# AC-DC Power Supplies DIN Rail type

## KHEA/KHNA30F

**RoHS Compliance**

- KHEA/KHNA30F-5
- KHEA/KHNA30F-12
- KHEA/KHNA30F-24

**Ordering Information**

- Series name: KHE
- Euro style I/O terminals
- Single output
- Universal input
- Single output wattage
- Universal input
- Single output wattage
- Universal input
- Single output wattage
- Universal input
- Single output wattage
- Universal input
- Single output wattage
- Universal input
- Single output wattage

## Specifications

**Model**

- KHEA/KHNA30F-5
- KHEA/KHNA30F-12
- KHEA/KHNA30F-24

**Maximum Output Wattage [W]**

- 25
- 27.6
- 31.2

**DC Output Voltage [V]**

- 5V 5A
- 12V 2.3A
- 24V 1.3A

**Model**

- KHEA/KHNA30F-5
- KHEA/KHNA30F-12
- KHEA/KHNA30F-24

**Voltage [V]**

- AC85 - 264 1 (Output derating is required) or DC120 - 370

**Current [A]**

- ACN 115V: 0.45tp, 0.50tp, 0.55tp
- ACN 230V: 0.30tp, 0.30tp, 0.35tp

**Frequency [Hz]**

- 50 / 60 (47 - 440) or DC

**Efficiency [%]**

- 84.0tp
- 86.5tp
- 89.5tp

**Input Current [A]**

- ACN 115V: 18tp (Io=0%); (at cold start Ta=25°C)
- ACN 230V: 35tp (Io=0%); (at cold start Ta=25°C)

**Leakage Current [mA]**

- 0.45 / 0.75 max (ACIN 100V / 240V 60Hz, Io=0%, According to IEC60950-1 and DEN-AN)

**VOLTAGE [V]**

- 5
- 12
- 24

**Current [A]**

- 2.3

**Ripple Current [A]**

- 1.3

**Line Regulation [mV]**

- 20max
- 48max
- 96max

**Load Regulation [mV]**

- 80max
- 100max
- 150max

**Ripple [mVpp]**

- 0.0% - 0% 150max
- 0.0% - 0% 150max
- 0.0% - 0% 150max

**Ripple Noise [mVpp]**

- 360max
- 360max
- 360max

**Temperature Regulation [mV]**

- 0% - 0% 50max
- 0% - 0% 240max

**Drift [mV]**

- 20max
- 48max
- 96max

**Startup Time [ms]**

- 200max

**Output Voltage Setting Range [V]**

- 4.50 to 5.50
- 10.80 to 13.20

**Output Voltage Setting [V]**

- 5.00 to 5.15
- 12.00 to 12.48
- 24.00 to 24.96

**Protection Circuit and Others**

**Overcurrent Protection**

- Works over 105% of rating and recovers automatically

**Overvoltage Protection [V]**

- 5.00 to 5.15
- 12.00 to 12.48
- 24.00 to 24.96

**DC_OK Lamp**

- LED (Green)

**Isolation**

- Input-Output: AC3.000V 1min, Cutoff current = 10mA, DC500V 50MΩ min
- Input-PF: AC2.000V 1min, Cutoff current = 10mA, DC500V 50MΩ min

**Environment**

- Operating Temp.: 0°C to 70°C (Required to Derating), 20 - 90%RH (Non condensing)
- Storage Temp.: -10°C to 85°C (Non condensing)
- Vibration: 10 - 55Hz, 1.96m/s² (2G), 3minutes period, 60 minutes along 2 axis (Non operating, mounted on DIN Rail)
- Impact: 196.1m/s² (20G), 11ms, once each X, Y and Z axis (Packing state)

**Safety and Noise Regulations**

- UL60950-1, C-UL(CSA60950-1), UL508 (NEC Class2 per UL1310), ANSI/ISA12.12.01, EN60950-1, EN50178 Complies with DEN-AN

**Conducted Noise**

- Complies with FCC-B, VCCI-B, CISPR22-B, EN55012-B, EN55022-B

**Weight**

- 165g max

**Cooling Method**

- Convection / Forced air

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### Notes:

1. The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(2.2m2 or less) is excluded.
2. Please contact us about dynamic load and input response.
3. This is the value that measured on measuring board with capacitor of 22µF and 0.1µF at 150mm from output terminal.
4. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
4. Please refer to the instruction manual 2.7.
5. Ripple and ripple noise spec is change at Io=0% - 30% by burst operation.
6. Please contact us about another class.
7. Case size contains neither the umbo.
8. Only as standard mounting orientation (A).
9. Please refer to the instruction manual 2.3.
10. To meet the specifications. Do not operate over-loaded condition.
11. A sound may occur from power supply at light or peak loading.

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**KHEA-KHNA30F-5**

**KHEA-KHNA30F-12**

**KHEA-KHNA30F-24**

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**Recommended EMI/EMC Filter**

**NAC-04-727-D**
# AC-DC Power Supplies DIN Rail type KHEA/KHNA60F

## Ordering information

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<th>KHEA/KHNA60F-12</th>
<th>KHEA/KHNA60F-24</th>
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</thead>
<tbody>
<tr>
<td>MAX OUTPUT WATTAGE[W]</td>
<td>54</td>
<td>60</td>
</tr>
<tr>
<td>DC OUTPUT</td>
<td>12V 4.5A</td>
<td>24V 2.5A</td>
</tr>
</tbody>
</table>

## SPECIFICATIONS

### Model KHEA/KHNA60F-12

| Voltage [V] | 12 |
| Current [A] | 4.5 |
| Line Regulation [mV] | 48max |
| Load Regulation [mV] | 100max |
| Ripple [mV-p-p] | 0 to ±70°C: 200max, ±0 - 30%: 300max |
| Ripple Noise [mV-p-p] | 0 to ±70°C: 200max, ±0 - 30%: 300max |
| Temperature Regulation [mV] | 0 to ±70°C: 120max, ±0 - 30%: 200max |
| Max Drift [mV] | 48max |

### Model KHEA/KHNA60F-24

| Voltage [V] | 24 |
| Current [A] | 2.5 |
| Line Regulation [mV] | 96max |
| Load Regulation [mV] | 150max |
| Ripple [mV-p-p] | 0 to ±70°C: 200max, ±0 - 30%: 300max |
| Ripple Noise [mV-p-p] | 0 to ±70°C: 200max, ±0 - 30%: 300max |
| Temperature Regulation [mV] | 0 to ±70°C: 240max, ±0 - 30%: 290max |
| Max Drift [mV] | 96max |

### Overcurrent Protection

Works over 105% of rating and recovers automatically.

### Voltage Adjustment Range

- AC85 to 264V 1-minute, Cutoff current = 100mA, DC500V 50MHz
- AC2000V 1-minute, Cutoff current = 10mA, DC500V 50MHz
- AC3000V 1-minute, Cutoff current = 10mA, DC500V 50MHz

### Start-up Time

- 200μs (ACIN 115V, Io=100%)

### Hold-up Time

- 200μs (ACIN 115V, Io=100%)

### Protection Circuit and Others

| Overcurrent Protection | Works over 105% of rating and recovers automatically |
| Overvoltage Protection | Works over 105% of rating and recovers automatically |

### Isolation

| Input-Output | AC3.000V 1 minute, Cutoff current = 10μA, DC500V 50μA |
| Input-PE | AC2.000V 1 minute, Cutoff current = 10μA, DC500V 50μA |

### Environment

| Operating Temp. and Humidity | -20 to +70°C (Required to Derating), 20 - 90%RH (Non condensing) |
| Storage Temp. and Humidity | -30 to 85°C, 20 - 90%RH (Non condensing) |

### Harmonic Attenuator

Complies with IEC61000-3-2 (Class A) (Not built-in to active filter)

### Others

| Weight | 270g max |

### Cooling Method

Convection | Forced air

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1. The value is a reference to the current of input surge to a built-in EMI/EMC Filter (20s to 30s) or less is included.
2. Please contact us about dynamic load and input response.
3. This is a value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal. 
   Measured by 20MHz oscilloscope or Ripple Noise meter (Equivalence to KEISOKU-GIKEN: RM103).
4. Please refer to the instruction manual 2.7.
5. Drift is the change in DC output for an 8-hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
6. Please contact us about another class.
7. Case size contains neither the umbo.
8. If two or more units are operating it may not comply with the IEC61000-3-2.
10. If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 2.3.
11. To meet the specifications. Do not operate over-loaded condition.
12. A sound may occur from power supply at light or peak loading.
**Block diagram**

Input: AC IN 85~264V

- Fuse 250V 3.15A
- Noise filter
- Inrush current limit
- Rectifier and filter
- Transformer
- Rectifier and filter
- Inverter
- Control
- Photocoupler
- Over voltage protection
- DC OUT

**External view**

<KHEA60F(Euro Style I/O Terminals)>  <KHNA60F(Barrier Blocks Style I/O Terminals)>

- Tolerance: ±1 [±0.04]
- Weight: 270g max
- PCB Material/Thickness: FR-4 / 1.6mm (0.06)
- Chassis: Case material: PBT
- Din rail attachment material: PC/ABS
- Dimensions in mm, [ ] = inches
- Screw tightening torque: 1N·m max
**AC-DC Power Supplies DIN Rail type**

**KHEA/KHNA90F**

**Ordering information**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>KHEA/KHNA90F-12</th>
<th>KHEA/KHNA90F-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX OUTPUT WATTAGE [W]</td>
<td>81.6</td>
<td>91.2</td>
</tr>
<tr>
<td>DC OUTPUT</td>
<td>12V 6.8A</td>
<td>24V 3.8A</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS**

### INPUT

- **Model**
  - KHEA/KHNA90F-12
  - KHEA/KHNA90F-24
- **Voltage [V]**
  - AC85 - 264 1 f (Output derating is required)
- **Current[A]**
  - ACIN 115V: 0.85typ
  - ACIN 230V: 0.45typ
- **Frequency [Hz]**
  - 50 / 60 (47 - 63)
- **Efficiency [%]**
  - ACIN 115V: 87.0typ
  - ACIN 230V: 88.0typ
- **Power Factor (Io=100%)**
  - ACIN 115V: 0.98typ
  - ACIN 230V: 0.86typ

### OUTPUT

- **Input Ripple Noise Spec**
  - Io=0 to 30% by burst operation.
  - Please refer to the instruction manual 2.7.
- **Ripple and ripple noise spec**
  - Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
- **AC Output**
  - 12V: 6.8A
  - 24V: 3.8A
- **Max Output Wattage [W]**
  - 81.6
  - 91.2

### OTHERS

- **Model Name**
  - KHEA/KHNA90F-12
  - KHEA/KHNA90F-24
- **Input Voltage**
  - AC85 - 264V
- **Output Voltage**
  - 12V: 6.8A
  - 24V: 3.8A

### Protection

- **Overcurrent Protection**
  - Works over 105% of rating and recovers automatically
- **Overvoltage Protection**
  - 13.80 to 16.80
  - 30.00 to 36.00

### DC_OK Lamp

- **Type**
  - LED (Green)

### Isolation

- **Input-Output**
  - AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min
- **Input-Pe**
  - AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min
- **Output-Pe**
  - AC230V 1minute, Cutoff current = 100mA, DC500V 50MΩ min
- **Operating Temp, Humid. And Altitude**
  - 0 to +70°C (Operating)
  - -20 to 0°C, 20% - 90%RH (Non-condensing)
- **Storage Temp, Humid. And Altitude**
  - -20°C to +85°C, 20% - 90%RH (Non-condensing)
- **Vibration**
  - 10 to 55Hz, 19.6m/s² (2G)
- **Impact**
  - 196.1m/s² (20G)

###harmonic attenuator

- **Agency Approvals (At only AC input)**
  - UL60950-1, C-UL(CSA60950-1), EN60950-1, EN50178, UL508, ANSi/UL510, Complies with DEN-AN
- **Conducted Noise**
  - Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN61000-6-3

### Others

- **Case Size**
  - 30 x 90 x 90mm (W x H x D)
- **Weight**
  - 450g max
- **Cooling Method**
  - Convection / Forced air

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*1 The value is primary surge. The current of input surge to a circuit is 0.2ms or less is excluded.
*2 Please contact us about another class. Case size contains neither the Loo sod.
*3 Only as standard mounting orientation (A). Refer to the instruction manual 5.1.
*4 Please contact us about DC input voltage.
*5 To meet the specifications. Do not operate over-loaded condition.
### KH series

#### Block diagram

- AC IN 85~264V
- FUSE 250V 3.15A
- NOISE FILTER
- INRUSH CURRENT LIMIT
- RECTIFIER
- BOOSTER INDUCTOR
- CURRENT SENSING
- RECTIFIER AND FILTER
- INVERTER
- CONTROL
- TRANSFORMER
- OVER VOLTAGE PROTECTION
- RECTIFIER AND FILTER
- DC OUT

#### External view

**<KHEA90F(Euro Style I/O Terminals)>**

**<KHNA90F(Barrier Blocks Style I/O Terminals)>**

- Tolerance: ±1 [±0.04]
- Weight: 405g max
- PCB Material/Thickness: FR-4 / 1.6mm [0.06]
- Chassis - Case material: PBT
- Din rail attachment material: PC/ABS
- Dimensions in mm, [ ] = inches
- Screw tightening torque: 1N·m max

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**<KHEA90F(Euro Style I/O Terminals)>**

**<KHNA90F(Barrier Blocks Style I/O Terminals)>**

- Tolerance: ±1 [±0.04]
- Weight: 405g max
- PCB Material/Thickness: FR-4 / 1.6mm [0.06]
- Chassis - Case material: PBT
- Din rail attachment material: PC/ABS
- Dimensions in mm, [ ] = inches
- Screw tightening torque: 1N·m max
## SPECIFICATIONS

### INPUT

<table>
<thead>
<tr>
<th>Model</th>
<th>KHEA120F-24</th>
<th>KHEA240F-24</th>
<th>KHEA480F-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Output Wattage[W]</td>
<td>120</td>
<td>240</td>
<td>480</td>
</tr>
<tr>
<td>DC Output</td>
<td>24V 5A (Peak 7.5A)</td>
<td>24V 10A (Peak 15A)</td>
<td>24V 20A (Peak 30A)</td>
</tr>
</tbody>
</table>

### OUTPUT

- **DC Output**: 24V 5A (Peak 7.5A), 24V 10A (Peak 15A), 24V 20A (Peak 30A)
- **Max Output Wattage [W]**: 120, 240, 480
- **Model**: KHEA120F-24, KHEA240F-24, KHEA480F-24

### Harmonic Attenuator

- Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
- UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178, UL508, ANSI / ISA12.12.01
- Complies with DEN-AN

### Convection / Forced air

- Weight: 58g max
- Cooling Method: Convection / Forced air

### OTHERS

- casing: NAC-04-472-D
- UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178, UL508, ANSI / ISA12.12.01
- Complies with DEN-AN

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1. This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150μm from output terminal.
2. If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
3. Burst operation at 30% load or less.
4. Output derating is necessary. Please refer to the instruction manual 5.2.
5. Please contact us about DC input voltage.
6. To meet the specifications. Do not operate over-loaded condition.
7. Only as standard mounting orientation (A). Refer to the instruction manual 5.1. If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
8. The output voltage is below 23.5V, the value is equal to three times of the output voltage.
9. The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded.
10. Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input voltage.
11. This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150μm from output terminal.
12. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
13. Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input voltage.
KHEA series

External view

KHEA120F

-RC +RC

KHEA240F

KHEA480F

+RC-RC

-RC +RC

Name plate

Name plate

AC(N)
AC(L)
DC_OK
Output terminal(+)
Output terminal(-)
LED(ALARM)
LED(DC_OK)
Output voltage adjustable potentiometer
AC(L)
AC(N)
PE

Tolerance : ±1 [±0.04]
Weight : 900g max
PCB Material/thickness : FR-4 / 1.6mm [0.06]
Case material : Stainless steel
DIN rail attachment material : Aluminum, Nylon
Dimensions in mm, [ ] = inches
Screw tightening torque : 1N - m max

Tolerance : ±1 [±0.04]
Weight : 1,200g max
PCB Material/thickness : FR-4 / 1.6mm [0.06]
Case material : Stainless steel
DIN rail attachment material : Aluminum, Nylon
Dimensions in mm, [ ] = inches
Screw tightening torque : 1N - m max

Tolerance : ±1 [±0.04]
Weight : 580g max
PCB Material/thickness : FR-4 / 1.6mm [0.06]
Case material : Stainless steel
DIN rail attachment material : Aluminum, Nylon
Dimensions in mm, [ ] = inches
Screw tightening torque : 1N - m max

Dimensions in mm, [ ] = inches
Screw tightening torque : 1N - m max

KH-9
### Specifications

#### INPUT

<table>
<thead>
<tr>
<th>MODEL</th>
<th>KHNA120F-24</th>
<th>KHNA240F-24</th>
<th>KHNA480F-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Output</td>
<td>24V 5A (Peak 7.5A)</td>
<td>24V 10A (Peak 15A)</td>
<td>24V 20A (Peak 30A)</td>
</tr>
</tbody>
</table>

#### OUTPUT

<table>
<thead>
<tr>
<th></th>
<th>KHNA120F-24</th>
<th>KHNA240F-24</th>
<th>KHNA480F-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24V 10A (Peak 15A)</td>
<td>24V 20A (Peak 30A)</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>2.3typ</td>
<td>4.6typ</td>
<td>9.2typ</td>
</tr>
<tr>
<td>Efficiency [%]</td>
<td>99typ</td>
<td>92typ</td>
<td>92typ</td>
</tr>
<tr>
<td>Power Factor</td>
<td>0.98typ</td>
<td>0.98typ</td>
<td>0.93typ</td>
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</tbody>
</table>

#### Isolation

<table>
<thead>
<tr>
<th></th>
<th>AC500V 1minute, Cutoff current = 10mA, DC500V 50M</th>
<th>AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>AC230V 150max</td>
<td>AC230V 150max</td>
</tr>
<tr>
<td>Current</td>
<td>240max</td>
<td>240max</td>
</tr>
<tr>
<td>Regulation [%]</td>
<td>0.0%</td>
<td>0.0%</td>
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</tbody>
</table>

#### Protection & Others

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<th>Works over 101% of peak current and recovers automatically</th>
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<td>Circuit</td>
<td>Overvoltage protection [V]</td>
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<tr>
<td>Voltage</td>
<td>20typ (ACIN 115V, Io=100%)</td>
</tr>
<tr>
<td>OCV Lamp</td>
<td>DC (Green)</td>
</tr>
<tr>
<td>DC_OK Contact</td>
<td>-</td>
</tr>
</tbody>
</table>

#### Environment

<table>
<thead>
<tr>
<th></th>
<th>-25 to +70°C (Required to Derating), 20 - 90%RH (Non condensing)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity</td>
<td>-40 to +85°C, 20 - 90%RH (Non condensing)</td>
</tr>
</tbody>
</table>

#### Safety & Noise Regulations

<table>
<thead>
<tr>
<th></th>
<th>Complies with FCC-B, VCCI-B, C-UL, 55011-B, 55022-B</th>
</tr>
</thead>
</table>

#### Others

<table>
<thead>
<tr>
<th></th>
<th>850g max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>1,200g max</td>
</tr>
</tbody>
</table>

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81 The value is primary usage. The current of input surge to a built-in EMI/EMC Filter (60A) or lesser excluded.
82 Please refer to instruction manual.
83 Please contact us about dynamic load and input response.
84 The output voltage is below 23.5V, this value is equal to three times of the peak current.
85 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.
86 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter (0.2ms or less) is excluded.
87 Please contact us about another class.
88 Case size contents neither the unit.
89 Duly, as standard mounting orientation (A), refer to the instruction manual 5.1.
90 Burst operation at 30% load or less.
91 Output derating is required. Please refer to the instruction manual 5.2.
92 Pulse load is required. Please refer to the instruction manual 5.2.
93 To meet the specifications. Do not operate over-loaded condition.
94 A sound may occur from power supply at light or peak loading.
95 The EMI/EMC Filter is recommended to connect with several devices.
**KHNA series**

**External view**

**KHNA120F**

[Diagram of KHNA120F]

- Dimensions in mm, [   ] = inches
- Tolerance : ±1 [±0.04]
- Weight : 580g max
- PCB Material/thickness : FR-4 / 1.6mm [0.06]
- Chassis material : Aluminum
- Case material : Stainless steel
- DIN rail attachment material : Aluminum, Nylon
- Screw tightening torque : 1.6N - m max

**KHNA240F**

[Diagram of KHNA240F]

- Dimensions in mm, [   ] = inches
- Tolerance : ±1 [±0.04]
- Weight : 900g max
- PCB Material/thickness : FR-4 / 1.6mm [0.06]
- Chassis material : Aluminum
- Case material : Stainless steel
- DIN rail attachment material : Aluminum, Nylon
- Screw tightening torque : 1.6N - m max

**KHNA480F**

[Diagram of KHNA480F]

- Dimensions in mm, [   ] = inches
- Tolerance : ±1 [±0.04]
- Weight : 1,200g max
- PCB Material/thickness : FR-4 / 1.6mm [0.06]
- Chassis material : Aluminum
- Case material : Stainless steel
- DIN rail attachment material : Aluminum, Nylon
- Screw tightening torque : 1.6N - m max
Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

**Cosel:**

KHEA90F-24  KHEA30F-12  KHEA30F-5