



# Micro Data Center Solutions



# Micro Data Center Solutions

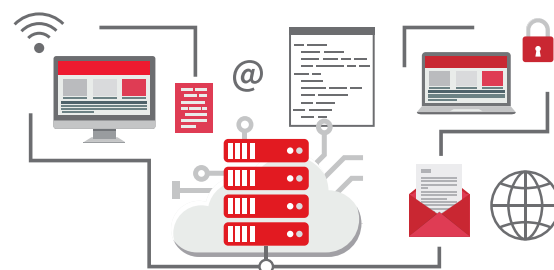
Hyper scale energy efficient data centers are becoming more and more common. However, smaller scale latency and security sensitive data centers are becoming the new trend with the demand on edge computing networks regarding to the wide spread of high bandwidth and latency required applications like IoT, AR, VR, mobile telecom networks and online gaming applications. Moreover, most of the data created is ephemeral in nature and will be neither saved nor stored. Only 10 percent of the ephemeral data is useful which means that there will be 10 times more useful data being than will be used. Edge is considered to be the solution to bridge this gap.

Edge computing is a distributed computing paradigm which brings data acquisition and control functions, storage of high bandwidth content, and applications closer to the location where it is needed, to improve response times and save bandwidth. Edge computing accelerated the evolution of micro data centers, which are downscaled, pre-designed data centers starting from a scale of a single rack to a few hundred KW IT load.

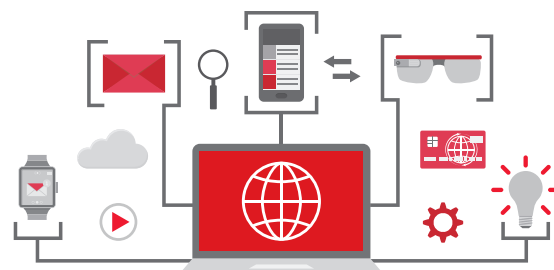
Micro DC is developed to answer all the edge computing needs; it is a modular, plug & play solution which does not require a white room to operate which reduces the initial commissioning investment. Moreover, Micro DC consist of all the essential components like UPS, PDU and cooling system. Environmental monitoring and management systems allow remote control on the data center through Lande's Remote Management System interface.



## BROAD BAND



## INTERNET OF THINGS



## BIG DATA



# Micro Data Center Solutions

## Provides Safety, Efficiency and Comfort

Lande Micro DC has been developed to meet all edge computing needs; It is a modular plug and play solution that does not require a new system room investment. Also Micro DC; It consists of all basic components such as UPS, PDU, EMS and cooling system.

Micro DC is a solution that provides efficiency and comfort by allowing users to easily monitor and manage active components on a single DCIM (Data Center Infrastructure Management) called Lande Remote Management Software.

Lande also secures the informational and physical integrity of Micro DC by mitigating vandalism and cyber terrorism risk with advance encryption and biometric access control systems.

Moreover, Micro DC is protected against any kind of undesired external hazards with its state-of-the-art environmental monitoring, fire detection and extinguishing systems.



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Split type ambient air conditioners, which are being used in small system rooms, are designed to operate at intervals during the day and they are not engineered to work uninterruptedly. Therefore, IT rooms should be climatized with in-row precision air conditioners.

Lande Micro DC solutions, are equipped with standard precision air conditioners from 10 kW to 25 kW and special production in-row type air conditioners between 30 and 50 kW in order to meet the cooling requirements. Micro DC's cooling system is designed for operating uninterruptedly in all the external climate conditions.

Lande Micro DC comes with two different configuration: the singular rack solution Smart DC and up to six racks, multiple rack solution Micro DC.

Lande products comply with EN 61587-1, 2002/95/EC4 RoHS Directory, EN 60950-1 and UL 60950-1 (Underwriters Laboratories).

Lande production facilities comply with ISO 9001-2008 Quality Management Systems-Requirements and ISO 14001 Environmental Management Systems.

TS EN 60529 Degrees of protection provided by enclosures (IP code) (For electrical equipment).

TS EN 50102 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code).

TS EN 61587-1 Functional safety of electrical/electronic/programmable electronic safety-related systems - Part 1: General requirements.

2002/95/EC RoHS Directory.

TS EN 60950-1 Information technology equipment - Safety Part 1: General requirements.

UL 60950-1 Information Technology Equipment - Safety Part 1: General Requirements.



# Micro Data Center Solutions

## Smart DC

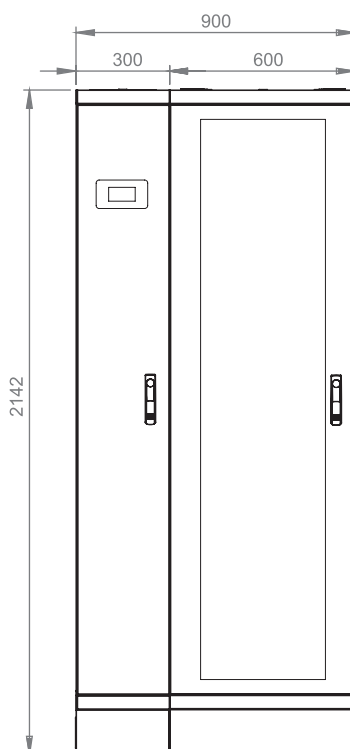
### Lande Smart DC;

Smallest member of Lande Micro DC family. Smart DC is a singular rack micro data center solution which provides 22U to 36U free equipment mounting area depending on the energy redundancy.

Smart DC offers 10 and 15 kW in-row precision air conditioning as standard. However, series can be configured with up to 32 kW in-row precision air conditioners.

Smart DC consists of an integrated environmental monitoring system, fire detection and extinguishing system (NOVEC1230 or FM200), redundant uninterruptible power supply, power distribution panel and PDU (power distribution unit) as standard.

| Smart DC - Micro Data Center              |      |                                                     |                                     |
|-------------------------------------------|------|-----------------------------------------------------|-------------------------------------|
| Power per rack                            | kW   | 6 kW                                                | 10 kW                               |
| Redundancy UPS & Air Conditioner          |      | N                                                   | 2N                                  |
| Number of racks                           | pcs  | 1                                                   |                                     |
| Height - H                                | U    | 42U                                                 | 45U                                 |
| Width of rack - W                         | mm   | 600                                                 | 800                                 |
| Width of the system WS mm                 | mm   | 900                                                 | 1100                                |
| Cabinet depth - D                         | mm   | 1050                                                |                                     |
| Cold aisle (front)                        |      | 250 mm - Glass door                                 |                                     |
| Hot aisle (rear)                          |      | None - Perforated door                              | 200 mm Glass door 200 mm Metal door |
| System depth - Ds                         | mm   | 1350                                                | 1550                                |
| Air conditioner power direct expansion DX | kW   | 10 kW                                               | 15 kW                               |
| Dimensions                                | mm   | 42U & 45U x 300 x 1050                              |                                     |
| Power input                               |      | 3 Faz, 400 Volt, 50/60 Hz                           |                                     |
| UPS                                       | kVA  | 6 kVA (2U)                                          | 10 kVA (3U)                         |
| UPS - batteries (5-15 minutes)            | adet | 16 pcs 9 Ah (2U)                                    | 20 pcs 9 Ah (3U)                    |
| UPS input                                 |      | 1 Faz, 240 Volt, 50/60 Hz                           |                                     |
| PDU                                       |      | Basic                                               | Monitored Managed                   |
|                                           |      | -                                                   | Inlet or each outlet Each outlet    |
| PDU - Inlet                               |      | 1 Phase, 240 Volt, 50/60 Hz, 32 Amp, 3x6 mm H05VV-F |                                     |
| PDU - outlet                              |      | 20xC13+4xC19                                        | 20xC13+4xC19 36xC13+6xC19           |



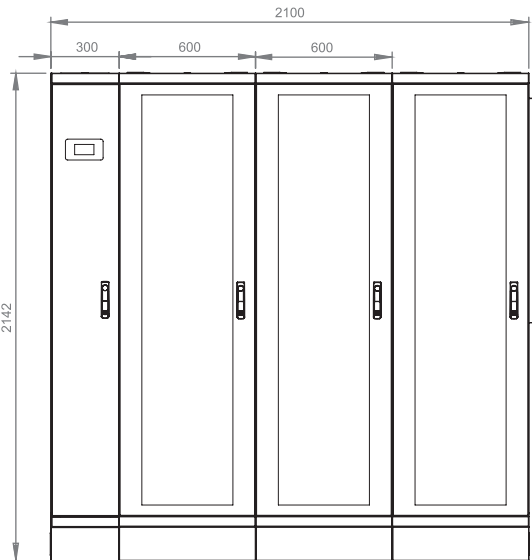
# Micro Data Center Solutions

## Micro DC

### Lande Micro DC;

Represents micro data center solution for two to six cabinets. Micro DC, was developed to host both servers and network/energy cabinets.

Micro DC can be configured with server/network/energy cabinets, in-row precision air conditioners, environmental monitoring system, fire detection and extinguishing system (NOVEC1230 or FM200), redundant uninterruptible power supply, power distribution panel and PDUs (power distribution unit). Micro DC offers N, N+1 and 2N redundancy for cooling and energy systems.



| Micro DC - Micro Data Center              |     |                                                            |                              |                   |
|-------------------------------------------|-----|------------------------------------------------------------|------------------------------|-------------------|
| Power per rack                            | kW  | 6 kW                                                       |                              | 10 kW             |
| Redundancy UPS & Air Conditioner          |     | N                                                          | N+1                          | 2N                |
| Quantity of racks                         | pcs | 2~6                                                        |                              |                   |
| Height - H                                | U   | 42U                                                        |                              | 45U               |
| Width of rack (Server) - W                | mm  | 600                                                        |                              |                   |
| Width of rack (Network) - W               | mm  | 800                                                        |                              |                   |
| Width of rack (Energy) - W                | mm  | 600                                                        |                              |                   |
| System width - WS                         | mm  | Variable depending of the system configuration             |                              |                   |
| Cabinets depth - D                        | mm  | 1050                                                       |                              |                   |
| Cold aisle (front)                        |     | 250 mm - Glass door                                        |                              |                   |
| Hot aisle (rear)                          |     | YOK - Perforated door                                      | 200 mm Glass door            | 200 mm Metal door |
| System depth - Ds                         | mm  | 1350                                                       |                              | 1550              |
| Air conditioner power direct expansion DX | kW  | 10 kW                                                      | 15 kW                        | 30 kW             |
| Dimensions                                | mm  | 42U & 45U x 300 x 1050                                     |                              |                   |
| Power input                               |     | 3 phase, 400 Volt, 50/60 Hz                                |                              |                   |
| UPS                                       | kVA | 10 kVA                                                     | 20 kVA                       | 30 kVA            |
| UPS - batteries                           |     | Variable backup time depending of the system configuration |                              |                   |
| UPS input                                 |     | 3 phase, 400 Volt, 50/60 Hz                                |                              |                   |
| PDU                                       |     | Basic                                                      | Monitored                    | Managed           |
|                                           |     | -                                                          | Inlet or each outlet         | Each outlet       |
| PDU - input                               |     | 1 phase, 240 Volt, 50/60 Hz, 32 amp, 3x6 mm H05VV-F        |                              |                   |
| PDU - outputs                             |     | 20xC13+4xC19                                               | 20xC13+4xC19<br>36xC13+6xC19 | 20xC13+4xC19      |

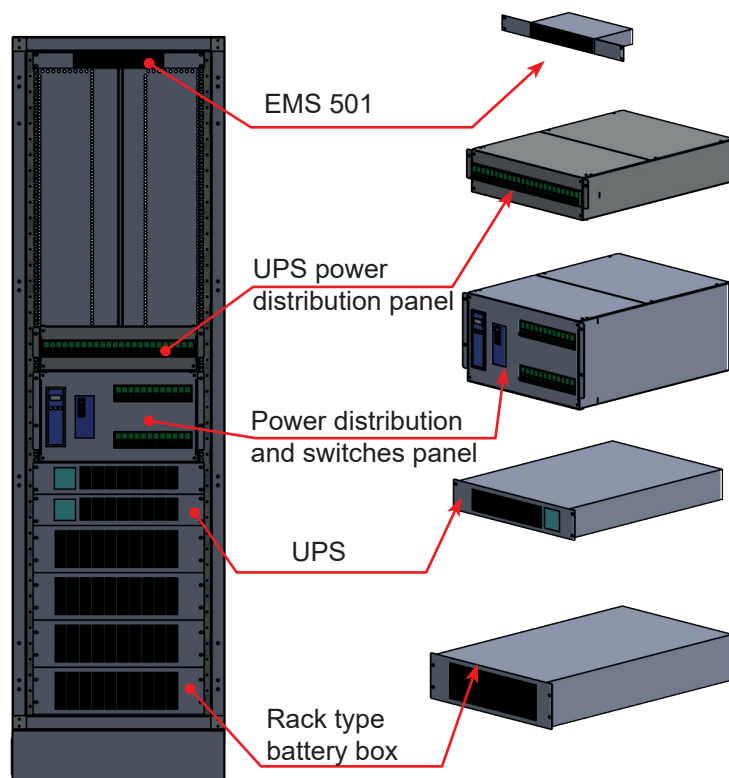
# Micro Data Center Solutions

## Control Cabinet

Lande Micro DC is configurable with a control cabinet where UPS and batteries, energy and UPS distribution panels, and environmental management system components can be located.

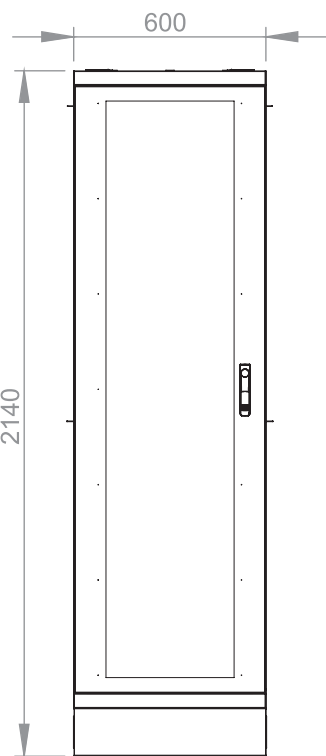
Power distribution panels and UPSs are designed for 2N power distribution redundancy. ATS (automatic transfer switch) in energy distribution panels allows redundant energy inlet for uninterrupted energy supply.

System can be configured to respond to long-term power cuts with additional 12V batteries.

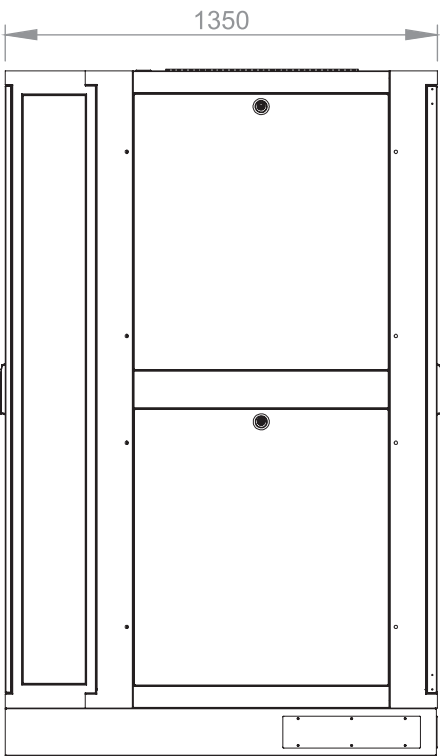


# Micro Data Center Solutions

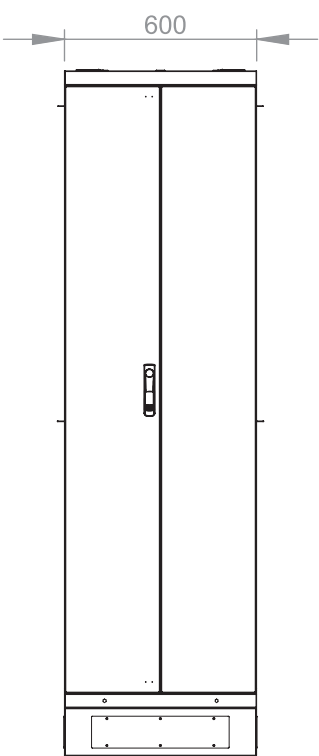
## Control Cabinet



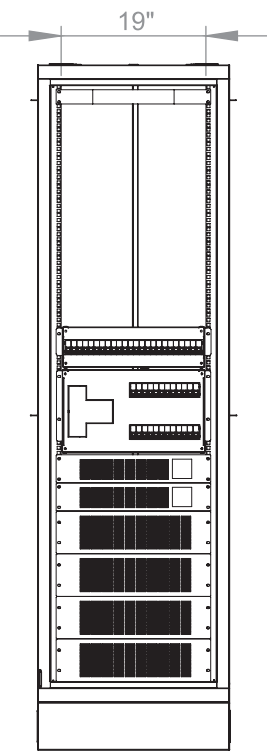
Front view



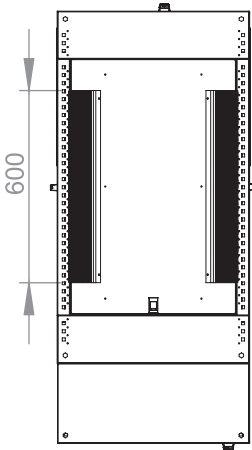
Side view



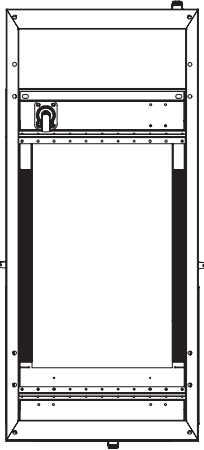
Rear view



Internal view - front



Top view



Bottom view

# Micro Data Center Solutions

## Energy Group

Micro DC energy group consist of essential power distribution and backup components for data centres; uninterruptible power supply (UPS), batteries, energy distribution panel, automatic transfer switch (ATS) and UPS energy distribution panel.

In case of a power failure, backup system automatically switches to backup energy source to avoid interrupting system uptime.

Micro DC DCIM allows monitoring the power distribution on UPS and power distribution panels for enhanced system efficiency assessment.

### Power Distribution Panel

| Product code          | Description                                                                  |
|-----------------------|------------------------------------------------------------------------------|
| LN-MDP-3U1960-201P-BL | 19" rack type modular power distribution panel, 3U, 20 kW, 230 Volt, 50 Hz   |
| LN-MDP-3U1960-401P-BL | 19" rack type modular power distribution panel, 3U, 40 kW, 230 Volt, 50 Hz   |
| LN-MDP-3U1960-401P-BL | 19" rack type modular power distribution panel, 2x3U, 40 kW, 230 Volt, 50 Hz |
| LN-MDP-3U1960-601P-BL | 19" rack type modular power distribution panel, 2x3U, 60 kW, 230 Volt, 50 Hz |

### Automatic Transfer Switch and Power Distribution Panel

| Product code          | Description                                                                                   |
|-----------------------|-----------------------------------------------------------------------------------------------|
| LN-TDP-6U1960-603P-BL | 19" rack type automatic transfer switch and power distribution panel, 6U, 60 kW, 400 V, 50 Hz |
| LN-TDP-6U1960-403P-BL | 19" rack type automatic transfer switch and power distribution panel, 6U, 40 kW, 400 V, 50 Hz |

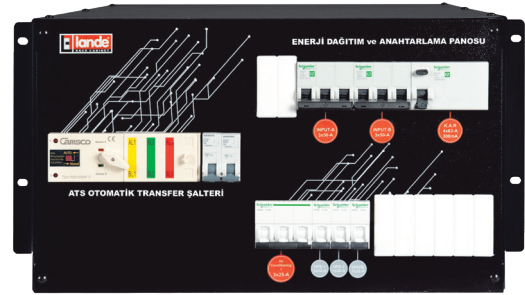
### UPS and Battery Case

| Product code          | Description                                                                                                       |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|
| LN-UPSR-2U1960-1011V  | 19" rack type UPS, 10 kVA/kW, 2U, 1P/1P, 230 V, 50/60 Hz, pF:1                                                    |
| LN-BAT-3U1970-9A20-BL | 19" rack type battery box, 3U, 20 pcs 9Ah 12V lead acid batteries (5 years lifespan), 15 min. backup time         |
| LN-UPSR-2U1960-1011V  | 19" rack type UPS, 10 kVA/kW, 2U, 1P/1P, 230 V, 50/60 Hz, pF:1                                                    |
| LN-BAT-3U1970-9A20-BL | 19" rack type battery box, 2x3U, 40 pieces 9Ah 12V lead acid batteries (5 years lifespan) 15 min. backup time     |
| LN-UPSR-2U1960-1011V  | 19" rack type UPS, 20 kVA/kW (2x10 kVA), 2x2U, 1P/1P, 230 V, 50/60 Hz, pF:1                                       |
| LN-BAT-3U1970-9A20-BL | 19" rack type battery box, 2x3U, 40 pieces 9Ah 12V lead acid batteries (5 years lifespan), 5-10 min. backup time  |
| LN-UPSR-2U1960-1011V  | 19" rack type UPS, 20 kVA/kW (2x10 kVA), 2x2U, 1P/1P, 230 V, 50/60 Hz, pF:1                                       |
| LN-BAT-3U1970-9A20-BL | 19" rack type battery box, 4x3U, 80 pieces 9 Ah 12V lead acid batteries (5 years lifespan), 15 min. backup time   |
| LN-UPSR-2U1960-1011V  | 19" rack type UPS, 30 kVA/kW (3x10 kVA), 3x2U, 1P/1P, 230 V, 50/60 Hz, pF:1                                       |
| LN-BAT-3U1970-9A20-BL | 19" rack type battery box, 4x3U, 80 pieces 9 Ah 12V lead acid batteries (5 years lifespan), 5-10 min backup time  |
| LN-MD45-11U1975-4533  | 19" rack type modular UPS, 45 kVA (3x15 kVA), 11U, 3P/1P, 400 V, 50/60 Hz, pF:1                                   |
| LN-BAT-3U1970-9A20-BL | 19" rack type battery box, 4x3U, 80 pieces 9 Ah 12V lead acid batteries (5 years lifespan), 5-10 min. backup time |

### UPS Energy Distribution Panel



### Power Distribution Panel



### Rack Type UPS



### Rack Type UPS



# Micro Data Center Solutions

## In-row DX Precision Air Conditioners

Reliability and uptime are the priorities for data centers while energy efficiency is another important aspect since cooling systems are responsible with up to 40% of the energy demand in data centers. Thermal environment is the most important variable for both priorities, since performance and efficiency IT equipment and power equipment is directly related to thermal quality of the computer rooms.

Direct expansion air-conditioners are ideal cooling systems for ICT equipment which require precise cooling within AESREA standards. Lande in-row air conditioners, which offer cooling capacities ranging from 10 to 32 kW, are equipped with an internal controller which manages the entire cooling process and air conditioner operation. In order to meet different capacity requirements in special projects, it can offer solutions in capacities such as 30-40-50 kW as a custom design in different chassis sizes.

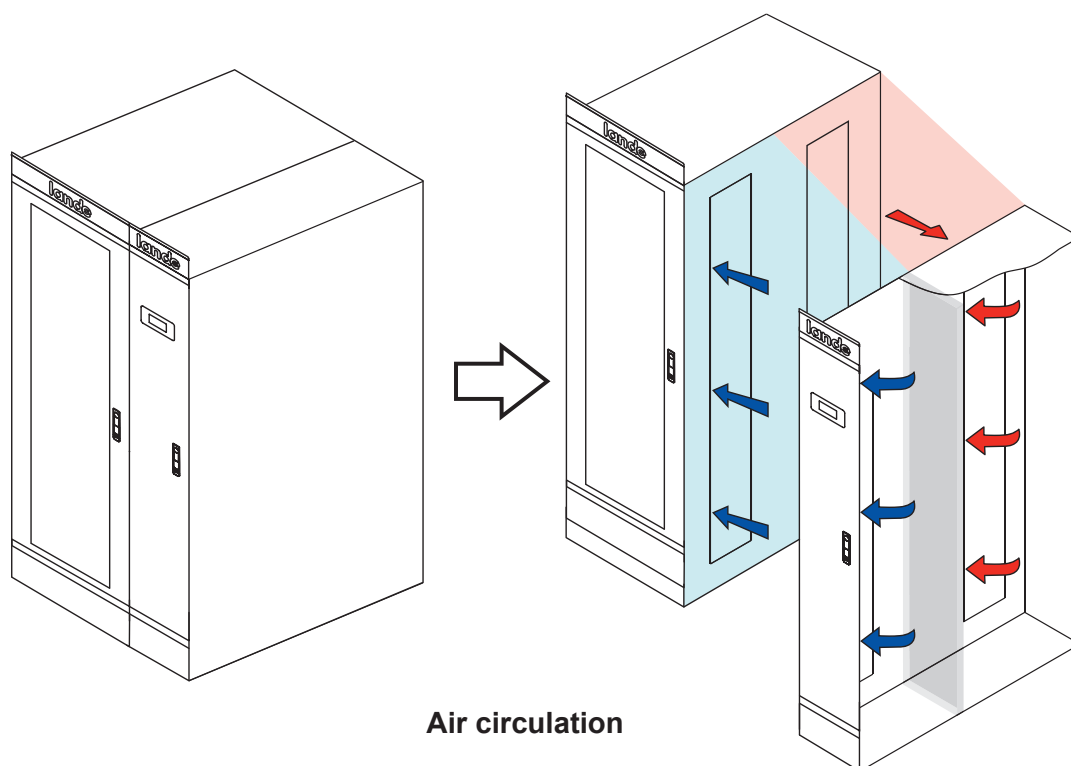
Temperature adjustment can be realized by changing the cooling capacity of the air conditioner with inverter technology (rotation speed change of the compressor). The sensitive controller (PLC) continuously monitors cooling requirements and provides the most efficient cooling for the rack rows. Air conditioners are also equipped with a built-in user interface panel; providing the opportunity to access instant air conditioning data from a single interface and manage it remotely.

Air conditioners are equipped with a process air filter and a condensate tank for enhanced user experience with maximum practicality and robustness.



# Micro Data Center Solutions

## In-row DX Precision Air Conditioners



| In-row Air Conditioner Specifications |                    | 3/10                                         | 4/15         | 4/20         | 6/25         |
|---------------------------------------|--------------------|----------------------------------------------|--------------|--------------|--------------|
| Compressor                            |                    | Hermetic - Inverter                          |              |              |              |
| Cooling power                         | <b>W</b>           | (1) 3000 / 10200                             | 4000 / 15300 | 6000 / 21000 | 6000 / 22500 |
|                                       |                    | (2) 3000 / 9300                              | 4000 / 13600 | 6000 / 19500 | 6000 / 20400 |
| Precision cooling power               | <b>W</b>           | (1) 3000 / 9000                              | 4000 / 13800 | 6000 / 18000 | 6000 / 19500 |
|                                       |                    | (2) 3000 / 8500                              | 4000 / 13000 | 6000 / 17200 | 6000 / 19100 |
| Voltage AC                            | <b>V / pH / Hz</b> | 400 / 3 / 50-60 + N                          |              |              |              |
| Power                                 | <b>W</b>           | 4450                                         | 6600         | 9000         | 11000        |
| Current                               | <b>A</b>           | 6.3                                          | 9            | 12.5         | 15.5         |
| Evaporator air flow rate              | <b>m³ / h</b>      |                                              |              |              |              |
| Voltage DC                            | <b>Vdc</b>         | 48                                           |              |              |              |
| Width                                 | <b>mm</b>          | 300                                          |              |              |              |
| Depth                                 | <b>mm</b>          | 1200                                         |              |              |              |
| Height                                | <b>mm</b>          | 2000 + 100 (Height base variable on request) |              |              |              |
| Weight                                | <b>Kg</b>          | 150 *                                        | 150 *        | 160 *        | 160 *        |
| Refrigerant <sup>(3)</sup>            |                    | R410A                                        |              |              |              |
| Sound level <sup>(4)</sup>            | <b>db(A)</b>       | 65                                           | 65           | 66           | 68           |
| Operating temperature                 | <b>C</b>           | -20° + 45°                                   |              |              |              |

<sup>(1)</sup> Cooling capacity when exterior is 35°C, interior is 35°C and relative humidity is 30%.

<sup>(2)</sup> Cooling capacity when exterior is 35°C, interior is 30°C and relative humidity is 30%.

<sup>(3)</sup> Applies for R134a refrigerant. Limit temperature -20°C / + 55°C / + 55°C / block 60°C.

<sup>(4)</sup> Evaporation section: the sound level is 41db (A) at the rear side when the air conditioner is in the compressor mode (cooling).

(\*) +20 kgs with free cooling accessories.

# Micro Data Center Solutions

## Power Distribution Units (PDU)

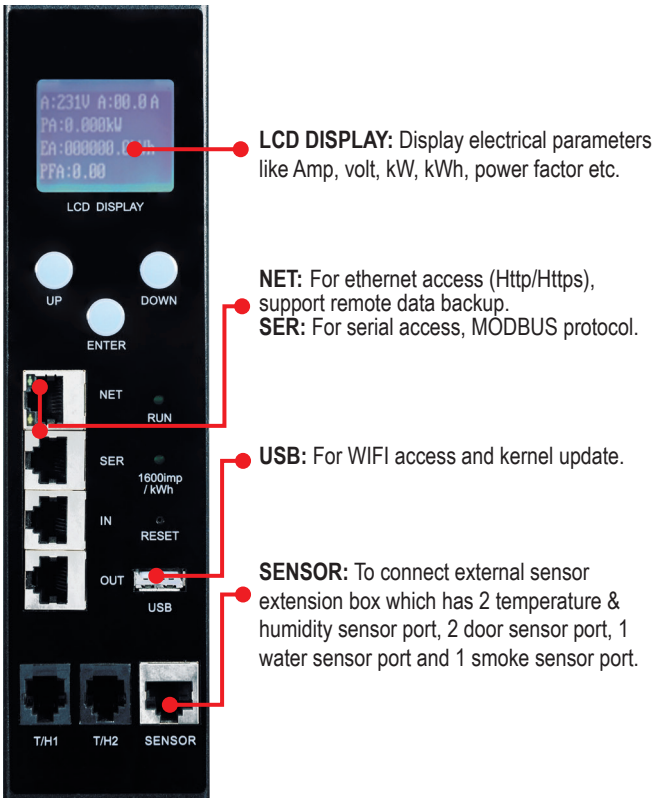
Power distribution unit - PDUs are electric power distribution systems which provide essential energy for ICT devices. PDUs also provide additional security with monitoring and managing the electric power conducted to the active devices.

IZP monitored PDU series provide energy consumption data and statistics of IT devices. Series also provide remote portbased turn on/off feature.

Integrated DCIM software can perform customer-based invoicing depending on monitored power consumption statistics.

Lande PDU series support environmental monitoring features once connected to external sensors such as: temperature, humidity, door and leak sensors.

| Main functions                                    | Product series         |                      |
|---------------------------------------------------|------------------------|----------------------|
|                                                   | IZP series (monitored) | YNP series (managed) |
| Accurate measurement of total energy consumption  | ✓                      | ✓                    |
| Total working voltage metering                    | ✓                      | ✓                    |
| Total load current metering                       | ✓                      | ✓                    |
| Total power metering                              | ✓                      | ✓                    |
| Power factor monitoring                           | ✓                      | ✓                    |
| Temperature & humidity monitoring                 | ✓                      | ✓                    |
| Outlet current metering                           |                        | ✓                    |
| Outlet power metering                             |                        | ✓                    |
| Threshold setting of outlet current               |                        | ✓                    |
| Accurate measurement of outlet energy consumption |                        | ✓                    |
| Outlet switching                                  |                        | ✓                    |
| Delay setting for outlet sequential switching     |                        | ✓                    |



# Micro Data Center Solutions

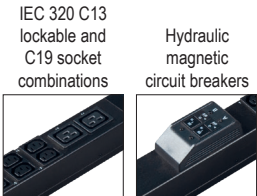
## Power Distribution Units(PDU)



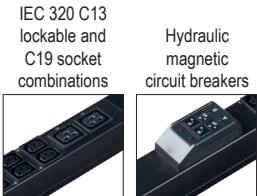
Optional Accessory



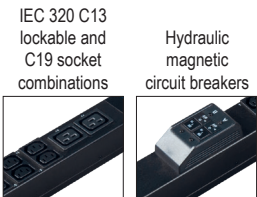
| Product Code       | Series                 | Product Description                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LN-PRZ-AMP-DM24-IE | Multimeter Display PDU | 24xIEC 320 (20xC13 + 4xC19) socket PDU with multimeter display, ZeroU, aluminium profile frame, 2x16A MCB, 8000 Watt, 250V AC, 3x6.0mm², 3m cord with IEC 60309 plug (32A 2P+E), CE mark, locking on sockets standard on both C13 and C19. Along with multimeter display other metering functions are added, V, A, W, kW, PF, temperature probe and sensing, total operating time. |



| Product Code       | Series        | Product Description                                                                                                                                                                                                                                                                                              |
|--------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LN-PRZ-IZP-DM24-IE | Monitored PDU | 24xIEC 320 (20xC13 + 4xC19) socket, monitored IP PDU with LCD Display, ZeroU, metal body, 2pcs 1P 16A hydraulic circuit breaker, 8000 Watt, 250V AC, 3x6.0mm², 3m cord with IEC 60309 plug (32A 2P+E), CE mark, daisy-chain function up to 1 master 4 slave units, remote monitoring port, PDU based monitoring. |



| Product Code       | Series        | Product Description                                                                                                                                                                                                                                                                                              |
|--------------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LN-PRZ-IZP-DM42-IE | Monitored PDU | 42xIEC 320 (36xC13 + 6xC19) socket, monitored IP PDU with LCD Display, ZeroU, metal body, 2pcs 1P 16A hydraulic circuit breaker, 8000 Watt, 250V AC, 3x6.0mm², 3m cord with IEC 60309 plug (32A 2P+E), CE mark, daisy-chain function up to 1 master 4 slave units, remote monitoring port, PDU based monitoring. |



| Product Code       | Series                  | Product Description                                                                                                                                                                                                                                                                                                                                                                |
|--------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LN-PRZ-YNP-DM24-IE | Managed intelligent PDU | 24xIEC 320 (20xC13 + 4xC19) socket, managed IP PDU with LCD Display, ZeroU, metal body, 2 pcs 1P 16A hydraulic circuit breaker, 8000 Watt, 250V AC, 3x6.0mm², 3m cord with IEC 60309 plug (32A 2P+E), CE mark, daisy-chain function up to 1 master 4 slave units, Remote Monitoring port, outlet based monitoring and remote switch on/off function per socket or group of sockets |

# Micro Data Center Solutions

## Environmental Management Systems

Lande Environmental Management System (EMS) is a set of processes and practices that enable organizations to remotely monitor the external environmental factors to reduce the undesired environmental impacts and increase operating efficiency.

Data center infrastructure management software of Lande EMS allows users to monitor and control the cooling system, UPS, PDUs, batteries and all sensors in their data centers.

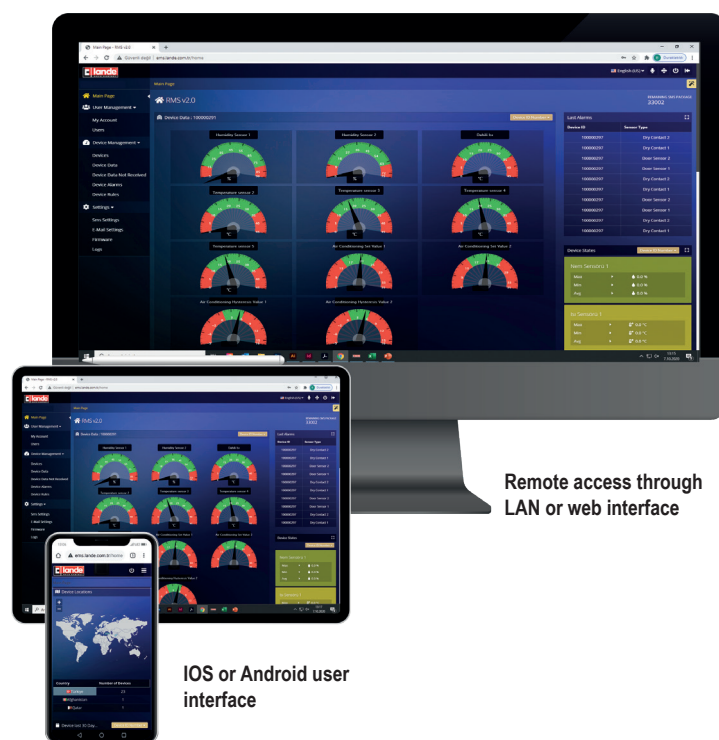
EMS combined with Lande temperature sensors allows enhanced zonal temperatures measurements to analyze cooling requirements in data centers.

### EMS 501 Technical Specifications

|                                 |                                                     |
|---------------------------------|-----------------------------------------------------|
| <b>Dimensions</b>               | 380 x 105 x 35 mm                                   |
| <b>Weight</b>                   | 480 gr                                              |
| <b>Voltage</b>                  | 12 Volt                                             |
| <b>Current</b>                  | 500-2000 mA                                         |
| <b>Communication protocol</b>   | Communication via standard TCP IP structure or GPRS |
| <b>EMC compatibility</b>        | TS EN 61000-6-2                                     |
| <b>Protection class</b>         | IP 44                                               |
| <b>Warranty</b>                 | 2 years                                             |
| <b>Measurement precision</b>    | %±2 standard                                        |
| <b>Device operating limits</b>  | -20°C - 80°C, up to 85% RH                          |
| <b>Temperature range</b>        | 0°C - 80°C (±1)                                     |
| <b>Relative humidity range</b>  | %0 - 95 RH (±3)                                     |
| <b>Measurement frequency</b>    | 750 ms                                              |
| <b>Transmission frequency</b>   | Adjustable transmission frequency                   |
| <b>Limit adjusting</b>          | Adjustable upper-lower limits                       |
| <b>Door sensor</b>              | Magnetic sensor (optional)                          |
| <b>Temperature and humidity</b> | Internal temperature and humidity sensor            |
| <b>Screen</b>                   | 2x16 LCD screen                                     |
| <b>Digital input</b>            | 8 input                                             |
| <b>Digital output</b>           | 3 output                                            |
| <b>Analog input</b>             | 8 input                                             |
| <b>Camera connection</b>        | Mevcut                                              |
| <b>Protocols</b>                | HTTP, HTTPS, SNMP Traps, Modbus, FTP, SSH, Telnet   |
| <b>Emergency e-mail</b>         | Yes                                                 |
| <b>Emergency SMS</b>            | Optional                                            |
| <b>Siren</b>                    | Yes                                                 |
| <b>USB cam support</b>          | Yes                                                 |

### Benefits;

- Enhanced environmental monitoring
- Improved device compatibility and management
- Remote security and internal auditing
- Increased efficiency / reduced costs
- Decrease in human resources dependency
- Ability to log data for system analysis
- Instant and retrospective reporting opportunity
- Increased awareness on environmental variables





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