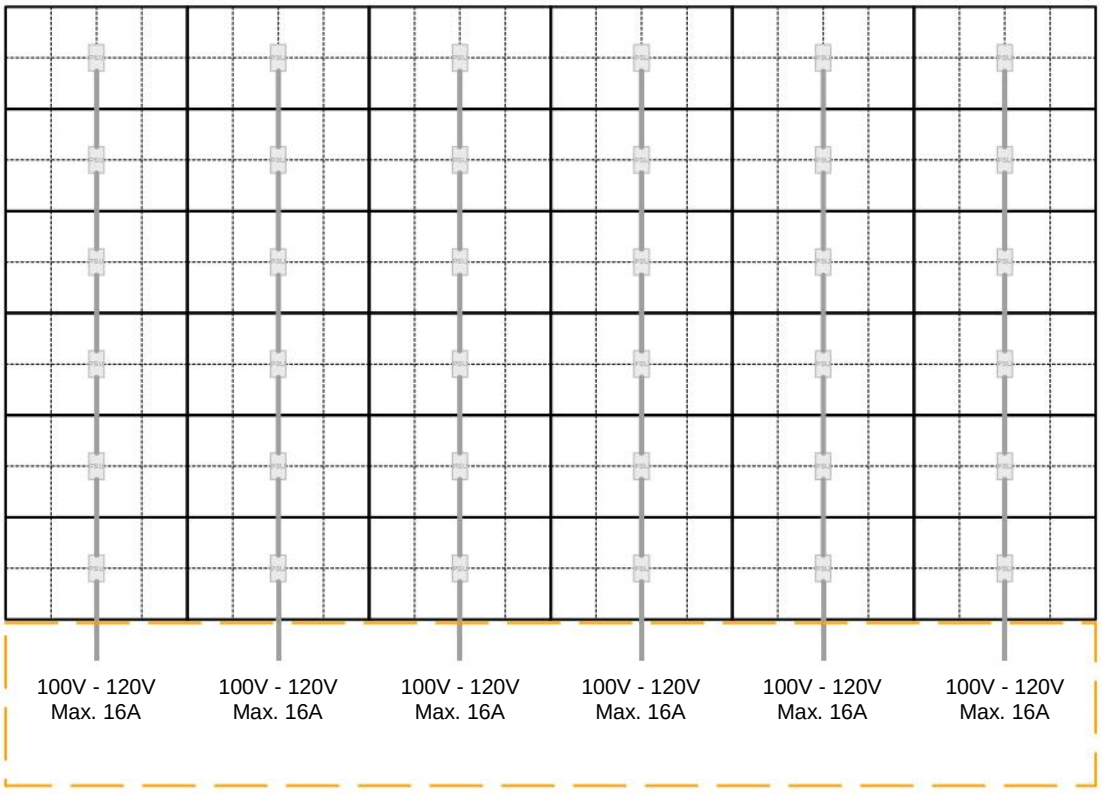
FE009i2-165" 6x6 0,95mm 3840 x 2160



FE009i2-165" 6x6 0,95mm 3840 x 2160



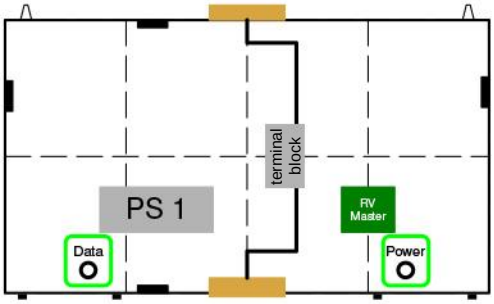

FE009i2-165" 6x6 0,95mm 3840 x 2160



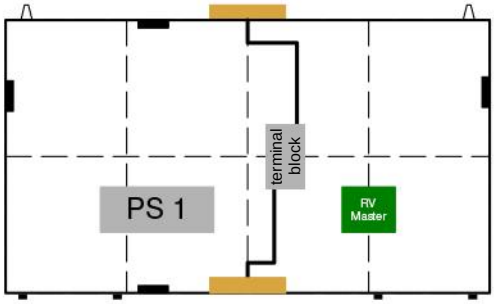
FE009i2-165" 6x6 0,95mm 3840 x 2160

| | | | | | |
|---|---|---|---|---|---|
| B 1 | B 1 | B 1 | B 1 | B 1 | B 1 |
| A 1 | A 1 | A 1 | A 1 | A 1 | A 1 |
| C 1 | C 1 | C 1 | C 1 | C 1 | C 1 |
| A 1 | A 1 | A 1 | A 1 | A 1 | A 1 |
| C 1 | C 1 | C 1 | C 1 | C 1 | C 1 |
| A 1 | A 1 | A 1 | A 1 | A 1 | A 1 |

**A1** (Backside hole cabinet)




**C1** (Type A)




**B1** (Type B)