### AC INPUT SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>1P3W 220VAC or 3P4W 380VAC ±20% 85V ~300V (Variation permitted)</td>
</tr>
<tr>
<td>Frequency</td>
<td>45-66Hz</td>
</tr>
<tr>
<td>Power Factor</td>
<td>&gt; 0.99 at 50% - 100% load</td>
</tr>
<tr>
<td>Efficiency</td>
<td>96.0% (20% - 100% load)</td>
</tr>
</tbody>
</table>

### DC OUTPUT SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Voltage</td>
<td>Default -54.0VDC</td>
</tr>
<tr>
<td>Nominal Output Voltage</td>
<td>-48VDC</td>
</tr>
<tr>
<td>Output Current</td>
<td>21KWmax (7 modules)</td>
</tr>
<tr>
<td>Adjustment Range</td>
<td>-42VDC ~ -58VDC</td>
</tr>
<tr>
<td>Line Regulation</td>
<td>±0.5% Max</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>±0.5% Max</td>
</tr>
<tr>
<td>Ripple &amp; Noise</td>
<td>&lt; 250mVp-p</td>
</tr>
<tr>
<td>Setpoint Accuracy</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Protection</td>
<td>Overvoltage protection, Overload protection, Thermal Shutdown, Short circuit protection</td>
</tr>
</tbody>
</table>

### GENERAL SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-40°C ~ +75°C (Derating above: +45°C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-40°C ~ +85°C</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>5% ~ 95% (Non-Condensing)</td>
</tr>
<tr>
<td>Storage Humidity</td>
<td>0% ~ 99% (Non-Condensing)</td>
</tr>
<tr>
<td>Cooling</td>
<td>Fan (speed controlled auto/manual)</td>
</tr>
<tr>
<td>Altitude</td>
<td>0 ~ 3,000 meter</td>
</tr>
<tr>
<td>Acoustic Noise</td>
<td>≤ 60dBa at nominal input and full load</td>
</tr>
<tr>
<td>Weight (Shelf)</td>
<td>&lt; 30kg (shelf without modules)</td>
</tr>
<tr>
<td>Size (WxDxH)</td>
<td>595.4mm x 578mm x 1791.5mm (Indoor type Rack)</td>
</tr>
<tr>
<td></td>
<td>444.8mm x 410.899mm x 265.9mm (Shelf)</td>
</tr>
</tbody>
</table>

### ELECMAGNETIC COMPATIBILITY:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emissions</td>
<td>FCC &amp; CISPR(EN55022) class A</td>
</tr>
<tr>
<td>Electrostatic Discharge</td>
<td>EN61000-4-2, 4KV Contact / 8KV Air</td>
</tr>
<tr>
<td>Radiated Susceptibility</td>
<td>EN61000-4-3, 26-1000MHz, 10V/M, 80%AM</td>
</tr>
<tr>
<td>EFT/Bursts</td>
<td>EN61000-4-4, 2KV</td>
</tr>
<tr>
<td>Surge Transients</td>
<td>EN61000-4-5</td>
</tr>
<tr>
<td>Conducted Disturbance</td>
<td>EN61000-4-6, 0.15-800MHz, 10V 80%</td>
</tr>
<tr>
<td>Voltage Dips</td>
<td>EN61000-4-10, 95% Dip&amp;10ms, 30% Dip&amp;500ms</td>
</tr>
<tr>
<td>Voltage Interruptions</td>
<td>EN61000-4-11, 95% reduction, 5ms</td>
</tr>
<tr>
<td>Fluctuations &amp; Flicker</td>
<td>EN61000-3-3</td>
</tr>
</tbody>
</table>

### STANDARDS & APPROVALS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>UL/CUL</td>
<td>60950-1</td>
</tr>
<tr>
<td></td>
<td>CB, ETSI EN 300 019-2-1</td>
</tr>
<tr>
<td></td>
<td>ETSI EN 300 019-2-2, ETSI EN 300 019-2-3</td>
</tr>
<tr>
<td></td>
<td>CE mark to Low Voltage Directive, IEC 60068-2-78</td>
</tr>
</tbody>
</table>
**INPUT SPECIFICATIONS:**

- **VOLTAGE:** 85VAC ~ 297VAC; see Derating for < 176VAC
- **FREQUENCY:** 45Hz ~ 63 Hz
- **INRUSH:** ≤ 25A @ 230VAC Full Load (Max Cold Start)
- **CURRENT:** ≤ 18.5A @ 230VAC (Max Continuous)
- **PROTECTION MAINS Fuse, each line (L, N); TVS for Transients**
- **LEAKAGE:** < 3.5mA @ 264VAC
- **INPUT PROTECTION Input Undervoltage; Output Overvoltage**
- **EFFICIENCY:** 96% typical (40%~60% Load)
- **HARMONICS:** EN61000-3-2 Class D (>0.99PF; > 50% load)

**OUTPUT SPECIFICATIONS:**

- **OUTPUT VOLTAGE:** 54Vdc (typical)
- **OUTPUT CURRENT:** 55.5A (3KW max, continuous) @ AC input ≥ 176V
- **LINE REGULATION:** ±0.5%, across full input range
- **LOAD REGULATION:** ±0.5%, across full load range
- **RIPPLE:** ≤300mV p-p; ≤ 20mVrms (20MHz BW)
- **OUTPUT ADJUSTMENT:** 43.5Vdc ~ 58Vdc
- **EXCERSION:** ±3% max, 50% Step Load
- **RECOVERY:** 100ms, max
- **OVER-CURRENT:** OCP (see Power Derating curves)
- **PROTECTION:** OVP, Power Deratings, Thermal Shutdown

**STATUS LED & COMMUNICATION:**

- **STATUS LED (ALARM):** Green=OK; Yellow=[Minor]; Red=[Major]
- **COMMUNICATION:** CAN Bus

**GENERAL SPECIFICATIONS:**

- **OPERATING TEMPERATURE:** -40°C to +75°C (derate 2%/°C above +45°C)
- **OPERATING HUMIDITY:** 10% ~ 95% (non-condensing)
- **STORAGE:** -40°C to +85°C; 5% ~ 95% RH (non-condensing)
- **COOLING:** Intelligent Fan; Front-to-back airflow
- **ACOUSTIC NOISE:** < 60dBA (nominal input, full load, Ta > 40°C)
- **VIBRATION:** 10-55Hz, 2G, 3Min Period, 60 min each (3 axes)
- **SHOCK:** 2G Peak Acceleration
- **RELIABILITY:** >350K Hours (per MIL STD 217F)
- **SIZE (WxHxD):** 108.2mm x 321.7mm x 41.0mm
- **WEIGHT:** 2.30 kg (5.07 lbs)
- **INSULATION:** 3KVAC I-O; 1.5KVAC I-Earth; 0.5KVDC O-Earth

**EMISSIONS:**

- **ELECTROMAGNETIC COMPATIBILITY:** EN55022 Level A (Conducted)
- **ELECTROSTATIC DISCHARGE:** EN61000-4-2, 4KV Contact/ 8KV Air
- **RADIATED SUSCEPTIBILITY:** EN61000-4-3, 26MHz-2000MHz, 10V/m, 80%AM
- **EMISSIONS:** EN61000-4-4, 2KV
- **SURGES:** EN61000-4-5, 2KV Earth, 1KV Line-Line
- **CONDUCTED IMMUNITY:** EN61000-4-6, 150KHz-800MHz, 10Vrms, 80%AM
- **VOLTAGE DIPS:** EN61000-4-10, 95% Dip,10ms / 30% Dip, 500ms
- **VOLTAGE INTERRUPTIONS:** EN61000-4-11, 95% reduction, 5ms
- **FLUCTUATIONS & FLICKER:** EN61000-3-3

**OUTPUT MODELS:**

<table>
<thead>
<tr>
<th>Output Model</th>
<th>Rectifier Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDC</td>
<td>Io (Min)</td>
</tr>
<tr>
<td>NESPACE-48/3K</td>
<td>54V</td>
</tr>
</tbody>
</table>

**SAFETY STANDARDS:**

- **UL/CSA:** IEC/UL 60950-1
- **CE MARK:** Low Voltage Directive
- **NERS:** Designed to Meet Telcordia GR-63-CORE
**NESPACE-48/3K**

**AC INPUT:**

- Voltage range: 85Vac ~ 297Vac
- Constant power range (Max 3KW): 176Vac ~ 297Vac
- Shut-down. Voltage
  - OVP: 297Vac (recovery 285Vac)
  - UVP: 77Vac (recovery 85Vac)

**DC INPUT:**

- Voltage range: -42.0Vdc ~ -58.0Vdc
- Constant power range (Max 3KW): -48.0Vdc ~ -58.0Vdc

**TEMPERATURE:**

- Operating temperature: -40°C ~ 75°C
- Constant power range (Max 3KW): -40°C ~ 45°C
- Shut-down. Temperature (Tolerance: ±5°C)
  - 75°C (recovery 65°C)
  - -40°C (recovery -35°C)
PRODUCT FEATURES:

Control Unit is that one Micro Processor Unit (MPU) connects to rectifier units by digital signal, uses software to monitor and control all of power system under real-time/online mode (real-time / online).

LCD display, LEDs (green, yellow, red) alarms to display, warning all of system status. Buttons allow to set system parameters, control rectifier cabinet.

DISPLAY:

- The status of the rectifier system is displayed on the color LCD (128*160) window:
  - Output voltage/input voltage
  - Output current/battery charge/discharge current
  - Rectifier system setup value and alarms
  - Display output currents for individual rectifier modules, the
  - Float mode/Equalizing mode
- Hot pluggable
- Energy saving operation

TECHNICAL SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>18Vdc ~ 60Vdc</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>≤4.5W</td>
</tr>
<tr>
<td>MTBF</td>
<td>&gt;300,000 Hrs MTBF (Ambient: 25°C)</td>
</tr>
<tr>
<td>Weight</td>
<td>≤0.9kg</td>
</tr>
<tr>
<td>Size (W×D×H)</td>
<td>108.2mm × 321.7mm × 41.0mm</td>
</tr>
<tr>
<td>Installation Methods</td>
<td>Hot plug-in, plug &amp; play</td>
</tr>
<tr>
<td>Language</td>
<td>English</td>
</tr>
<tr>
<td>Inputs</td>
<td>8 Digital Input (Define name for the extended alarm)</td>
</tr>
<tr>
<td>Outputs</td>
<td>8 Dry Contact (Alarm User Define)</td>
</tr>
</tbody>
</table>

ANALOG MEASUREMENTS (Tolerance : Full Scale ±0.5%):

- Rectifier input AC voltage
- Rectifier output DC voltage
- Rectifier load current
- Rectifier battery charge/discharge current
- Battery enclosure temperature, Battery charge current
- Rectifier temperature

REV: 082118

Control Module
CONTROLLER UNIT FUNCTION:

- Setting of Battery Temperature Compensation Curve
- Failure of the rectifier controller shall not affect the operation of the rectifiers in the system
- The Control unit which sees can be stored and displayed 10,000 event alarm log (memory card)
- Display indicating by picture and sound (SOUND LEVEL – 60dB)
- User level mode / factory level mode for GUI
- Self-Test function (LLVD, BLVD, Dry Contact)
- External Alarm/Control (solar, air condition)
- Set Alarm Enable/Disable
- Setting output voltage (43V~58V), Float mode / Boost mode (43V~58V)
- LLVD/BLVD control (startup, reset, shutdown)
- RECTIFIER MODULE FAN control (Auto / manual mode)
- Setting charging current, Boost charging (time, voltage, current)
- Setting Password for LCD
- Storage export data to file
- Rect 1~7 Information (Output voltage, Output current, Alarm, Serial Number)
- Alarm
  - AC High / Low Voltage Alarm
  - AC Power Fail (3-phase)
  - AC Surge Alarm
  - DC Over / High / Low / Under Voltage Alarm
  - DC Over Capacity Alarm
  - DC Zero Ampere Alarm
  - Load CB Off, LLVD Open Alarm
  - Rect 1~7 Alarm
  - Battery Cell1~4 Alarm
  - Battery Discharge Alarm
  - Battery Test Fail Alarm
  - Battery Low / Under Voltage Alarm
  - Battery High / Low Temperature Alarm
  - Battery CB1~4 Off, BLVD Open Alarm
  - Rectifier High Temperature Alarm
  - Battery / Rectifier Temperature Sensor Alarm
  - Digital Input 1~8 Alarm
  - Control Alarm

CPU:

- Coretex-M4 Core
- CPU Clock – Up to 150MHz
- 32ch DMA, 16KB cache, DSP, floating-point unit
- Memory : Flash 1MB / RAM128KB / EEPROM / Flash RAM, Flash NVM
- Ethernet, UART, RS485
- Support RTOS

INTERFACE:

- RS232, USB , RS485
  - Baud Rate : 115,200 bps
  - Data Bits : 8Bit / Stop Bits : 1Bit / Parity Bits : N
- LAN (RJ45)
  - Hardwired TCP/IP protocol (TCP/UDP/ICMP/Ethernet)
  - 10BaseT/100BaseTX Ethernet MAC/PHY Embedded
  - Auto Negotiation (Full and half duplex, 10/100-Based)
  - Auto MDI/MDIX (Straight-through or Crossover)
  - IPv4, IPv6, HTTPS, SNMP V1, SNMP V2C
- I/O expansion Card : CAN Port
CIRCUIT BREAKER SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB for LLVD</td>
<td>50A * 3EA, 25A *2EA</td>
</tr>
<tr>
<td>CB for BLVD</td>
<td>25A * 2EA, 16A *3EA</td>
</tr>
<tr>
<td>CB for BATTERY</td>
<td>100A* 4ea</td>
</tr>
</tbody>
</table>

DONGAH ELECOMM
WWW.DONGAHUSA.COM

DORS-14KV (Rack Type)

FRONT VIEW: RECTIFIER SHELF (DOOR OPEN VIEW)
**DORS-14KV (Rack Type)**

**GENERAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIZE (W×D×H)</td>
<td>595.4mm x 578mm x 1791.5mm</td>
</tr>
<tr>
<td>Loading Capacity</td>
<td>&gt; 500kg/m²</td>
</tr>
</tbody>
</table>

**Battery:**

12V150Ah 4 Strings

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**Power Shelf**

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**Front View: Rectifier Cabinet**

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**DongAh Elecomm USA**

Phone: (972) 497-9990

Fax: (972) 497-9991

275 W. Campbell Road, Suite 320

Richardson TX 75080

sales@dongahusa.com

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**DongAh Elecomm Corp.**

Phone: 82-31-330-5500

Fax: 82-31-336-9040

167 Namgok-ri, Yangii-myun,

Yongin-si Kyunggi-do 449-820 Korea

sales@dongahelecomm.co.kr

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[WWW.DONGAHUSA.COM](http://WWW.DONGAHUSA.COM)