



# SmartRow™ 2 Infrastructure Solution

**Submittals Addendum**

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### **Technical Support Site**

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

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# 1 Submittal Drawings

## 1.1 SmartRow™ 2 Site Planning Datasheet (208V, 3 phase, 4 wire + PE)

| Configuration Number | Part Number   | Max Row Capacity (kW) | IT Racks per Row | Capacity per Rack (kW) | Cooling Units per Row | pdu count | Main Input Breaker Size <sup>6</sup> | Per Condenser Breaker Size | Per Condenser Dry Weight kg (lbs) | Row Dimensions (L x H x D) mm (in) <sup>7</sup> | Row Weight kg (lbs) | Min. Staging Area m <sup>2</sup> (ft <sup>2</sup> ) |
|----------------------|---------------|-----------------------|------------------|------------------------|-----------------------|-----------|--------------------------------------|----------------------------|-----------------------------------|---|---------------------|---|
| 1                    | SR2N02010NAA1 | 10                    | 2                | 5                      | 1                     | 2         | 100A                                 | N/A <sup>5</sup>           | 60 (132.3)                        | 2100 (82.7) x 2271 (107) x 1400 (55.2)          | 1463 (3227)         | 14.41 (155.2)                                       |
| 2                    | SR2N02010PAA1 | 10                    | 2                | 5                      | 1                     | 4         | 100A                                 | N/A <sup>5</sup>           | 60 (132.3)                        | 2100 (82.7) x 2271 (107) x 1400 (55.2)          | 1491 (3288)         | 14.99 (161.4)                                       |
| 3                    | SR2N02010FAA1 | 10                    | 2                | 5                      | 2                     | 4         | 100A                                 | N/A <sup>5</sup>           | 60 (132.3)                        | 2400 (94.5) x 2271 (107) x 1400 (55.2)          | 2112 (4656)         | 17.67 (190.2)                                       |
| 4                    | SR2N03010NAA1 | 10                    | 3                | 3                      | 1                     | 3         | 100A                                 | N/A <sup>5</sup>           | 60 (132.3)                        | 2700 (106.3) x 2271 (107) x 1400 (55.2)         | 1633 (3601)         | 15.76 (169.7)                                       |
| 5                    | SR2N03010PAA1 | 10                    | 3                | 3                      | 1                     | 6         | 100A                                 | N/A <sup>5</sup>           | 60 (132.3)                        | 2700 (106.3) x 2271 (107) x 1400 (55.2)         | 1675 (3694)         | 16.34 (175.9)                                       |
| 6                    | SR2N03010FAA1 | 10                    | 3                | 3                      | 2                     | 6         | 100A                                 | N/A <sup>5</sup>           | 60 (132.3)                        | 3000 (118.2) x 2271 (107) x 1400 (55.2)         | 2296 (5061)         | 19.02 (204.8)                                       |
| 7                    | SR2N03020NAA1 | 20                    | 3                | 6                      | 1                     | 3         | 175A                                 | 15A                        | 118 (260.2)                       | 2700 (106.3) x 2271 (107) x 1400 (55.2)         | 1863 (4108)         | 18.46 (198.8)                                       |
| 8                    | SR2N03020PAA1 | 20                    | 3                | 6                      | 1                     | 6         | 175A                                 | 15A                        | 118 (260.2)                       | 2700 (106.3) x 2271 (107) x 1400 (55.2)         | 1905 (4201)         | 20.51 (220.8)                                       |
| 9                    | SR2N03020FAA1 | 20                    | 3                | 6                      | 2                     | 6         | 175A                                 | 15A                        | 118 (260.2)                       | 3000 (118.2) x 2271 (107) x 1400 (55.2)         | 2526 (5568)         | 24.42 (262.9)                                       |
| 10                   | SR2N04020NAA1 | 20                    | 4                | 5                      | 1                     | 4         | 175A                                 | 15A                        | 118 (260.2)                       | 3300 (130) x 2271 (107) x 1400 (55.2)           | 2033 (4483)         | 19.81 (213.3)                                       |
| 11                   | SR2N04020PAA1 | 20                    | 4                | 5                      | 1                     | 8         | 175A                                 | 15A                        | 118 (260.2)                       | 3300 (130) x 2271 (107) x 1400 (55.2)           | 2089 (4607)         | 21.86 (235.3)                                       |
| 12                   | SR2N04020FAA1 | 20                    | 4                | 5                      | 2                     | 8         | 175A                                 | 15A                        | 118 (260.2)                       | 3600 (141.8) x 2271 (107) x 1400 (55.2)         | 2710 (5974)         | 25.77 (277.4)                                       |
| 13                   | SR2N05020NAA1 | 20                    | 5                | 4                      | 1                     | 5         | 175A                                 | 15A                        | 118 (260.2)                       | 3900 (153.6) x 2271 (107) x 1400 (55.2)         | 2203 (4858)         | 21.16 (227.8)                                       |
| 14                   | SR2N05020PAA1 | 20                    | 5                | 4                      | 1                     | 10        | 175A                                 | 15A                        | 118 (260.2)                       | 3900 (153.6) x 2271 (107) x 1400 (55.2)         | 2273 (5012)         | 23.21 (249.9)                                       |
| 15                   | SR2N05020FAA1 | 20                    | 5                | 4                      | 2                     | 10        | 175A                                 | 15A                        | 118 (260.2)                       | 4200 (165.4) x 2271 (107) x 1400 (55.2)         | 2894 (6380)         | 27.12 (292)   |

**Notes:**


1. System Environmental Conditions: Indoors, 41 °F to 104 °F (5 °C to 40 °C), RH to 80% with Max dew point of 82.4 °F (28 °C)
2. Floor surface must be level and continuous (expansion joints sealed, raised floor tile gaps sealed, no floor drains, etc).
3. No building sprinkler head should be within 19.7 in (0.5 m).
4. Install in accordance with national and local electrical codes
5. 10kW condenser power is sourced from the indoor unit
6. Cable Sizing: 100A = 3 AWG ; 175A = 2/0 AWG
7. Row Dimensions do not include necessary space needed for access including per ADA or local codes.

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|           |              | TITLE   | Smart Row 2 Site Planning Datasheet (208V, 3 phase, 4 wire + PE) |   |

2

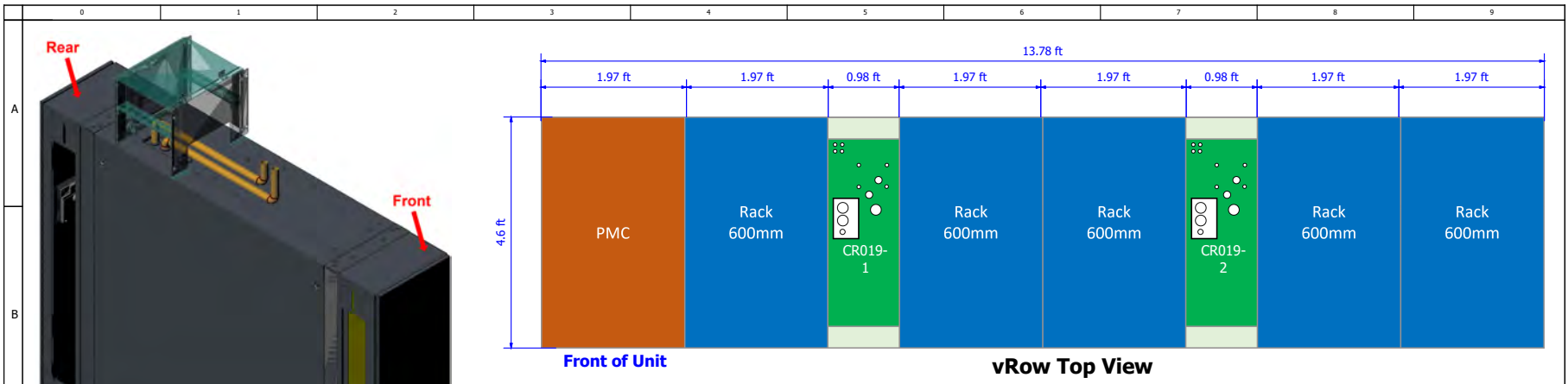
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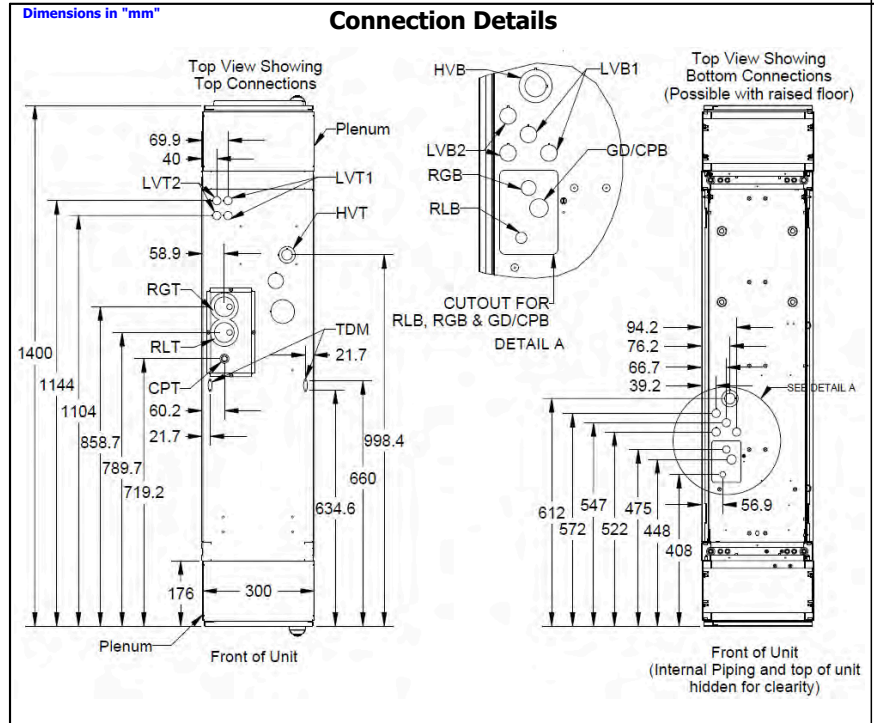
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|---|---|---|---|---|---|---|--|---|---|
| 0 | 1   | 2 | 3 | 4 | 5 | 6 | 7  | 8 | 9 |
| A | <h1 style="margin: 0;">Vertiv Row Solution</h1> <h2 style="margin: 0;">Knowledge to Build Optimized Infrastructure Solutions</h2> |   |   |   |   |   |  |   |   |
| B | <p>"Vertiv™ SmartRow™ 2": 5x IT Rack 20kW</p>   |   |   |   |   |   |  |   |   |
| C |    |   |   |   |   |   | <p>Row IT Load Capacity: 20 kW<br/>                 Power Redundancy UPS: Yes<br/>                 Power Redundancy rPDU: Yes<br/>                 Cooling Redundancy: Yes<br/>                 Dimensions:<br/>                 Length: 13.78 ft<br/>                 Depth: 4.6 ft<br/>                 Height: 7.38 ft</p> <p><b>NOTE: This is only a representative picture. The layout and appearance will vary depending on the row configuration. For specific layout images, please refer to the submittal packages.</b></p> |   |   |
| D |   |   |   |   |   |   |  |   |   |
| E |   |   |   |   |   |   |  |   |   |

|   |                           |  |                       |   |
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| CHANGE NO.                                    | APPROVED BY: Jakub Fencel | TITLE / DESCRIPTION: "Vertiv™ SmartRow™ 2": 5x IT Rack 20kW  | DATE (LATEST REV.)    |   |
| PAGE DESCRIPTION: 1- Title page / cover sheet |                           |  | REVISION: B           | 505 N. CLEVELAND AVE WESTERVILLE OH 43081 |

# 1.3 Vertiv™ Liebert® CR019 In-Row Cooling System - Piping and Electrical Connections



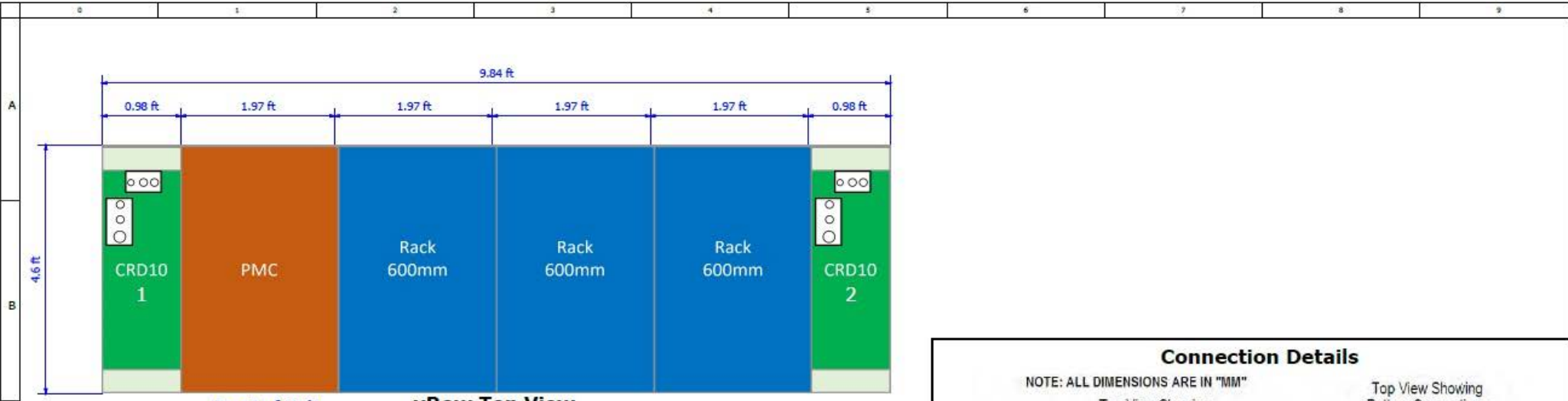
**Note:- CR019 Inlet/Outlet piping needs to be routed during installation**



| Unit Top Connections |   | Unit Bottom Connections |   |
|----------------------|---|-------------------------|---|
| RLT                  | Refrigerant Liquid Line Inlet<br>1/2" O.D Copper                                    | RLB                     | Refrigerant Liquid Line Inlet<br>1/2" O.D Copper  |
| RGT                  | Refrigerant Gas Line Outlet<br>5/8" O.D Copper                                      | RGB                     | Refrigerant Gas Line Outlet<br>5/8" O.D Copper  |
| CPT                  | Condensate Pump<br>Knockout Hole Ø1-3/8" (35mm)                                     | GD                      | Gravity Coil Pan Drain<br>Knockout Hole Diameter  |
| HVT                  | High Voltage Top Connection<br>Combination Knockout Ø1-1/8" (29mm) & Ø1-3/4" (44mm) | CPB                     | Condensate Pump<br>1-3/4" (44mm)  |
| LVT1                 | Low Voltage (Twisted Pair)<br>Knockout Hole Ø7/8" (22mm)<br>2 places                | HVB                     | High Voltage Bottom Entrance (feed through the base of the unit)<br>Combination Knockout 1-1/8" (29mm) & 1-3/4" |
| LVT2                 | Low Voltage (Shielded Cable)<br>Knockout Hole Ø7/8" (22mm)<br>2 places              | LVB1                    | Low Voltage (Twisted Pair)<br>Knockout Hole Ø7/8" (22mm) 2 places   |
| TDM                  | Tie Down (Top) Mounting<br>Hole Ø1/8" (3mm) 4 places                                | LVB2                    | Low Voltage (Shielded Cable)  |

**Note:- Piping and Electrical connections available at the top and bottom of unit.**

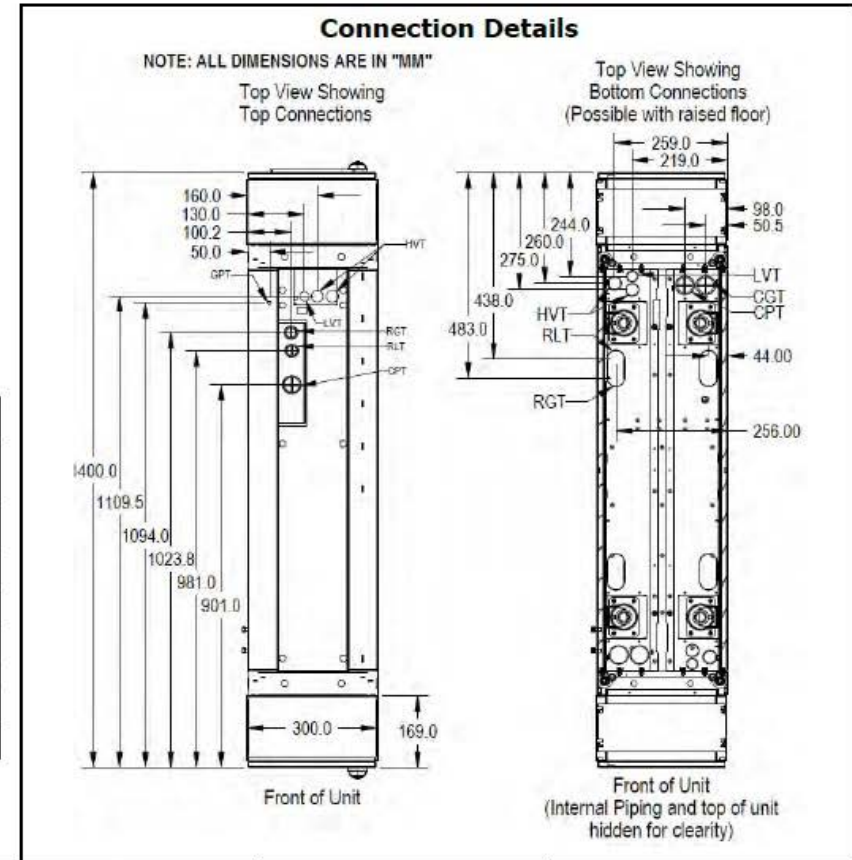
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Front of Unit vRow Top View

| Unit Top Connections |                                |  | Unit Bottom Connections |                                |  |
|----------------------|--------------------------------|--|-------------------------|--------------------------------|--|
| RLT                  | Refrigerant Liquid Line Inlet  | 1/2" O.D Copper Sweat                  | RLT                     | Refrigerant Liquid Line Inlet  | 1/2" O.D Copper                        |
| RGT                  | Refrigerant Gas Line Outlet    | 5/8" O.D Copper Sweat                  | RGT                     | Refrigerant Gas Line Outlet    | 5/8" O.D Copper                        |
| CPT                  | Condensate Pump                | 1/2" NPTF FEMALE                       | CPT                     | Condensate Pump                | 1/2" NPTF FEMALE                       |
| HVT                  | High Voltage Bottom Connection | Combination knockout<br>1-1/8" (29mm)  | HVT                     | High Voltage Bottom Connection | Combination knockout<br>1-1/8" (29mm)  |
| LVT                  | Low Voltage Bottom Connection  | Knockout Hole Diameter<br>7/8" (22 mm) | LVT                     | Low Voltage Bottom Connection  | Knockout Hole Diameter<br>7/8" (22 mm) |
| GPT                  | Grounding Point                | Thread Hole M8                         | CGT                     | Condensate Gravity             | 1/2" NPTF FEMALE                       |



**Note:- Piping and Electrical connections available at the top and bottom of unit.**



Front of Unit

Front of Unit (Internal Piping and top of unit hidden for clarity)

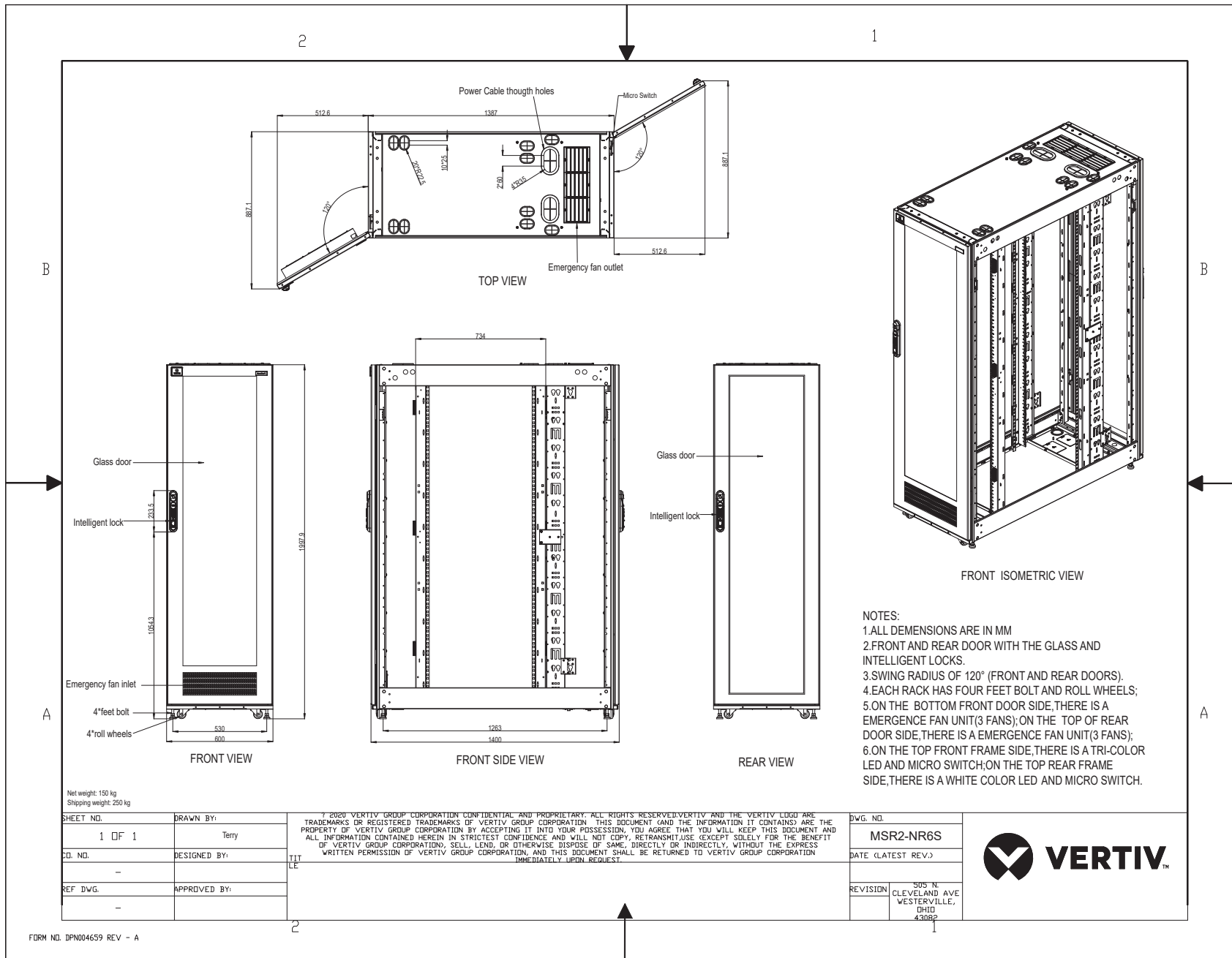
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| PAGE DESCRIPTION:<br>4.a- vRow Top View |                             | TITLE / DESCRIPTION:<br>Vertiv™ SmartRow™ 2: 3x IT Rack 10kW   | REVISION:<br>B           | 505 N. CLEVELAND AVE WESTERVILLE OH 43081 |

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|--|--|---|---|--|---|---|---|-----------------------|--|---|--|
|  | 0  | 1   | 2   | 3  | 4 | 5 | 6 | 7                     | 8  | 9   |  |
| A  | <h2 style="margin:0;">SR2 Main Components</h2> <div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <p><b>9-inch Touchscreen Panel:</b><br/>User-friendly display enables easy access to system running status &amp; condition.</p> </div> <div style="width: 20%;"> <p><b>Centralized Infrastructure Management:</b><br/>Enables central management of all intelligent equipment and IT devices within the system. Reading &amp; data are consolidated into single platform.</p> </div> <div style="width: 20%;"> <p><b>Racks with Containment:</b><br/>EIA310 19-inch rack system coupled with tempered glass door enables fully enclosed system design. Allows focused cooling in IT environment.</p> </div> </div> |   |   |  |   |   |   |                       | <p><b>Explanation of terms:</b></p> <ul style="list-style-type: none"> <li>• FU Emergency Fan Control Unit</li> <li>• FDS Front Door Switch</li> <li>• RDS Rear Door Switch</li> <li>• FDL Front Door Lock Handle</li> <li>• RDL Rear Door Lock Handle</li> <li>• DC_PS DC Power Supply</li> </ul> |   |  |
| B  |   |   |   |  |   |   |   |                       |  |   |  |
| C  |  |   |   |  |   |   |   |                       |  |   | <p><b>Precision Cooling:</b><br/>Row-based solution designed to provide maximum cooling in a compact footprint. Cooling modulation enables cooling on demand and quickly adapts to load fluctuation.</p> |
| D  |  |   |   |  |   |   |   |                       |  |   | <p><b>Electronic Lock:</b><br/>Enables rack level security and access log is recorded intelligently. Supports local &amp; remote door authorization.</p>   |
| D  |  |   |   |  |   |   |   |                       |  |   | <p><b>Power Management &amp; Distribution:</b><br/>Pre-assembled &amp; pre-integrated switchboard with surge protection.</p>   |
| D  |  |   |   |  |   |   |   |                       |  |   | <p><b>Power Protection:</b><br/>On-line double conversion UPS with unity power factor ensures clean power feeding to critical IT equipment.</p>  |
| E  | <ul style="list-style-type: none"> <li><span style="color: orange;">●</span> Power Management &amp; Protection</li> <li><span style="color: blue;">●</span> Thermal Management</li> <li><span style="color: black;">●</span> Management &amp; Monitoring</li> </ul>  | <p><b>Emergency Ventilation:</b><br/>Activates automatically in the event of overheating or cooling unit failure.</p> | <p><b>Environmental Sensor:</b><br/>Report critical environmental information and alarm notification. Ensure IT equipment is kept in desired condition.</p> |  |   |   |   |                       |  |   |  |
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| PAGE DESCRIPTION: 4.b- SR2 Components View |  |   |   |  |   |   |   | REVISION: B           |  |   |  |

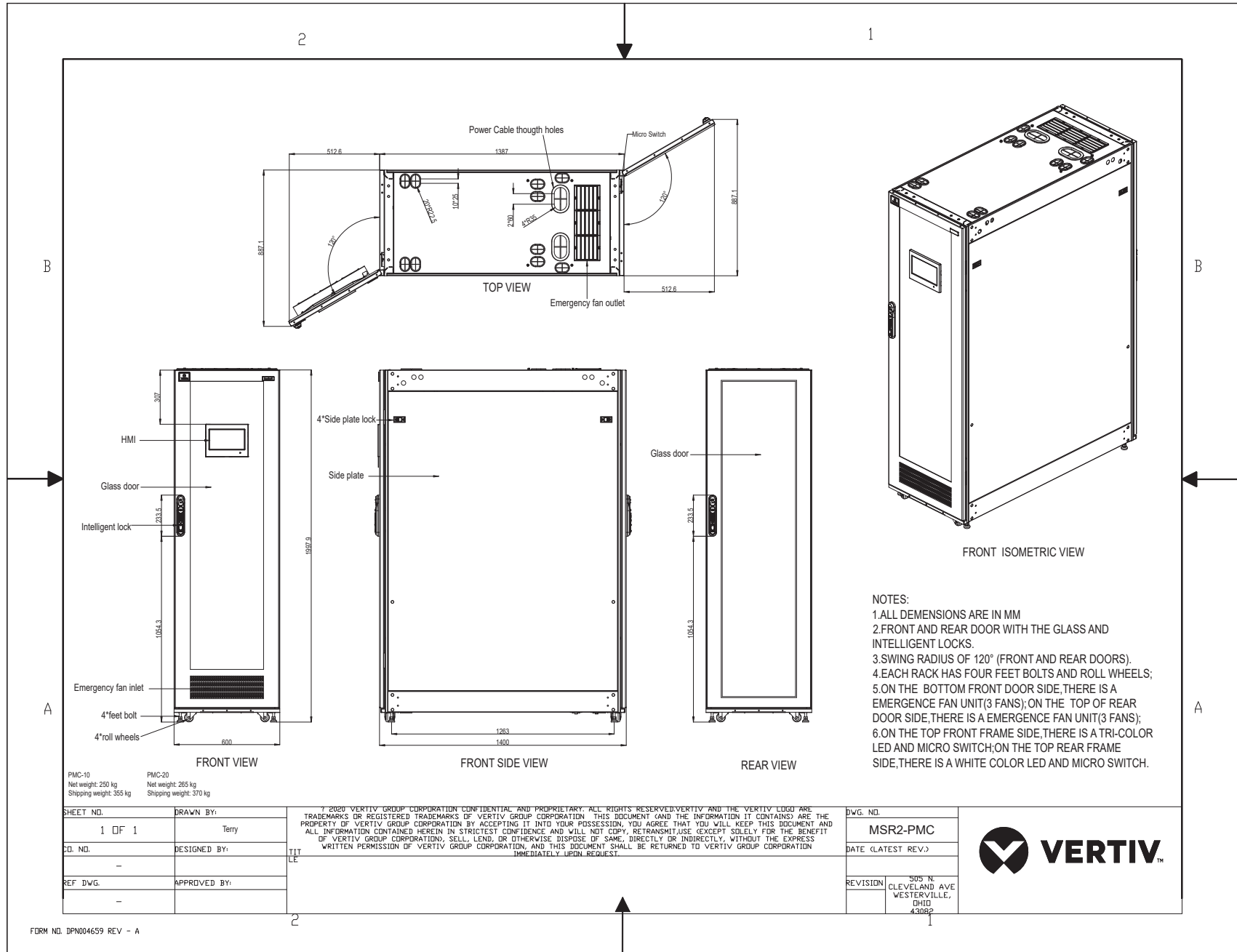




# 1.6 Vertiv™ MSR2 600mm IT Rack - Isometric View

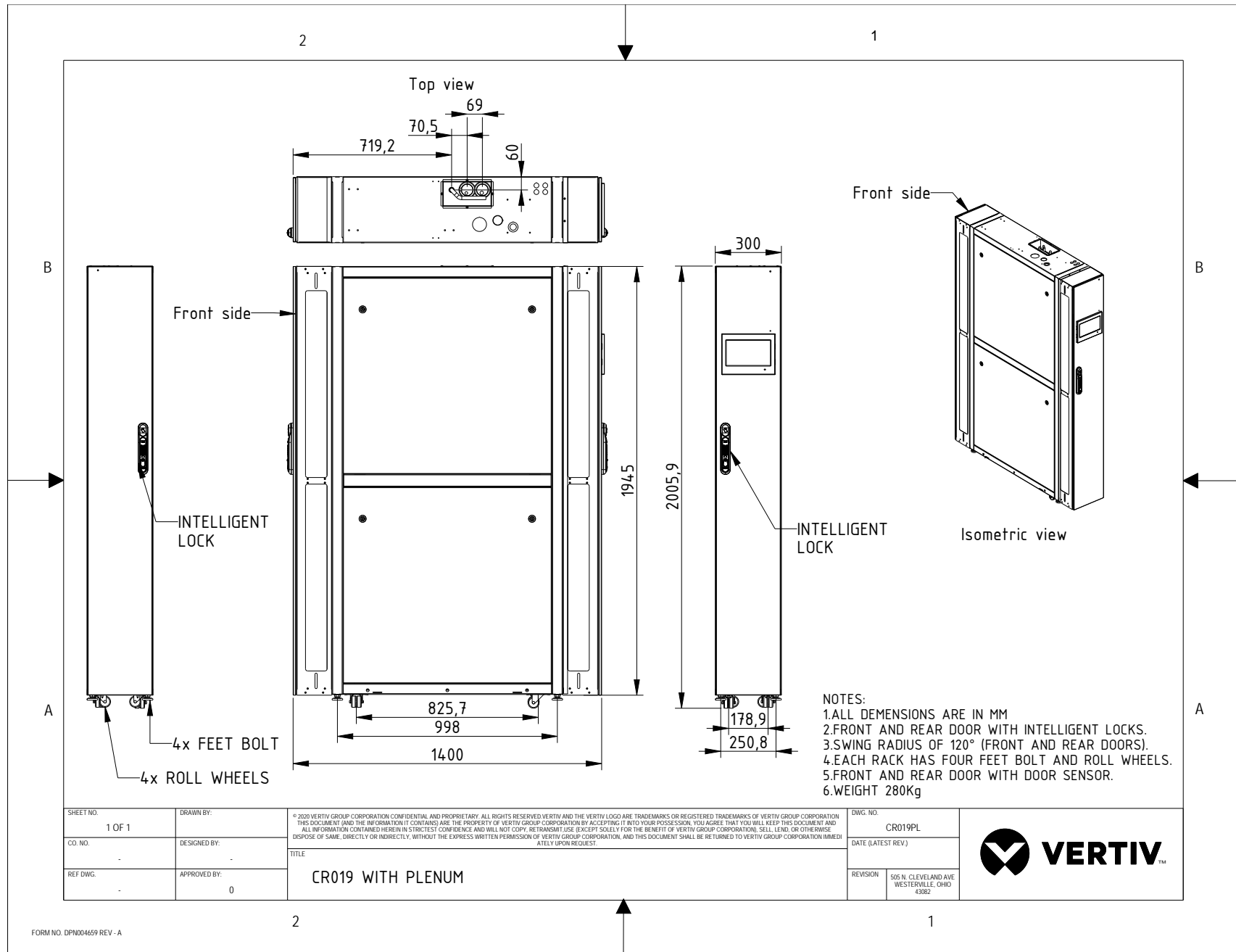


# 1.7 Vertiv™ MSR2 Power Management Cabinet (PMC) - Isometric View

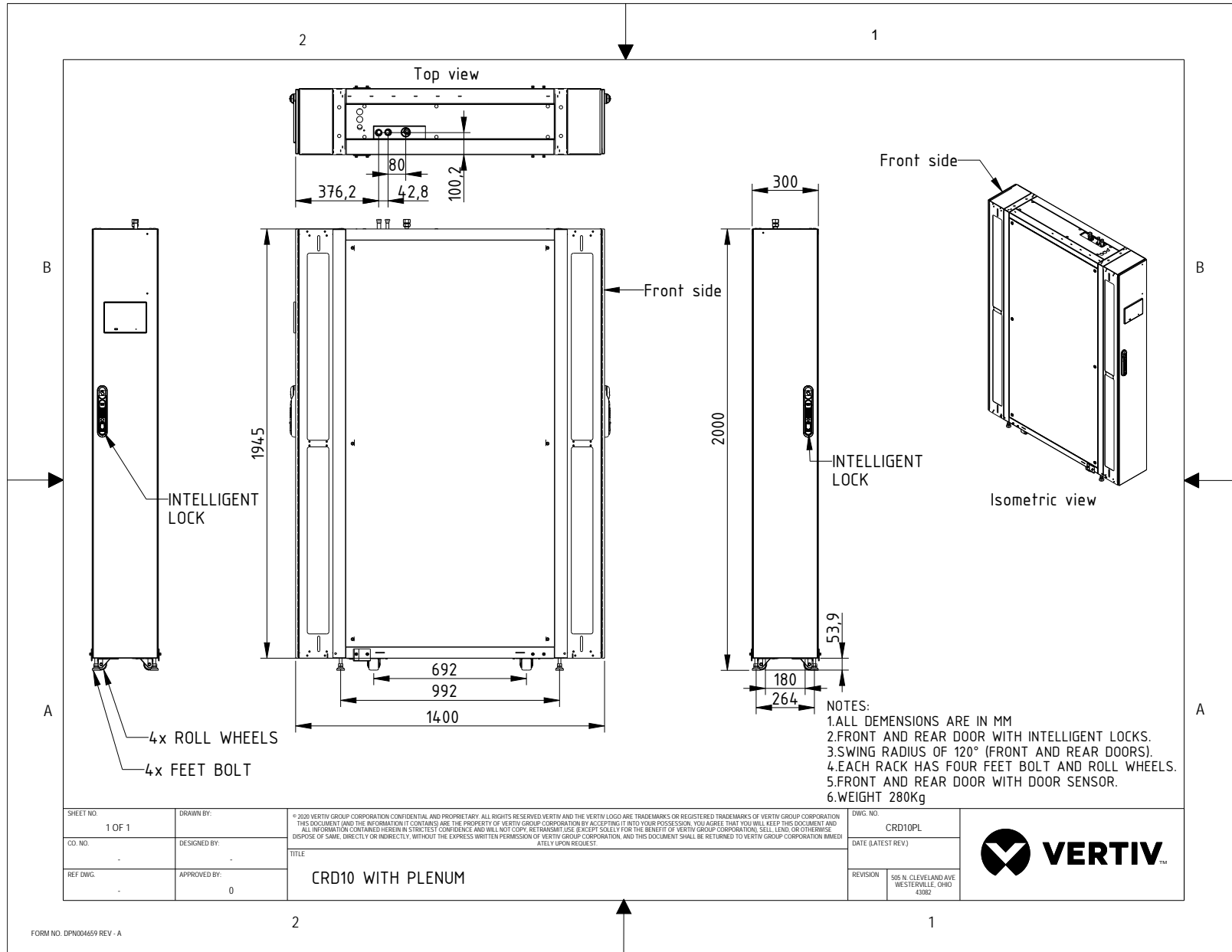




# 1.8 Vertiv™ Liebert® CR019 with Plenums - Dimensions



# 1.9 Vertiv™ Liebert® CRD10 with Plenums - Dimensions



|                     |                   |
|---------------------|-------------------|
| SHEET NO.<br>1 OF 1 | DRAWN BY:         |
| CO. NO.             | DESIGNED BY:      |
| REF DWG.            | APPROVED BY:<br>0 |

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| TITLE<br>CRD10 WITH PLENUM   |  |

|                     |  |
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| DWG. NO.<br>CRD10PL | DATE (LATEST REV.)                                 |
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FORM NO. DPN004659 REV - A

# 1.10 Power Management Unit - 20kW (PMU20)

2
1

B
B

FRONT VIEW

REAR VIEW  
(PMU COVER REMOVED)

FRONT ISOMETRIC VIEW

NOTES:

PMU20 is used in Power Redundancy and No Power Redundancy PMC

Net weight: 41 kg

| 23  | GROUND SCREWS                  | 1   |        |
|-----|--------------------------------|-----|--------|
| 22  | MAIN POWER TERMINAL BLOCKS     | 1   |        |
| 21  | POWER METER RS485(RJ45)        | 1   |        |
| 20  | SPD DI(RJ45)                   | 1   |        |
| 19  | STOBE SIREN CONTROL DO1(RJ45)  | 1   |        |
| 18  | RED CONTROL DO2(RJ45)          | 1   |        |
| 17  | DC POWER TERMINAL BLOCKS       | 1   |        |
| 16  | POWER TERMINAL 2 BLOCKS        | 1   |        |
| 15  | POWER TERMINAL 1 BLOCKS        | 1   |        |
| 14  | PDU EXTENDER 2 BREAKER         | 1   |        |
| 13  | PDU EXTENDER 1 BREAKER         | 1   |        |
| 12  | AC/DC BREAKER                  | 1   |        |
| 11  | CRV2 BREAKER                   | 1   |        |
| 10  | CRV1 BREAKER                   | 1   |        |
| 9   | MBC2 INPUT BREAKER             | 1   |        |
| 8   | MAIN INPUT BREAKER             | 1   |        |
| 7   | 24VDC OUTPUT BREAKER           | 1   |        |
| 6   | 12VDC OUTPUT BREAKER           | 1   |        |
| 5   | MBC1 BREAKER                   | 1   |        |
| 4   | BOATLIKE SWITCH FOR BLUE LIGHT | 1   |        |
| 3   | SPD                            | 1   |        |
| 2   | SPD BREAKER                    | 1   |        |
| 1   | POWER LIGHT(L1/L2/L3)          | 3   |        |
| NO. | NAME                           | Qty | REMARK |

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A

|           |              |
|-----------|--------------|
| SHEET NO. | DRAWN BY:    |
| 1 OF 2    | Terry        |
| CD. NO.   | DESIGNED BY: |
| -         |              |
| REF DWG.  | APPROVED BY: |
| -         |              |

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FORM NO. DPN004659 REV - A
2
1

# 1.11 Power Management Unit - 10kW (PMU10)

2
1

FRONT VIEW

REAR VIEW  
(PMU COVER REMOVED)

FRONT ISOMETRIC VIEW

NOTES:

PMU10 is used in Power Redundancy and No Power Redundancy PMC

Net weight: 36 kg

| NO. | NAME                           | Qty | REMARK |
|-----|--------------------------------|-----|--------|
| 20  | GROUND SCREWS                  | 1   |        |
| 19  | POWER METER RS485(RJ45)        | 1   |        |
| 18  | SPD DI(RJ45)                   | 1   |        |
| 17  | STOBE SIREN CONTROL DO1(RJ45)  | 1   |        |
| 16  | RED CONTROL DO2(RJ45)          | 1   |        |
| 15  | DC POWER TERMINAL BLOCKS       | 1   |        |
| 14  | TO CRV2 POWER TERMINAL BLOCKS  | 1   |        |
| 13  | POWER TERMINAL BLOCKS          | 1   |        |
| 12  | 24VDC BREAKER                  | 1   |        |
| 11  | 12VDC BREAKER                  | 1   |        |
| 10  | AC/DC BREAKER                  | 1   |        |
| 9   | CRV2 BREAKER                   | 1   |        |
| 8   | CRV1 BREAKER                   | 1   |        |
| 7   | MAIN INPUT BREAKER             | 1   |        |
| 6   | JPS2 INPUT BREAKER             | 1   |        |
| 5   | UPS1 INPUT BREAKER             | 1   |        |
| 4   | BOATLIKE SWITCH FOR BLUE LIGHT | 1   |        |
| 3   | SPD                            | 1   |        |
| 2   | SPD BREAKER                    | 1   |        |
| 1   | POWER LIGHT(L1/L2/L3)          | 3   |        |

|           |              |
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| CD. NO.   | DESIGNED BY: |
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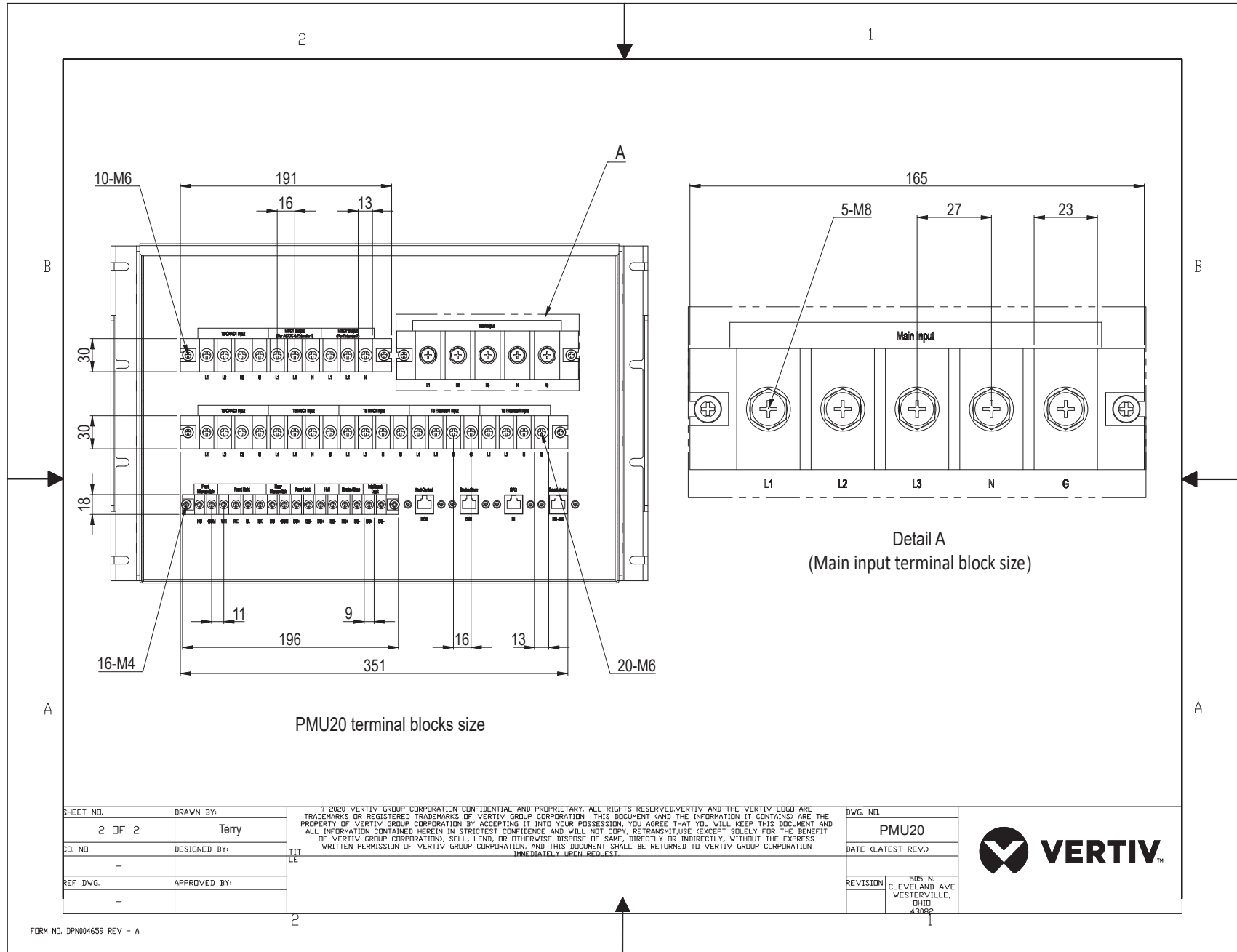
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FORM NO. DPN004659 REV - A

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| 2 OF 2    | Terry        |
| CD. NO.   | DESIGNED BY: |
| -         |              |
| REF DWG.  | APPROVED BY: |
| -         |              |

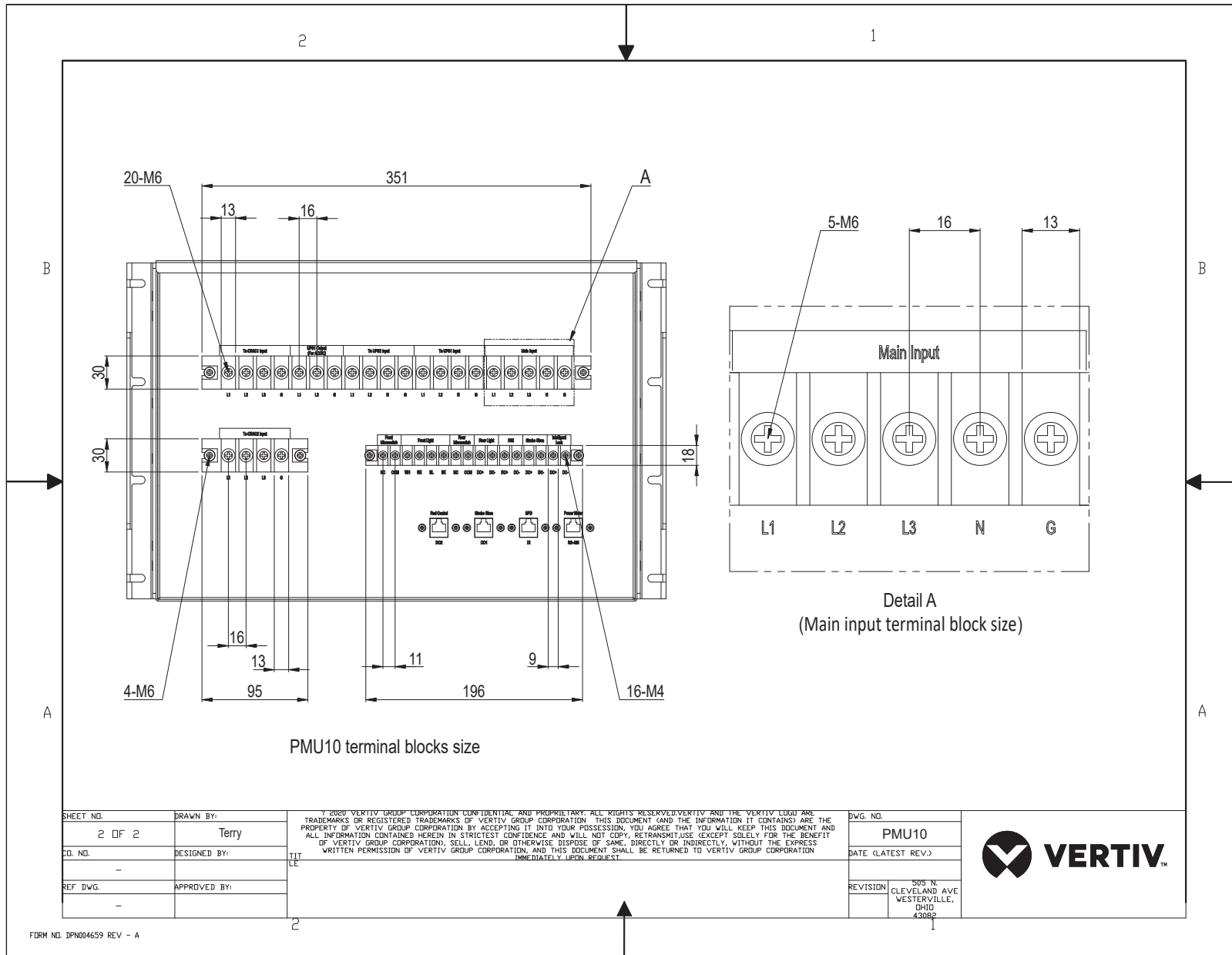
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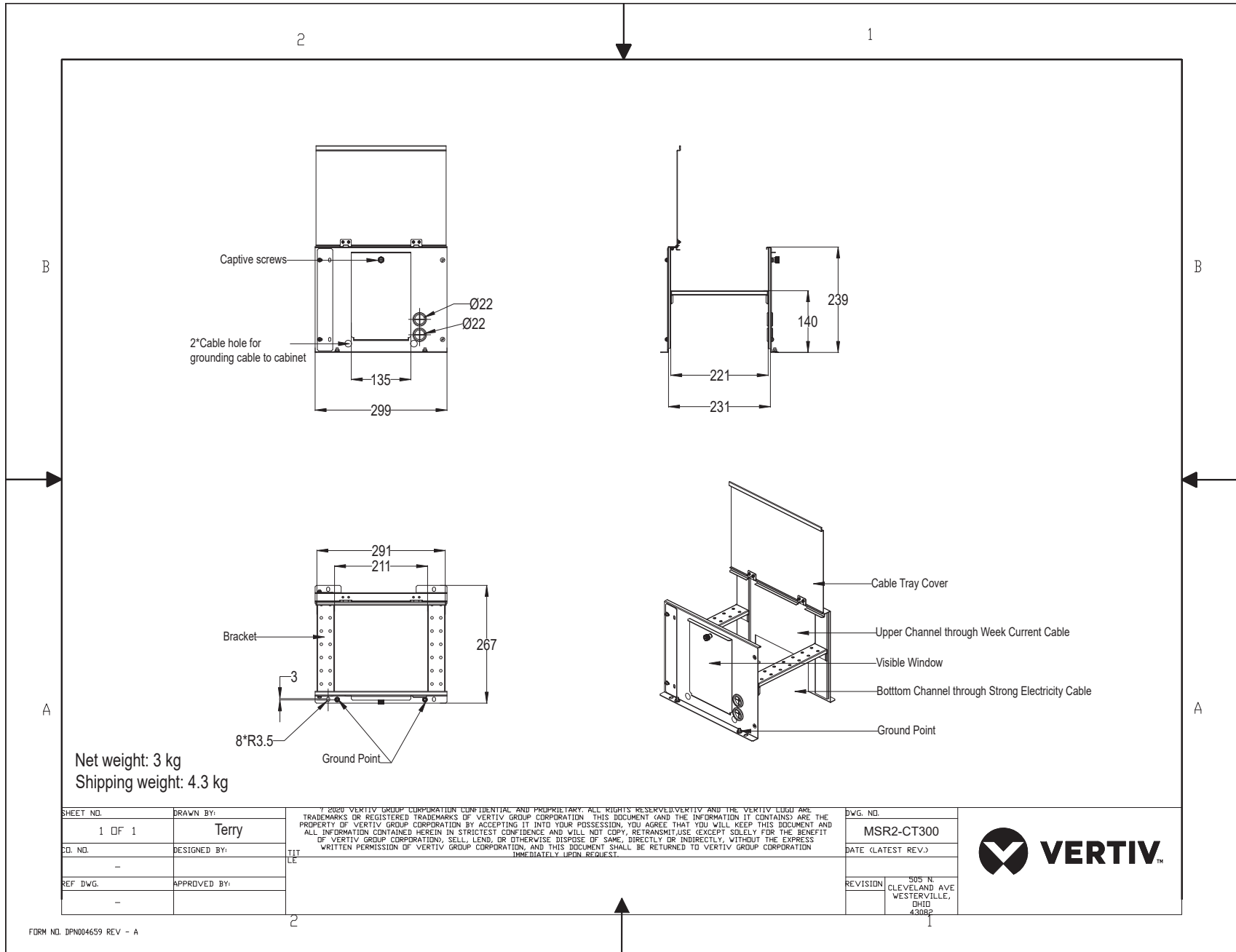
FORM NO. DP004659 REV - A

# 1.13 PMU10 Terminal Blocks Size

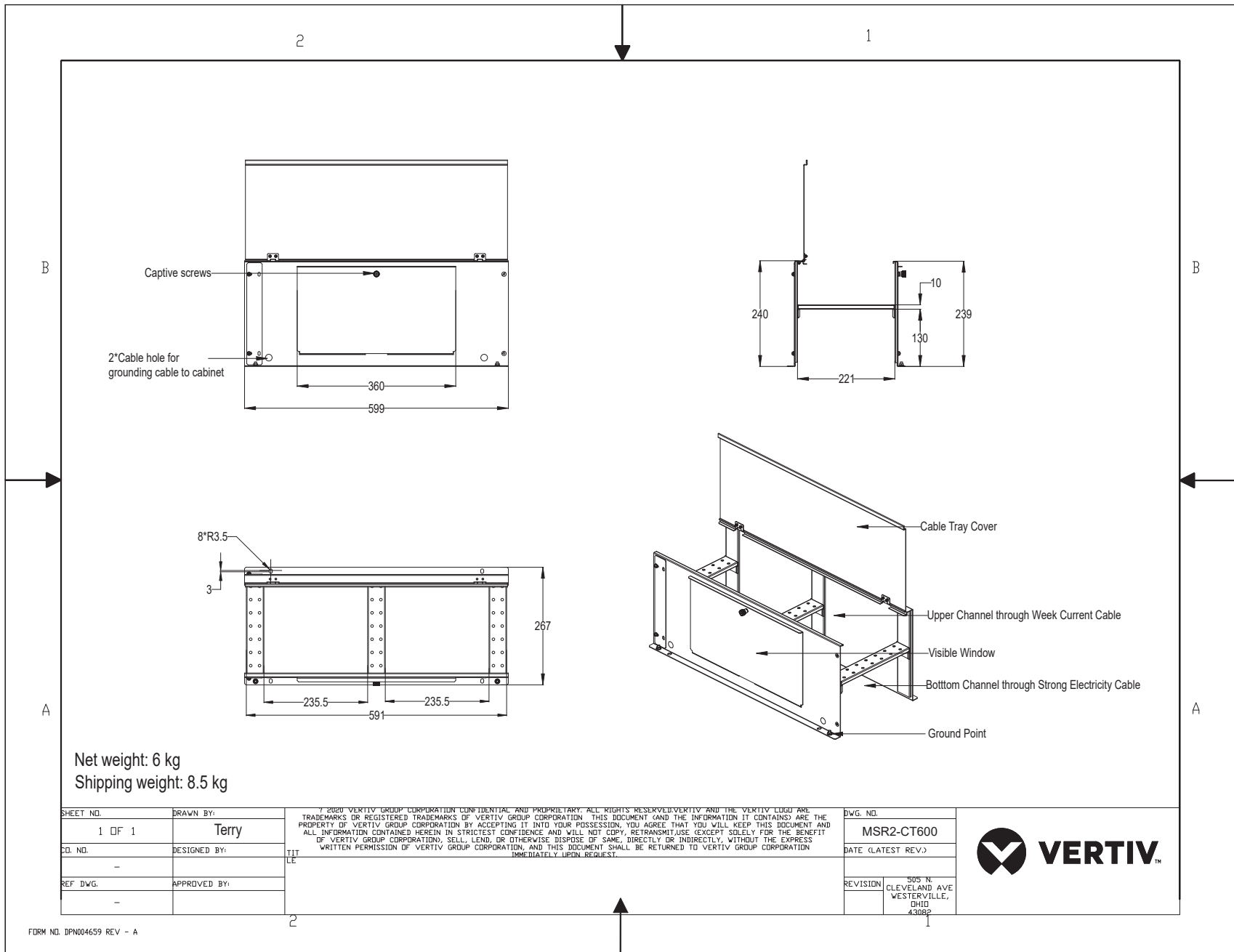




# 1.14 Vertiv™ MSR2 - CT300 Cable Tray 300mm

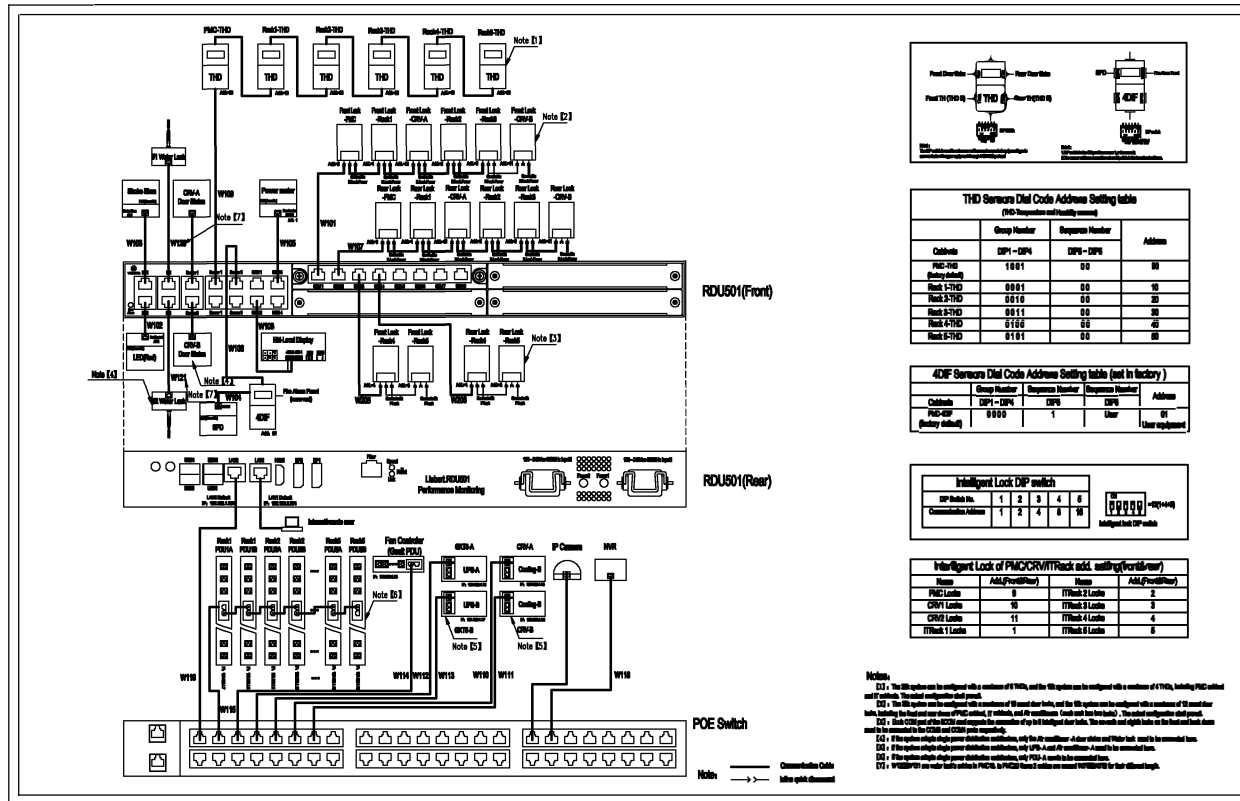


# 1.15 Vertiv™ MSR2 - CT600 Cable Tray 600mm

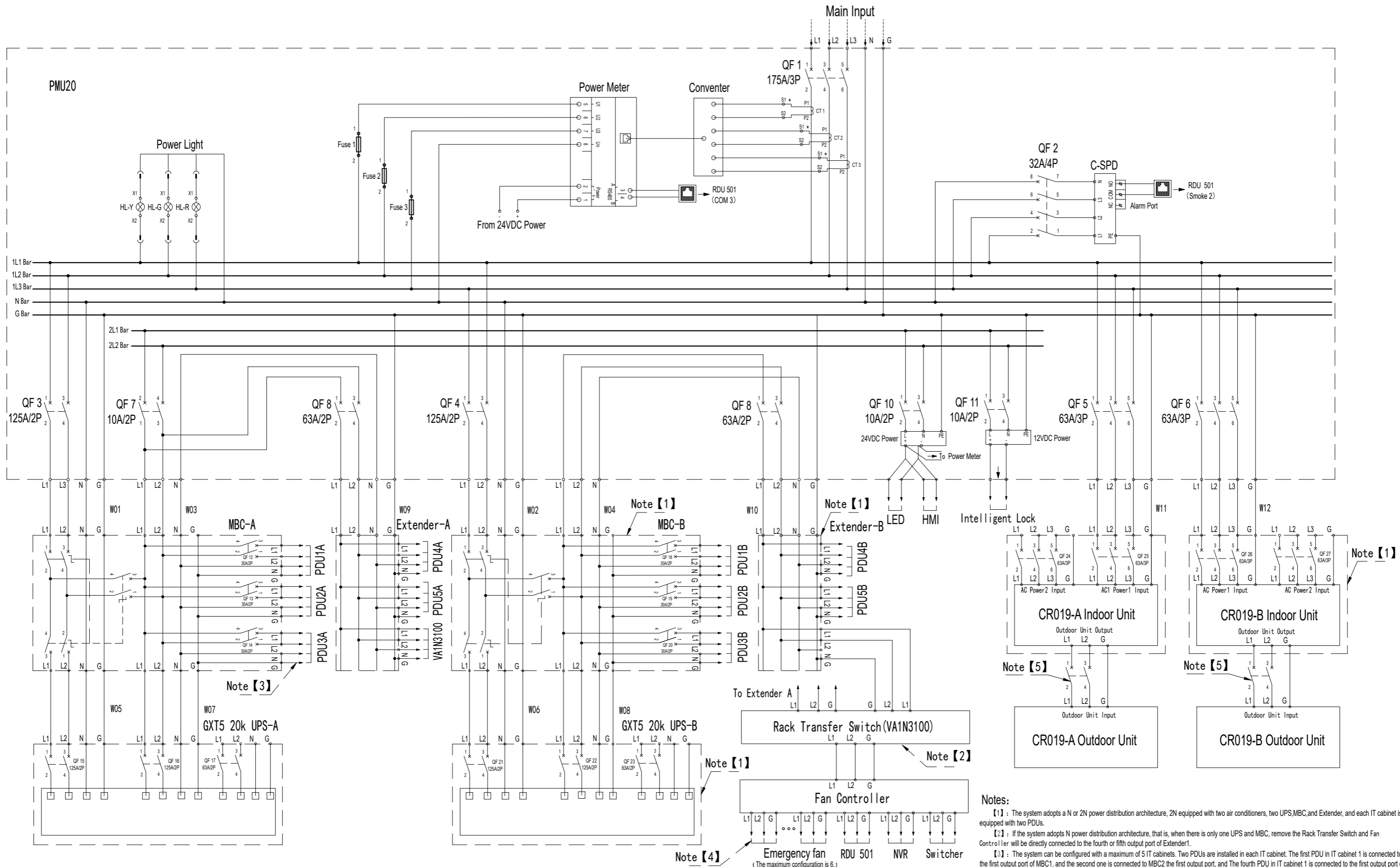


### 1.16 Monitoring System Diagram

# Monitoring system diagram



# 1.17 20kW System Wiring Diagram



**Notes:**

- AC 208 volt wiring & DC 24/12 volt wiring
- Copper busbar
- Terminal block connector
- Inline quick disconnect
- - - - - Power Cable(By Vendor)

**Notes:**

**【1】** : The system adopts a N or 2N power distribution architecture, 2N equipped with two air conditioners, two UPS, MBC, and Extender, and each IT cabinet is equipped with two PDUs.

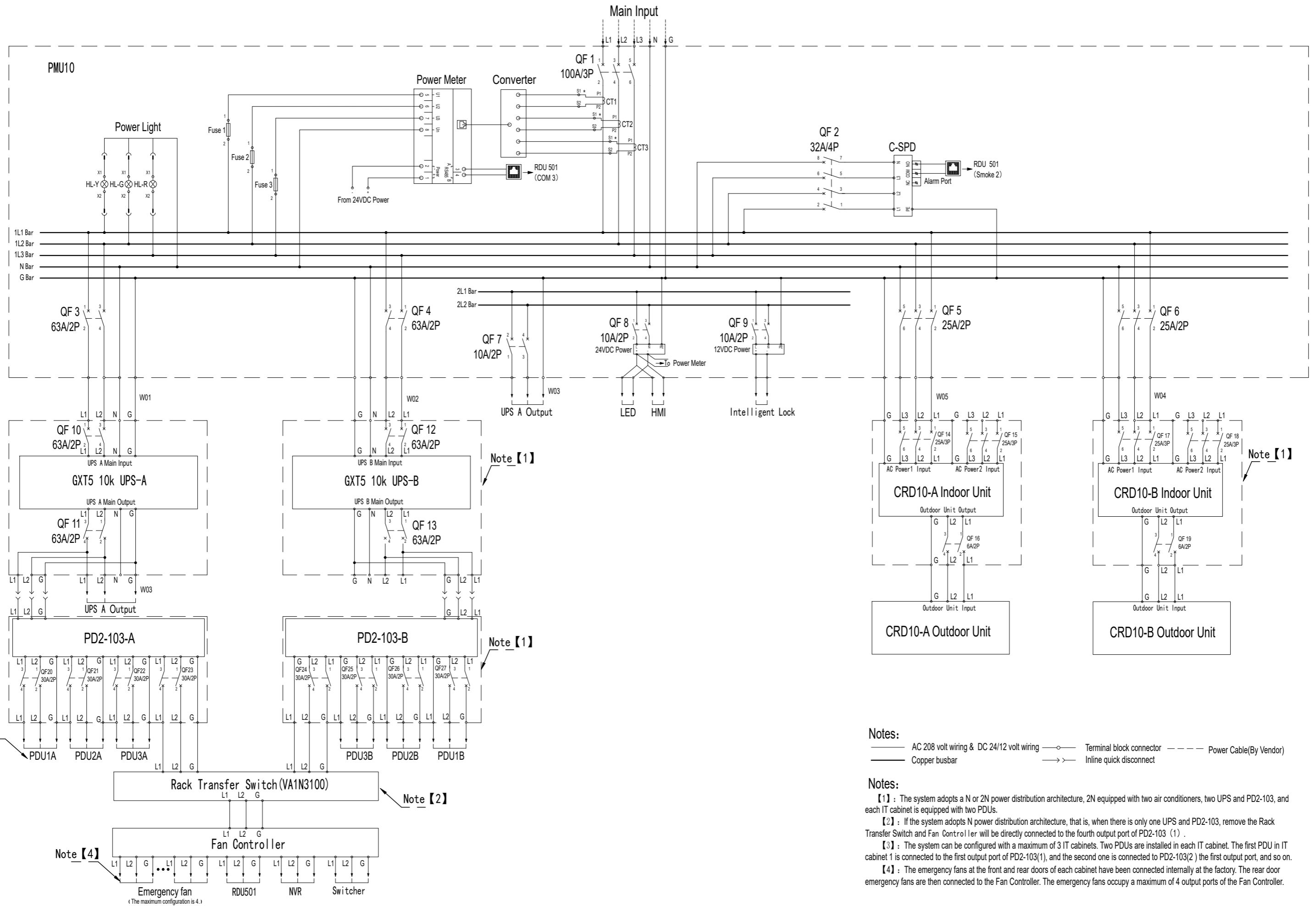
**【2】** : If the system adopts N power distribution architecture, that is, when there is only one UPS and MBC, remove the Rack Transfer Switch and Fan Controller will be directly connected to the fourth or fifth output port of Extender1.

**【3】** : The system can be configured with a maximum of 5 IT cabinets. Two PDUs are installed in each IT cabinet. The first PDU in IT cabinet 1 is connected to the first output port of MBC1, and the second one is connected to MBC2 the first output port, and the fourth PDU in IT cabinet 1 is connected to the first output port of Extender1, and the other one is connected to the first output port of Extender2.

**【4】** : The emergency fans at the front and rear doors of each cabinet have been connected internally at the factory. The rear door emergency fans are then connected to the Fan Controller. The emergency fans occupy a maximum of 6 output ports of the Fan Controller.

**【5】** : The outdoor unit circuit breaker of the CR019 requires on-site configuration and connection, and it is required to be installed within 5 feet of the outdoor condensing unit.

### 1.18 10kW System Wiring Diagram

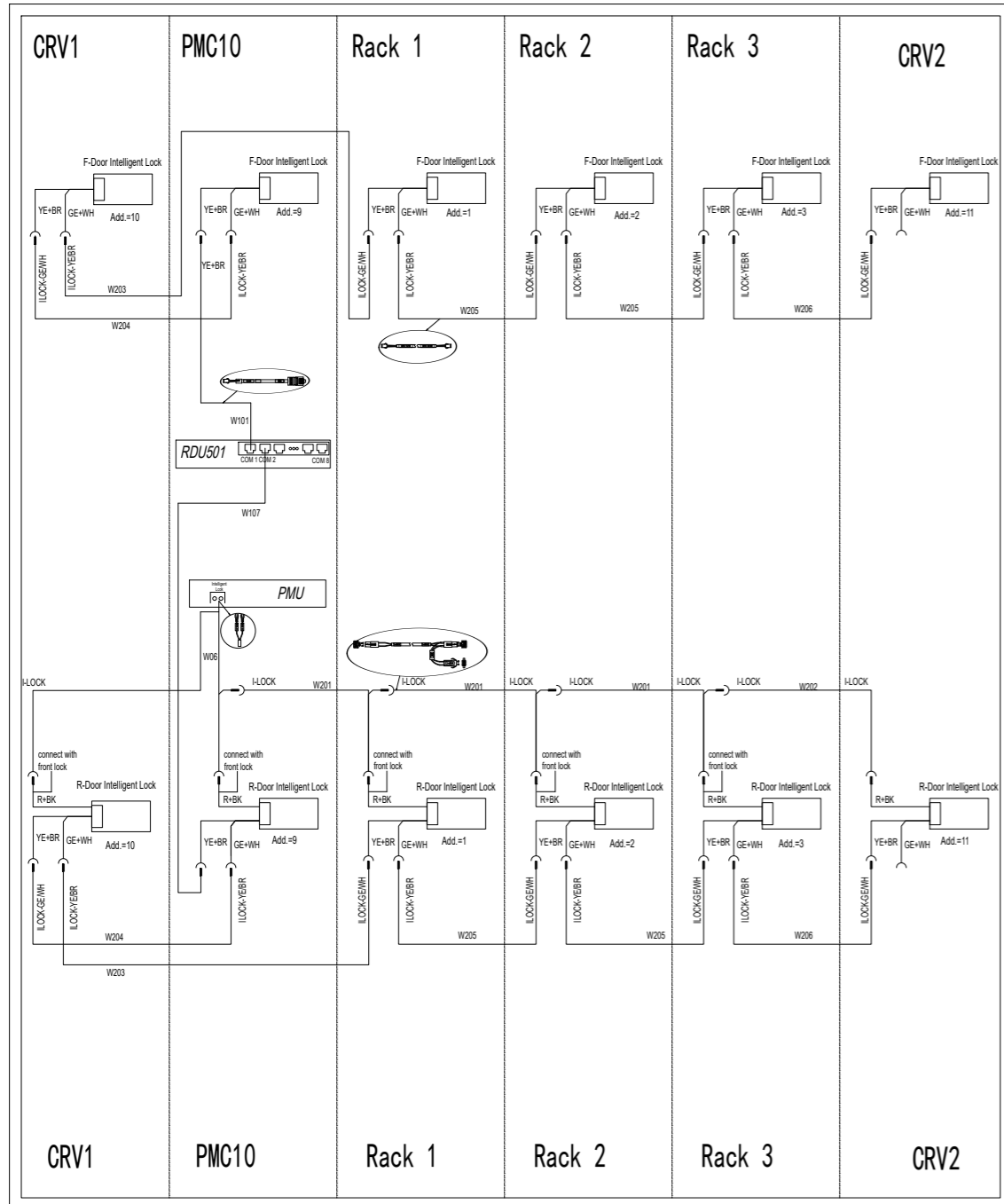


**Notes:**

- AC 208 volt wiring & DC 24/12 volt wiring
- Copper busbar
- Terminal block connector
- Inline quick disconnect
- - - Power Cable(By Vendor)

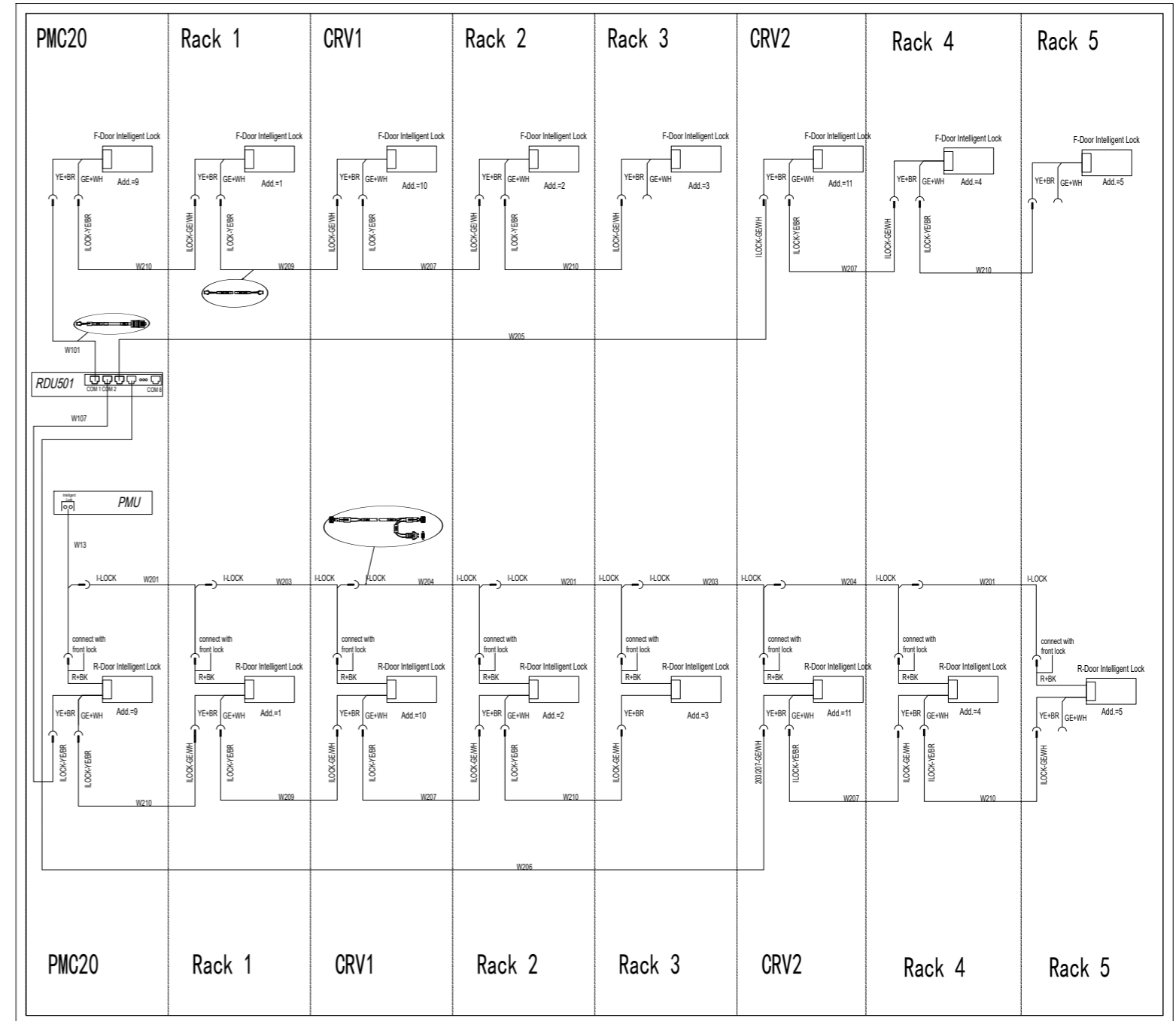
**Notes:**

- 【1】** : The system adopts a N or 2N power distribution architecture, 2N equipped with two air conditioners, two UPS and PD2-103, and each IT cabinet is equipped with two PDUs.
- 【2】** : If the system adopts N power distribution architecture, that is, when there is only one UPS and PD2-103, remove the Rack Transfer Switch and Fan Controller will be directly connected to the fourth output port of PD2-103 (1) .
- 【3】** : The system can be configured with a maximum of 3 IT cabinets. Two PDUs are installed in each IT cabinet. The first PDU in IT cabinet 1 is connected to the first output port of PD2-103(1), and the second one is connected to PD2-103(2) the first output port, and so on.
- 【4】** : The emergency fans at the front and rear doors of each cabinet have been connected internally at the factory. The rear door emergency fans are then connected to the Fan Controller. The emergency fans occupy a maximum of 4 output ports of the Fan Controller.



Interlligent Locks -SR2 for 10K(Max 3\*ITRack)

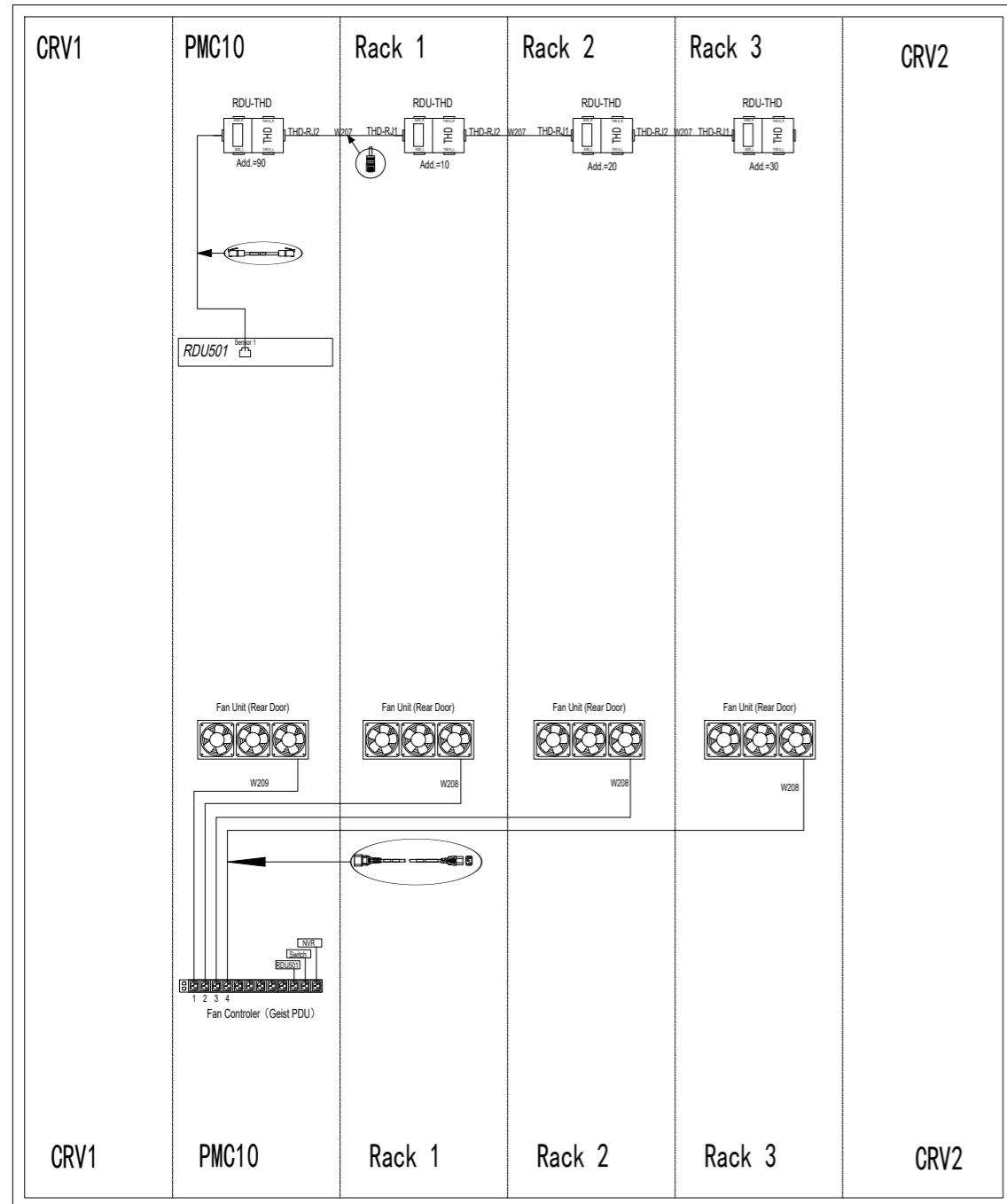
————— Factory connection cable  
 - - - - - Connection cable on site



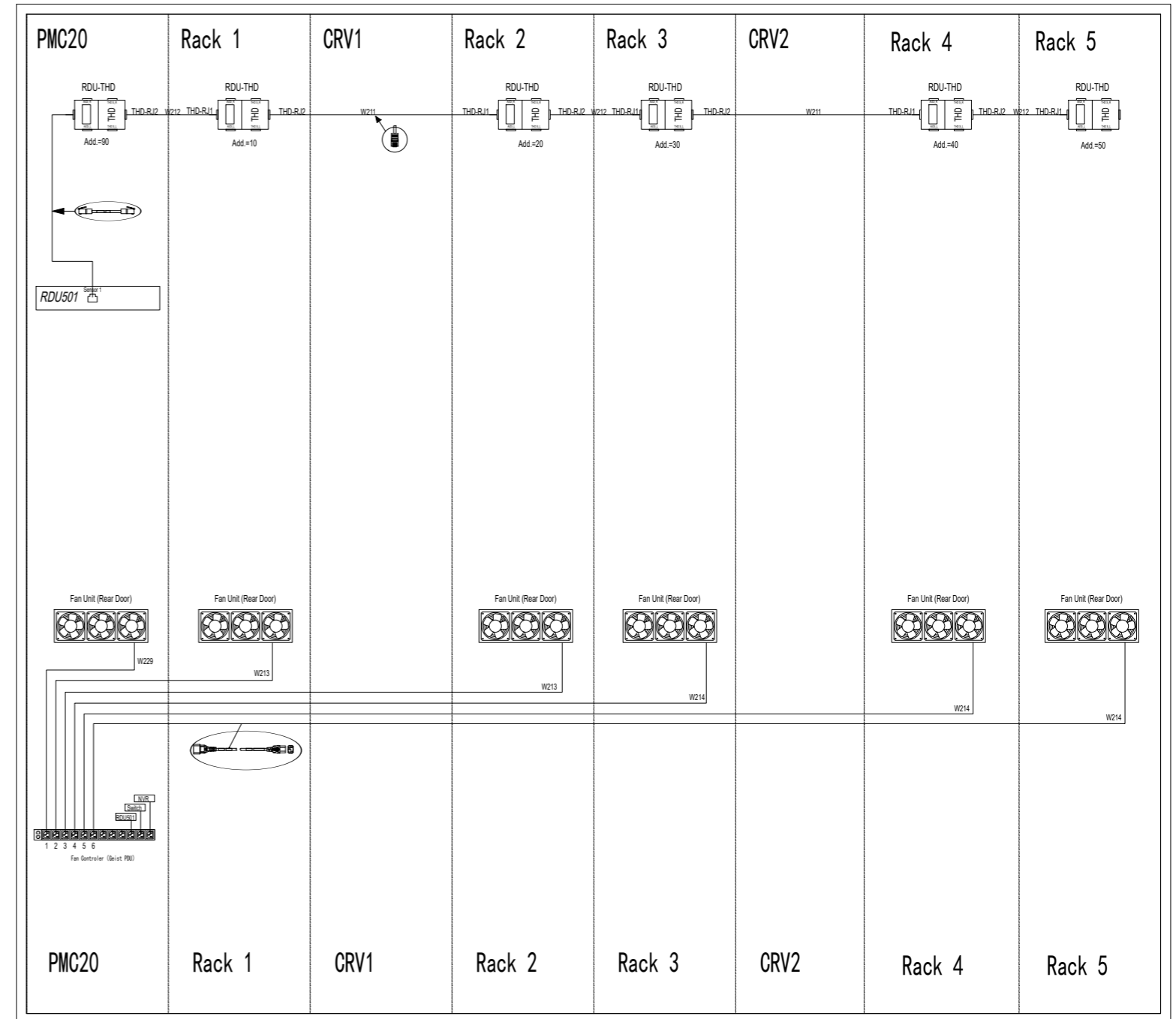
Interlligent Locks -SR2 for 20K(Max 5\*ITRack)



# 1.20 THD Sensor and Emergency Fan Wiring Diagram



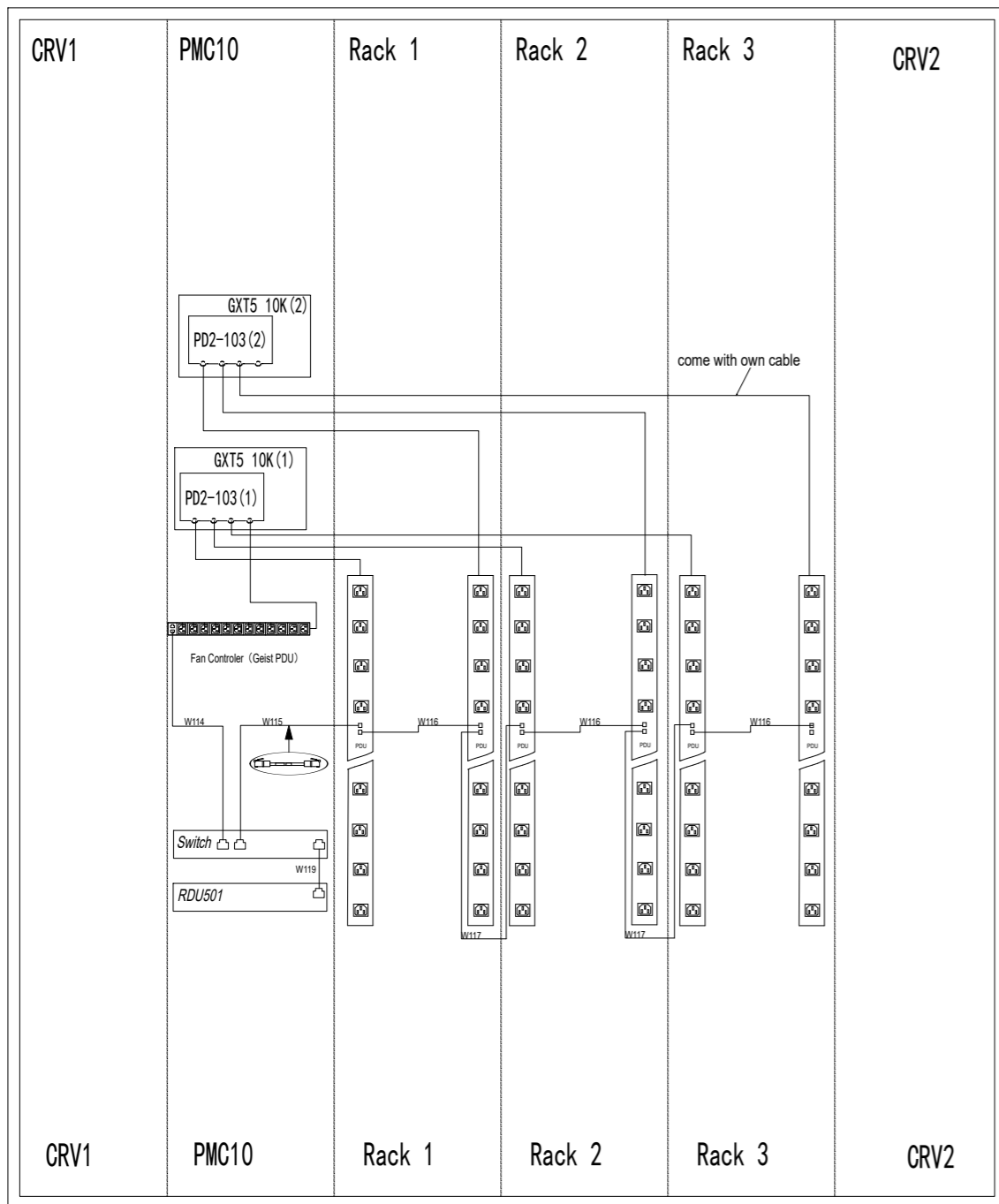
Fans & THDs -SR2 for 10K(Max 3\*ITRack)



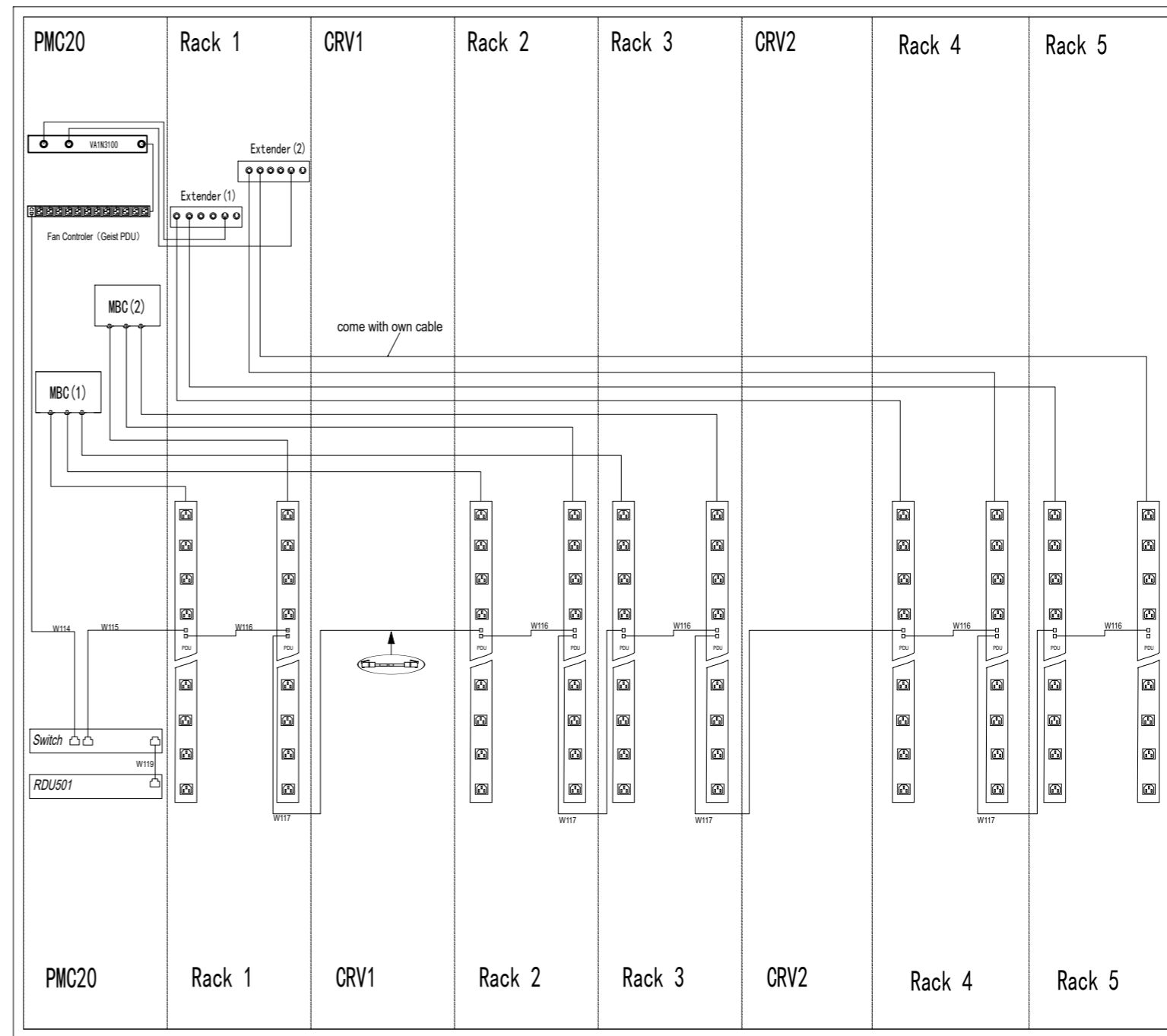
Fans & THDs -SR2 for 20K(Max 5\*ITRack)

———— Factory connection cable  
 ———— Connection cable on site

### 1.21 Rack PDU Wiring Diagram



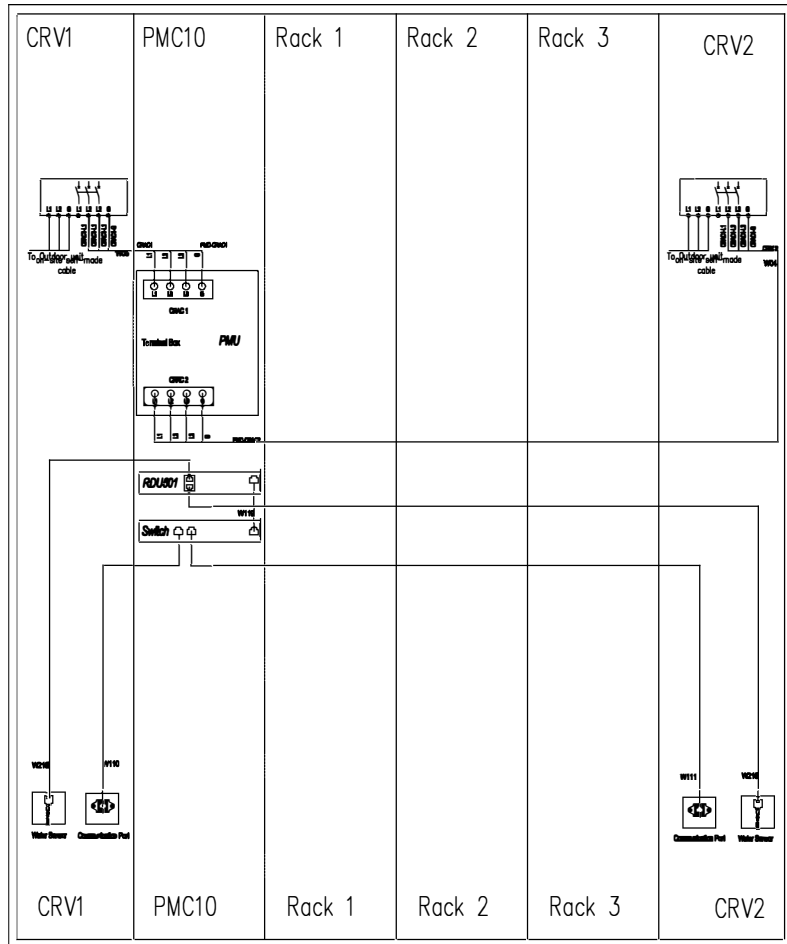
FC & Geist PDUs -SR2 for 10K(Max 3\*ITRack)



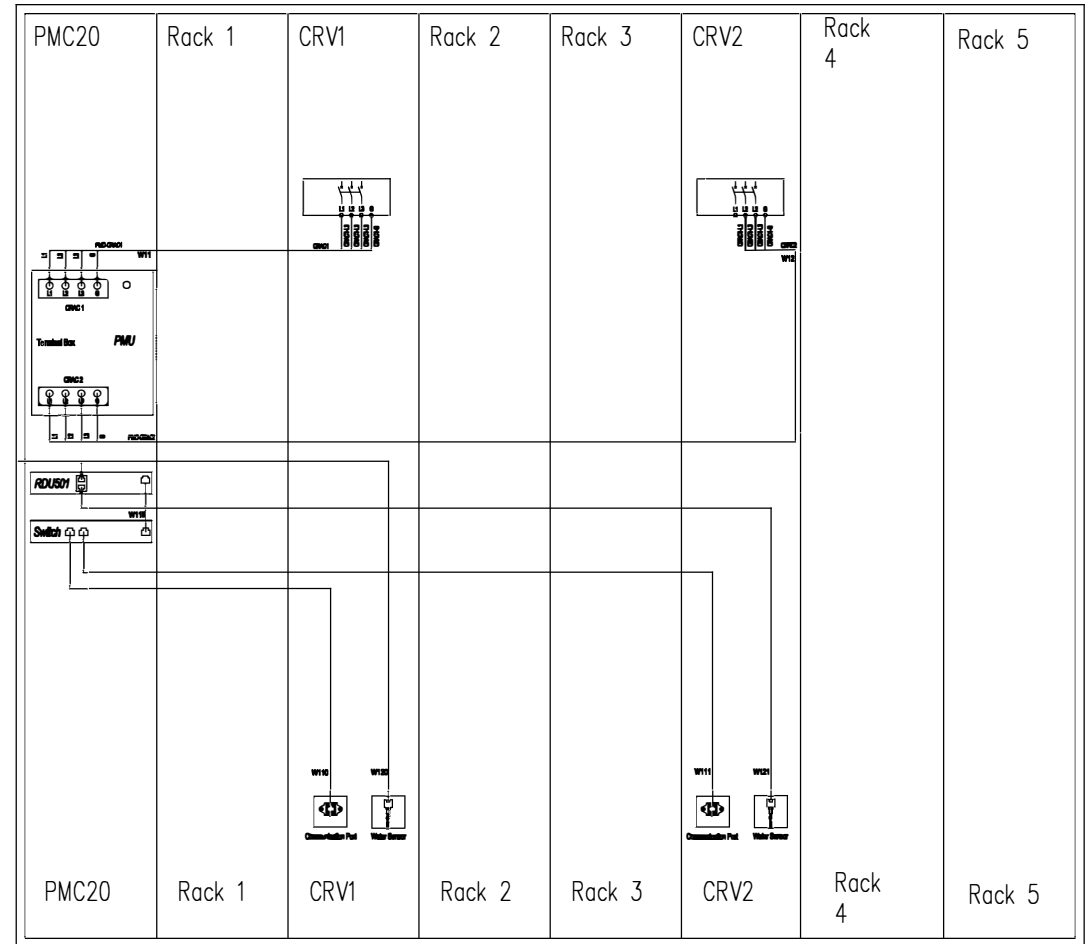
FC & Geist PDUs -SR2 for 20K(Max 5\*ITRack)

———— Factory connection cable  
 - - - - - Connection cable on site

# 1.22 Air Conditioner Wiring Diagram



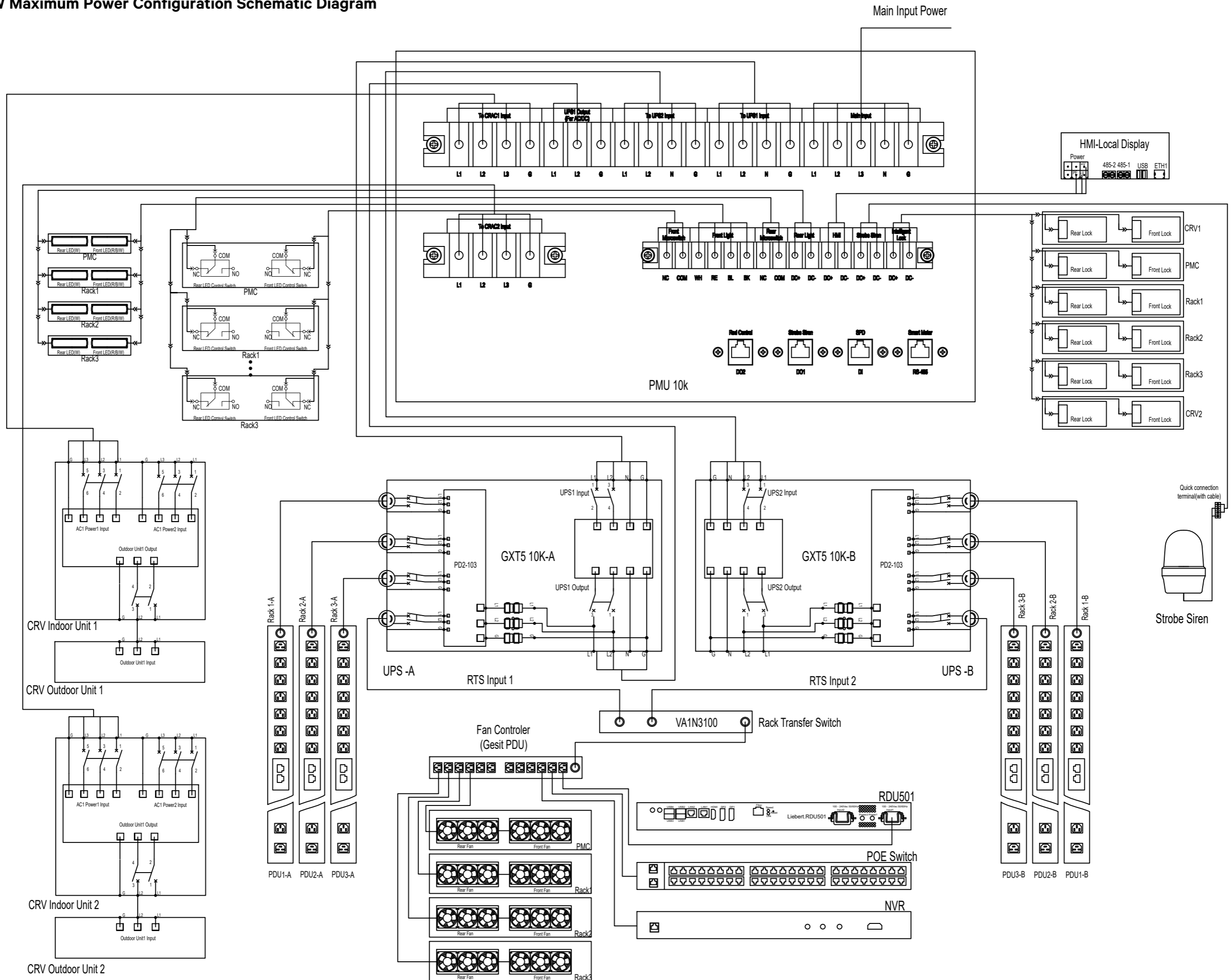
**CRVs(CRD10)-SR2 for 10K(Max 3\*ITRack)**



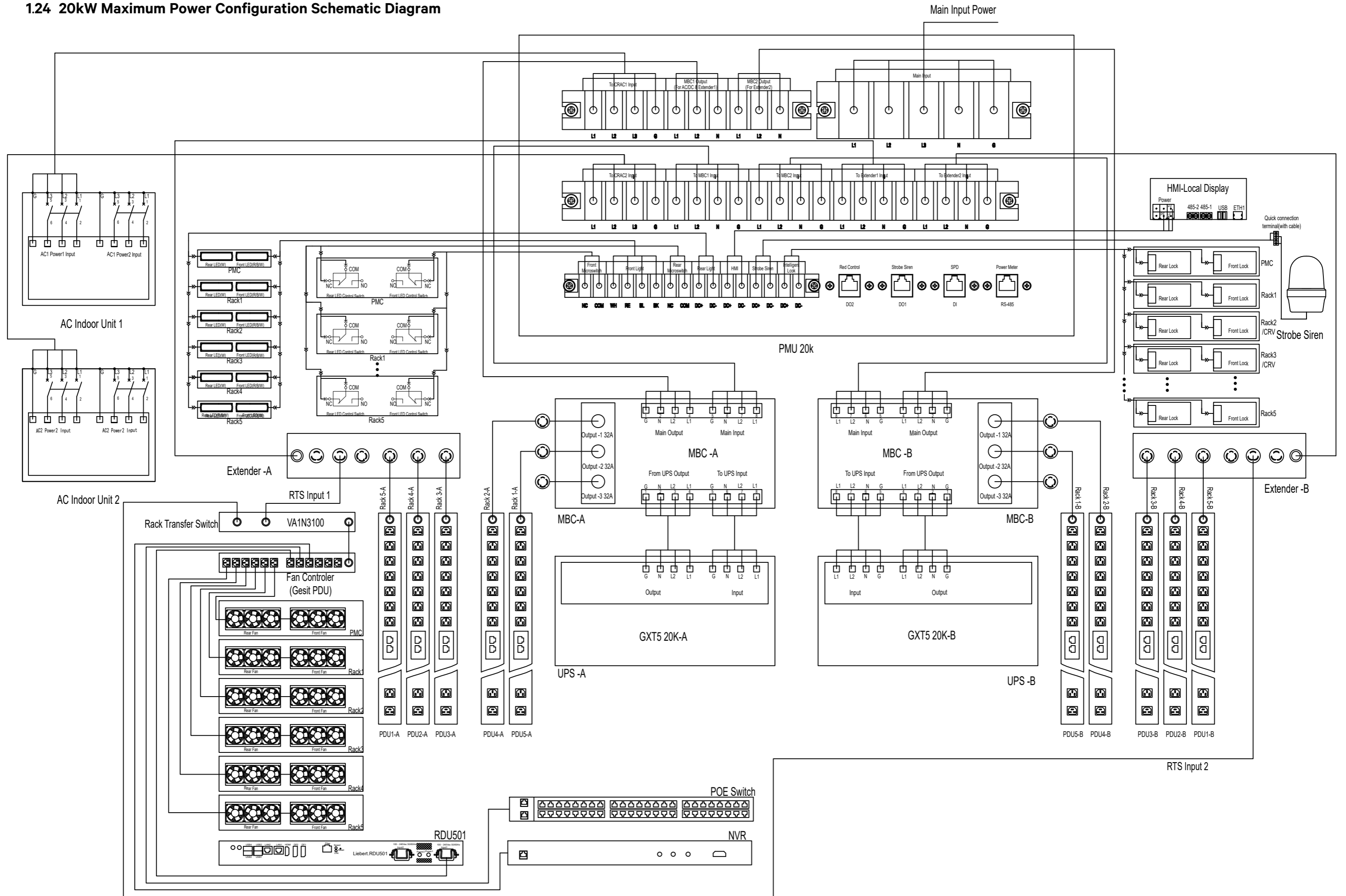
**CRVs(CR019)-SR2 for 20K(Max 5\*ITRack)**

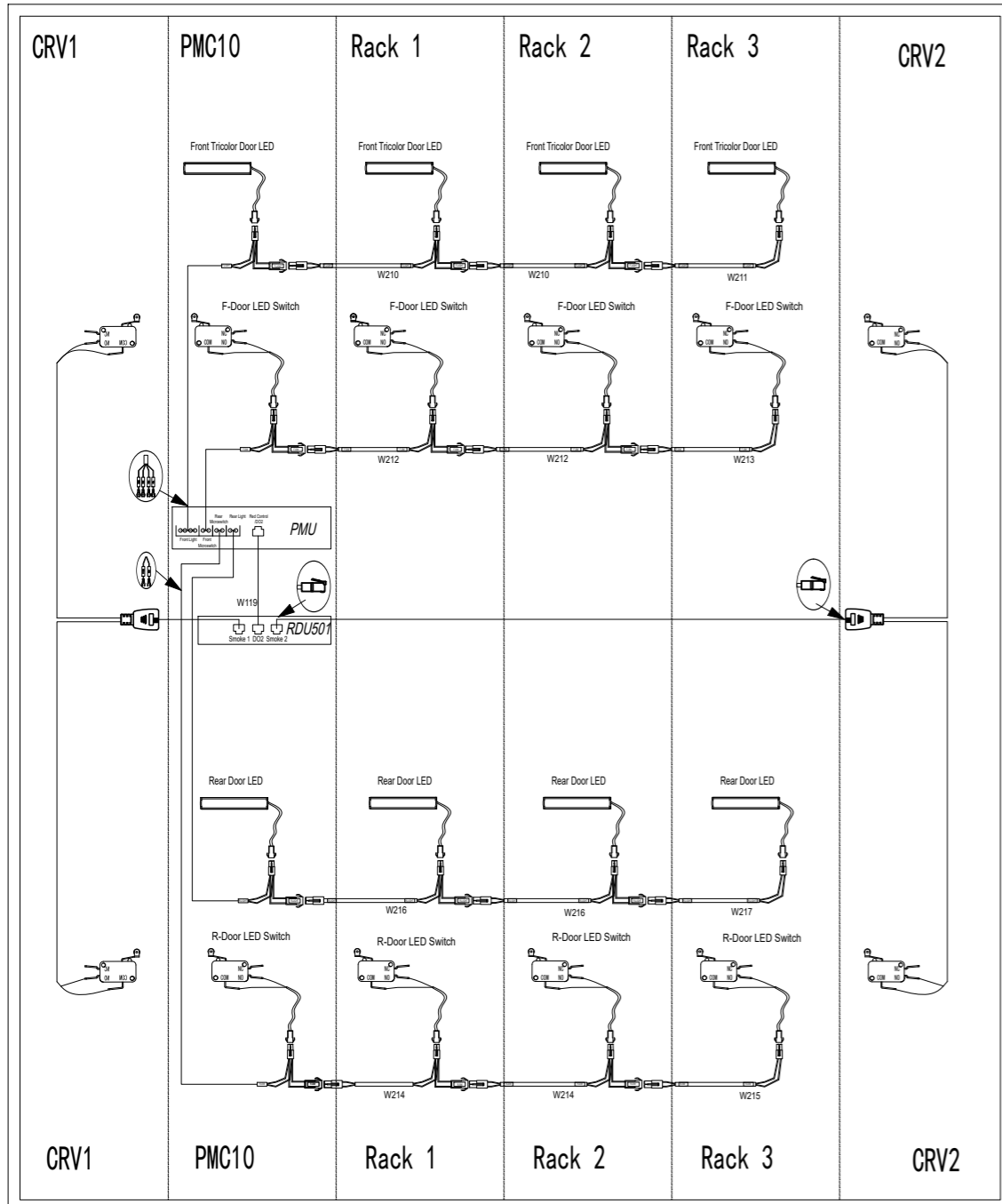
——— Factory connection cable  
 - - - - - Connection cable on site

# 1.23 10kW Maximum Power Configuration Schematic Diagram

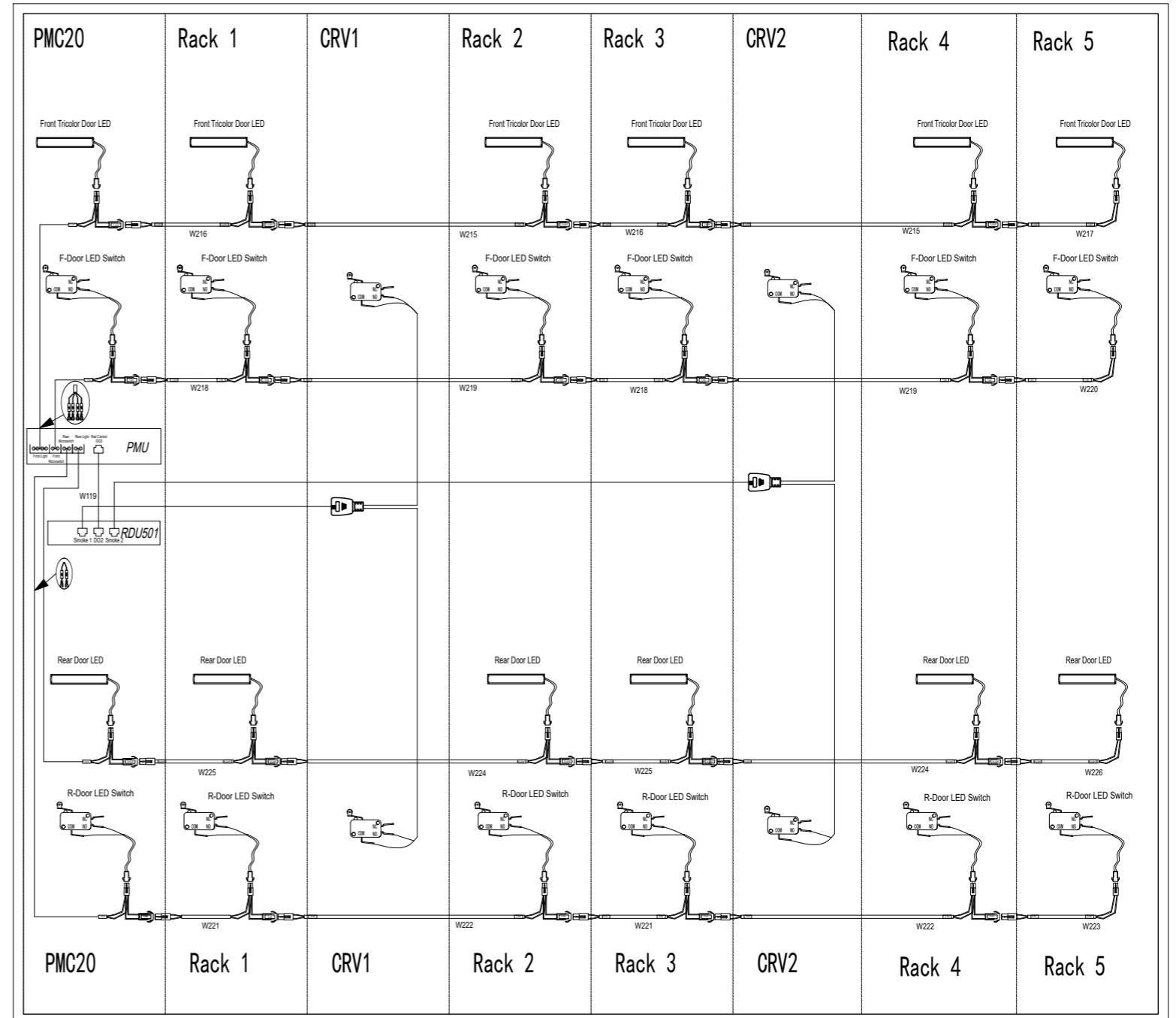


### 1.24 20kW Maximum Power Configuration Schematic Diagram





LED & LED Switch -SR2 for 10K(Max 3\*ITRack)



LED & LED Switch -SR2 for 20K(Max 5\*ITRack)

———— Factory connection cable  
 - - - - - Connection cable on site



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