

Power  
Factor  
CorrectionWorld  
wideSafety  
Approvals

EMI

Inrush  
current  
limiting

OCP



OVP

# KL-series



## Feature

For DIN (35mm) rail products  
Wide operating ambient temperature range  
I/O terminal has 2 types, Euro Style and Barrier Blocks Style  
Built in overcurrent protection, overvoltage protection circuits  
Complies with SEMI F-47 (refer to Instruction Manual 1.1)

## Safety agency approvals

UL60950-1, UL508, C-UL (CSA60950-1), EN62368-1  
Complies with DEN-AN

## 5-year warranty (refer to Instruction Manual)

## CE marking

Low Voltage Directive  
RoHS Directive

## UKCA marking

Electrical Equipment Safety Regulations  
RoHS Regulations

## EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

## EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2  
EN61000-4-3  
EN61000-4-4  
EN61000-4-5  
EN61000-4-6  
EN61000-4-8  
EN61000-4-11

# KLEA/KLNA120F

KL ☐ A 120 F - ☐ - ☐

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-04-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KLE : Euro Style I/O Terminals  
KLN : Barrier Blocks Style I/O Terminals  
② Single output  
③ Output wattage  
④ Universal input  
⑤ Output voltage  
⑥ Option  
C : with Coating  
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

| MODEL                 | KLEA/KLNA120F-24 | KLEA/KLNA120F-48 |
|-----------------------|------------------|------------------|
| MAX OUTPUT WATTAGE[W] | 120              | 120              |
| DC OUTPUT             | 24V 5A           | 48V 2.5A         |

## SPECIFICATIONS

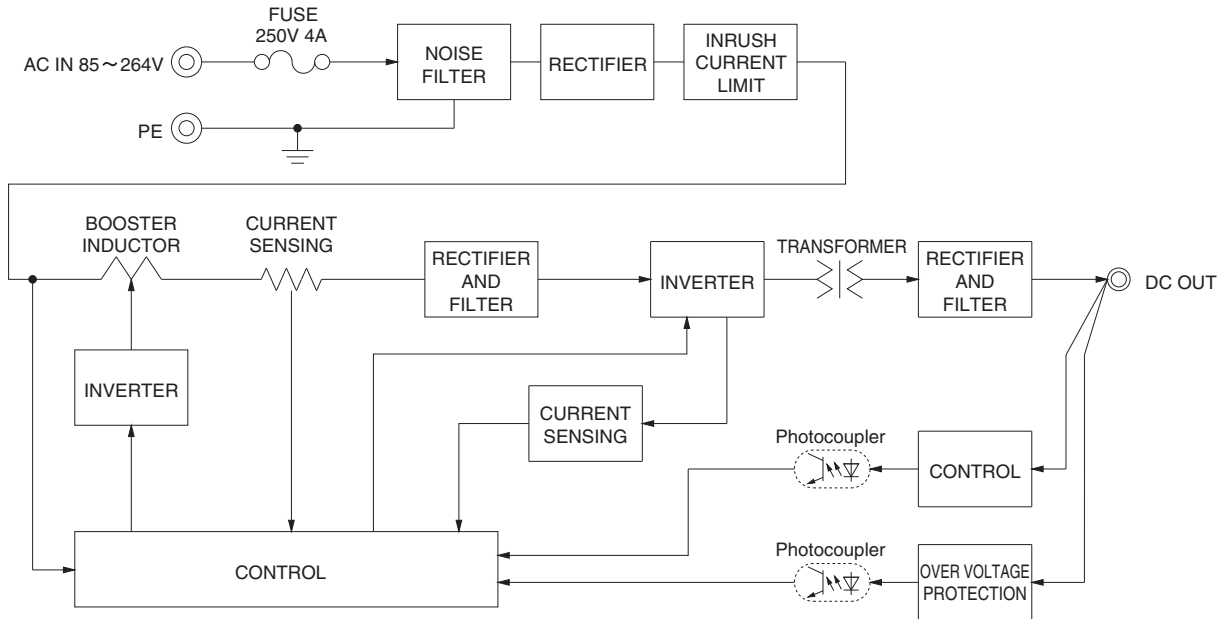
|                               | MODEL                                | KLEA/KLNA120F-24                                                                                                               | KLEA/KLNA120F-48                    |
|-------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| INPUT                         | VOLTAGE[V]                           | AC85 - 264 1 φ (Refer to "Derating") *9                                                                                        |                                     |
|                               | CURRENT[A]                           | ACIN 115V 1.2typ<br>ACIN 230V 0.6typ                                                                                           |                                     |
|                               | FREQUENCY[Hz]                        | 50 / 60 (45 - 66)                                                                                                              |                                     |
|                               | EFFICIENCY[%]                        | ACIN 115V 86.5typ<br>ACIN 230V 88.0typ                                                                                         |                                     |
|                               | POWER FACTOR                         | ACIN 115V 0.98typ<br>ACIN 230V 0.90typ                                                                                         |                                     |
|                               | INRUSH CURRENT[A]                    | ACIN 115V 20typ (I <sub>o</sub> =100%)(at cold start Ta=25°C)<br>ACIN 230V 40typ (I <sub>o</sub> =100%)(at cold start Ta=25°C) |                                     |
|                               | LEAKAGE CURRENT[ma]                  | 0.45 / 0.75max (ACIN 100V / 240V 60Hz, I <sub>o</sub> =100%, According to IEC62368-1 and DEN-AN)                               |                                     |
| OUTPUT                        | VOLTAGE[V]                           | 24                                                                                                                             | 48                                  |
|                               | CURRENT[A]                           | 5                                                                                                                              | 2.5                                 |
|                               | LINE REGULATION[mV]                  | *2 96max (I <sub>o</sub> =30-100%) *8                                                                                          | 192max (I <sub>o</sub> =30-100%) *8 |
|                               | LOAD REGULATION[mV]                  | *2 150max (I <sub>o</sub> =30-100%) *8                                                                                         | 300max (I <sub>o</sub> =30-100%) *8 |
|                               | RIPPLE[mVp-p]                        | 0 to +70°C 150max                                                                                                              | 150max                              |
|                               |                                      | -20 - 0°C 240max                                                                                                               | 240max                              |
|                               |                                      | I <sub>o</sub> =0 - 30% 500max                                                                                                 | 650max                              |
|                               | RIPPLE NOISE[mVp-p]                  | 0 to +70°C 180max                                                                                                              | 180max                              |
|                               |                                      | -20 - 0°C 300max                                                                                                               | 300max                              |
|                               |                                      | I <sub>o</sub> =0 - 30% 500max                                                                                                 | 650max                              |
|                               | TEMPERATURE REGULATION[mV]           | 0 to +70°C 240max<br>-20 to +70°C 290max                                                                                       | 480max<br>600max                    |
|                               | DRIFT[mV]                            | *4 96max                                                                                                                       | 192max                              |
| PROTECTION CIRCUIT AND OTHERS | START-UP TIME[ms]                    | 500typ (ACIN 115V, I <sub>o</sub> =100%)                                                                                       |                                     |
|                               | HOLD-UP TIME[ms]                     | 20typ (ACIN 115V, I <sub>o</sub> =100%)                                                                                        |                                     |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]   | 21.60 to 26.40                                                                                                                 | 43.20 to 52.80                      |
|                               | OUTPUT VOLTAGE SETTING[V]            | 24.00 to 24.96                                                                                                                 | 48.00 to 49.92                      |
| ISOLATION                     | OVERCURRENT PROTECTION               | Works over 105% of rating and recovers automatically                                                                           |                                     |
|                               | OVERVOLTAGE PROTECTION[V]            | 27.60 to 33.60                                                                                                                 | 54.00 to 67.20                      |
|                               | DC_OK LAMP                           | LED (Green)                                                                                                                    |                                     |
| ENVIRONMENT                   | INPUT-OUTPUT                         | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                                 |                                     |
|                               | INPUT-PE                             | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                                 |                                     |
|                               | OUTPUT-PE                            | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)                                                  |                                     |
| SAFETY AND NOISE REGULATIONS  | OPERATING TEMP., HUMID. AND ALTITUDE | -20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")                                |                                     |
|                               | STORAGE TEMP., HUMID. AND ALTITUDE   | -30 to +85°C, 20 - 90%RH (Non condensing)                                                                                      |                                     |
|                               | VIBRATION                            | *7 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)         |                                     |
|                               | IMPACT                               | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)                                                   |                                     |
| OTHERS                        | AGENCY APPROVALS                     | UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508, Complies with DEN-AN                                                           |                                     |
|                               | CONDUCTED NOISE                      | Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                   |                                     |
|                               | HARMONIC ATTENUATOR                  | Complies with IEC61000-3-2 (Class A) *5                                                                                        |                                     |
| OTHERS                        | CASE SIZE                            | *6 38×124×117mm (W×H×D) [1.5×4.88×4.61 inches]                                                                                 |                                     |
|                               | WEIGHT                               | 580g max                                                                                                                       |                                     |
|                               | COOLING METHOD                       | Convection                                                                                                                     |                                     |

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms 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 22 μF and 0.1 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
Please refer to the instruction manual 1.5.

\*4 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/output.  
\*5 Please contact us about another class.  
\*6 Case size contains neither the umbo.  
\*7 Only as standard mounting orientation (A). Refer to "Assembling and Installation Method".  
If install other than standard mounting orientation (A), please fix the power

supply for withstand the vibration and impact.  
\*8 Burst operation at 30% load or less.  
\*9 Please contact us about DC input voltage.  
\* To meet the specifications. Do not operate over-loaded condition.  
\* A sound may occur from power supply at light or peak loading.

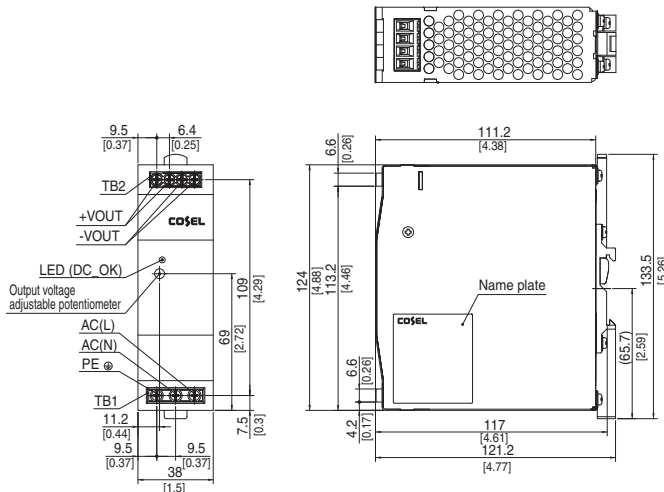
## Block diagram



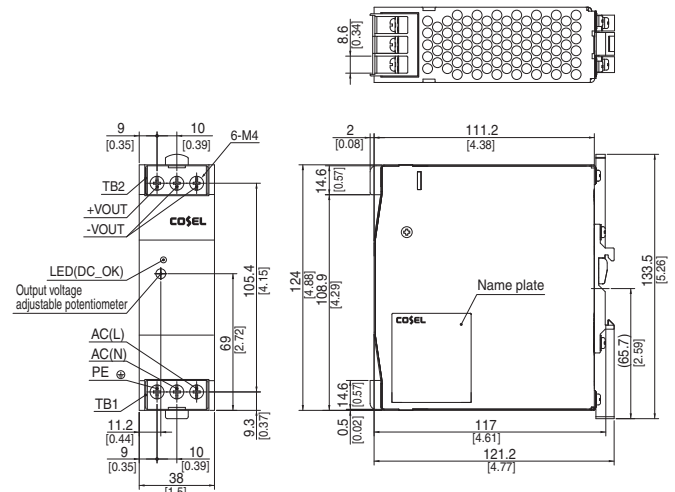
## External view

<KLEA120F(Euro Style I/O Terminals)>

<KLNA120F(Barrier Blocks Style I/O Terminals)>



- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 580g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max



- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 580g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

# KLEA/KLNA240F

KL ☐ A 240 F - ☐ - ☐

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472-D



High voltage pulse noise type : NAP series  
Low leakage current type : NAM series  
\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

- ① Series name  
KLE : Euro Style I/O Terminals  
KLN : Barrier Blocks Style I/O Terminals  
② Single output  
③ Output wattage  
④ Universal input  
⑤ Output voltage  
⑥ Option  
C : with Coating  
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

| MODEL                 | KLEA/KLNA240F-24 | KLEA/KLNA240F-48 |
|-----------------------|------------------|------------------|
| MAX OUTPUT WATTAGE[W] | 240              | 240              |
| DC OUTPUT             | 24V 10A          | 48V 5A           |

## SPECIFICATIONS

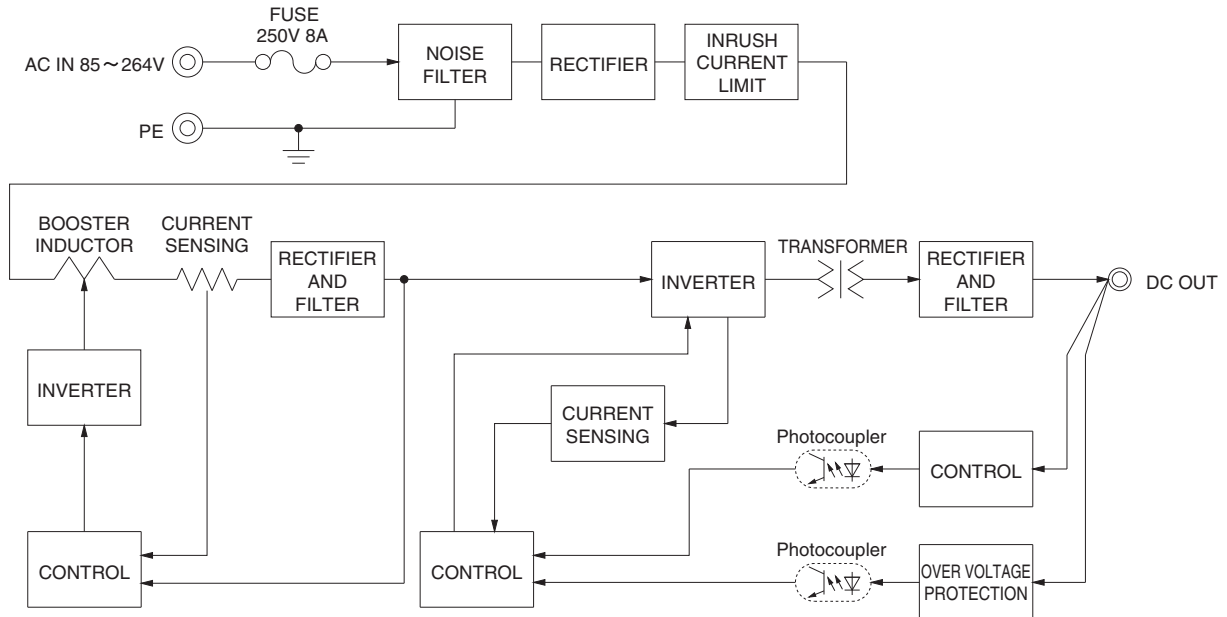
|                                    | MODEL                                |                                                                                     | KLEA/KLNA240F-24                                                                                        | KLEA/KLNA240F-48 |
|------------------------------------|--------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------|
| INPUT                              | VOLTAGE[V]                           |                                                                                     | AC85 - 264 1 φ (Refer to “Derating”) *8                                                                 |                  |
|                                    | CURRENT[A]                           | ACIN 115V                                                                           | 2.4typ                                                                                                  |                  |
|                                    |                                      | ACIN 230V                                                                           | 1.3typ                                                                                                  |                  |
|                                    | FREQUENCY[Hz]                        |                                                                                     | 50 / 60 (45 - 66)                                                                                       |                  |
|                                    | EFFICIENCY[%]                        | ACIN 115V                                                                           | 88typ                                                                                                   |                  |
|                                    |                                      | ACIN 230V                                                                           | 90typ                                                                                                   |                  |
|                                    | POWER FACTOR                         | ACIN 115V                                                                           | 0.98typ                                                                                                 |                  |
|                                    |                                      | ACIN 230V                                                                           | 0.90typ                                                                                                 |                  |
|                                    | INRUSH CURRENT[A]                    | ACIN 115V                                                                           | 20typ (Io=100%)(at cold start Ta=25℃)                                                                   |                  |
|                                    | *1 ACIN 230V                         | 40typ (Io=100%)(at cold start Ta=25℃)                                               |                                                                                                         |                  |
| LEAKAGE CURRENT[ma]                |                                      | 0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN) |                                                                                                         |                  |
| OUTPUT                             | VOLTAGE[V]                           |                                                                                     | 24                                                                                                      | 48               |
|                                    | CURRENT[A]                           |                                                                                     | 10                                                                                                      | 5                |
|                                    | LINE REGULATION[mV] *2               |                                                                                     | 96max                                                                                                   | 192max           |
|                                    | LOAD REGULATION[mV] *2               |                                                                                     | 150max                                                                                                  | 300max           |
|                                    | RIPPLE[mVp-p] *3                     | 0 to +70℃                                                                           | 150max                                                                                                  | 150max           |
|                                    |                                      | -20 - 0℃                                                                            | 240max                                                                                                  | 240max           |
|                                    | RIPPLE NOISE[mVp-p] *3               | 0 to +70℃                                                                           | 180max                                                                                                  | 180max           |
|                                    |                                      | -20 - 0℃                                                                            | 300max                                                                                                  | 300max           |
|                                    | TEMPERATURE REGULATION[mV]           | 0 to +70℃                                                                           | 240max                                                                                                  | 480max           |
|                                    |                                      | -20 to +70℃                                                                         | 290max                                                                                                  | 600max           |
|                                    | DRIFT[mV] *4                         |                                                                                     | 96max                                                                                                   | 192max           |
|                                    | START-UP TIME[ms]                    |                                                                                     | 500typ (ACIN 115V, Io=100%)                                                                             |                  |
| HOLD-UP TIME[ms]                   |                                      | 20typ (ACIN 115V, Io=100%)                                                          |                                                                                                         |                  |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V] |                                      | 21.60 to 26.40                                                                      | 43.20 to 52.80                                                                                          |                  |
| OUTPUT VOLTAGE SETTING[V]          |                                      | 24.00 to 24.96                                                                      | 48.00 to 49.92                                                                                          |                  |
| PROTECTION CIRCUIT AND OTHERS      | OVERCURRENT PROTECTION               |                                                                                     | Works over 105% of rating and recovers automatically                                                    |                  |
|                                    | OVERVOLTAGE PROTECTION[V]            |                                                                                     | 27.60 to 33.60                                                                                          | 54.00 to 67.20   |
|                                    | DC_OK LAMP                           |                                                                                     | LED (Green)                                                                                             |                  |
| ISOLATION                          | INPUT-OUTPUT                         |                                                                                     | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                          |                  |
|                                    | INPUT-PE                             |                                                                                     | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                          |                  |
|                                    | OUTPUT-PE                            |                                                                                     | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)                           |                  |
| ENVIRONMENT                        | OPERATING TEMP., HUMID. AND ALTITUDE |                                                                                     | -20 to +70℃, 20 - 90%RH (Non condensing), Type tested for -40℃ start-up (Refer to “Derating”)           |                  |
|                                    | STORAGE TEMP., HUMID. AND ALTITUDE   |                                                                                     | -30 to +85℃, 20 - 90%RH (Non condensing)                                                                |                  |
|                                    | VIBRATION *7                         |                                                                                     | 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60 minutes along Z 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       | AGENCY APPROVALS                     |                                                                                     | UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508, Complies with DEN-AN                                    |                  |
|                                    | CONDUCTED NOISE                      |                                                                                     | Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                            |                  |
|                                    | HARMONIC ATTENUATOR                  |                                                                                     | Complies with IEC61000-3-2 (Class A) *5                                                                 |                  |
|                                    |                                      |                                                                                     |                                                                                                         |                  |
| OTHERS                             | CASE SIZE *6                         | 50×124×117mm (W×H×D) [1.97×4.88×4.61 inches]                                        |                                                                                                         |                  |
|                                    | WEIGHT                               |                                                                                     | 750g max                                                                                                |                  |
|                                    | COOLING METHOD                       |                                                                                     | Convection                                                                                              |                  |

\*1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms 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 22 μF and 0.1 μF at 150mm from output terminal.  
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).  
Please refer to the instruction manual 1.5.

\*4 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/output.  
\*5 Please contact us about another class.  
\*6 Case size contains neither the umbo.  
\*7 Only as standard mounting orientation (A). Refer to "Assembling and Installation Method".  
If install other than standard mounting orientation (A), please fix the power

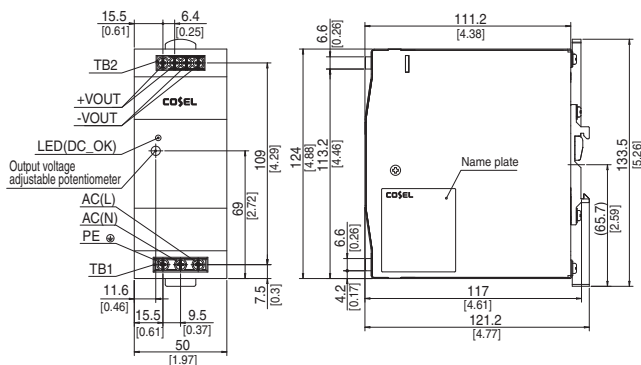
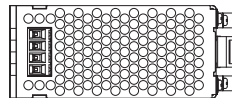
supply for withstand the vibration and impact.  
\*8 Please contact us about DC input voltage.  
\* To meet the specifications. Do not operate over-loaded condition.  
\* A sound may occur from power supply at light or peak loading.

## Block diagram



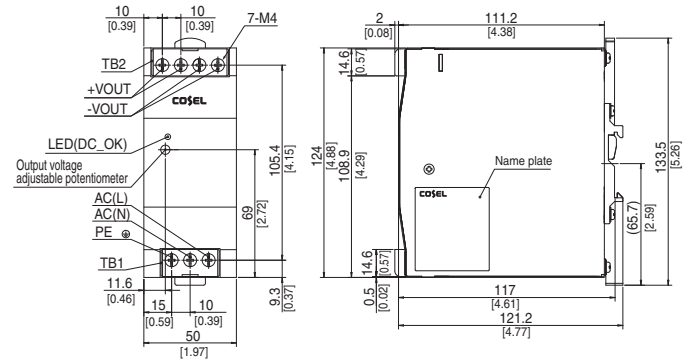
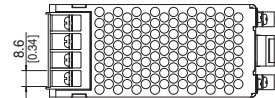
## External view

<KLEA240F(Euro Style I/O Terminals)>



- ※ Tolerance :  $\pm 1.5$  [±0.06]
- ※ Weight : 750g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1N · m max

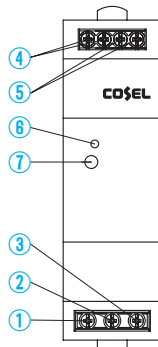
<KLNA240F(Barrier Blocks Style I/O Terminals)>



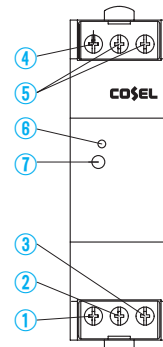
- ※ Tolerance :  $\pm 1.5$  [ $\pm 0.06$ ]
- ※ Weight : 750g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [ $0.06$ ]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ Din rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque : 1.6N · m max

## Terminal Blocks

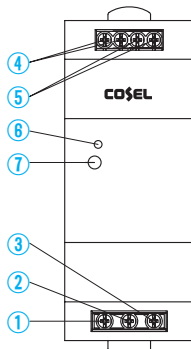
### ● KLEA120F



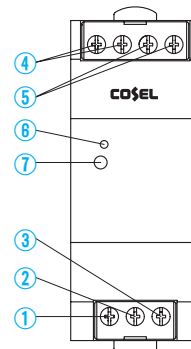
### ● KLNA120F



### ● KLEA240F



### ● KLNA240F



| Terminal Number | Terminal Name | Function                            |
|-----------------|---------------|-------------------------------------|
| ①               | PE            | Protective earth Terminal           |
| ②               | AC (N)        | Input Terminals                     |
| ③               | AC (L)        |                                     |
| ④               | +VOUT         | +Output Terminals                   |
| ⑤               | -VOUT         | -Output Terminals                   |
| ⑥               | DC_OK         | LED for output voltage confirmation |
| ⑦               | TRM           | Adjustment of output voltage        |

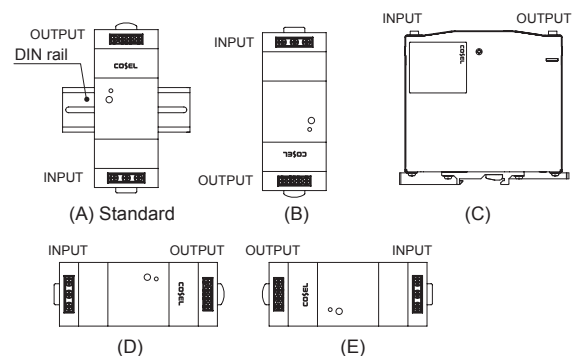
## Assembling and Installation Method

### Installation method

■ About DIN-Rail Attachment available with DIN EN60715 TH 35 (35×7.5mm or 35×15mm) (Top hat shaped DIN rail)

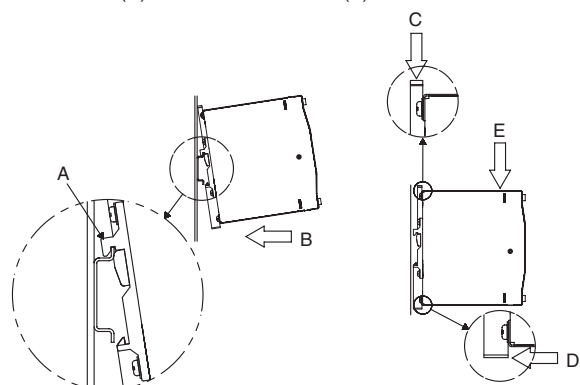
■ Below shows mounting orientation.

If install other than standard mounting orientation (A), please fix the power supply for withstand the impact and vibration.



■ When you mount a power supply on a DIN rail, have the area marked A catch one side of the rail and push the unit to the direction of B. To remove the power supply from the rail, either push down the area marked C or insert a tool such as driver to the area marked D and pull the unit apart from the rail.

When you couldn't remove the unit easily, push down the area marked C while lightly pushing the unit to the direction of E.



## Assembling and Installation Method

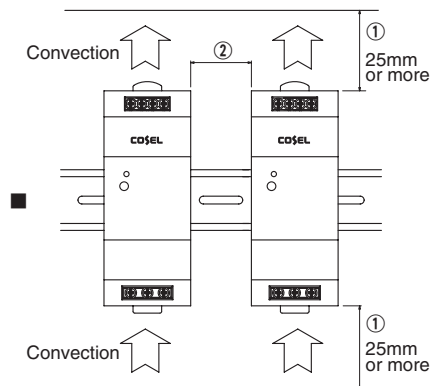
■ Shown below the notes about installation clearance of a unit.

### ① Installation clearance at above and below the unit.

Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.

### ② Installation clearance at the side of the unit.

Please have clearance of at least 5mm side the unit to insulating the internal components. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.

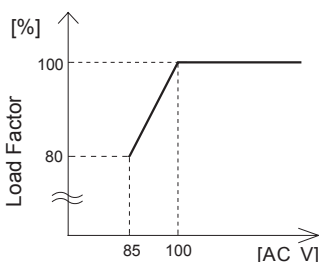


| No. | Model              | Adjacent device of the unit |                |
|-----|--------------------|-----------------------------|----------------|
|     |                    | Non-heat source             | Heat source(*) |
| 1   | KLEA120F, KLNA120F | 15mm or more                | 25mm or more   |
| 2   | KLEA240F, KLNA240F | 15mm or more                | 25mm or more   |

\* Reference value when same power units are adjacent.

## Derating

### Derating curve for input voltage



### Ambient temperature derating

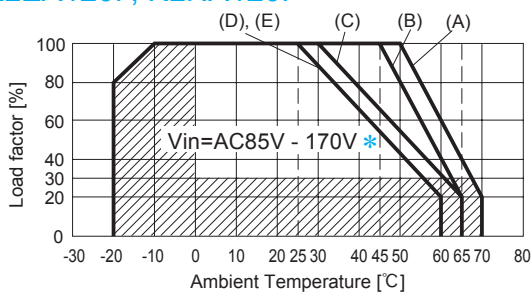
■ The operative ambient temperature as different by input voltage. Derating curve is shown below.

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

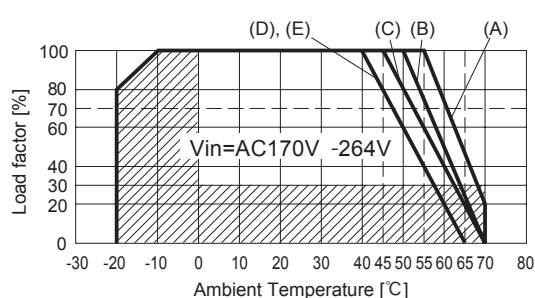
■ Derating Curve (Convection)

■ Refer to instruction manual 3 for Ambient temperature measurement point.

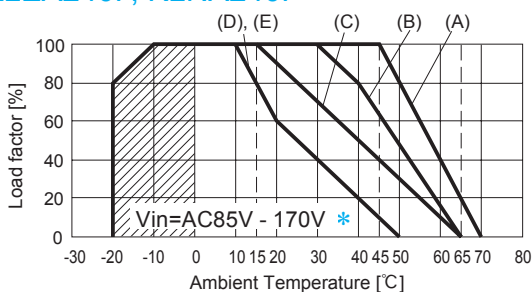
### ● KLEA120F, KLNA120F



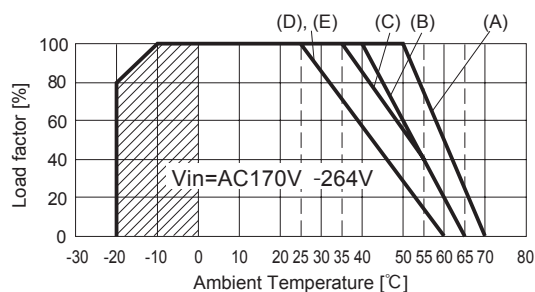
\* Derating curve depend on input voltage is required.



### ● KLEA240F, KLNA240F



\* Derating curve depend on input voltage is required.

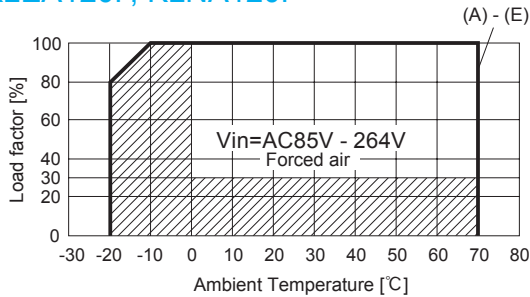


## Derating

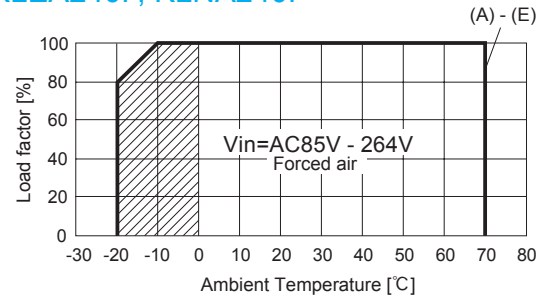
### ■ Derating Curve (Forced air)

■ Use the temperature measurement point as shown in instruction manual 3. Please use at the temperature dose not exceed the values in instruction manual 3.

### ● KLEA120F, KLNA120F



### ● KLEA240F, KLNA240F



## Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Instruction Manual <https://www.cosel.co.jp/redirect/catalog/en/KL/>  
Before using our product <https://en.cosel.co.jp/technical/caution/index.html>

KL



NOTICE



## Basic Characteristics Data

| Model    | Circuit method    | Switching frequency [KLz] | Input current [A] *1 | Rated input fuse | Inrush current protection circuit | PCB/Pattern |              |              | Series/Parallel operation availability |                    |
|----------|-------------------|---------------------------|----------------------|------------------|-----------------------------------|-------------|--------------|--------------|----------------------------------------|--------------------|
|          |                   |                           |                      |                  |                                   | Material    | Single sided | Double sided | Series operation                       | Parallel operation |
| KLEA120F | Active filter     | 40 - 160                  | 1.2                  | 250V 4A          | Thermistor                        | FR-4        |              | Yes          | Yes                                    | No                 |
| KLNA120F | Flyback converter | 20 - 150*2                |                      |                  |                                   |             |              |              |                                        |                    |
| KLEA240F | Active filter     | 50 - 70                   | 2.4                  | 250V 8A          | Thermistor                        | FR-4        |              | Yes          | Yes                                    | No                 |
| KLNA240F | Forward converter | 130                       |                      |                  |                                   |             |              |              |                                        |                    |

\*1 The value of input current is at ACIN 115V and 100%.

\*2 Burst operation at light loading, frequency is change by use condition.  
Please contact us about detail.