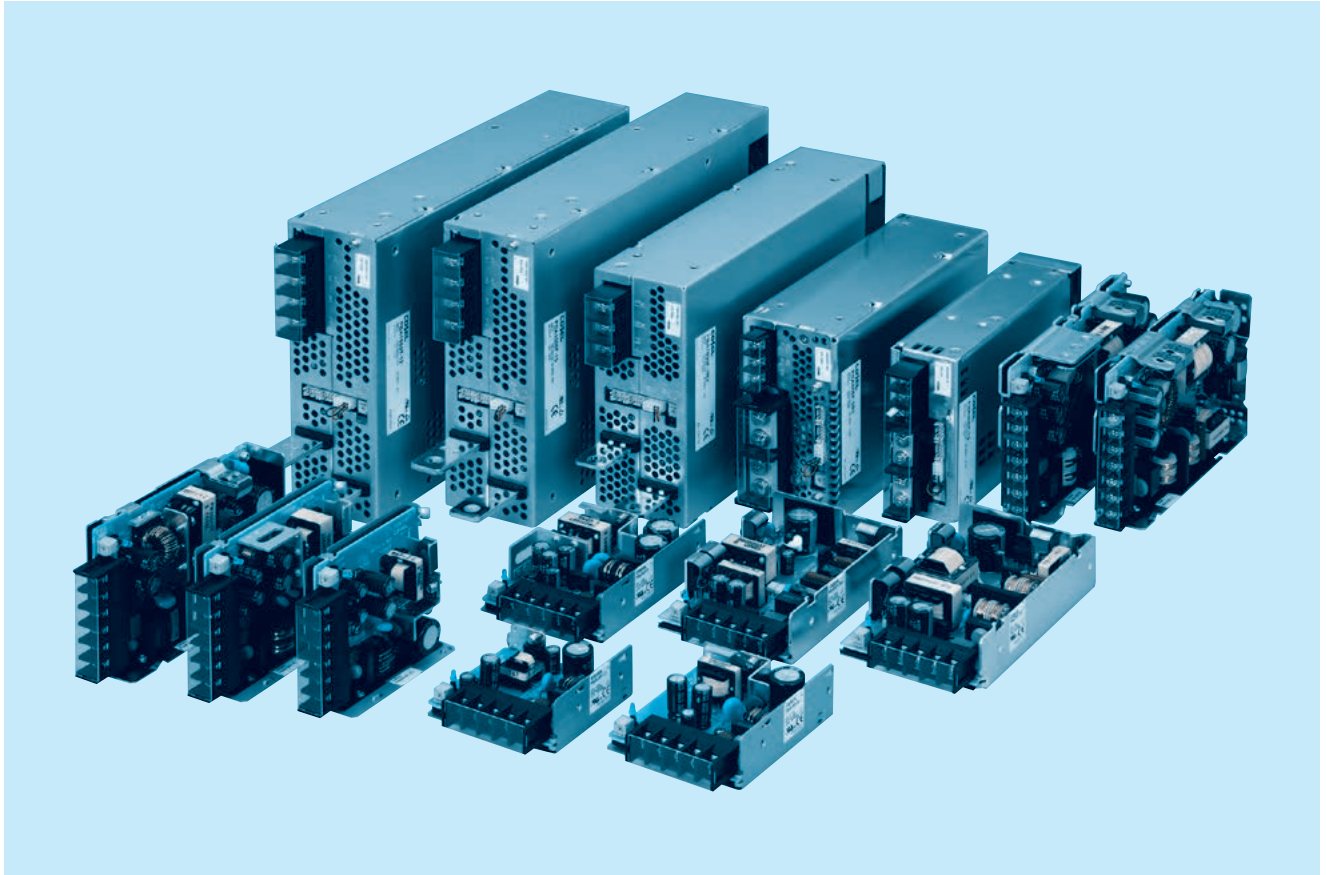




# PBA, PBW-series



## Feature

Small-size & light weight  
 Harmonic attenuator (Complies with IEC61000-3-2) : except PBA1500T  
 Universal input (AC85 - 264V) : PBA1500T(AC170 - 264V 3  $\phi$ )  
 Efficiency increased with synchronous rectification technology (PBA50F - 150F)  
 Variety of option (PBA10F - 150F, PBW15F - 50F)  
 Parallel operation and Parallel redundancy operation (PBA300F - 1500F, PBA1500T)  
 Fan alarm, Remote ON/OFF and other functions (PBA300F - 1500F, PBA1500T)

## Safety agency approvals

UL60950-1, C-UL(CSA60950-1), EN62368-1  
 UL508 (PBA10F - 150F, -24, with cover)  
 Complies with DEN-AN

## EMI

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

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

## CE marking

Low Voltage Directive  
 RoHS Directive

## UKCA marking

Electrical Equipment Safety Regulations  
 RoHS Regulations

## 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

# PBA10F

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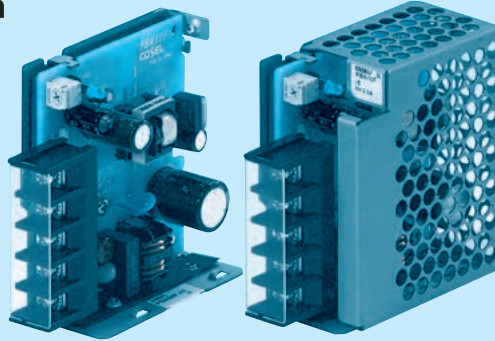
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Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- E : Low leakage current and EMI class A
- T : Vertical terminal block
- J1 : VH (J.S.T.) connector type
- N : with Cover (UL508 is acquired)
- N1 : with DIN rail and Cover
- V : Output voltage setting potentiometer external-ly

Cover is optional

\*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                 | PBA10F-5 | PBA10F-12 | PBA10F-24 |
|-----------------------|----------|-----------|-----------|
| MAX OUTPUT WATTAGE[W] | 10       | 10.8      | 12        |
| DC OUTPUT             | 5V 2A    | 12V 0.9A  | 24V 0.5A  |

## SPECIFICATIONS

|                               | MODEL                               | PBA10F-5                                                                                                                                 | PBA10F-12         | PBA10F-24     |
|-------------------------------|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|
| INPUT                         | VOLTAGE[V]                          | AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)                                 |                   |               |
|                               | CURRENT[A]                          | ACIN 100V                                                                                                                                | 0.30typ (Io=100%) |               |
|                               |                                     | ACIN 200V                                                                                                                                | 0.20typ (Io=100%) |               |
|                               | FREQUENCY[Hz]                       | 50/60 (47 - 440) or DC                                                                                                                   |                   |               |
|                               | EFFICIENCY[%]                       | ACIN 100V                                                                                                                                | 74typ             | 77typ         |
|                               |                                     | ACIN 200V                                                                                                                                | 74typ             | 77typ         |
|                               | INRUSH CURRENT[A]                   | ACIN 100V                                                                                                                                | 15typ (Io=100%)   |               |
| OUTPUT                        |                                     | ACIN 200V                                                                                                                                | 30typ (Io=100%)   |               |
|                               | LEAKAGE CURRENT[ma]                 | 0.15/0.30max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1, DENAN)                                                              |                   |               |
|                               | VOLTAGE[V]                          | 5                                                                                                                                        | 12                | 24            |
|                               | CURRENT[A]                          | 2                                                                                                                                        | 0.9               | 0.5           |
|                               | LINE REGULATION[mV] *6              | 20max                                                                                                                                    | 48max             | 96max         |
|                               | LOAD REGULATION[mV] *6              | 40max                                                                                                                                    | 100max            | 150max        |
|                               | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                                                             | 80max             | 120max        |
|                               |                                     | -10 - 0℃ *1                                                                                                                              | 140max            | 160max        |
|                               | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                                                             | 120max            | 150max        |
|                               |                                     | -10 - 0℃ *1                                                                                                                              | 160max            | 180max        |
|                               | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                                                | 50max             | 120max        |
|                               |                                     | -10 to +50℃                                                                                                                              | 60max             | 240max        |
|                               | DRIFT[mV] *2                        | 20max                                                                                                                                    | 48max             | 96max         |
|                               | START-UP TIME[ms]                   | 200typ(ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage. |                   |               |
|                               | HOLD-UP TIME[ms]                    | 20typ (ACIN 100V, Io=100%)                                                                                                               |                   |               |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 4.50 - 5.50                                                                                                                              | 10.0 - 13.2       | 19.2 - 27.0   |
|                               | OUTPUT VOLTAGE SETTING[V]           | 5.00 - 5.15                                                                                                                              | 12.00 - 12.48     | 24.00 - 24.96 |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                                                              |                   |               |
|                               | OVERVOLTAGE PROTECTION[V]           | 5.75 - 7.00                                                                                                                              | 15.0 - 18.0       | 30.0 - 37.0   |
|                               | OPERATING INDICATION                | LED (Green)                                                                                                                              |                   |               |
|                               | REMOTE ON/OFF                       | None                                                                                                                                     |                   |               |
| ISOLATION                     | INPUT-OUTPUT                        | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                            |                   |               |
|                               | INPUT-FG                            | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                            |                   |               |
|                               | OUTPUT-FG                           | AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                              |                   |               |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71℃ (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                   |                   |               |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                         |                   |               |
|                               | VIBRATION                           | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                              |                   |               |
|                               | IMPACT                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                             |                   |               |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                              |                   |               |
|                               | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                 |                   |               |
|                               | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 (Not built-in to active filter *4) *7                                                                         |                   |               |
| OTHERS                        | CASE SIZE/WEIGHT                    | 31 x 78 x 68mm [1.22 x 3.07 x 2.68 inches] (without terminal block) (W x H x D) / 150g max (with cover : 180g max)                       |                   |               |
|                               | COOLING METHOD                      | Convection                                                                                                                               |                   |               |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃.

\*3 Derating is required.

\*4 When two or more units are used,they may not comply with the harmonic attenuator. Please contact us for details.

\*5 Please contact us about safety approvals for the model with option.

\*6 Please contact us about dynamic load and input response.

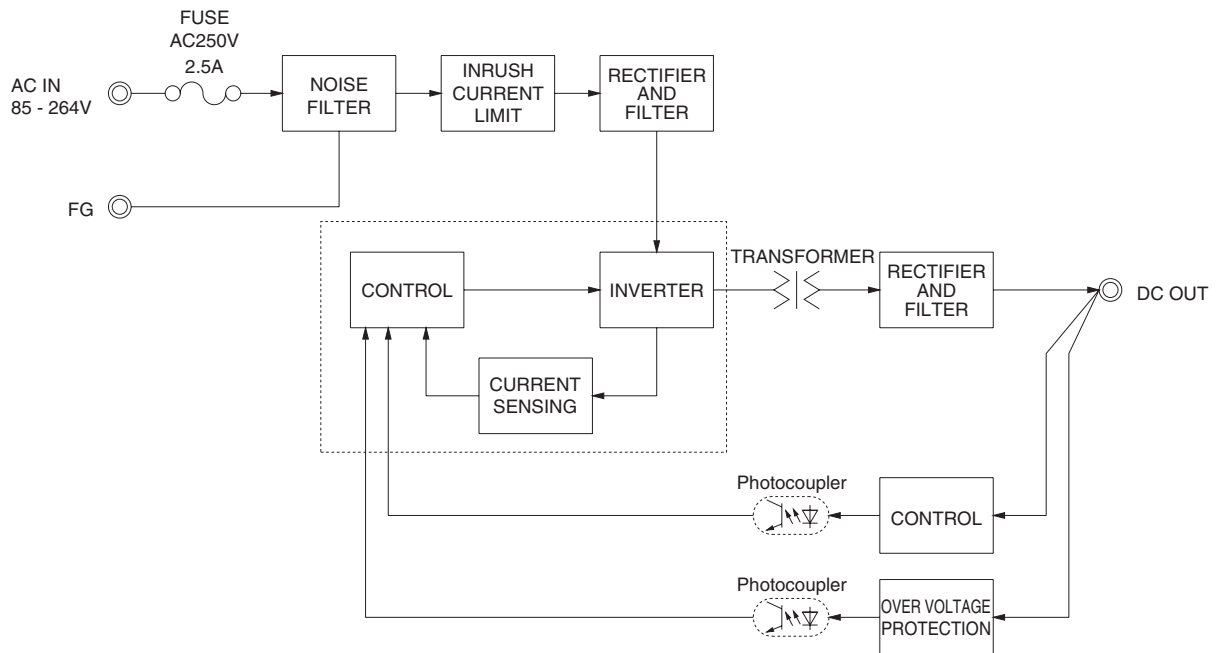
\*7 Please contact us about class C.

\* Parallel operation with other model is not possible.

\* Derating is required when operated with cover.

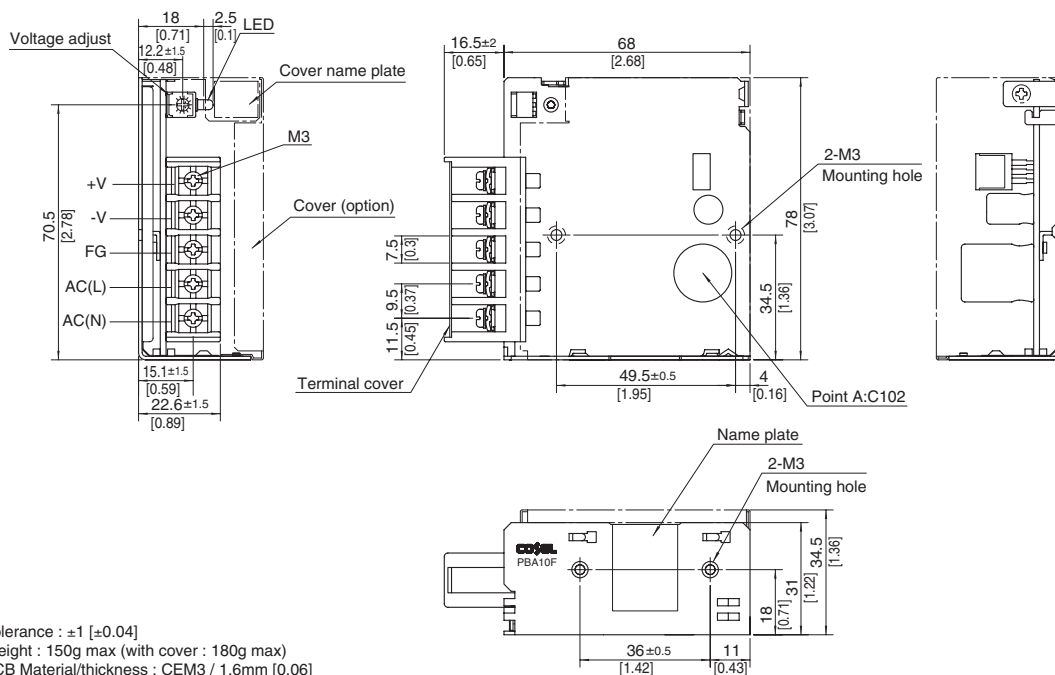
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

※ External size of option T,J1,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 150g max (with cover : 180g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Hot-dip galvanized steel plate
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.6N • m (6.3kgf • cm) max
- ※ Screw tightening torque : M3 0.8N • m (8.5kgf • cm) max
- ※ Please connect safety ground to the unit in 2-M3 holes.

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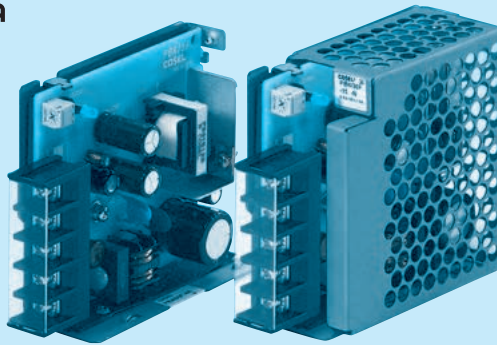
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Example recommended EMI/EMC filter  
NAC-06-472



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.

Cover is optional

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- E : Low leakage current and EMI class A
- T : Vertical terminal block
- J1 : VH (J.S.T.) connector type
- N : with Cover (UL508 is acquired [5V, 12V, 24V])
- NI : with DIN rail and Cover
- V : Output voltage setting potentiometer external

\*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                 | PBA15F-3R3 | PBA15F-5 | PBA15F-9 | PBA15F-12 | PBA15F-15 | PBA15F-24 | PBA15F-48 |
|-----------------------|------------|----------|----------|-----------|-----------|-----------|-----------|
| MAX OUTPUT WATTAGE[W] | 9.9        | 15       | 15.3     | 15.6      | 15        | 16.8      | 16.8      |
| DC OUTPUT             | 3.3V 3A    | 5V 3A    | 9V 1.7A  | 12V 1.3A  | 15V 1A    | 24V 0.7A  | 48V 0.35A |

## SPECIFICATIONS

|                               | MODEL                               | PBA15F-3R3                                                                                                                                | PBA15F-5                        | PBA15F-9         | PBA15F-12     | PBA15F-15     | PBA15F-24     | PBA15F-48     |
|-------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|------------------|---------------|---------------|---------------|---------------|
| INPUT                         | VOLTAGE[V]                          | AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)                                  |                                 |                  |               |               |               |               |
|                               | CURRENT[A]                          | ACIN 100V                                                                                                                                 | 0.30typ (Io=100%)               | 0.4typ (Io=100%) |               |               |               |               |
|                               |                                     | ACIN 200V                                                                                                                                 | 0.15typ (Io=100%)               | 0.2typ (Io=100%) |               |               |               |               |
|                               | FREQUENCY[Hz]                       | 50/60 (47 - 440) or DC                                                                                                                    |                                 |                  |               |               |               |               |
|                               | EFFICIENCY[%]                       | ACIN 100V                                                                                                                                 | 68typ                           | 74typ            | 75typ         | 77typ         | 75typ         | 75typ         |
|                               |                                     | ACIN 200V                                                                                                                                 | 68typ                           | 75typ            | 77typ         | 80typ         | 78typ         | 78typ         |
|                               | INRUSH CURRENT[A]                   | ACIN 100V                                                                                                                                 | 15typ (Io=100%) (At cold start) |                  |               |               |               |               |
| OUTPUT                        |                                     | ACIN 200V                                                                                                                                 | 30typ (Io=100%) (At cold start) |                  |               |               |               |               |
|                               | LEAKAGE CURRENT[ma]                 | 0.15/0.30max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1.DENAN)                                                                |                                 |                  |               |               |               |               |
|                               | VOLTAGE[V]                          | 3.3                                                                                                                                       | 5                               | 9                | 12            | 15            | 24            | 48            |
|                               | CURRENT[A]                          | 3                                                                                                                                         | 3                               | 1.7              | 1.3           | 1             | 0.7           | 0.35          |
|                               | LINE REGULATION[mV] *6              | 20max                                                                                                                                     | 20max                           | 36max            | 48max         | 60max         | 96max         | 192max        |
|                               | LOAD REGULATION[mV] *6              | 40max                                                                                                                                     | 40max                           | 100max           | 100max        | 120max        | 150max        | 240max        |
|                               | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                                                              | 80max                           | 80max            | 120max        | 120max        | 120max        | 150max        |
|                               |                                     | -10 - 0℃ *1                                                                                                                               | 140max                          | 140max           | 160max        | 160max        | 160max        | 200max        |
|                               | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                                                              | 120max                          | 120max           | 150max        | 150max        | 150max        | 250max        |
|                               |                                     | -10 - 0℃ *1                                                                                                                               | 160max                          | 160max           | 180max        | 180max        | 180max        | 300max        |
|                               | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                                                 | 50max                           | 50max            | 90max         | 120max        | 150max        | 480max        |
|                               |                                     | -10 to +50℃                                                                                                                               | 60max                           | 60max            | 120max        | 150max        | 180max        | 600max        |
|                               | DRIFT[mV] *2                        | 20max                                                                                                                                     | 20max                           | 36max            | 48max         | 60max         | 96max         | 192max        |
|                               | START-UP TIME[ms]                   | 200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage. |                                 |                  |               |               |               |               |
|                               | HOLD-UP TIME[ms]                    | 20typ (ACIN 100V, Io=100%)                                                                                                                |                                 |                  |               |               |               |               |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 2.85 - 3.60                                                                                                                               | 4.50 - 5.50                     | 7.50 - 10.0      | 10.0 - 13.2   | 13.2 - 18.0   | 19.2 - 27.0   | 39.0 - 53.0   |
|                               | OUTPUT VOLTAGE SETTING[V]           | 3.30 - 3.40                                                                                                                               | 5.00 - 5.15                     | 9.00 - 9.36      | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 48.00 - 49.92 |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                                                               |                                 |                  |               |               |               |               |
|                               | OVERVOLTAGE PROTECTION[V]           | 4.00 - 5.25                                                                                                                               | 5.75 - 7.00                     | 11.5 - 14.0      | 15.0 - 18.0   | 20.0 - 25.0   | 30.0 - 37.0   | 58.0 - 65.0   |
|                               | OPERATING INDICATION                | LED (Green)                                                                                                                               |                                 |                  |               |               |               |               |
|                               | REMOTE ON/OFF                       | None                                                                                                                                      |                                 |                  |               |               |               |               |
| ISOLATION                     | INPUT-OUTPUT                        | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                             |                                 |                  |               |               |               |               |
|                               | INPUT-FG                            | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                             |                                 |                  |               |               |               |               |
|                               | OUTPUT-FG                           | AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                               |                                 |                  |               |               |               |               |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71℃ (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                    |                                 |                  |               |               |               |               |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                          |                                 |                  |               |               |               |               |
|                               | VIBRATION                           | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                               |                                 |                  |               |               |               |               |
|                               | IMPACT                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                              |                                 |                  |               |               |               |               |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                               |                                 |                  |               |               |               |               |
|                               | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                  |                                 |                  |               |               |               |               |
|                               | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 (Not built-in to active filter *4) *7                                                                          |                                 |                  |               |               |               |               |
| OTHERS                        | CASE SIZE/WEIGHT                    | 31 x 78 x 85mm [1.22 x 3.07 x 3.35 inches] (without terminal block) (W x H x D) / 200g max (with cover : 235g max)                        |                                 |                  |               |               |               |               |
|                               | COOLING METHOD                      | Convection                                                                                                                                |                                 |                  |               |               |               |               |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃.

\*3 Derating is required.

\*4 When two or more units are used,they may not comply with the harmonic attenuator. Please contact us for details.

\*5 Please contact us about safety approvals for the model with option.

\*6 Please contact us about dynamic load and input response.

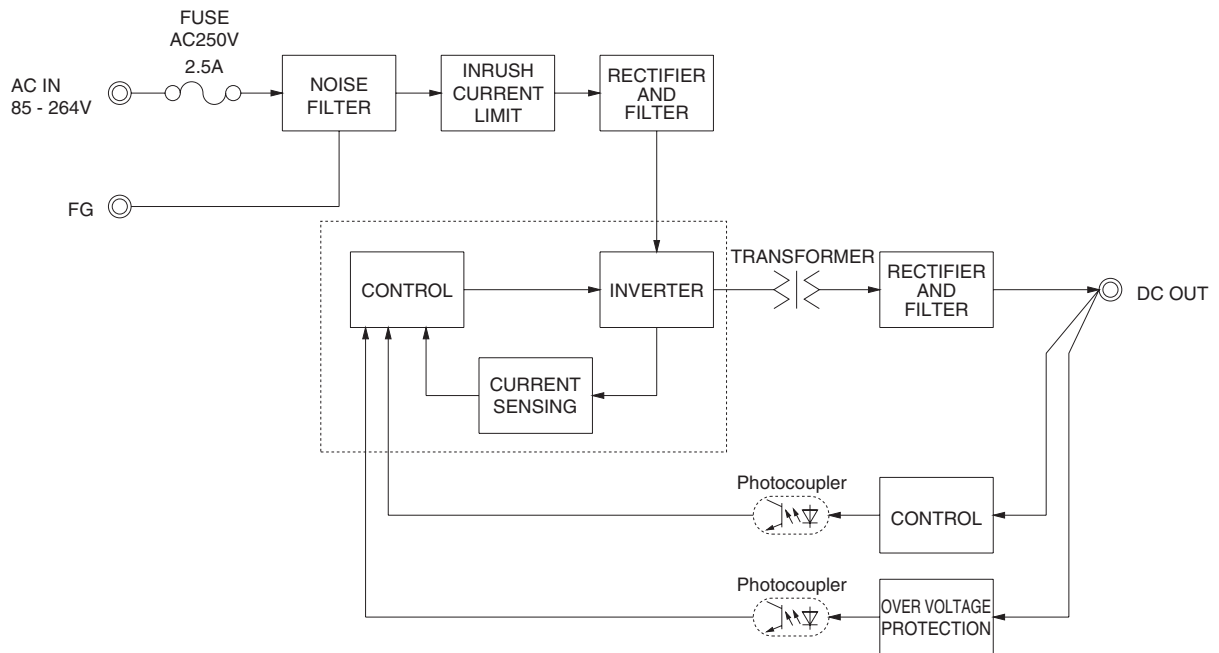
\*7 Please contact us about class C.

\* Parallel operation with other model is not possible.

\* Derating is required when operated with cover.

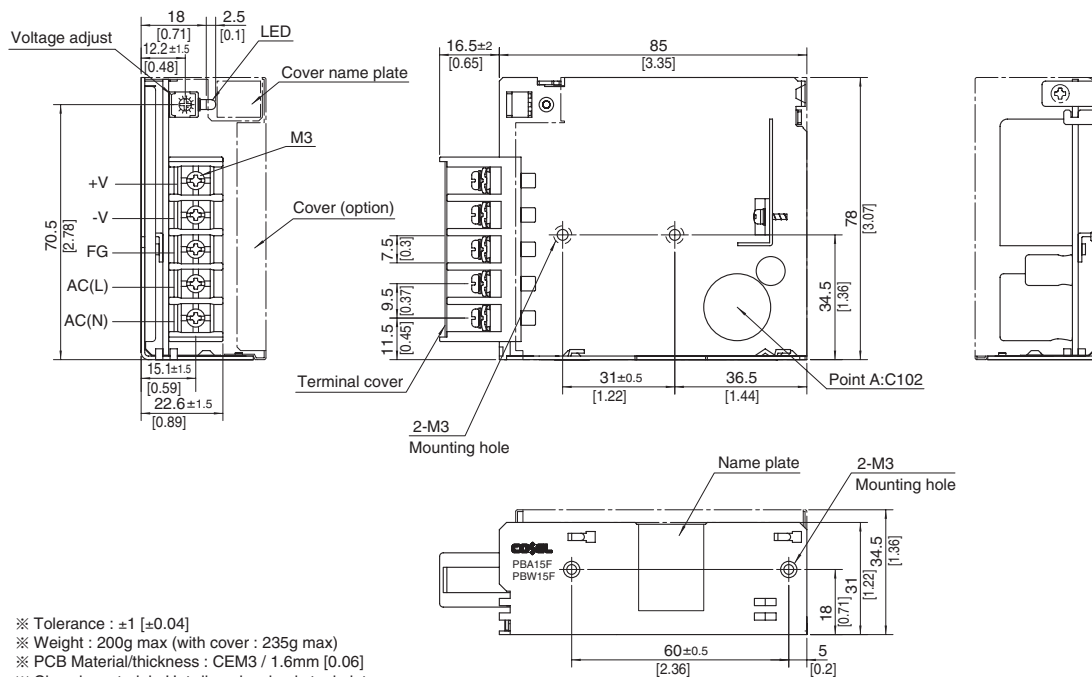
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

※ External size of option T, J1, N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 200g max (with cover : 235g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Hot-dip galvanized steel plate
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.6N • m (6.3kgf • cm) max
- ※ Screw tightening torque : M3 0.8N • m (8.5kgf • cm) max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBA30F

## Ordering information

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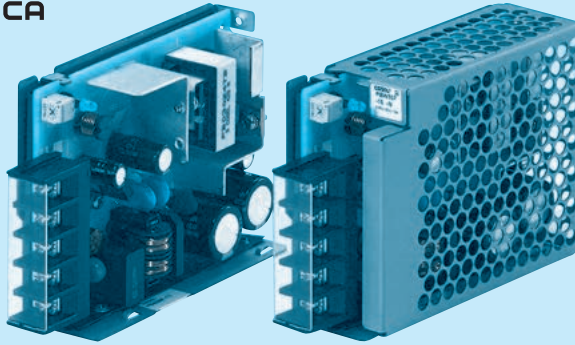
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Example recommended EMI/EMC filter  
NAC-06-472



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.

Cover is optional

- ① Series name
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- E : Low leakage current and EMI class A
- T : Vertical terminal block
- J1 : V.H (J.S.T.) connector type
- N : with Cover (UL508 is acquired [5V, 12V, 24V])
- N1 : with DIN rail and Cover
- V : Output voltage setting potentiometer external-ly

\*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                 | PBA30F-3R3 | PBA30F-5 | PBA30F-9 | PBA30F-12 | PBA30F-15 | PBA30F-24 | PBA30F-48 |
|-----------------------|------------|----------|----------|-----------|-----------|-----------|-----------|
| MAX OUTPUT WATTAGE[W] | 19.8       | 30       | 30.6     | 30        | 30        | 31.2      | 31.2      |
| DC OUTPUT             | 3.3V 6A    | 5V 6A    | 9V 3.4A  | 12V 2.5A  | 15V 2A    | 24V 1.3A  | 48V 0.65A |

## SPECIFICATIONS

|                               | MODEL                               | PBA30F-3R3                                                                                                                                | PBA30F-5                        | PBA30F-9          | PBA30F-12     | PBA30F-15     | PBA30F-24     | PBA30F-48     |
|-------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------|---------------|---------------|---------------|---------------|
| INPUT                         | VOLTAGE[V]                          | AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)                                  |                                 |                   |               |               |               |               |
|                               | CURRENT[A]                          | ACIN 100V                                                                                                                                 | 0.50typ (Io=100%)               | 0.70typ (Io=100%) |               |               |               |               |
|                               |                                     | ACIN 200V                                                                                                                                 | 0.30typ (Io=100%)               | 0.40typ (Io=100%) |               |               |               |               |
|                               | FREQUENCY[Hz]                       | 50/60 (47 - 440) or DC                                                                                                                    |                                 |                   |               |               |               |               |
|                               | EFFICIENCY[%]                       | ACIN 100V                                                                                                                                 | 68typ                           | 74typ             | 75typ         | 76typ         | 78typ         | 79typ         |
|                               |                                     | ACIN 200V                                                                                                                                 | 69typ                           | 77typ             | 77typ         | 78typ         | 81typ         | 81typ         |
|                               | INRUSH CURRENT[A]                   | ACIN 100V                                                                                                                                 | 15typ (Io=100%) (At cold start) |                   |               |               |               |               |
| OUTPUT                        |                                     | ACIN 200V                                                                                                                                 | 30typ (Io=100%) (At cold start) |                   |               |               |               |               |
|                               | LEAKAGE CURRENT[ma]                 | 0.30/0.65max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1.DENAN)                                                                |                                 |                   |               |               |               |               |
|                               | VOLTAGE[V]                          | 3.3                                                                                                                                       | 5                               | 9                 | 12            | 15            | 24            | 48            |
|                               | CURRENT[A]                          | 6                                                                                                                                         | 6                               | 3.4               | 2.5           | 2             | 1.3           | 0.65          |
|                               | LINE REGULATION[mV] *6              | 20max                                                                                                                                     | 20max                           | 36max             | 48max         | 60max         | 96max         | 192max        |
|                               | LOAD REGULATION[mV] *6              | 40max                                                                                                                                     | 40max                           | 100max            | 100max        | 120max        | 150max        | 240max        |
|                               | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                                                              | 80max                           | 80max             | 120max        | 120max        | 120max        | 150max        |
|                               |                                     | -10 - 0℃ *1                                                                                                                               | 140max                          | 140max            | 160max        | 160max        | 160max        | 200max        |
|                               | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                                                              | 120max                          | 120max            | 150max        | 150max        | 150max        | 250max        |
|                               |                                     | -10 - 0℃ *1                                                                                                                               | 160max                          | 160max            | 180max        | 180max        | 180max        | 300max        |
|                               | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                                                 | 50max                           | 50max             | 90max         | 120max        | 150max        | 240max        |
|                               |                                     | -10 to +50℃                                                                                                                               | 60max                           | 60max             | 120max        | 150max        | 180max        | 290max        |
|                               | DRIFT[mV] *2                        | 20max                                                                                                                                     | 20max                           | 36max             | 48max         | 60max         | 96max         | 192max        |
|                               | START-UP TIME[ms]                   | 200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage. |                                 |                   |               |               |               |               |
|                               | HOLD-UP TIME[ms]                    | 20typ (ACIN 100V, Io=100%)                                                                                                                |                                 |                   |               |               |               |               |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 2.85 - 3.60                                                                                                                               | 4.50 - 5.50                     | 7.50 - 10.0       | 10.0 - 13.2   | 13.2 - 18.0   | 19.2 - 27.0   | 39.0 - 53.0   |
|                               | OUTPUT VOLTAGE SETTING[V]           | 3.30 - 3.40                                                                                                                               | 5.00 - 5.15                     | 9.00 - 9.36       | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 48.00 - 49.92 |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                                                               |                                 |                   |               |               |               |               |
|                               | OVERVOLTAGE PROTECTION[V]           | 4.00 - 5.25                                                                                                                               | 5.75 - 7.00                     | 11.5 - 14.0       | 15.0 - 18.0   | 20.0 - 25.0   | 30.0 - 37.0   | 58.0 - 65.0   |
|                               | OPERATING INDICATION                | LED (Green)                                                                                                                               |                                 |                   |               |               |               |               |
|                               | REMOTE ON/OFF                       | None                                                                                                                                      |                                 |                   |               |               |               |               |
| ISOLATION                     | INPUT-OUTPUT                        | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                             |                                 |                   |               |               |               |               |
|                               | INPUT-FG                            | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                             |                                 |                   |               |               |               |               |
|                               | OUTPUT-FG                           | AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                               |                                 |                   |               |               |               |               |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71℃ (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                    |                                 |                   |               |               |               |               |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                          |                                 |                   |               |               |               |               |
|                               | VIBRATION                           | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                               |                                 |                   |               |               |               |               |
|                               | IMPACT                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                              |                                 |                   |               |               |               |               |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                               |                                 |                   |               |               |               |               |
|                               | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                  |                                 |                   |               |               |               |               |
|                               | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 (Not built-in to active filter *4) *7                                                                          |                                 |                   |               |               |               |               |
| OTHERS                        | CASE SIZE/WEIGHT                    | 31 x 78 x 103mm [1.22 x 3.07 x 4.06 inches] (without terminal block) (W x H x D) / 270g max (with cover : 310g max)                       |                                 |                   |               |               |               |               |
|                               | COOLING METHOD                      | Convection                                                                                                                                |                                 |                   |               |               |               |               |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃.

\*3 Derating is required.

\*4 When two or more units are used,they may not comply with the harmonic attenuator. Please contact us for details.

\*5 Please contact us about safety approvals for the model with option.

\*6 Please contact us about dynamic load and input response.

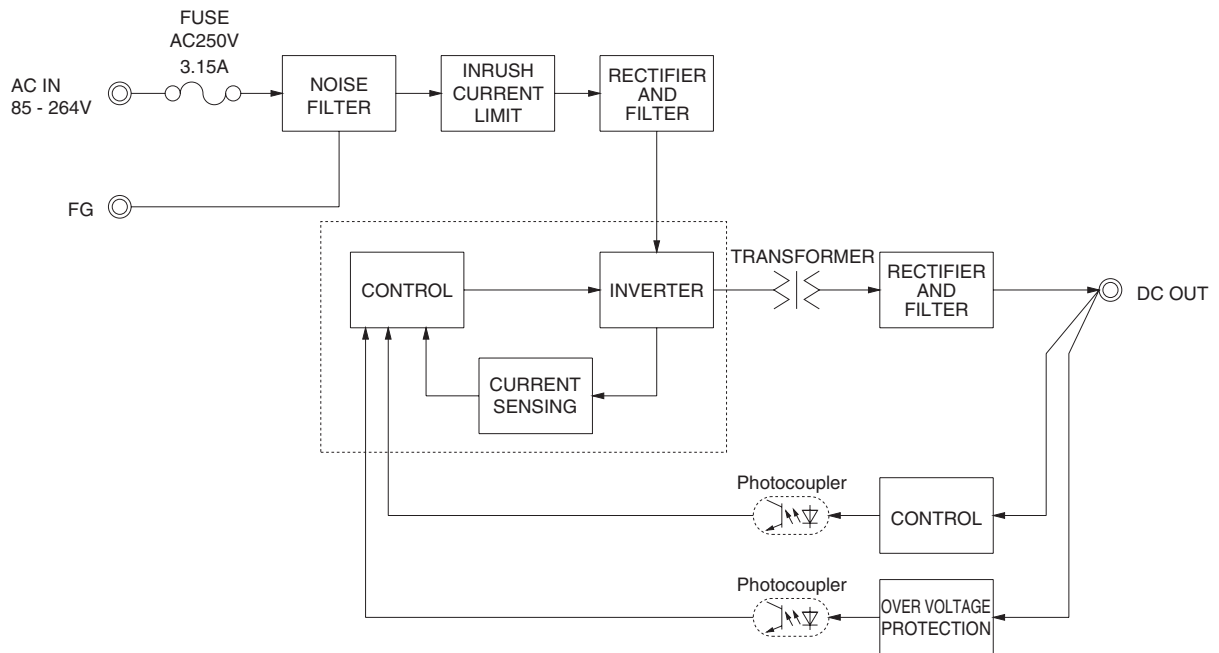
\*7 Please contact us about class C.

\* Parallel operation with other model is not possible.

\* Derating is required when operated with cover.

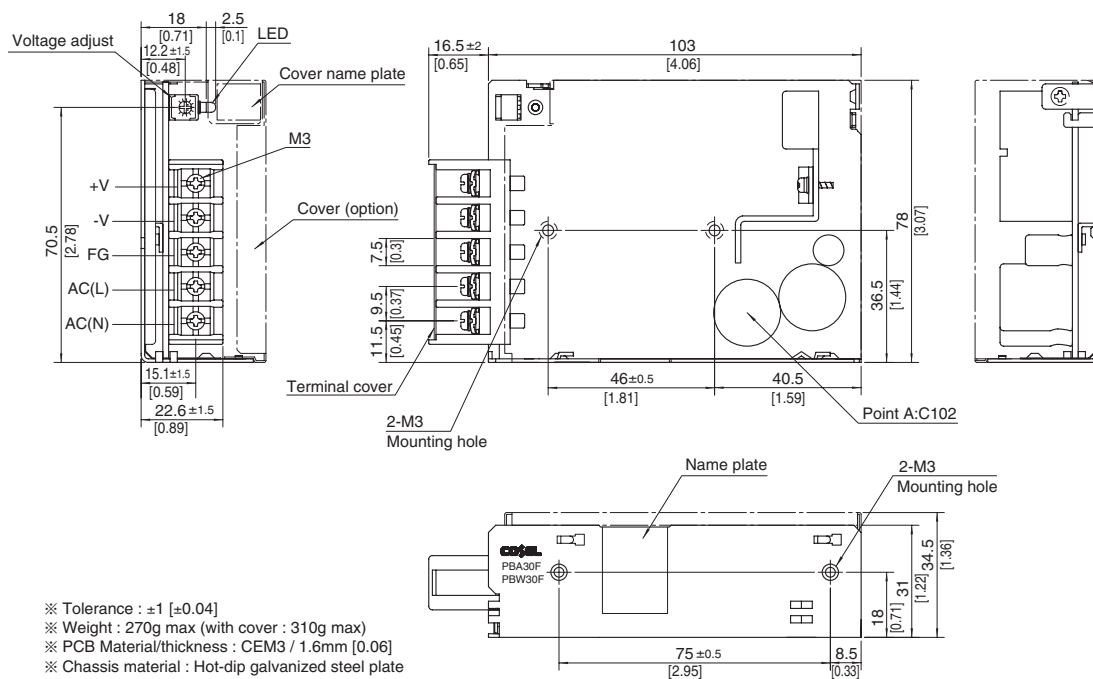
\* A sound may occur from power supply at peak loading.

## Block diagram

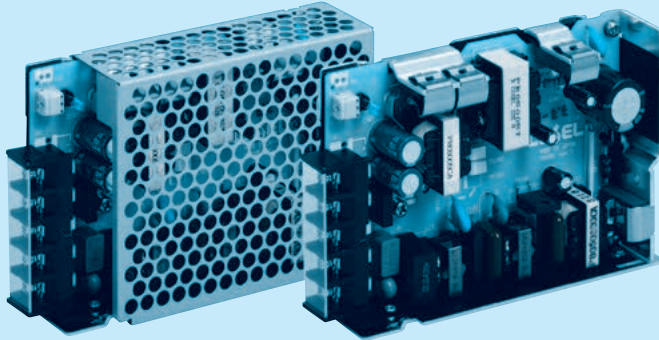


## External view

※ External size of option T,J1,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 270g max (with cover : 310g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Hot-dip galvanized steel plate
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $0.6\text{N} \cdot \text{m}$  (6.3kgf  $\cdot$  cm) max
- ※ Screw tightening torque : M3  $0.8\text{N} \cdot \text{m}$  (8.5kgf  $\cdot$  cm) max
- ※ Please connect safety ground to the unit in 2-M3 holes.



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current (0.15mA max / ACIN 240V)
- E : Low leakage current and EMI class A (0.5mA max / ACIN 240V)
- T : Vertical terminal block
- J1 : VH (J.S.T.) connector type
- R : with Remote ON/OFF
- N : with Cover (Only 24V UL508 is acquired)
- Nt : with DIN rail and Cover
- V : Output voltage setting potentiometer externally

Cover is optional

\*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                 | PBA50F-3R3 | PBA50F-5 | PBA50F-9 | PBA50F-12 | PBA50F-15 | PBA50F-24 | PBA50F-36 | PBA50F-48 |
|-----------------------|------------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| MAX OUTPUT WATTAGE[W] | 33         | 50       | 50.4     | 51.6      | 52.5      | 52.8      | 50.4      | 52.8      |
| DC OUTPUT             | 3.3V 10A   | 5V 10A   | 9V 5.6A  | 12V 4.3A  | 15V 3.5A  | 24V 2.2A  | 36V 1.4A  | 48V 1.1A  |

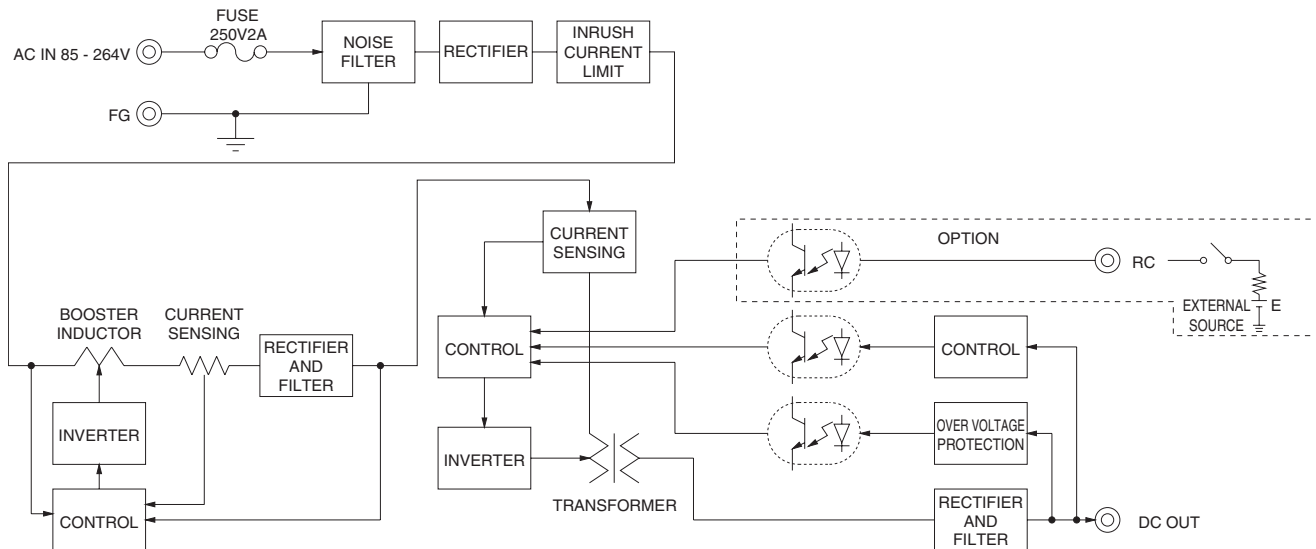
## SPECIFICATIONS

|                               | MODEL                               | PBA50F-3R3                                                                                                          | PBA50F-5                                                                      | PBA50F-9    | PBA50F-12     | PBA50F-15     | PBA50F-24     | PBA50F-36     | PBA50F-48     |        |
|-------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------|---------------|---------------|---------------|---------------|---------------|--------|
| INPUT                         | VOLTAGE[V]                          | AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4)            |                                                                               |             |               |               |               |               |               |        |
|                               | CURRENT[A]                          | ACIN 100V                                                                                                           | 0.5typ                                                                        | 0.7typ      |               |               |               |               |               |        |
|                               |                                     | ACIN 200V                                                                                                           | 0.3typ                                                                        | 0.4typ      |               |               |               |               |               |        |
|                               | FREQUENCY[Hz]                       | 50/60 (47 - 63)                                                                                                     |                                                                               |             |               |               |               |               |               |        |
|                               | EFFICIENCY[%]                       | ACIN 100V                                                                                                           | 75typ                                                                         | 80typ       | 79typ         | 80typ         | 81typ         | 82typ         | 83typ         | 83typ  |
|                               |                                     | ACIN 200V                                                                                                           | 76typ                                                                         | 82typ       | 81typ         | 82typ         | 83typ         | 84typ         | 85typ         | 85typ  |
|                               | POWER FACTOR(Lo=100%)               | ACIN 100V                                                                                                           | 0.98typ                                                                       | 0.99typ     |               |               |               |               |               |        |
| ACIN 200V                     |                                     | 0.87typ                                                                                                             | 0.93typ                                                                       |             |               |               |               |               |               |        |
|                               | INRUSH CURRENT[A]                   | ACIN 100V                                                                                                           | 15typ (Lo=100%) (At cold start)                                               |             |               |               |               |               |               |        |
|                               |                                     | ACIN 200V                                                                                                           | 30typ (Lo=100%) (At cold start)                                               |             |               |               |               |               |               |        |
|                               | LEAKAGE CURRENT[mA]                 | 0.4/0.75max (ACIN 100V/240V 60Hz, Lo=100%, According to IEC62368-1.DENAN)                                           |                                                                               |             |               |               |               |               |               |        |
| OUTPUT                        | VOLTAGE[V]                          | 3.3                                                                                                                 | 5                                                                             | 9           | 12            | 15            | 24            | 36            | 48            |        |
|                               | CURRENT[A]                          | 10                                                                                                                  | 10                                                                            | 5.6         | 4.3           | 3.5           | 2.2           | 1.4           | 1.1           |        |
|                               | LINE REGULATION[mV]                 | 20max                                                                                                               | 20max                                                                         | 36max       | 48max         | 60max         | 96max         | 144max        | 192max        |        |
|                               | LOAD REGULATION[mV]                 | 40max                                                                                                               | 40max                                                                         | 100max      | 100max        | 120max        | 150max        | 240max        | 240max        |        |
|                               | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                                        | 80max                                                                         | 80max       | 120max        | 120max        | 120max        | 120max        | 150max        | 150max |
|                               |                                     | -10 - 0℃ *1                                                                                                         | 140max                                                                        | 140max      | 160max        | 160max        | 160max        | 160max        | 200max        | 200max |
|                               | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                                        | 120max                                                                        | 120max      | 150max        | 150max        | 150max        | 150max        | 250max        | 250max |
|                               |                                     | -10 - 0℃ *1                                                                                                         | 160max                                                                        | 160max      | 180max        | 180max        | 180max        | 180max        | 300max        | 300max |
|                               | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                           | 50max                                                                         | 50max       | 90max         | 120max        | 150max        | 240max        | 360max        | 480max |
|                               |                                     | -10 to +50℃                                                                                                         | 60max                                                                         | 60max       | 120max        | 150max        | 180max        | 290max        | 450max        | 600max |
|                               | DRIFT[mV]                           | *2                                                                                                                  | 20max                                                                         | 20max       | 36max         | 48max         | 60max         | 96max         | 144max        | 192max |
|                               |                                     | START-UP TIME[ms]                                                                                                   | 350typ(ACIN 100V, Lo=100%)                                                    |             |               |               |               |               |               |        |
|                               |                                     | HOLD-UP TIME[ms]                                                                                                    | 20typ (ACIN 100V, Lo=100%)                                                    |             |               |               |               |               |               |        |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 2.85 - 3.63                                                                                                         | 4.00 - 5.50                                                                   | 7.50 - 10.0 | 10.0 - 13.2   | 13.2 - 18.0   | 19.2 - 27.0   | 28.8 - 39.6   | 39.0 - 53.0   |        |
|                               | OUTPUT VOLTAGE SETTING[V]           | 3.30 - 3.40                                                                                                         | 5.00 - 5.15                                                                   | 9.00 - 9.36 | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 35.00 - 37.44 | 48.00 - 49.92 |        |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                                         |                                                                               |             |               |               |               |               |               |        |
|                               | OVERVOLTAGE PROTECTION[V]           | 4.00 - 5.25                                                                                                         | 5.75 - 7.00                                                                   | 11.5 - 14.0 | 15.0 - 18.0   | 20.0 - 25.0   | 30.0 - 37.0   | 43.0 - 50.0   | 58.0 - 65.0   |        |
|                               | OPERATING INDICATION                | LED (Green)                                                                                                         |                                                                               |             |               |               |               |               |               |        |
|                               | REMOTE ON/OFF                       | Optional (Required external power source)                                                                           |                                                                               |             |               |               |               |               |               |        |
| ISOLATION                     | INPUT-OUTPUT · RC                   | *3                                                                                                                  | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |             |               |               |               |               |               |        |
|                               | INPUT-FG                            |                                                                                                                     | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |             |               |               |               |               |               |        |
|                               | OUTPUT · RC-FG                      | *3                                                                                                                  | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)  |             |               |               |               |               |               |        |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71℃ (Refer to “Derating”), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                              |                                                                               |             |               |               |               |               |               |        |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                    |                                                                               |             |               |               |               |               |               |        |
|                               | VIBRATION                           | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                         |                                                                               |             |               |               |               |               |               |        |
|                               | IMPACT                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                        |                                                                               |             |               |               |               |               |               |        |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                         |                                                                               |             |               |               |               |               |               |        |
|                               | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                            |                                                                               |             |               |               |               |               |               |        |
|                               | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 *6                                                                                       |                                                                               |             |               |               |               |               |               |        |
| OTHERS                        | CASE SIZE/WEIGHT                    | 31 x 82 x 120mm [1.22 x 3.23 x 4.72 inches] (without terminal block) (W x H x D) / 280g max (with cover : 325g max) |                                                                               |             |               |               |               |               |               |        |
|                               | COOLING METHOD                      | Convection                                                                                                          |                                                                               |             |               |               |               |               |               |        |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.  
\*4 Derating is required.

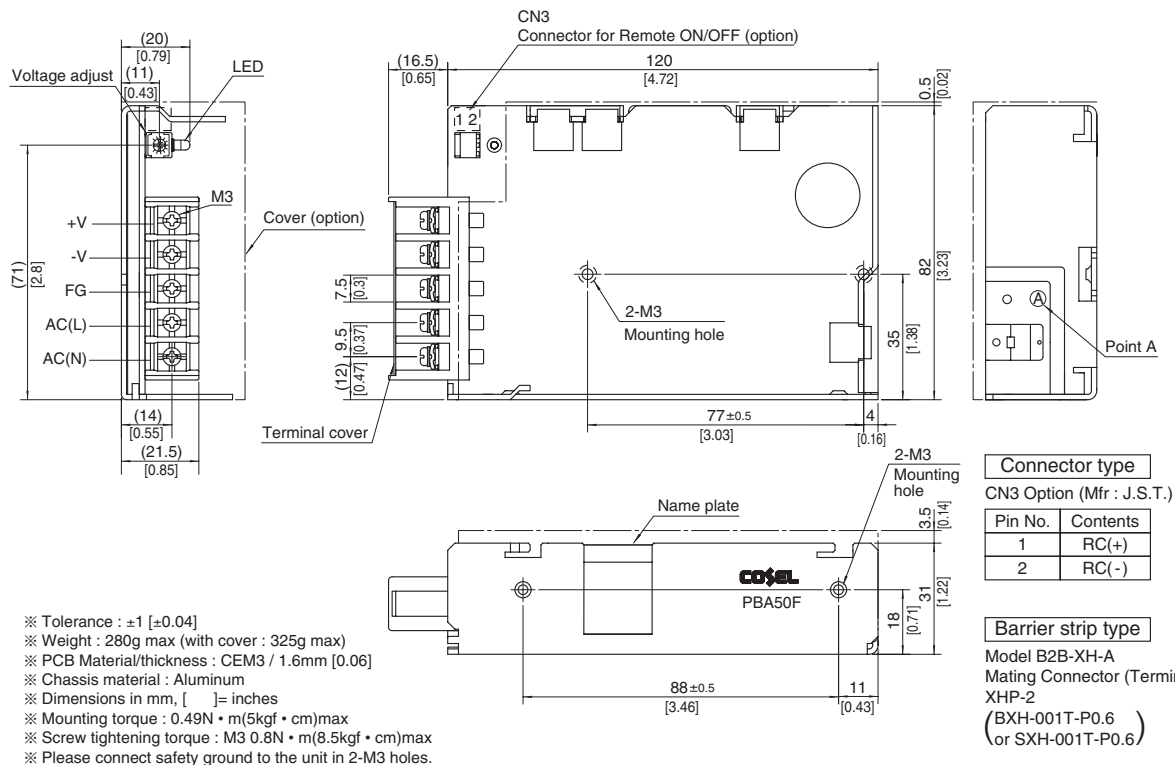
\*5 Please contact us about safety approvals for the model with option.  
\*6 Please contact us about class C.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with cover.  
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

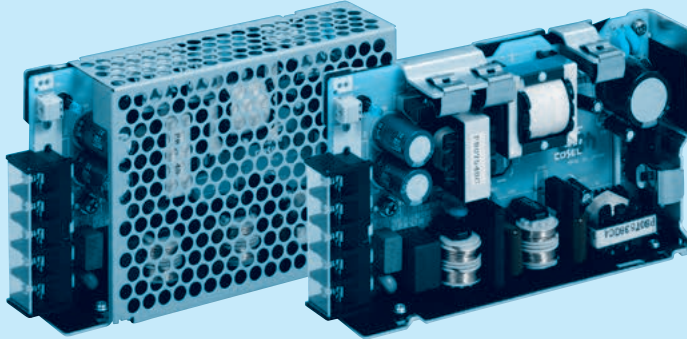
※ External size of option T,J1,R,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



# PBA75F

PB A 75 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current (0.15mA max / ACIN 240V)
- E : Low leakage current and EMI class A (0.5mA max / ACIN 240V)
- T : Vertical terminal block
- J1 : VH (J.S.T.) connector type
- R : with Remote ON/OFF
- N : with Cover (Only 24V UL508 is acquired)
- Nt : with DIN rail and Cover
- V : Output voltage setting potentiometer externally

Cover is optional

\*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                 | PBA75F-3R3 | PBA75F-5 | PBA75F-9 | PBA75F-12 | PBA75F-15 | PBA75F-24 | PBA75F-36 | PBA75F-48 |
|-----------------------|------------|----------|----------|-----------|-----------|-----------|-----------|-----------|
| MAX OUTPUT WATTAGE[W] | 49.5       | 75       | 75.6     | 75.6      | 75        | 76.8      | 75.6      | 76.8      |
| DC OUTPUT             | 3.3V 15A   | 5V 15A   | 9V 8.4A  | 12V 6.3A  | 15V 5A    | 24V 3.2A  | 36V 2.1A  | 48V 1.6A  |

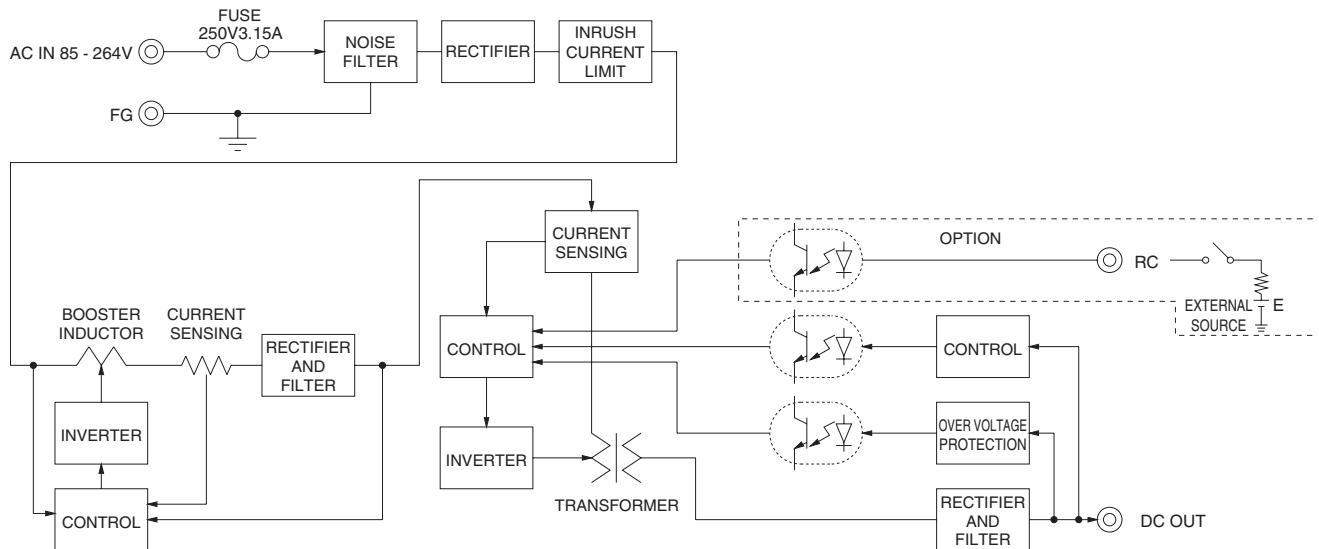
## SPECIFICATIONS

|                                    | MODEL                                                                     | PBA75F-3R3                                                                                                          | PBA75F-5                                                                      | PBA75F-9      | PBA75F-12     | PBA75F-15     | PBA75F-24     | PBA75F-36     | PBA75F-48   |        |
|------------------------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|-------------|--------|
| INPUT                              | VOLTAGE[V]                                                                | AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4)            |                                                                               |               |               |               |               |               |             |        |
|                                    | CURRENT[A]                                                                | ACIN 100V                                                                                                           | 0.7typ                                                                        | 1.0typ        |               |               |               |               |             |        |
|                                    |                                                                           | ACIN 200V                                                                                                           | 0.4typ                                                                        | 0.5typ        |               |               |               |               |             |        |
|                                    | FREQUENCY[Hz]                                                             | 50/60 (47 - 63)                                                                                                     |                                                                               |               |               |               |               |               |             |        |
|                                    | EFFICIENCY[%]                                                             | ACIN 100V                                                                                                           | 77typ                                                                         | 81typ         | 80typ         | 81typ         | 82typ         | 83typ         | 84typ       | 84typ  |
|                                    |                                                                           | ACIN 200V                                                                                                           | 78typ                                                                         | 83typ         | 82typ         | 83typ         | 84typ         | 85typ         | 86typ       | 86typ  |
|                                    | POWER FACTOR(Lo=100%)                                                     | ACIN 100V                                                                                                           | 0.98typ                                                                       | 0.99typ       |               |               |               |               |             |        |
| ACIN 200V                          |                                                                           | 0.87typ                                                                                                             | 0.93typ                                                                       |               |               |               |               |               |             |        |
| INRUSH CURRENT[A]                  | ACIN 100V                                                                 | 15typ (Io=100%) (At cold start)                                                                                     |                                                                               |               |               |               |               |               |             |        |
|                                    | ACIN 200V                                                                 | 30typ (Io=100%) (At cold start)                                                                                     |                                                                               |               |               |               |               |               |             |        |
| LEAKAGE CURRENT[ma]                | 0.4/0.75max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1.DENAN) |                                                                                                                     |                                                                               |               |               |               |               |               |             |        |
| OUTPUT                             | VOLTAGE[V]                                                                | 3.3                                                                                                                 | 5                                                                             | 9             | 12            | 15            | 24            | 36            | 48          |        |
|                                    | CURRENT[A]                                                                | 15                                                                                                                  | 15                                                                            | 8.4           | 6.3           | 5             | 3.2           | 2.1           | 1.6         |        |
|                                    | LINE REGULATION[mV]                                                       | 20max                                                                                                               | 20max                                                                         | 36max         | 48max         | 60max         | 96max         | 144max        | 192max      |        |
|                                    | LOAD REGULATION[mV]                                                       | 40max                                                                                                               | 40max                                                                         | 100max        | 100max        | 120max        | 150max        | 240max        | 240max      |        |
|                                    | RIPPLE[mVp-p]                                                             | 0 to +50℃ *1                                                                                                        | 80max                                                                         | 80max         | 120max        | 120max        | 120max        | 120max        | 150max      | 150max |
|                                    |                                                                           | -10 - 0℃ *1                                                                                                         | 140max                                                                        | 140max        | 160max        | 160max        | 160max        | 160max        | 200max      | 200max |
|                                    | RIPPLE NOISE[mVp-p]                                                       | 0 to +50℃ *1                                                                                                        | 120max                                                                        | 120max        | 150max        | 150max        | 150max        | 150max        | 250max      | 250max |
|                                    |                                                                           | -10 - 0℃ *1                                                                                                         | 160max                                                                        | 160max        | 180max        | 180max        | 180max        | 180max        | 300max      | 300max |
|                                    | TEMPERATURE REGULATION[mV]                                                | 0 to +50℃                                                                                                           | 50max                                                                         | 50max         | 90max         | 120max        | 150max        | 240max        | 360max      | 480max |
|                                    |                                                                           | -10 to +50℃                                                                                                         | 60max                                                                         | 60max         | 120max        | 150max        | 180max        | 290max        | 450max      | 600max |
|                                    | DRIFT[mV]                                                                 | *2                                                                                                                  | 20max                                                                         | 20max         | 36max         | 48max         | 60max         | 96max         | 144max      | 192max |
|                                    | START-UP TIME[ms]                                                         | 350typ(ACIN 100V, Io=100%)                                                                                          |                                                                               |               |               |               |               |               |             |        |
|                                    | HOLD-UP TIME[ms]                                                          | 20typ (ACIN 100V, Io=100%)                                                                                          |                                                                               |               |               |               |               |               |             |        |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V] | 2.85 - 3.63                                                               | 4.00 - 5.50                                                                                                         | 7.50 - 10.0                                                                   | 10.0 - 13.2   | 13.2 - 18.0   | 19.2 - 27.0   | 28.8 - 39.6   | 39.0 - 53.0   |             |        |
| OUTPUT VOLTAGE SETTING[V]          | 3.30 - 3.40                                                               | 5.00 - 5.15                                                                                                         | 9.00 - 9.36                                                                   | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |             |        |
| PROTECTION CIRCUIT AND OTHERS      | OVERCURRENT PROTECTION                                                    | Works over 105% of rated current and recovers automatically                                                         |                                                                               |               |               |               |               |               |             |        |
|                                    | OVERVOLTAGE PROTECTION[V]                                                 | 4.00 - 5.25                                                                                                         | 5.75 - 7.00                                                                   | 11.5 - 14.0   | 15.0 - 18.0   | 20.0 - 25.0   | 30.0 - 37.0   | 43.0 - 50.0   | 58.0 - 65.0 |        |
|                                    | OPERATING INDICATION                                                      | LED (Green)                                                                                                         |                                                                               |               |               |               |               |               |             |        |
| ISOLATION                          | REMOTE ON/OFF                                                             | Optional (Required external power source)                                                                           |                                                                               |               |               |               |               |               |             |        |
|                                    | INPUT-OUTPUT · RC                                                         | *3                                                                                                                  | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |               |               |               |               |               |             |        |
|                                    | INPUT-FG                                                                  |                                                                                                                     | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |               |               |               |               |               |             |        |
|                                    | OUTPUT · RC-FG                                                            | *3                                                                                                                  | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)  |               |               |               |               |               |             |        |
| ENVIRONMENT                        | OPERATING TEMP.,HUMID.AND ALTITUDE                                        | -10 to +71℃ (Refer to “Derating”), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                              |                                                                               |               |               |               |               |               |             |        |
|                                    | STORAGE TEMP.,HUMID.AND ALTITUDE                                          | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                    |                                                                               |               |               |               |               |               |             |        |
|                                    | VIBRATION                                                                 | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                         |                                                                               |               |               |               |               |               |             |        |
|                                    | IMPACT                                                                    | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                        |                                                                               |               |               |               |               |               |             |        |
| SAFETY AND NOISE REGULATIONS       | AGENCY APPROVALS (At only AC input)                                       | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                         |                                                                               |               |               |               |               |               |             |        |
|                                    | CONDUCTED NOISE                                                           | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                            |                                                                               |               |               |               |               |               |             |        |
|                                    | HARMONIC ATTENUATOR                                                       | Complies with IEC61000-3-2 *6                                                                                       |                                                                               |               |               |               |               |               |             |        |
| OTHERS                             | CASE SIZE/WEIGHT                                                          | 32 x 82 x 135mm [1.26 x 3.23 x 5.31 inches] (without terminal block) (W x H x D) / 350g max (with cover : 400g max) |                                                                               |               |               |               |               |               |             |        |
|                                    | COOLING METHOD                                                            | Convection                                                                                                          |                                                                               |               |               |               |               |               |             |        |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.  
 \*4 Derating is required.

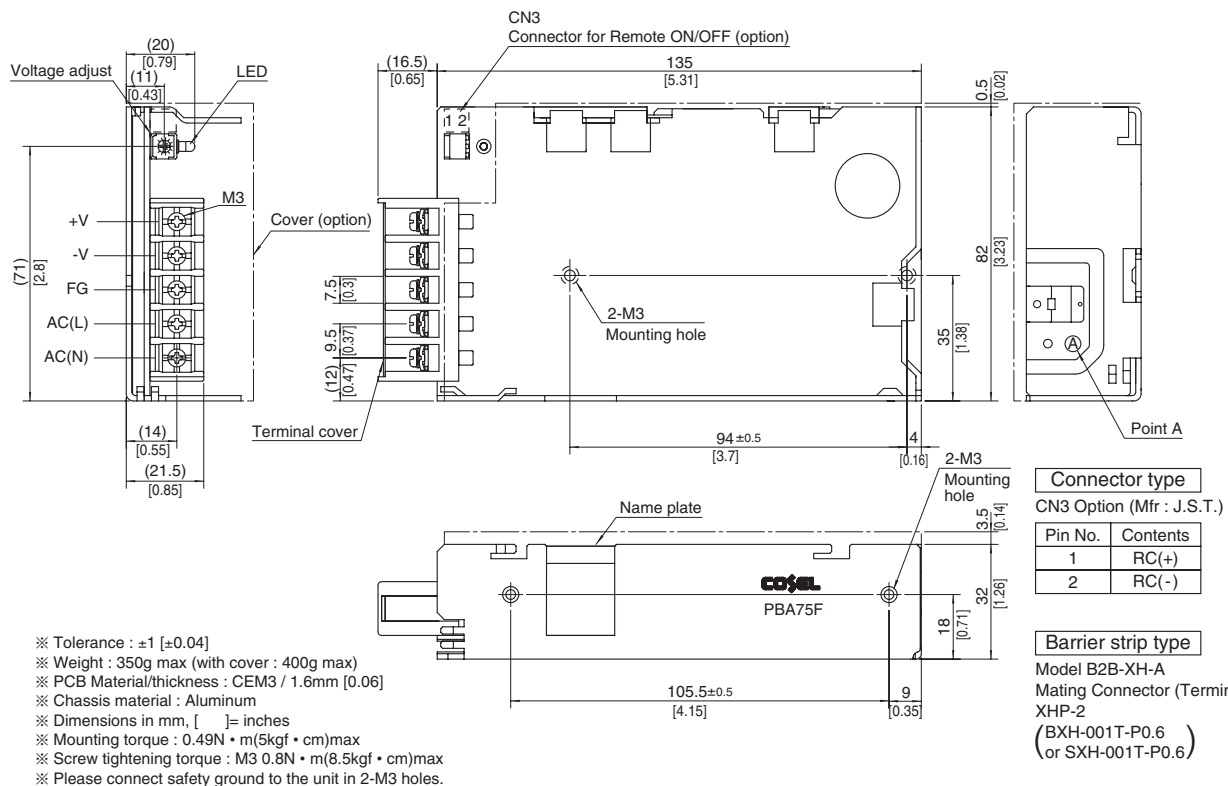
\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

## Block diagram



## External view

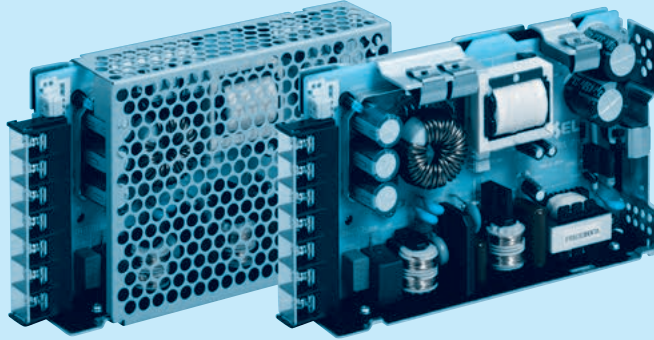
※ External size of option T, J1, R, N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



# PBA100F

PB A 100 F -5 -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5  
C : with Coating  
G : Low leakage current (0.15mA max / ACIN 240V)  
E : Low leakage current and EMI class A (0.5mA max / ACIN 240V)  
T : Vertical terminal block  
J1 : VH (J.S.T.) connector type (Only -12, -15, -24, -36, -48)  
R : with Remote ON/OFF  
N : with Cover (Only 24V UL508 is acquired)  
N1 : with DIN rail and Cover  
V : Output voltage setting potentiometer external

Cover is optional

\* 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                 | PBA100F-3R3 | PBA100F-5 | PBA100F-9 | PBA100F-12 | PBA100F-15 | PBA100F-24 | PBA100F-36 | PBA100F-48 |
|-----------------------|-------------|-----------|-----------|------------|------------|------------|------------|------------|
| MAX OUTPUT WATTAGE[W] | 66          | 100       | 94.5      | 102        | 105        | 108        | 100.8      | 100.8      |
| DC OUTPUT             | 3.3V 20A    | 5V 20A    | 9V 10.5A  | 12V 8.5A   | 15V 7A     | 24V 4.5A   | 36V 2.8A   | 48V 2.1A   |

## SPECIFICATIONS

|                               | MODEL                               | PBA100F-3R3                                                                                              | PBA100F-5                                                                     | PBA100F-9   | PBA100F-12    | PBA100F-15    | PBA100F-24    | PBA100F-36    | PBA100F-48    |        |
|-------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------|---------------|---------------|---------------|---------------|---------------|--------|
| INPUT                         | VOLTAGE[V]                          | AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4) |                                                                               |             |               |               |               |               |               |        |
|                               | CURRENT[A]                          | ACIN 100V                                                                                                | 0.9typ                                                                        | 1.3typ      |               |               |               |               |               |        |
|                               |                                     | ACIN 200V                                                                                                | 0.5typ                                                                        | 0.7typ      |               |               |               |               |               |        |
|                               | FREQUENCY[Hz]                       | 50/60 (47 - 63)                                                                                          |                                                                               |             |               |               |               |               |               |        |
|                               | EFFICIENCY[%]                       | ACIN 100V                                                                                                | 77typ                                                                         | 82typ       | 80typ         | 81typ         | 83typ         | 84typ         | 84typ         |        |
|                               |                                     | ACIN 200V                                                                                                | 79typ                                                                         | 84typ       | 82typ         | 83typ         | 86typ         | 86typ         | 86typ         |        |
|                               | POWER FACTOR(lo=100%)               | ACIN 100V                                                                                                | 0.98typ                                                                       | 0.99typ     |               |               |               |               |               |        |
|                               |                                     | ACIN 200V                                                                                                | 0.87typ                                                                       | 0.93typ     |               |               |               |               |               |        |
| INRUSH CURRENT[A]             | ACIN 100V                           | 20typ (lo=100%) (At cold start)                                                                          |                                                                               |             |               |               |               |               |               |        |
|                               | ACIN 200V                           | 40typ (lo=100%) (At cold start)                                                                          |                                                                               |             |               |               |               |               |               |        |
|                               | LEAKAGE CURRENT[mA]                 | 0.4/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC62368-1, DENAN)                               |                                                                               |             |               |               |               |               |               |        |
| OUTPUT                        | VOLTAGE[V]                          | 3.3                                                                                                      | 5                                                                             | 9           | 12            | 15            | 24            | 36            | 48            |        |
|                               | CURRENT[A]                          | 20                                                                                                       | 20                                                                            | 10.5        | 8.5           | 7             | 4.5           | 2.8           | 2.1           |        |
|                               | LINE REGULATION[mV]                 | 20max                                                                                                    | 20max                                                                         | 36max       | 48max         | 60max         | 96max         | 144max        | 192max        |        |
|                               | LOAD REGULATION[mV]                 | 40max                                                                                                    | 40max                                                                         | 100max      | 100max        | 120max        | 150max        | 240max        | 240max        |        |
|                               | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                             | 80max                                                                         | 80max       | 120max        | 120max        | 120max        | 120max        | 150max        | 150max |
|                               |                                     | -10 - 0℃ *1                                                                                              | 140max                                                                        | 140max      | 160max        | 160max        | 160max        | 160max        | 200max        | 200max |
|                               | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                             | 120max                                                                        | 120max      | 150max        | 150max        | 150max        | 150max        | 250max        | 250max |
|                               |                                     | -10 - 0℃ *1                                                                                              | 160max                                                                        | 160max      | 180max        | 180max        | 180max        | 180max        | 300max        | 300max |
|                               | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                | 50max                                                                         | 50max       | 90max         | 120max        | 150max        | 240max        | 360max        | 480max |
|                               |                                     | -10 to +50℃                                                                                              | 60max                                                                         | 60max       | 120max        | 150max        | 180max        | 290max        | 450max        | 600max |
|                               | DRIFT[mV]                           | *2                                                                                                       | 20max                                                                         | 20max       | 36max         | 48max         | 60max         | 96max         | 144max        | 192max |
|                               |                                     | START-UP TIME[ms]                                                                                        | 350typ(ACIN 100V, lo=100%)                                                    |             |               |               |               |               |               |        |
|                               |                                     | HOLD-UP TIME[ms]                                                                                         | 20typ (ACIN 100V, lo=100%)                                                    |             |               |               |               |               |               |        |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 2.85 - 3.63                                                                                              | 4.00 - 5.50                                                                   | 7.50 - 10.0 | 10.0 - 13.2   | 13.2 - 18.0   | 19.2 - 27.0   | 28.8 - 39.6   | 39.0 - 53.0   |        |
|                               | OUTPUT VOLTAGE SETTING[V]           | 3.20 - 3.40                                                                                              | 5.00 - 5.15                                                                   | 9.00 - 9.36 | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |        |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                              |                                                                               |             |               |               |               |               |               |        |
|                               | OVERVOLTAGE PROTECTION[V]           | 4.00 - 5.25                                                                                              | 5.75 - 7.00                                                                   | 11.5 - 14.0 | 15.0 - 18.0   | 20.0 - 25.0   | 30.0 - 37.0   | 43.0 - 50.0   | 58.0 - 65.0   |        |
|                               | OPERATING INDICATION                | LED (Green)                                                                                              |                                                                               |             |               |               |               |               |               |        |
|                               | REMOTE SENSING                      | Optional (Only -3R3, -5 Option -K)                                                                       |                                                                               |             |               |               |               |               |               |        |
|                               | REMOTE ON/OFF                       | Optional (Required external power source)                                                                |                                                                               |             |               |               |               |               |               |        |
| ISOLATION                     | INPUT-OUTPUT · RC                   | *3                                                                                                       | AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |             |               |               |               |               |               |        |
|                               | INPUT-FG                            |                                                                                                          | AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |             |               |               |               |               |               |        |
|                               | OUTPUT · RC-FG                      | *3                                                                                                       | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)  |             |               |               |               |               |               |        |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71℃ (Refer to “Derating”), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                   |                                                                               |             |               |               |               |               |               |        |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                         |                                                                               |             |               |               |               |               |               |        |
|                               | VIBRATION                           | 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis                          |                                                                               |             |               |               |               |               |               |        |
|                               | IMPACT                              | 196.1m/s² (20G), 11ms, once each X, Y and Z axis                                                         |                                                                               |             |               |               |               |               |               |        |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                              |                                                                               |             |               |               |               |               |               |        |
|                               | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                 |                                                                               |             |               |               |               |               |               |        |
|                               | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 *6                                                                            |                                                                               |             |               |               |               |               |               |        |
| OTHERS                        | CASE SIZE/WEIGHT                    | 32×93×147mm [1.26×3.66×5.79 inches] (without terminal block) (W×H×D) / 440g max (with cover : 500g max)  |                                                                               |             |               |               |               |               |               |        |
|                               | COOLING METHOD                      | Convection                                                                                               |                                                                               |             |               |               |               |               |               |        |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.

\*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.

\*4 Derating is required.

\*5 Please contact us about safety approvals for the model with option.

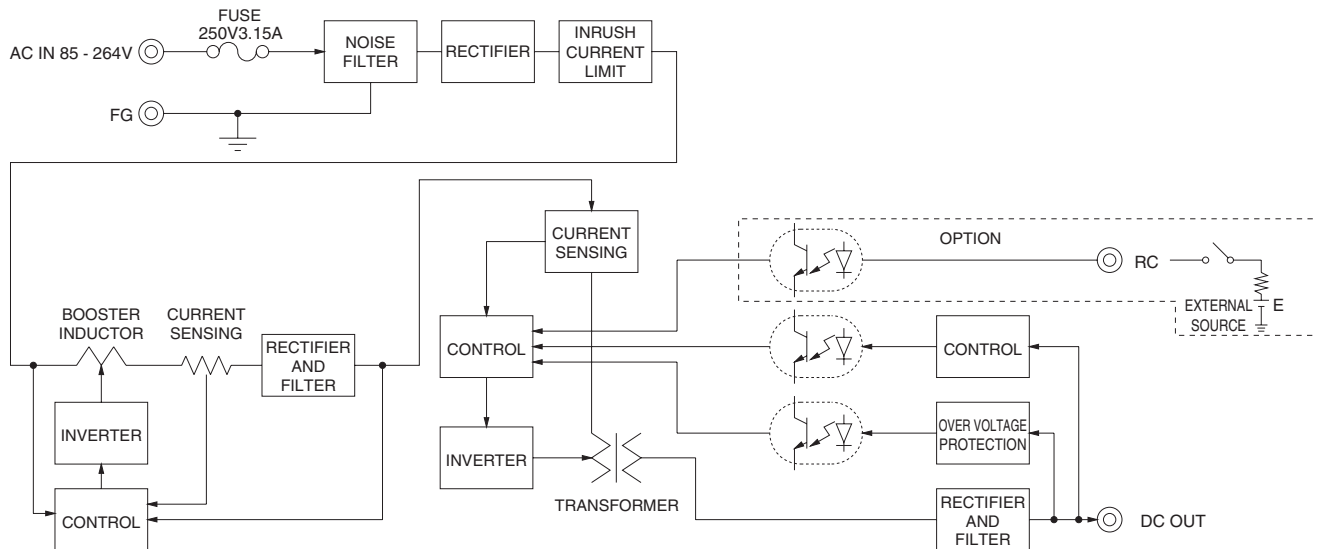
\*6 Please contact us about class C.

\* Parallel operation with other model is not possible.

\* Derating is required when operated with cover.

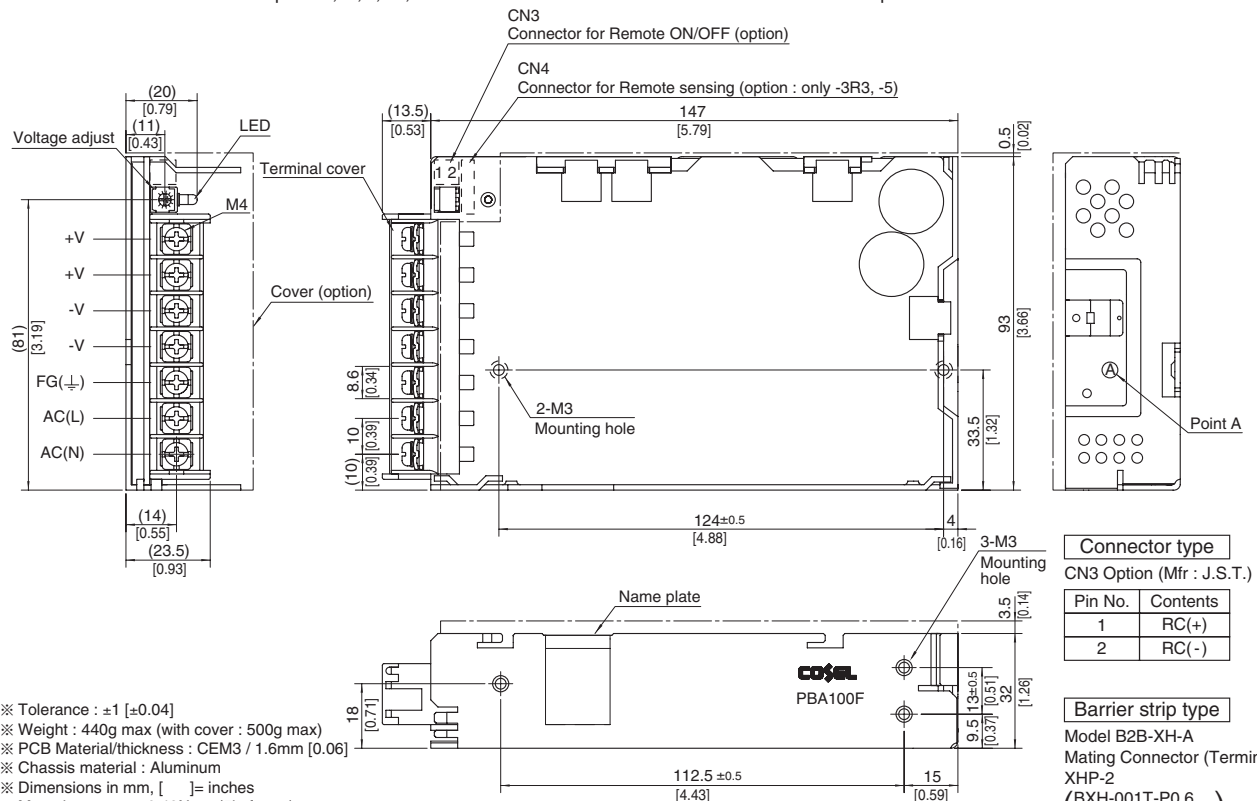
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

※ External size of option T, J1, R, N1, V and K is different from standard model and refer to 7 Option of instruction manual for details.

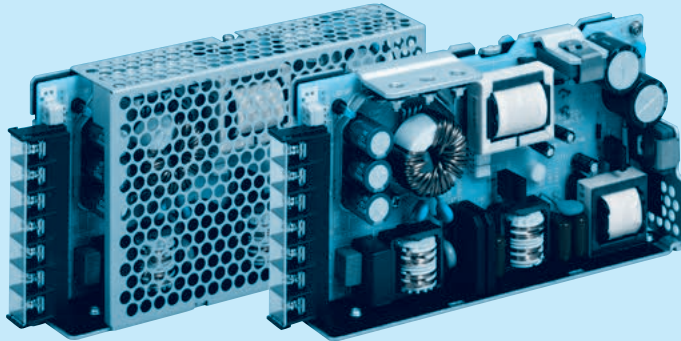


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 440g max (with cover : 500g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [ $0.06$ ]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 0.49N · m (5kgf · cm) max
- ※ Mounting torque : M4:1.6N · m (16.9kgf · cm) max
- ※ Please connect safety ground to FG terminal on the unit.

# PBA150F

PB A 150 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current  
(0.15mA max / ACIN 240V)
- E : Low leakage current  
and EMI class A  
(0.5mA max / ACIN 240V)
- T : Vertical terminal block
- J1 : VH (J.S.T.) connector type  
(Only -12, -15, -24, -36, -48)
- R : with Remote ON/OFF
- N : with Cover  
(Only 24V UL508 is acquired)
- NI : with DIN rail and Cover
- V : Output voltage setting  
potentiometer external-ly

Cover is optional

\* 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                 | PBA150F-3R3 | PBA150F-5 | PBA150F-9 | PBA150F-12 | PBA150F-15 | PBA150F-24 | PBA150F-36 | PBA150F-48 |
|-----------------------|-------------|-----------|-----------|------------|------------|------------|------------|------------|
| MAX OUTPUT WATTAGE[W] | 99          | 150       | 150.3     | 156        | 150        | 156        | 154.8      | 158.4      |
| DC OUTPUT             | 3.3V 30A    | 5V 30A    | 9V 16.7A  | 12V 13A    | 15V 10A    | 24V 6.5A   | 36V 4.3A   | 48V 3.3A   |

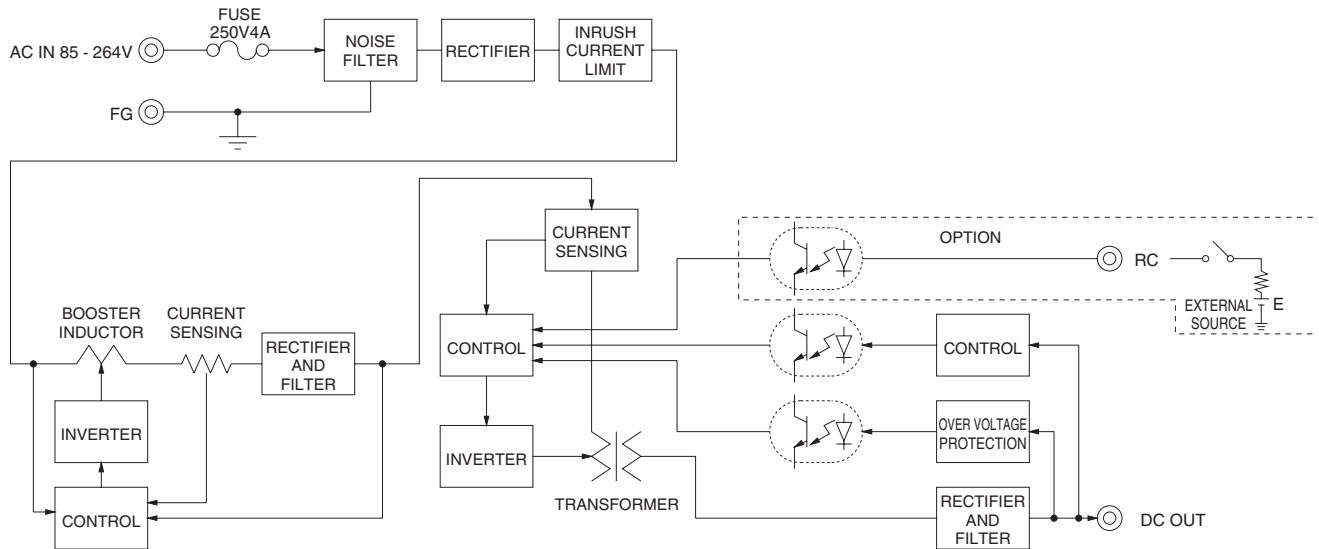
## SPECIFICATIONS

|                               | MODEL                               | PBA150F-3R3                                                                                              | PBA150F-5                                                                     | PBA150F-9   | PBA150F-12    | PBA150F-15    | PBA150F-24    | PBA150F-36    | PBA150F-48    |  |
|-------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------|---------------|---------------|---------------|---------------|---------------|--|
| INPUT                         | VOLTAGE[V]                          | AC85 - 264 1 ϕ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *4) |                                                                               |             |               |               |               |               |               |  |
|                               | CURRENT[A]                          | ACIN 100V                                                                                                | 1.3typ                                                                        | 2.0typ      |               |               |               |               |               |  |
|                               |                                     | ACIN 200V                                                                                                | 0.7typ                                                                        | 1.0typ      |               |               |               |               |               |  |
|                               | FREQUENCY[Hz]                       | 50/60 (47 - 63)                                                                                          |                                                                               |             |               |               |               |               |               |  |
|                               | EFFICIENCY[%]                       | ACIN 100V                                                                                                | 80typ                                                                         | 83typ       | 82typ         | 83typ         | 84typ         | 85typ         | 85typ         |  |
|                               |                                     | ACIN 200V                                                                                                | 82typ                                                                         | 86typ       | 85typ         | 86typ         | 87typ         | 88typ         | 88typ         |  |
|                               | POWER FACTOR(ℓo=100%)               | ACIN 100V                                                                                                | 0.98typ                                                                       | 0.99typ     |               |               |               |               |               |  |
|                               |                                     | ACIN 200V                                                                                                | 0.87typ                                                                       | 0.93typ     |               |               |               |               |               |  |
| INRUSH CURRENT[A]             | ACIN 100V                           | 20typ (ℓo=100%) (At cold start)                                                                          |                                                                               |             |               |               |               |               |               |  |
|                               | ACIN 200V                           | 40typ (ℓo=100%) (At cold start)                                                                          |                                                                               |             |               |               |               |               |               |  |
|                               | LEAKAGE CURRENT[ma]                 | 0.4/0.75max (ACIN 100V/240V 60Hz, ℓo=100%, According to IEC62368-1.DENAN)                                |                                                                               |             |               |               |               |               |               |  |
| OUTPUT                        | VOLTAGE[V]                          | 3.3                                                                                                      | 5                                                                             | 9           | 12            | 15            | 24            | 36            | 48            |  |
|                               | CURRENT[A]                          | 30                                                                                                       | 30                                                                            | 16.7        | 13            | 10            | 6.5           | 4.3           | 3.3           |  |
|                               | LINE REGULATION[mV]                 | 20max                                                                                                    | 20max                                                                         | 36max       | 48max         | 60max         | 96max         | 144max        | 192max        |  |
|                               | LOAD REGULATION[mV]                 | 40max                                                                                                    | 40max                                                                         | 100max      | 100max        | 120max        | 150max        | 240max        | 240max        |  |
|                               | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                             | 80max                                                                         | 80max       | 120max        | 120max        | 120max        | 150max        | 150max        |  |
|                               |                                     | -10 - 0℃ *1                                                                                              | 140max                                                                        | 140max      | 160max        | 160max        | 160max        | 200max        | 200max        |  |
|                               | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                             | 120max                                                                        | 120max      | 150max        | 150max        | 150max        | 250max        | 250max        |  |
|                               |                                     | -10 - 0℃ *1                                                                                              | 160max                                                                        | 160max      | 180max        | 180max        | 180max        | 300max        | 300max        |  |
|                               | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                | 50max                                                                         | 50max       | 90max         | 120max        | 150max        | 240max        | 360max        |  |
|                               |                                     | -10 to +50℃                                                                                              | 60max                                                                         | 60max       | 120max        | 150max        | 180max        | 290max        | 450max        |  |
|                               | DRIFT[mV]                           | *2                                                                                                       | 20max                                                                         | 20max       | 36max         | 48max         | 60max         | 96max         | 144max        |  |
|                               |                                     | START-UP TIME[ms]                                                                                        | 350typ(ACIN 100V, ℓo=100%)                                                    |             |               |               |               |               |               |  |
|                               |                                     | HOLD-UP TIME[ms]                                                                                         | 20typ (ACIN 100V, ℓo=100%)                                                    |             |               |               |               |               |               |  |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 2.85 - 3.63                                                                                              | 4.00 - 5.50                                                                   | 7.50 - 10.0 | 10.0 - 13.2   | 13.2 - 18.0   | 19.2 - 27.0   | 28.8 - 39.6   | 39.0 - 53.0   |  |
|                               | OUTPUT VOLTAGE SETTING[V]           | 3.30 - 3.40                                                                                              | 5.00 - 5.15                                                                   | 9.00 - 9.36 | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |  |
| PROTECTION CIRCUIT AND OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                              |                                                                               |             |               |               |               |               |               |  |
|                               | OVERVOLTAGE PROTECTION[V]           | 4.00 - 5.25                                                                                              | 5.75 - 7.00                                                                   | 11.5 - 14.0 | 15.0 - 18.0   | 20.0 - 25.0   | 30.0 - 37.0   | 43.0 - 50.0   | 58.0 - 65.0   |  |
|                               | OPERATING INDICATION                | LED (Green)                                                                                              |                                                                               |             |               |               |               |               |               |  |
|                               | REMOTE SENSING                      | Optional (Only -3R3, -5 Option -K)                                                                       |                                                                               |             |               |               |               |               |               |  |
|                               | REMOTE ON/OFF                       | Optional (Required external power source)                                                                |                                                                               |             |               |               |               |               |               |  |
| ISOLATION                     | INPUT-OUTPUT · RC                   | *3                                                                                                       | AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |             |               |               |               |               |               |  |
|                               | INPUT-FG                            |                                                                                                          | AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature) |             |               |               |               |               |               |  |
|                               | OUTPUT · RC-FG                      | *3                                                                                                       | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)  |             |               |               |               |               |               |  |
| ENVIRONMENT                   | OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71℃ (Refer to “Derating”), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                   |                                                                               |             |               |               |               |               |               |  |
|                               | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                         |                                                                               |             |               |               |               |               |               |  |
|                               | VIBRATION                           | 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis                          |                                                                               |             |               |               |               |               |               |  |
|                               | IMPACT                              | 196.1m/s² (20G), 11ms, once each X, Y and Z axis                                                         |                                                                               |             |               |               |               |               |               |  |
| SAFETY AND NOISE REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                              |                                                                               |             |               |               |               |               |               |  |
|                               | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                 |                                                                               |             |               |               |               |               |               |  |
|                               | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 *6                                                                            |                                                                               |             |               |               |               |               |               |  |
| OTHERS                        | CASE SIZE/WEIGHT                    | 34×93×168mm [1.34×3.66×6.61 inches] (without terminal block) (W×H×D) / 560g max (with cover : 630g max)  |                                                                               |             |               |               |               |               |               |  |
|                               | COOLING METHOD                      | Convection                                                                                               |                                                                               |             |               |               |               |               |               |  |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
 \*3 Applicable when Remote ON/OFF(optional) is added. RC is insulated with input, output and FG.  
 \*4 Derating is required.

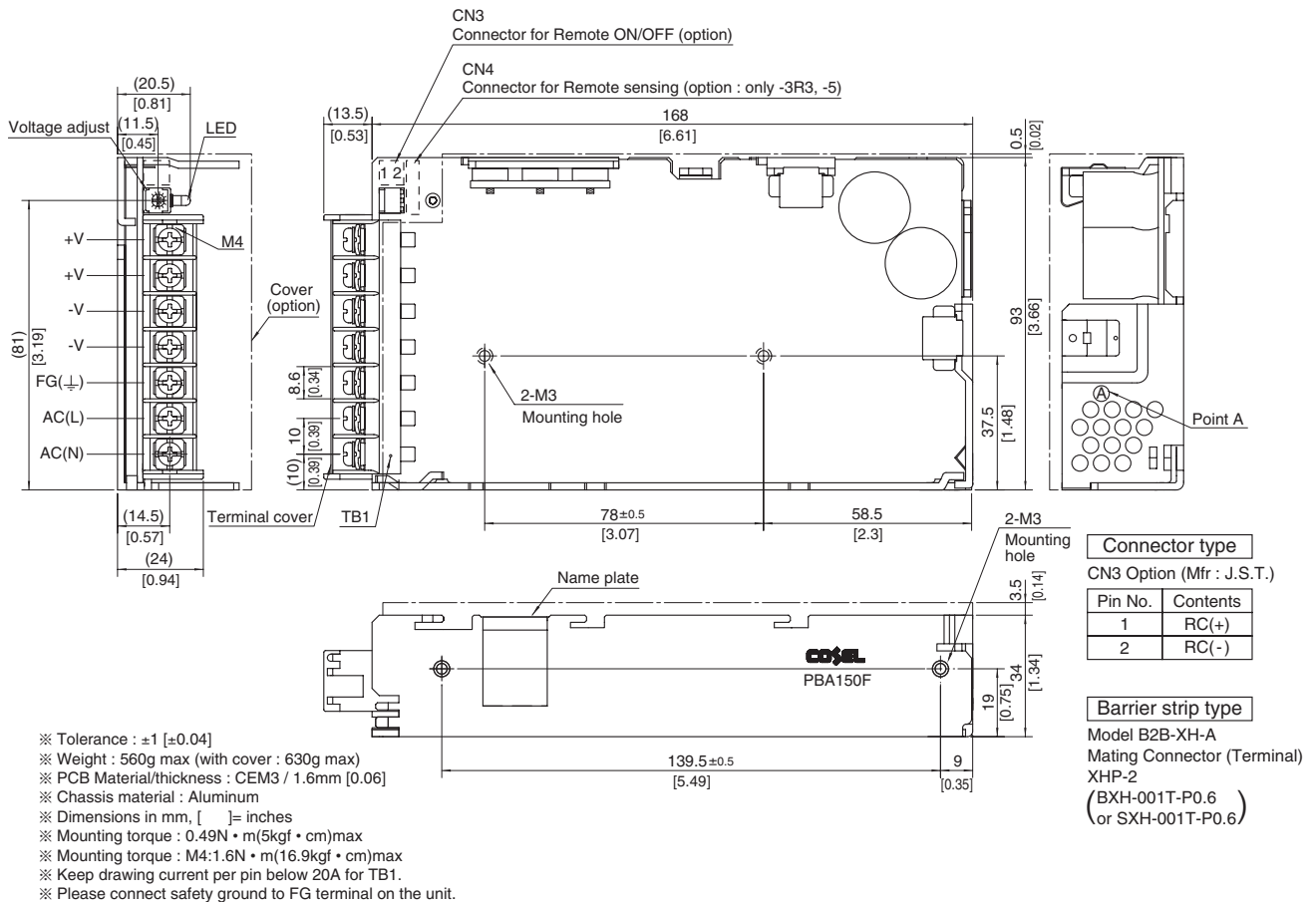
\*5 Please contact us about safety approvals for the model with option.  
 \*6 Please contact us about class C.  
 \* Parallel operation with other model is not possible.  
 \* Derating is required when operated with cover.  
 \* A sound may occur from power supply at peak loading.

## Block diagram



## External view

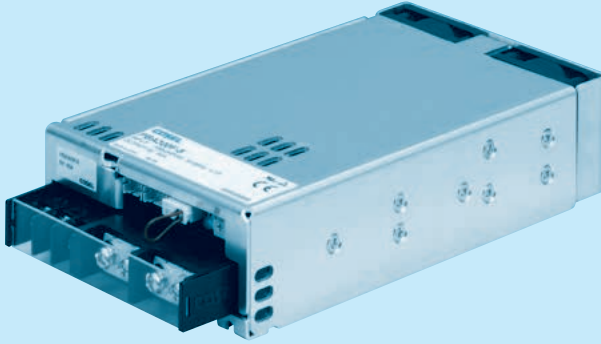
※ External size of option T,J1,R,N1,V and K is different from standard model and refer to 7 Option of instruction manual for details.



# PBA300F

PB A 300 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*5
- C : with Coating
- G : Low leakage current
- U : Operation stop voltage  
is set at a lower value
- F3 : Reverse air exhaust  
type
- F4 : Low speed fan
- N1 : with DIN rail

Refer to instruction manual  
7.1.

\*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                 | PBA300F-3R3  | PBA300F-5 | PBA300F-7R5 | PBA300F-12 | PBA300F-15 | PBA300F-24 | PBA300F-36    | PBA300F-48 |
|-----------------------|--------------|-----------|-------------|------------|------------|------------|---------------|------------|
| MAX OUTPUT WATTAGE[W] | 198          | 300       | 300         | 324        | 330        | 336        | 324           | 336        |
| DC OUTPUT             | ACIN 100V    | 3.3V 60A  | 5V 60A      | 7.5V 40A   | 12V 27A    | 15V 22A    | 24V 14A       | 36V 9A     |
|                       | ACIN 200V *3 | 3.3V 60A  | 5V 60A      | 7.5V 40A   | 12V 27A    | 15V 22A    | 24V 14(16.5)A | 36V 9A     |

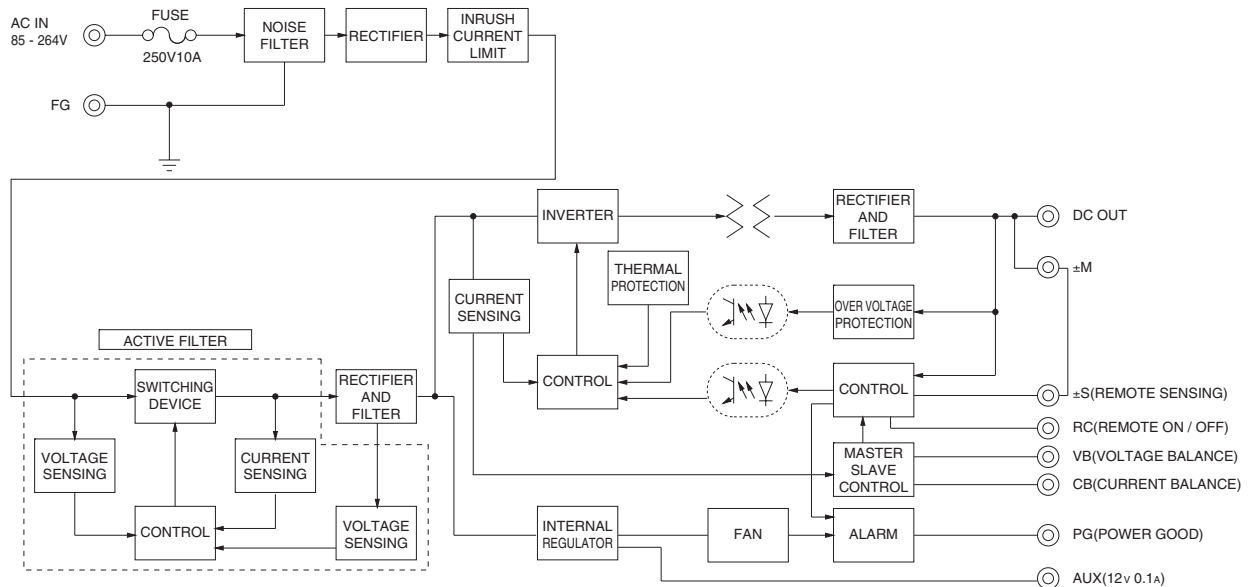
## SPECIFICATIONS

|                                     | MODEL                               | PBA300F-3R3                                                                                                                                  | PBA300F-5                                                                                            | PBA300F-7R5 | PBA300F-12    | PBA300F-15    | PBA300F-24    | PBA300F-36    | PBA300F-48    |   |
|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-------------|---------------|---------------|---------------|---------------|---------------|---|
| INPUT                               | VOLTAGE[V]                          | AC85 - 264 1 φ or DC120 - 350 (AC50 or DC70 Please refer to the instruction manual 7. option *4)                                             |                                                                                                      |             |               |               |               |               |               |   |
|                                     | CURRENT[A]                          | ACIN 100V                                                                                                                                    | 3typ                                                                                                 | 4.1typ      |               |               |               |               |               |   |
|                                     |                                     | ACIN 200V                                                                                                                                    | 1.6typ                                                                                               | 2typ        |               |               |               |               |               |   |
|                                     | FREQUENCY[Hz]                       | 50/60 (47 - 63)                                                                                                                              |                                                                                                      |             |               |               |               |               |               |   |
|                                     | EFFICIENCY[%]                       | ACIN 100V                                                                                                                                    | 68typ                                                                                                | 74typ       | 76typ         | 78typ         | 78typ         | 79typ         | 81typ         |   |
|                                     |                                     | ACIN 200V                                                                                                                                    | 71typ                                                                                                | 77typ       | 79typ         | 81typ         | 81typ         | 82typ         | 84typ         |   |
|                                     | POWER FACTOR                        | ACIN 100V                                                                                                                                    | 0.98typ (lo=100%)                                                                                    |             |               |               |               |               |               |   |
|                                     | ACIN 200V                           | 0.95typ (lo=100%)                                                                                                                            |                                                                                                      |             |               |               |               |               |               |   |
|                                     | INRUSH CURRENT[A]                   | ACIN 100V                                                                                                                                    | 20/40typ (lo=100%) (Primary inrush current /Secondary inrush current) (More then 3 sec. to re-start) |             |               |               |               |               |               |   |
| ACIN 200V                           |                                     | 40/40typ (lo=100%) (Primary inrush current /Secondary inrush current) (More then 3 sec. to re-start)                                         |                                                                                                      |             |               |               |               |               |               |   |
|                                     | LEAKAGE CURRENT[ma]                 | 0.45/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC62368-1.DENAN)                                                                   |                                                                                                      |             |               |               |               |               |               |   |
| OUTPUT                              | VOLTAGE[V]                          | 3.3                                                                                                                                          | 5                                                                                                    | 7.5         | 12            | 15            | 24            | 36            | 48            |   |
|                                     | CURRENT[A]                          | ACIN 100V                                                                                                                                    | 60                                                                                                   | 60          | 40            | 27            | 22            | 14            | 9             | 7 |
|                                     |                                     | ACIN 200V *3                                                                                                                                 | 60                                                                                                   | 60          | 40            | 27            | 22            | 14(16.5)      | 9             | 7 |
|                                     | LINE REGULATION[mV]                 | 20max                                                                                                                                        | 20max                                                                                                | 36max       | 48max         | 60max         | 96max         | 144max        | 192max        |   |
|                                     | LOAD REGULATION[mV]                 | 40max                                                                                                                                        | 40max                                                                                                | 60max       | 100max        | 120max        | 150max        | 150max        | 300max        |   |
|                                     | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                                                                 | 80max                                                                                                | 80max       | 120max        | 120max        | 120max        | 150max        | 150max        |   |
|                                     |                                     | -20 - 0℃ *1                                                                                                                                  | 140max                                                                                               | 140max      | 160max        | 160max        | 160max        | 160max        | 400max        |   |
|                                     | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                                                                 | 120max                                                                                               | 120max      | 150max        | 150max        | 150max        | 200max        | 200max        |   |
|                                     |                                     | -20 - 0℃ *1                                                                                                                                  | 160max                                                                                               | 160max      | 180max        | 180max        | 180max        | 240max        | 500max        |   |
|                                     | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                                                    | 40max                                                                                                | 50max       | 75max         | 120max        | 150max        | 240max        | 360max        |   |
|                                     |                                     | -20 to +50℃                                                                                                                                  | 60max                                                                                                | 75max       | 120max        | 180max        | 180max        | 290max        | 440max        |   |
|                                     | DRIFT[mV]                           | *2                                                                                                                                           | 12max                                                                                                | 20max       | 30max         | 48max         | 60max         | 96max         | 144max        |   |
|                                     | START-UP TIME[ms]                   | 300typ(ACIN 100/200V, lo=100%) *Start-up time is 500ms typ for less than 1minute of applying input again from turning off the input voltage. |                                                                                                      |             |               |               |               |               |               |   |
|                                     | HOLD-UP TIME[ms]                    | 20typ (ACIN 100/200V, lo=100%)                                                                                                               |                                                                                                      |             |               |               |               |               |               |   |
|                                     | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 2.64 - 3.96                                                                                                                                  | 3.96 - 6.00                                                                                          | 5.25 - 8.25 | 8.25 - 13.20  | 10.50 - 16.50 | 16.50 - 26.40 | 25.20 - 39.60 | 38.40 - 56.00 |   |
|                                     | OUTPUT VOLTAGE SETTING[V]           | 3.30 - 3.40                                                                                                                                  | 5.00 - 5.15                                                                                          | 7.50 - 7.80 | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |   |
| PROTECTION<br>CIRCUIT AND<br>OTHERS | OVERCURRENT PROTECTION              | Works over 105% of rated current or 101% of peak current and recovers automatically                                                          |                                                                                                      |             |               |               |               |               |               |   |
|                                     | OVERVOLTAGE PROTECTION[V]           | 4.3 - 6.3                                                                                                                                    | 6.5 - 8.0                                                                                            | 9.0 - 11.6  | 14.4 - 18.6   | 18.0 - 23.3   | 28.8 - 37.2   | 43.2 - 54.0   | 57.6 - 80.0   |   |
|                                     | OPERATING INDICATION                | LED (Green)                                                                                                                                  |                                                                                                      |             |               |               |               |               |               |   |
|                                     | REMOTE SENSING                      | Provided                                                                                                                                     |                                                                                                      |             |               |               |               |               |               |   |
|                                     | REMOTE ON/OFF                       | Provided                                                                                                                                     |                                                                                                      |             |               |               |               |               |               |   |
| ISOLATION                           | INPUT-OUTPUT · RC                   | AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                                |                                                                                                      |             |               |               |               |               |               |   |
|                                     | INPUT-FG                            | AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                                                                |                                                                                                      |             |               |               |               |               |               |   |
|                                     | OUTPUT · RC · AUX-FG                | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                                                                 |                                                                                                      |             |               |               |               |               |               |   |
|                                     | OUTPUT-RC · AUX                     | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                                                                 |                                                                                                      |             |               |               |               |               |               |   |
| ENVIRONMENT                         | OPERATING TEMP.,HUMID.AND ALTITUDE  | -20 to +71℃ (Refer to “Derating”), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                       |                                                                                                      |             |               |               |               |               |               |   |
|                                     | STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75℃, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                             |                                                                                                      |             |               |               |               |               |               |   |
|                                     | VIBRATION                           | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                                  |                                                                                                      |             |               |               |               |               |               |   |
|                                     | IMPACT                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                                 |                                                                                                      |             |               |               |               |               |               |   |
| SAFETY AND<br>NOISE<br>REGULATIONS  | AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                                  |                                                                                                      |             |               |               |               |               |               |   |
|                                     | CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                     |                                                                                                      |             |               |               |               |               |               |   |
|                                     | HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 *6                                                                                                                |                                                                                                      |             |               |               |               |               |               |   |
| OTHERS                              | CASE SIZE/WEIGHT                    | 102×42×170mm [4.02×1.65×6.69 inches] (without terminal block and screw) (W×H×D) /1.0kg max                                                   |                                                                                                      |             |               |               |               |               |               |   |
|                                     | COOLING METHOD                      | Forced cooling (internal fan)                                                                                                                |                                                                                                      |             |               |               |               |               |               |   |

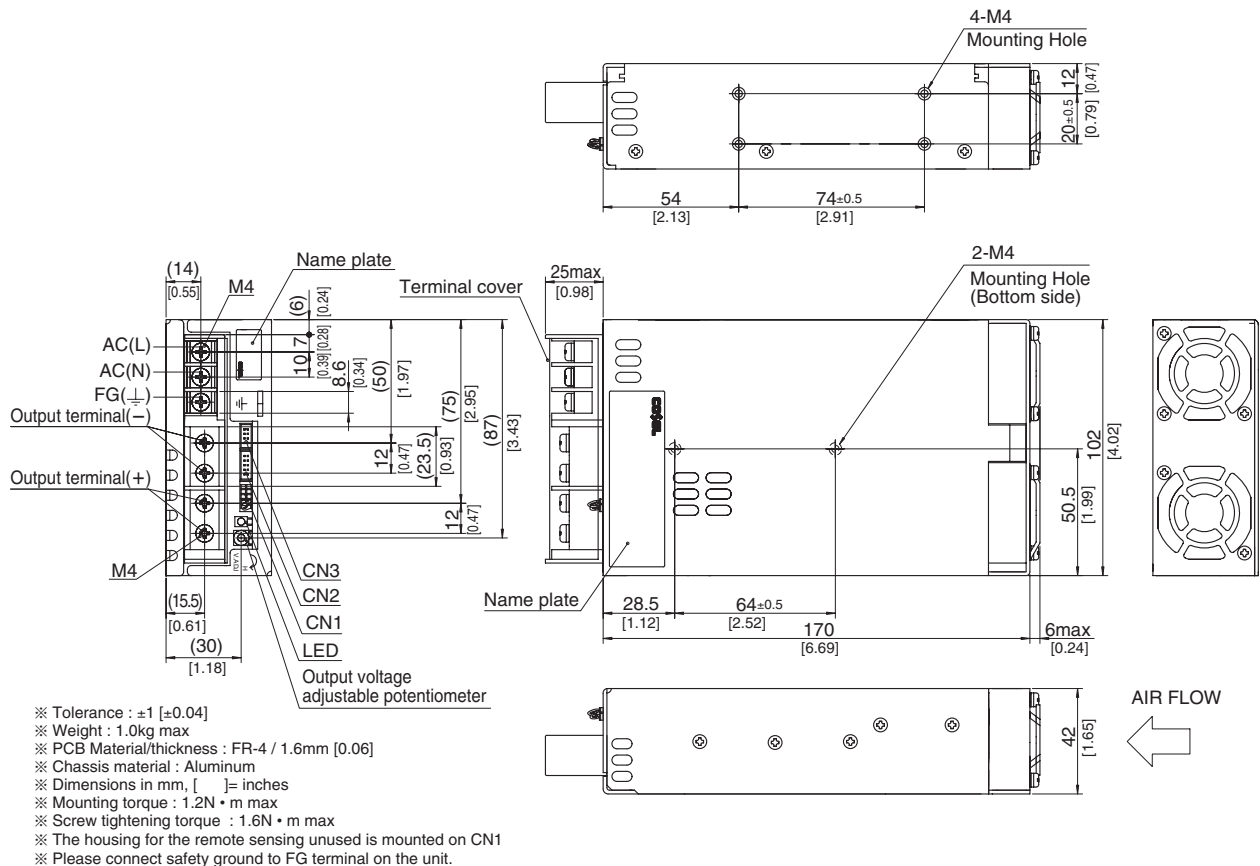
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.  
\*4 Derating is required.Consult us for details.

\*5 Please contact us about safety approvals for the model with option.  
\*6 Please contact us about class C.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



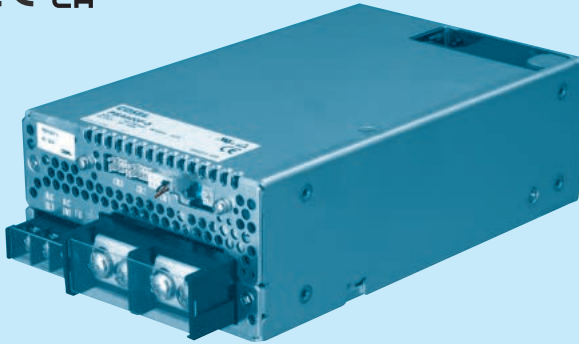
## External view



# PBA600F

PB A 600 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-16-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- G : Low leakage current
- U : Operation stop voltage  
is set at a lower value
- F1 : With Long-Life fan
- F3 : Reverse air exhaust  
type
- F4 : Low speed fan

Refer to instruction manual  
7.1.

\*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                 | PBA600F-3R3  | PBA600F-5 | PBA600F-7R5 | PBA600F-12 | PBA600F-15 | PBA600F-24 | PBA600F-36  | PBA600F-48 |
|-----------------------|--------------|-----------|-------------|------------|------------|------------|-------------|------------|
| MAX OUTPUT WATTAGE[W] | 396          | 600       | 600         | 636        | 645        | 648        | 648         | 624        |
| DC OUTPUT             | ACIN 100V    | 3.3V 120A | 5V 120A     | 7.5V 80A   | 12V 53A    | 15V 43A    | 24V 27A     | 36V 18A    |
|                       | ACIN 200V *3 | 3.3V 120A | 5V 120A     | 7.5V 80A   | 12V 53A    | 15V 43A    | 24V 27(31)A | 36V 18A    |

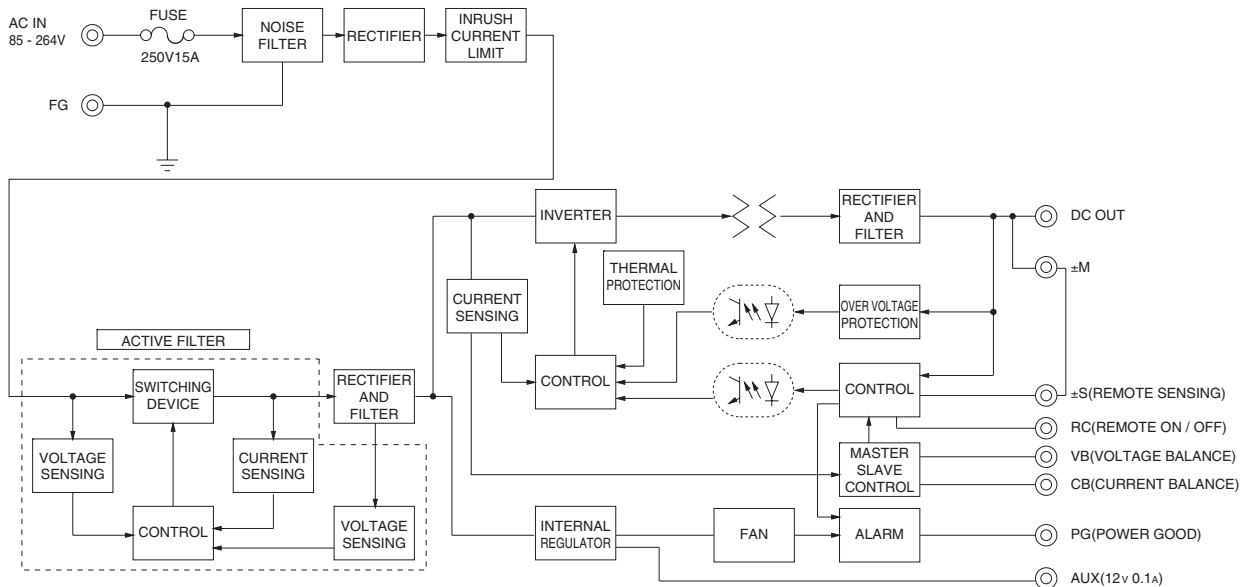
## SPECIFICATIONS

|                                     | MODEL                               |                                                                                                                                              | PBA600F-3R3                                                                                      | PBA600F-5    | PBA600F-7R5   | PBA600F-12    | PBA600F-15    | PBA600F-24    | PBA600F-36    | PBA600F-48    |
|-------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| INPUT                               | VOLTAGE[V]                          |                                                                                                                                              | AC85 - 264 1 φ or DC120 - 350 (AC50 or DC70 Please refer to the instruction manual 7. option ※5) |              |               |               |               |               |               |               |
|                                     | CURRENT[A]                          | ACIN 100V                                                                                                                                    | 5.8typ                                                                                           | 8.2typ       |               |               |               |               |               |               |
|                                     |                                     | ACIN 200V                                                                                                                                    | 3typ                                                                                             | 4.1typ       |               |               |               |               |               |               |
|                                     | FREQUENCY[Hz]                       |                                                                                                                                              | 50/60 (47 - 63)                                                                                  |              |               |               |               |               |               |               |
|                                     | EFFICIENCY[%]                       | ACIN 100V                                                                                                                                    | 70typ                                                                                            | 75typ        | 76typ         | 79typ         | 79typ         | 81typ         | 82typ         | 81typ         |
|                                     |                                     | ACIN 200V                                                                                                                                    | 72typ                                                                                            | 77typ        | 79typ         | 82typ         | 82typ         | 84typ         | 84typ         | 83typ         |
|                                     | POWER FACTOR                        | ACIN 100V                                                                                                                                    | 0.98typ (Io=100%)                                                                                |              |               |               |               |               |               |               |
|                                     | ACIN 200V                           | 0.95typ (Io=100%)                                                                                                                            |                                                                                                  |              |               |               |               |               |               |               |
|                                     | ACIN 100V                           | 20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)                                         |                                                                                                  |              |               |               |               |               |               |               |
|                                     | ACIN 200V                           | 40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 3 sec. to re-start)                                         |                                                                                                  |              |               |               |               |               |               |               |
| LEAKAGE CURRENT[ma]                 |                                     | 0.45/0.75max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1, DENAN)                                                                  |                                                                                                  |              |               |               |               |               |               |               |
| OUTPUT                              | VOLTAGE[V]                          |                                                                                                                                              | 3.3                                                                                              | 5            | 7.5           | 12            | 15            | 24            | 36            | 48            |
|                                     | CURRENT[A]                          | ACIN 100V                                                                                                                                    | 120                                                                                              | 120          | 80            | 53            | 43            | 27            | 18            | 13            |
|                                     |                                     | ACIN 200V ※3                                                                                                                                 | 120                                                                                              | 120          | 80            | 53            | 43            | 27(31)        | 18            | 13            |
|                                     | LINE REGULATION[mV]                 |                                                                                                                                              | 20max                                                                                            | 20max        | 36max         | 48max         | 60max         | 96max         | 144max        | 192max        |
|                                     | LOAD REGULATION[mV]                 |                                                                                                                                              | 40max                                                                                            | 40max        | 60max         | 100max        | 120max        | 150max        | 150max        | 300max        |
|                                     | RIPPLE[mVp-p]                       | 0 to +50℃ ※1                                                                                                                                 | 80max                                                                                            | 80max        | 120max        | 120max        | 120max        | 120max        | 150max        | 150max        |
|                                     |                                     | -20 - 0℃ ※1                                                                                                                                  | 140max                                                                                           | 140max       | 160max        | 160max        | 160max        | 160max        | 160max        | 400max        |
|                                     | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ ※1                                                                                                                                 | 120max                                                                                           | 120max       | 150max        | 150max        | 150max        | 150max        | 200max        | 200max        |
|                                     |                                     | -20 - 0℃ ※1                                                                                                                                  | 160max                                                                                           | 160max       | 180max        | 180max        | 180max        | 180max        | 240max        | 500max        |
|                                     | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                                                    | 40max                                                                                            | 50max        | 75max         | 120max        | 150max        | 240max        | 360max        | 480max        |
|                                     |                                     | -20 to +50℃                                                                                                                                  | 60max                                                                                            | 75max        | 120max        | 180max        | 180max        | 290max        | 440max        | 600max        |
|                                     | DRIFT[mV]                           | ※2                                                                                                                                           | 12max                                                                                            | 20max        | 30max         | 48max         | 60max         | 96max         | 144max        | 192max        |
| START-UP TIME[ms]                   |                                     | 400typ(ACIN 100/200V, Io=100%) ※Start-up time is 500ms typ for less than 1minute of applying input again from turning off the input voltage. |                                                                                                  |              |               |               |               |               |               |               |
| HOLD-UP TIME[ms]                    |                                     | 20typ (ACIN 100/200V, Io=100%)                                                                                                               |                                                                                                  |              |               |               |               |               |               |               |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  |                                     | 2.64 - 3.96                                                                                                                                  | 3.96 - 6.00                                                                                      | 5.25 - 8.25  | 8.25 - 13.20  | 10.50 - 16.50 | 16.50 - 26.40 | 25.20 - 39.60 | 38.40 - 56.00 |               |
| OUTPUT VOLTAGE SETTING[V]           |                                     | 3.30 - 3.40                                                                                                                                  | 5.00 - 5.15                                                                                      | 7.50 - 7.80  | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |               |
| PROTECTION<br>CIRCUIT AND<br>OTHERS | OVERCURRENT PROTECTION              |                                                                                                                                              | Works over 105% of rated current or 101% of peak current and recovers automatically              |              |               |               |               |               |               |               |
|                                     | OVERVOLTAGE PROTECTION[V] ※4        |                                                                                                                                              | Vo+0.66 - 1.32                                                                                   | Vo+1.0 - 2.0 | Vo+1.5 - 3.0  | Vo+2.4 - 4.8  | Vo+3.0 - 6.0  | Vo+4.8 - 9.6  | Vo+7.2 - 14.4 | Vo+4.8 - 12.0 |
|                                     | OPERATING INDICATION                |                                                                                                                                              | LED (Green)                                                                                      |              |               |               |               |               |               |               |
|                                     | REMOTE SENSING                      |                                                                                                                                              | Provided                                                                                         |              |               |               |               |               |               |               |
|                                     | REMOTE ON/OFF                       |                                                                                                                                              | Provided                                                                                         |              |               |               |               |               |               |               |
| ISOLATION                           | INPUT-OUTPUT · RC                   |                                                                                                                                              | AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                    |              |               |               |               |               |               |               |
|                                     | INPUT-FG                            |                                                                                                                                              | AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩmin (At Room Temperature)                    |              |               |               |               |               |               |               |
|                                     | OUTPUT · RC · AUX-FG                |                                                                                                                                              | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                     |              |               |               |               |               |               |               |
|                                     | OUTPUT-RC · AUX                     |                                                                                                                                              | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                     |              |               |               |               |               |               |               |
| ENVIRONMENT                         | OPERATING TEMP.,HUMID.AND ALTITUDE  |                                                                                                                                              | -20 to +71℃ (Refer to "Derating"), 20 - 90%RH (Non condensing) 3.000m (10.000feet) max           |              |               |               |               |               |               |               |
|                                     | STORAGE TEMP.,HUMID.AND ALTITUDE    |                                                                                                                                              | -20 to +75℃, 20 - 90%RH (Non condensing) 9.000m (30.000feet) max                                 |              |               |               |               |               |               |               |
|                                     | VIBRATION                           |                                                                                                                                              | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis      |              |               |               |               |               |               |               |
|                                     | IMPACT                              |                                                                                                                                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                     |              |               |               |               |               |               |               |
| SAFETY AND<br>NOISE<br>REGULATIONS  | AGENCY APPROVALS (At only AC input) |                                                                                                                                              | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                      |              |               |               |               |               |               |               |
|                                     | CONDUCTED NOISE                     |                                                                                                                                              | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                         |              |               |               |               |               |               |               |
|                                     | HARMONIC ATTENUATOR                 |                                                                                                                                              | Complies with IEC61000-3-2 ※7                                                                    |              |               |               |               |               |               |               |
| OTHERS                              | CASE SIZE/WEIGHT                    |                                                                                                                                              | 120×61×190mm [4.72×2.4×7.48 inches] (without terminal block and screw) (W×H×D) /1.6kg max        |              |               |               |               |               |               |               |
|                                     | COOLING METHOD                      |                                                                                                                                              | Forced cooling (internal fan)                                                                    |              |               |               |               |               |               |               |

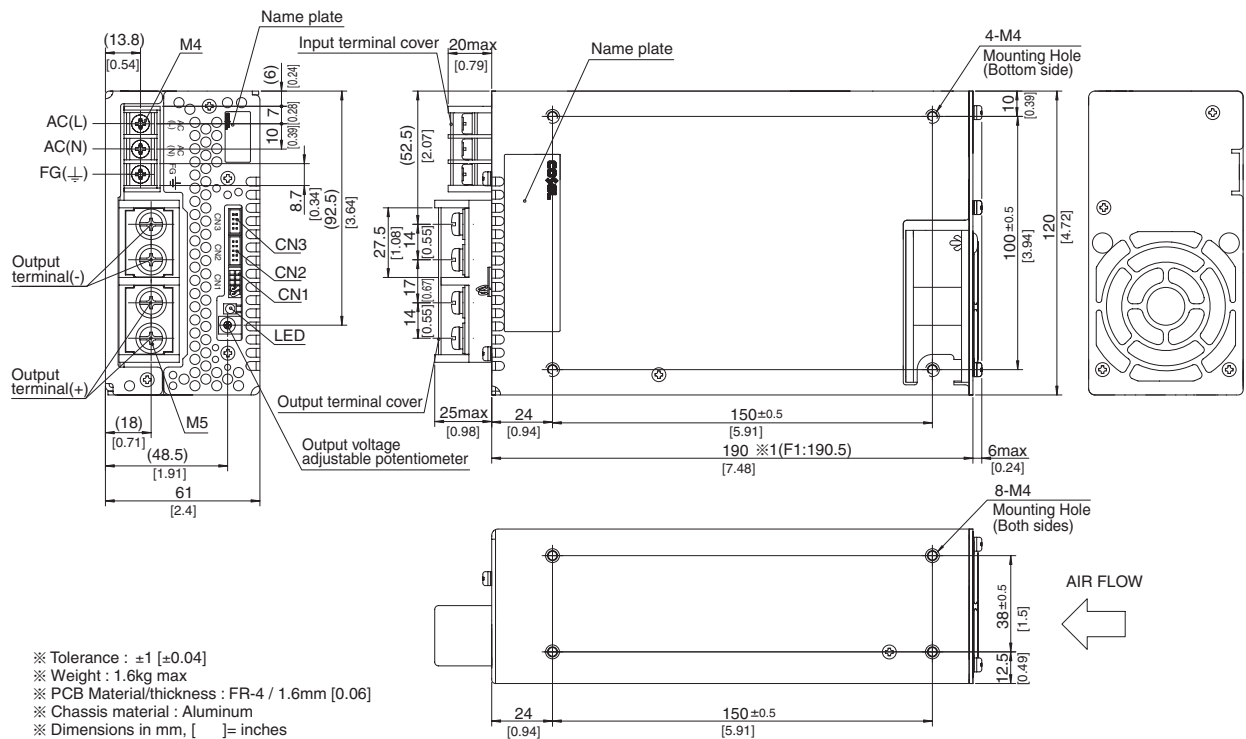
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
 \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃.  
 \*3 ( ) means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.  
 \*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.

\*5 Derating is required.Consult us for details.  
 \*6 Please contact us about safety approvals for the model with option.  
 \*7 Please contact us about class C.  
 \* A sound may occur from power supply at pulse loading.

## Block diagram



## External view

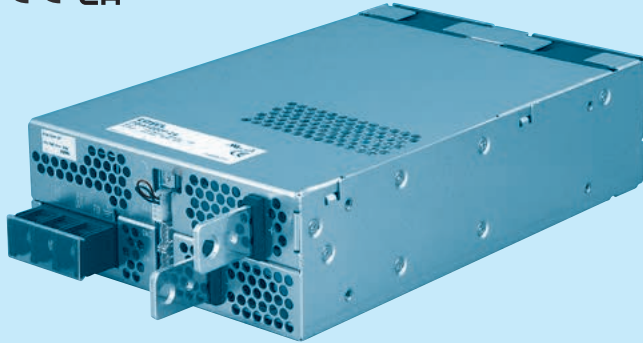


- ※ Tolerance :  $\pm 1 [\pm 0.04]$
- ※ Weight : 1.6kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque : M4 1.6N · m (16.9kgf · cm) max  
M5 2.5N · m (24.5kgf · cm) max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ 1 F1(Optional):190.5
- ※ Please connect safety ground to FG terminal on the unit.

# PBA1000F

PB A 1000 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-20-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- G : Low leakage current
- U : Operation stop voltage  
is set at a lower value
- F1 : With Long-Life fan
- F3 : Reverse air exhaust  
type
- F4 : Low speed fan

Refer to instruction manual  
7.1.

\*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                 |              | PBA1000F-3R3 | PBA1000F-5 | PBA1000F-7R5 | PBA1000F-12 | PBA1000F-15 | PBA1000F-24 | PBA1000F-36 | PBA1000F-48 |
|-----------------------|--------------|--------------|------------|--------------|-------------|-------------|-------------|-------------|-------------|
| MAX OUTPUT WATTAGE[W] |              | 660          | 1000       | 1005         | 1056        | 1050        | 1056        | 1044        | 1056        |
| DC OUTPUT             | ACIN 100V    | 3.3V 200A    | 5V 200A    | 7.5V 134A    | 12V 88A     | 15V 70A     | 24V 44A     | 36V 29A     | 48V 22A     |
|                       | ACIN 200V *3 | 3.3V 200A    | 5V 200A    | 7.5V 134A    | 12V 88A     | 15V 70A     | 24V 44(51)A | 36V 29A     | 48V 22A     |

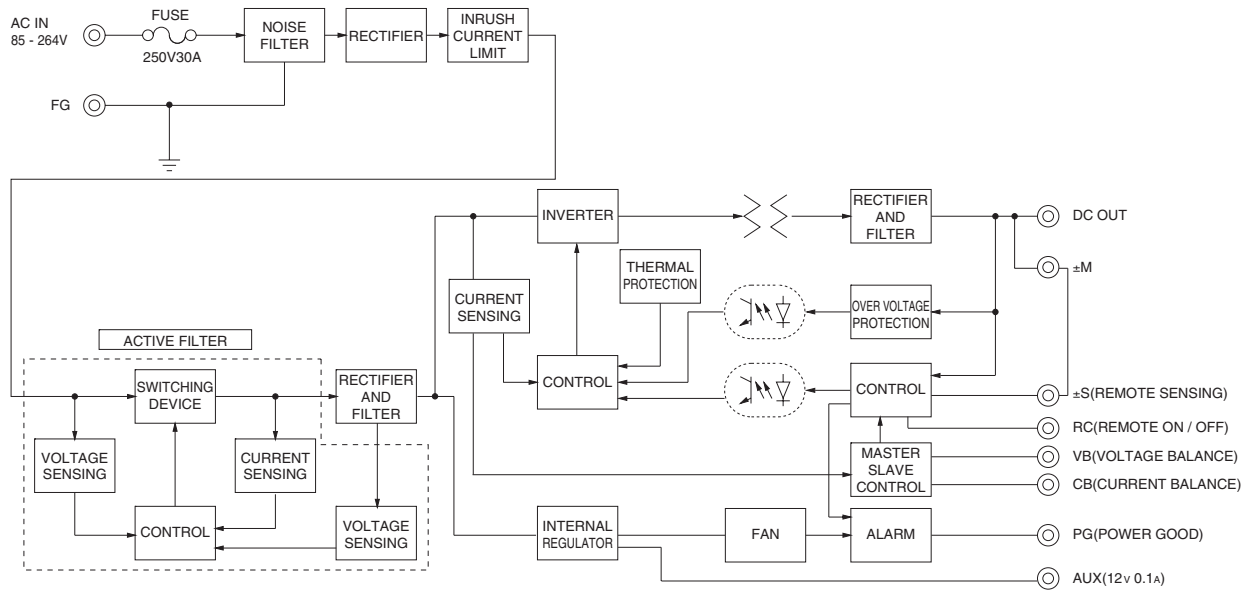
## SPECIFICATIONS

|                                    | MODEL                               |                                                                                                                                              | PBA1000F-3R3                                                                                     | PBA1000F-5   | PBA1000F-7R5  | PBA1000F-12   | PBA1000F-15   | PBA1000F-24   | PBA1000F-36   | PBA1000F-48   |
|------------------------------------|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| INPUT                              | VOLTAGE[V]                          |                                                                                                                                              | AC85 - 264 1 φ or DC120 - 350 (AC50 or DC70 Please refer to the instruction manual 7. option *5) |              |               |               |               |               |               |               |
|                                    | CURRENT[A]                          | ACIN 100V                                                                                                                                    | 9typ                                                                                             | 13typ        |               |               |               |               |               |               |
|                                    |                                     | ACIN 200V                                                                                                                                    | 5typ                                                                                             | 7typ         |               |               |               |               |               |               |
|                                    | FREQUENCY[Hz]                       |                                                                                                                                              | 50/60 (47 - 63)                                                                                  |              |               |               |               |               |               |               |
|                                    | EFFICIENCY[%]                       | ACIN 100V                                                                                                                                    | 74typ                                                                                            | 79typ        | 80typ         | 82typ         | 82typ         | 84typ         | 84typ         | 84typ         |
|                                    |                                     | ACIN 200V                                                                                                                                    | 76typ                                                                                            | 81typ        | 83typ         | 84typ         | 84typ         | 86typ         | 86typ         | 86typ         |
|                                    | POWER FACTOR                        | ACIN 100V                                                                                                                                    | 0.98typ (Io=100%)                                                                                |              |               |               |               |               |               |               |
|                                    | ACIN 200V                           | 0.95typ (Io=100%)                                                                                                                            |                                                                                                  |              |               |               |               |               |               |               |
|                                    | ACIN 100V                           | 20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)                                        |                                                                                                  |              |               |               |               |               |               |               |
|                                    | ACIN 200V                           | 40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)                                        |                                                                                                  |              |               |               |               |               |               |               |
| LEAKAGE CURRENT[ma]                |                                     | 0.5/1.0max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1, DENAN)                                                                    |                                                                                                  |              |               |               |               |               |               |               |
| OUTPUT                             | VOLTAGE[V]                          |                                                                                                                                              | 3.3                                                                                              | 5            | 7.5           | 12            | 15            | 24            | 36            | 48            |
|                                    | CURRENT[A]                          | ACIN 100V                                                                                                                                    | 200                                                                                              | 200          | 134           | 88            | 70            | 44            | 29            | 22            |
|                                    |                                     | ACIN 200V *3                                                                                                                                 | 200                                                                                              | 200          | 134           | 88            | 70            | 44(51)        | 29            | 22            |
|                                    | LINE REGULATION[mV]                 |                                                                                                                                              | 20max                                                                                            | 20max        | 36max         | 48max         | 60max         | 96max         | 144max        | 192max        |
|                                    | LOAD REGULATION[mV]                 |                                                                                                                                              | 40max                                                                                            | 40max        | 60max         | 100max        | 120max        | 150max        | 150max        | 300max        |
|                                    | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                                                                 | 80max                                                                                            | 80max        | 120max        | 120max        | 120max        | 120max        | 150max        | 150max        |
|                                    |                                     | -20 - 0℃ *1                                                                                                                                  | 140max                                                                                           | 140max       | 160max        | 160max        | 160max        | 160max        | 160max        | 400max        |
|                                    | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                                                                 | 120max                                                                                           | 120max       | 150max        | 150max        | 150max        | 150max        | 200max        | 200max        |
|                                    |                                     | -20 - 0℃ *1                                                                                                                                  | 160max                                                                                           | 160max       | 180max        | 180max        | 180max        | 180max        | 240max        | 500max        |
|                                    | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                                                                    | 40max                                                                                            | 50max        | 75max         | 120max        | 150max        | 240max        | 360max        | 480max        |
|                                    |                                     | -20 to +50℃                                                                                                                                  | 60max                                                                                            | 75max        | 120max        | 180max        | 180max        | 290max        | 440max        | 600max        |
|                                    | DRIFT[mV]                           | *2                                                                                                                                           | 12max                                                                                            | 20max        | 30max         | 48max         | 60max         | 96max         | 144max        | 192max        |
| START-UP TIME[ms]                  |                                     | 400typ(ACIN 100/200V, Io=100%) *Start-up time is 500ms typ for less than 1minute of applying input again from turning off the input voltage. |                                                                                                  |              |               |               |               |               |               |               |
| HOLD-UP TIME[ms]                   |                                     | 20typ (ACIN 100/200V, Io=100%)                                                                                                               |                                                                                                  |              |               |               |               |               |               |               |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V] |                                     | 2.64 - 3.96                                                                                                                                  | 3.96 - 6.00                                                                                      | 5.25 - 8.25  | 8.25 - 13.20  | 10.50 - 16.50 | 16.50 - 26.40 | 25.20 - 39.60 | 38.40 - 56.00 |               |
| OUTPUT VOLTAGE SETTING[V]          |                                     | 3.30 - 3.40                                                                                                                                  | 5.00 - 5.15                                                                                      | 7.50 - 7.80  | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |               |
| PROTECTION CIRCUIT AND OTHERS      | OVERCURRENT PROTECTION              |                                                                                                                                              | Works over 105% of rated current or 101% of peak current and recovers automatically              |              |               |               |               |               |               |               |
|                                    | OVERVOLTAGE PROTECTION[V] *4        |                                                                                                                                              | Vo+0.66 - 1.32                                                                                   | Vo+1.0 - 2.0 | Vo+1.5 - 3.0  | Vo+2.4 - 4.8  | Vo+3.0 - 6.0  | Vo+4.8 - 9.6  | Vo+7.2 - 14.4 | Vo+4.8 - 12.0 |
|                                    | OPERATING INDICATION                |                                                                                                                                              | LED (Green)                                                                                      |              |               |               |               |               |               |               |
|                                    | REMOTE SENSING                      |                                                                                                                                              | Provided                                                                                         |              |               |               |               |               |               |               |
|                                    | REMOTE ON/OFF                       |                                                                                                                                              | Provided                                                                                         |              |               |               |               |               |               |               |
| ISOLATION                          | INPUT-OUTPUT · RC                   |                                                                                                                                              | AC3.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                    |              |               |               |               |               |               |               |
|                                    | INPUT-FG                            |                                                                                                                                              | AC2.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                    |              |               |               |               |               |               |               |
|                                    | OUTPUT · RC · AUX-FG                |                                                                                                                                              | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                     |              |               |               |               |               |               |               |
|                                    | OUTPUT-RC · AUX                     |                                                                                                                                              | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                     |              |               |               |               |               |               |               |
| ENVIRONMENT                        | OPERATING TEMP.,HUMID.AND ALTITUDE  |                                                                                                                                              | -20 to +71℃ (Refer to "Derating"), 20 - 90%RH (Non condensing) 3.000m (10.000feet) max           |              |               |               |               |               |               |               |
|                                    | STORAGE TEMP.,HUMID.AND ALTITUDE    |                                                                                                                                              | -20 to +75℃, 20 - 90%RH (Non condensing) 9.000m (30.000feet) max                                 |              |               |               |               |               |               |               |
|                                    | VIBRATION                           |                                                                                                                                              | 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis                  |              |               |               |               |               |               |               |
|                                    | IMPACT                              |                                                                                                                                              | 196.1m/s² (20G), 11ms, once each X, Y and Z axis                                                 |              |               |               |               |               |               |               |
| SAFETY AND NOISE REGULATIONS       | AGENCY APPROVALS (At only AC input) |                                                                                                                                              | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                      |              |               |               |               |               |               |               |
|                                    | CONDUCTED NOISE                     |                                                                                                                                              | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                         |              |               |               |               |               |               |               |
|                                    | HARMONIC ATTENUATOR                 |                                                                                                                                              | Complies with IEC61000-3-2 *7                                                                    |              |               |               |               |               |               |               |
| OTHERS                             | CASE SIZE/WEIGHT                    |                                                                                                                                              | 150×61×240mm [5.91×2.4×9.45 inches] (without terminal block and screw) (W×H×D) /2.2kg max        |              |               |               |               |               |               |               |
|                                    | COOLING METHOD                      |                                                                                                                                              | Forced cooling (internal fan)                                                                    |              |               |               |               |               |               |               |

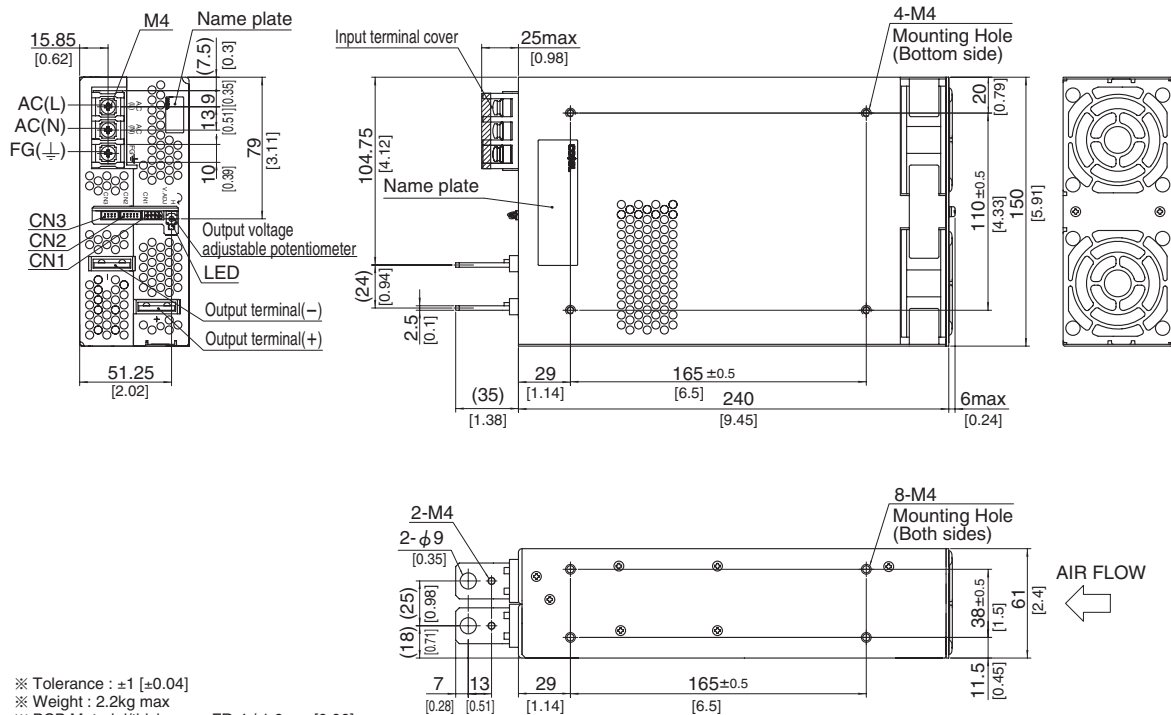
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
Ripple and ripple noise is measured on measuring board with capacitor of 22 μF within 150mm from the output terminal.  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.  
\*5 Derating is required. Consult us for details.  
\*6 Please contact us about safety approvals for the model with option.  
\*7 Please contact us about class C.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 2.2kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N • m (12.8kgf • cm) max
- ※ Screw tightening torque : 1.6N • m (16.9kgf • cm) max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to FG terminal on the unit.

# PBA1500F

PB A 1500 F -5 -□

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-20-472



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
- ② Single output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*6
- C : with Coating
- G : Low leakage current
- U : Operation stop voltage  
is set at a lower value
- F1 : With Long-Life fan
- F3 : Reverse air exhaust  
type
- F4 : Low speed fan

Refer to instruction manual  
7.1.

\*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                 | PBA1500F-3R3 | PBA1500F-5 | PBA1500F-7R5 | PBA1500F-12 | PBA1500F-15 | PBA1500F-24 | PBA1500F-36  | PBA1500F-48 |
|-----------------------|--------------|------------|--------------|-------------|-------------|-------------|--------------|-------------|
| MAX OUTPUT WATTAGE[W] | 990          | 1500       | 1500         | 1500        | 1500        | 1680        | 1692         | 1680        |
| DC OUTPUT             | ACIN 100V    | 3.3V 300A  | 5V 300A      | 7.5V 200A   | 12V 125A    | 15V 100A    | 24V 65A      | 36V 42A     |
|                       | ACIN 200V *3 | 3.3V 300A  | 5V 300A      | 7.5V 200A   | 12V 125A    | 15V 100A    | 24V 70(105)A | 36V 47(70)A |

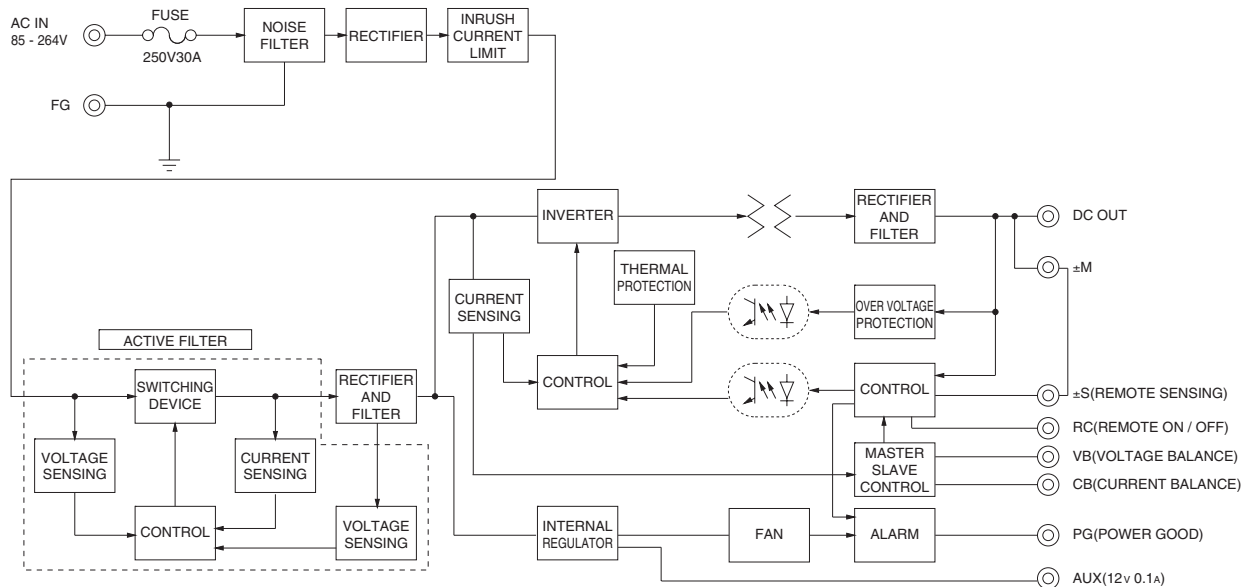
## SPECIFICATIONS

|                                     | MODEL                               |                                                                                                       | PBA1500F-3R3                                                                                                                     | PBA1500F-5   | PBA1500F-7R5  | PBA1500F-12   | PBA1500F-15   | PBA1500F-24   | PBA1500F-36   | PBA1500F-48   |
|-------------------------------------|-------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|
| INPUT                               | VOLTAGE[V]                          |                                                                                                       | AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 7. option *5)                                 |              |               |               |               |               |               |               |
|                                     | CURRENT[A]                          | ACIN 100V                                                                                             | 15typ                                                                                                                            | 19typ        |               |               |               |               |               |               |
|                                     |                                     | ACIN 200V                                                                                             | 8typ                                                                                                                             | 10typ        |               |               |               |               |               |               |
|                                     | FREQUENCY[Hz]                       |                                                                                                       | 50/60 (47 - 63)                                                                                                                  |              |               |               |               |               |               |               |
|                                     | EFFICIENCY[%]                       | ACIN 100V                                                                                             | 72typ                                                                                                                            | 77typ        | 81typ         | 81typ         | 83typ         | 84typ         | 84typ         | 84typ         |
|                                     |                                     | ACIN 200V                                                                                             | 75typ                                                                                                                            | 81typ        | 83typ         | 84typ         | 86typ         | 87typ         | 87typ         | 87typ         |
|                                     | POWER FACTOR                        | ACIN 100V                                                                                             | 0.98typ (Io=100%)                                                                                                                |              |               |               |               |               |               |               |
|                                     | ACIN 200V                           | 0.95typ (Io=100%)                                                                                     |                                                                                                                                  |              |               |               |               |               |               |               |
|                                     | ACIN 100V                           | 20/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start) |                                                                                                                                  |              |               |               |               |               |               |               |
|                                     | ACIN 200V                           | 40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start) |                                                                                                                                  |              |               |               |               |               |               |               |
| LEAKAGE CURRENT[ma]                 |                                     | 0.9/1.5max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1, DENAN)                             |                                                                                                                                  |              |               |               |               |               |               |               |
| OUTPUT                              | VOLTAGE[V]                          |                                                                                                       | 3.3                                                                                                                              | 5            | 7.5           | 12            | 15            | 24            | 36            | 48            |
|                                     | CURRENT[A]                          | ACIN 100V                                                                                             | 300                                                                                                                              | 300          | 200           | 125           | 100           | 65            | 42            | 32            |
|                                     |                                     | ACIN 200V *3                                                                                          | 300                                                                                                                              | 300          | 200           | 125           | 100           | 70(105)       | 47(70)        | 35            |
|                                     | LINE REGULATION[mV]                 |                                                                                                       | 20max                                                                                                                            | 20max        | 36max         | 48max         | 60max         | 96max         | 144max        | 192max        |
|                                     | LOAD REGULATION[mV]                 |                                                                                                       | 40max                                                                                                                            | 40max        | 60max         | 100max        | 120max        | 150max        | 150max        | 300max        |
|                                     | RIPPLE[mVp-p]                       | 0 to +50℃ *1                                                                                          | 80max                                                                                                                            | 80max        | 120max        | 120max        | 120max        | 120max        | 150max        | 150max        |
|                                     |                                     | -20 - 0℃ *1                                                                                           | 140max                                                                                                                           | 140max       | 160max        | 160max        | 160max        | 160max        | 160max        | 400max        |
|                                     | RIPPLE NOISE[mVp-p]                 | 0 to +50℃ *1                                                                                          | 120max                                                                                                                           | 120max       | 150max        | 150max        | 150max        | 150max        | 200max        | 200max        |
|                                     |                                     | -20 - 0℃ *1                                                                                           | 160max                                                                                                                           | 160max       | 180max        | 180max        | 180max        | 180max        | 240max        | 500max        |
|                                     | TEMPERATURE REGULATION[mV]          | 0 to +50℃                                                                                             | 40max                                                                                                                            | 50max        | 75max         | 120max        | 150max        | 240max        | 360max        | 480max        |
|                                     |                                     | -20 to +50℃                                                                                           | 60max                                                                                                                            | 75max        | 120max        | 180max        | 180max        | 290max        | 440max        | 600max        |
|                                     | DRIFT[mV]                           | *2                                                                                                    | 12max                                                                                                                            | 20max        | 30max         | 48max         | 60max         | 96max         | 144max        | 192max        |
|                                     | START-UP TIME[ms]                   |                                                                                                       | 600typ(ACIN 100/200V, Io=100%)                                                                                                   |              |               |               |               |               |               |               |
| HOLD-UP TIME[ms]                    |                                     | 20typ (ACIN 100/200V, Io=100%)                                                                        |                                                                                                                                  |              |               |               |               |               |               |               |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  |                                     | 2.64 - 3.96                                                                                           | 3.96 - 6.00                                                                                                                      | 5.25 - 8.25  | 8.25 - 13.20  | 10.50 - 16.50 | 16.50 - 26.40 | 25.20 - 39.60 | 38.40 - 56.00 |               |
| OUTPUT VOLTAGE SETTING[V]           |                                     | 3.30 - 3.40                                                                                           | 5.00 - 5.15                                                                                                                      | 7.50 - 7.80  | 12.00 - 12.48 | 15.00 - 15.60 | 24.00 - 24.96 | 36.00 - 37.44 | 48.00 - 49.92 |               |
| PROTECTION<br>CIRCUIT AND<br>OTHERS | OVERCURRENT PROTECTION              |                                                                                                       | Works over 105% of rated current or 101% of peak current and recovers automatically                                              |              |               |               |               |               |               |               |
|                                     | OVERVOLTAGE PROTECTION[V] *4        |                                                                                                       | Vo+0.66 - 1.32                                                                                                                   | Vo+1.0 - 2.0 | Vo+1.5 - 3.0  | Vo+2.4 - 4.8  | Vo+3.0 - 6.0  | Vo+4.8 - 9.6  | Vo+7.2 - 14.4 | Vo+4.8 - 12.0 |
|                                     | OPERATING INDICATION                |                                                                                                       | LED (Green)                                                                                                                      |              |               |               |               |               |               |               |
|                                     | REMOTE SENSING                      |                                                                                                       | Provided                                                                                                                         |              |               |               |               |               |               |               |
|                                     | REMOTE ON/OFF                       |                                                                                                       | Provided                                                                                                                         |              |               |               |               |               |               |               |
| ISOLATION                           | INPUT-OUTPUT · RC                   |                                                                                                       | AC3.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                    |              |               |               |               |               |               |               |
|                                     | INPUT-FG                            |                                                                                                       | AC2.000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                    |              |               |               |               |               |               |               |
|                                     | OUTPUT · RC · AUX-FG                |                                                                                                       | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                                                     |              |               |               |               |               |               |               |
|                                     | OUTPUT-RC · AUX                     |                                                                                                       | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                                                     |              |               |               |               |               |               |               |
| ENVIRONMENT                         | OPERATING TEMP.,HUMID.AND ALTITUDE  |                                                                                                       | -20 to +71℃ (Refer to "Derating"), 20 - 90%RH (Non condensing) 3.000m (10.000feet) max                                           |              |               |               |               |               |               |               |
|                                     | STORAGE TEMP.,HUMID.AND ALTITUDE    |                                                                                                       | -20 to +75℃, 20 - 90%RH (Non condensing) 9.000m (30.000feet) max                                                                 |              |               |               |               |               |               |               |
|                                     | VIBRATION                           |                                                                                                       | 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis                                                  |              |               |               |               |               |               |               |
|                                     | IMPACT                              |                                                                                                       | 196.1m/s² (20G), 11ms, once each X, Y and Z axis                                                                                 |              |               |               |               |               |               |               |
| SAFETY AND<br>NOISE<br>REGULATIONS  | AGENCY APPROVALS (At only AC input) |                                                                                                       | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                      |              |               |               |               |               |               |               |
|                                     | CONDUCTED NOISE                     |                                                                                                       | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B, additional EMI/EMC Filter required for meeting class B |              |               |               |               |               |               |               |
|                                     | HARMONIC ATTENUATOR                 |                                                                                                       | Complies with IEC61000-3-2 *7                                                                                                    |              |               |               |               |               |               |               |
| OTHERS                              | CASE SIZE/WEIGHT                    |                                                                                                       | 178×61×268mm [7.01×2.4×10.55 inches] (without terminal block and screw) (W×H×D) /3.4kg max                                       |              |               |               |               |               |               |               |
|                                     | COOLING METHOD                      |                                                                                                       | Forced cooling (internal fan)                                                                                                    |              |               |               |               |               |               |               |

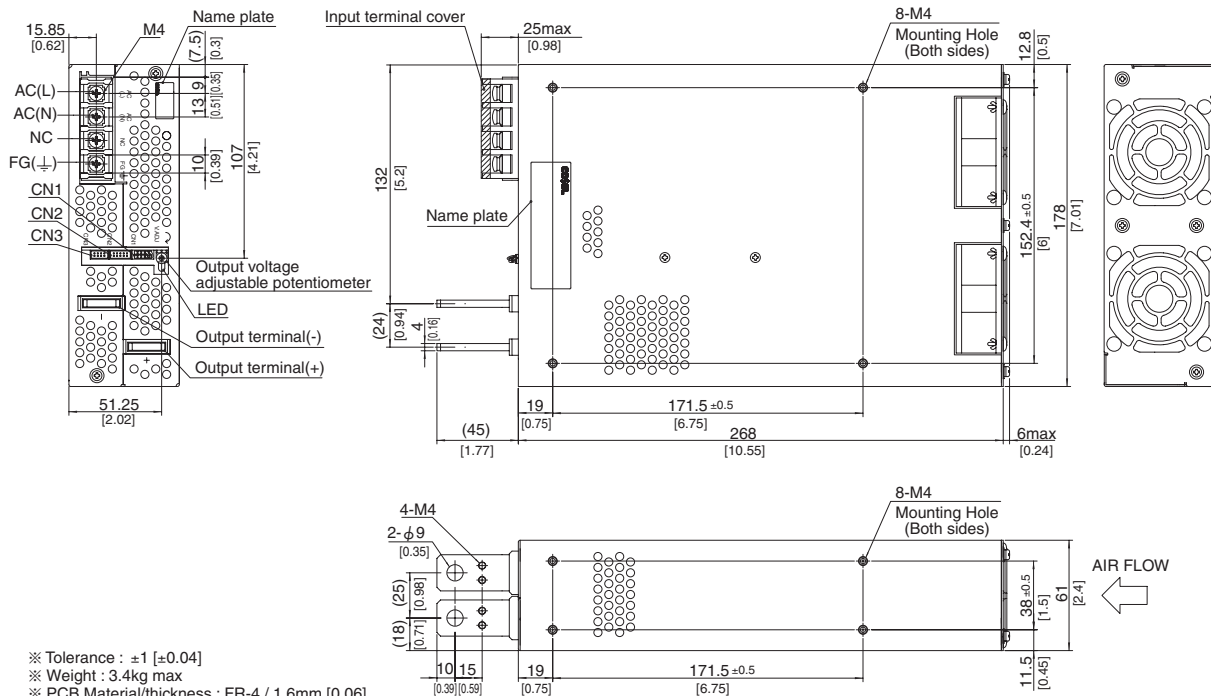
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
Ripple and ripple noise is measured on measuring board with capacitor of 22 μF within 150mm from the output terminal.  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.  
\*5 Derating is required. Consult us for details.  
\*6 Please contact us about safety approvals for the model with option.  
\*7 Please contact us about class C.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view

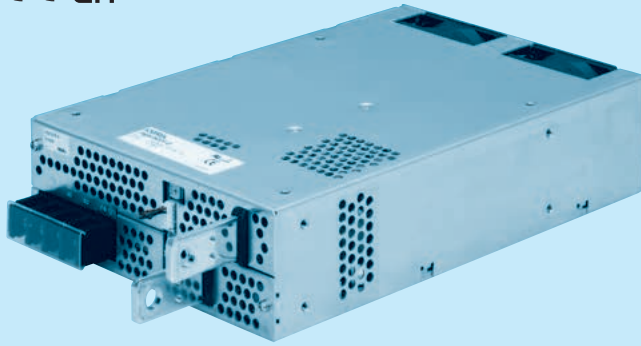
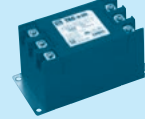


- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 3.4kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque : 1.6N · m (16.9kgf · cm) max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to FG terminal on the unit.

## PBA1500T

PB A 1500 T -5 -□

① ② ③ ④ ⑤ ⑥

Example recommended EMI/EMC filter  
TAC-10-683

\* 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  
② Single output  
③ Output wattage  
④ Triple input phase  
⑤ Output voltage  
⑥ Optional \*6  
C : with Coating  
G : Low leakage current  
U : Operation stop voltage is set at a lower value  
F1 : With Long-Life fan  
F3 : Reverse air exhaust type  
F4 : Low speed fan

Refer to instruction manual 7.1.

\*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                 | PBA1500T-5           | PBA1500T-12 | PBA1500T-24  | PBA1500T-48 |
|-----------------------|----------------------|-------------|--------------|-------------|
| MAX OUTPUT WATTAGE[W] | 1500                 | 1500        | 1680         | 1680        |
| DC OUTPUT             | ACIN 200V *3 5V 300A | 12V 125A    | 24V 70(105)A | 48V 35A     |

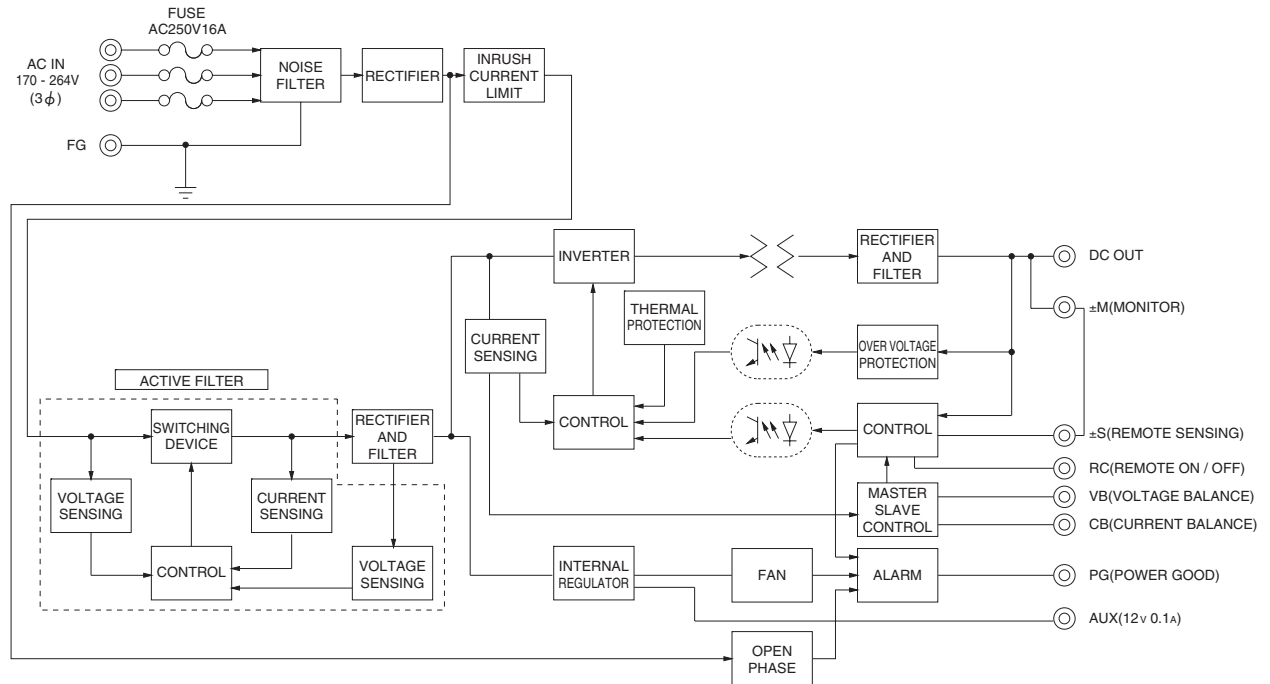
## SPECIFICATIONS

|                               | MODEL                                | PBA1500T-5                                                                                                                                  | PBA1500T-12      | PBA1500T-24      | PBA1500T-48      |
|-------------------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------|------------------|
| INPUT                         | VOLTAGE[V]                           | AC170 - 264 3φ (AC100 Please refer to the instruction manual 7. option *5)                                                                  |                  |                  |                  |
|                               | CURRENT[A]                           | ACIN 200V 6typ                                                                                                                              |                  |                  |                  |
|                               | FREQUENCY[Hz]                        | 50/60 (47 - 63)                                                                                                                             |                  |                  |                  |
|                               | EFFICIENCY[%]                        | ACIN 200V 81typ                                                                                                                             | 84typ            | 87typ            | 87typ            |
|                               | POWER FACTOR                         | ACIN 200V 0.95typ (Io=100%)                                                                                                                 |                  |                  |                  |
|                               | INRUSH CURRENT[A]                    | ACIN 200V 40/40typ (Io=100%) (Primary inrush current /Secondary inrush current) (More than 10 sec. to re-start)                             |                  |                  |                  |
| OUTPUT                        | LEAKAGE CURRENT[mA]                  | 1.5max (ACIN 240V 60Hz, Io=100%, According to IEC62368-1, DENAN)                                                                            |                  |                  |                  |
|                               | VOLTAGE[V]                           | 5                                                                                                                                           | 12               | 24               | 48               |
|                               | CURRENT[A]                           | ACIN 200V *3 300                                                                                                                            | 125              | 70(105)          | 35               |
|                               | LINE REGULATION[mV]                  | 20max                                                                                                                                       | 48max            | 96max            | 192max           |
|                               | LOAD REGULATION[mV]                  | 40max                                                                                                                                       | 100max           | 150max           | 300max           |
|                               | RIPPLE[mVp-p]                        | 0 to +50°C *1 80max<br>-20 - 0°C *1 140max                                                                                                  | 120max<br>160max | 120max<br>160max | 150max<br>400max |
|                               | RIPPLE NOISE[mVp-p]                  | 0 to +50°C *1 120max<br>-20 - 0°C *1 160max                                                                                                 | 150max<br>180max | 150max<br>180max | 200max<br>500max |
|                               | TEMPERATURE REGULATION[mV]           | 0 to +50°C 50max<br>-20 to +50°C 75max                                                                                                      | 120max<br>180max | 240max<br>290max | 480max<br>600max |
|                               | DRIFT[mV]                            | *2 20max                                                                                                                                    | 48max            | 96max            | 192max           |
|                               | START-UP TIME[ms]                    | 300typ (ACIN 200V, Io=100%) * Start-up time is 500ms typ for less than 1 minute of applying input again from turning off the input voltage. |                  |                  |                  |
|                               | HOLD-UP TIME[ms]                     | 20typ (ACIN 200V, Io=100%)                                                                                                                  |                  |                  |                  |
|                               | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]   | 3.96 - 6.00                                                                                                                                 | 8.25 - 13.20     | 16.50 - 26.40    | 38.40 - 56.00    |
| PROTECTION CIRCUIT AND OTHERS | OUTPUT VOLTAGE SETTING[V]            | 5.00 - 5.15                                                                                                                                 | 12.00 - 12.48    | 24.00 - 24.96    | 48.00 - 49.92    |
|                               | OVERCURRENT PROTECTION               | Works over 105% of rated current or 101% of peak current and recovers automatically                                                         |                  |                  |                  |
|                               | OVERVOLTAGE PROTECTION[V] *4         | Vo+1.0 - 2.0                                                                                                                                | Vo+2.4 - 4.8     | Vo+4.8 - 9.6     | Vo+2.0 - 12.0    |
|                               | OPERATING INDICATION                 | LED (Green)                                                                                                                                 |                  |                  |                  |
| ISOLATION                     | REMOTE SENSING                       | Provided                                                                                                                                    |                  |                  |                  |
|                               | REMOTE ON/OFF                        | Provided                                                                                                                                    |                  |                  |                  |
|                               | INPUT-OUTPUT · RC                    | AC3,000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                               |                  |                  |                  |
|                               | INPUT-FG                             | AC2,000V 1minute, Cutoff current = 25mA, DC500V 50MΩmin (At Room Temperature)                                                               |                  |                  |                  |
| ENVIRONMENT                   | OUTPUT · RC · AUX-FG                 | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                                                                |                  |                  |                  |
|                               | OUTPUT-RC · AUX                      | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩmin (At Room Temperature)                                                                |                  |                  |                  |
| SAFETY AND NOISE REGULATIONS  | OPERATING TEMP., HUMID. AND ALTITUDE | -20 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                     |                  |                  |                  |
|                               | STORAGE TEMP., HUMID. AND ALTITUDE   | -20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                           |                  |                  |                  |
|                               | VIBRATION                            | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                                 |                  |                  |                  |
| OTHERS                        | IMPACT                               | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                                |                  |                  |                  |
|                               | AGENCY APPROVALS (At only AC input)  | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                                 |                  |                  |                  |
| OTHERS                        | CONDUCTED NOISE                      | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B, additional EMI/EMC Filter required for meeting class B            |                  |                  |                  |
|                               | CASE SIZE/WEIGHT                     | 178×61×268mm [7.01×2.4×10.55 inches] (without terminal block and screw) (W×H×D) /3.4kg max                                                  |                  |                  |                  |
|                               | COOLING METHOD                       | Forced cooling (internal fan)                                                                                                               |                  |                  |                  |

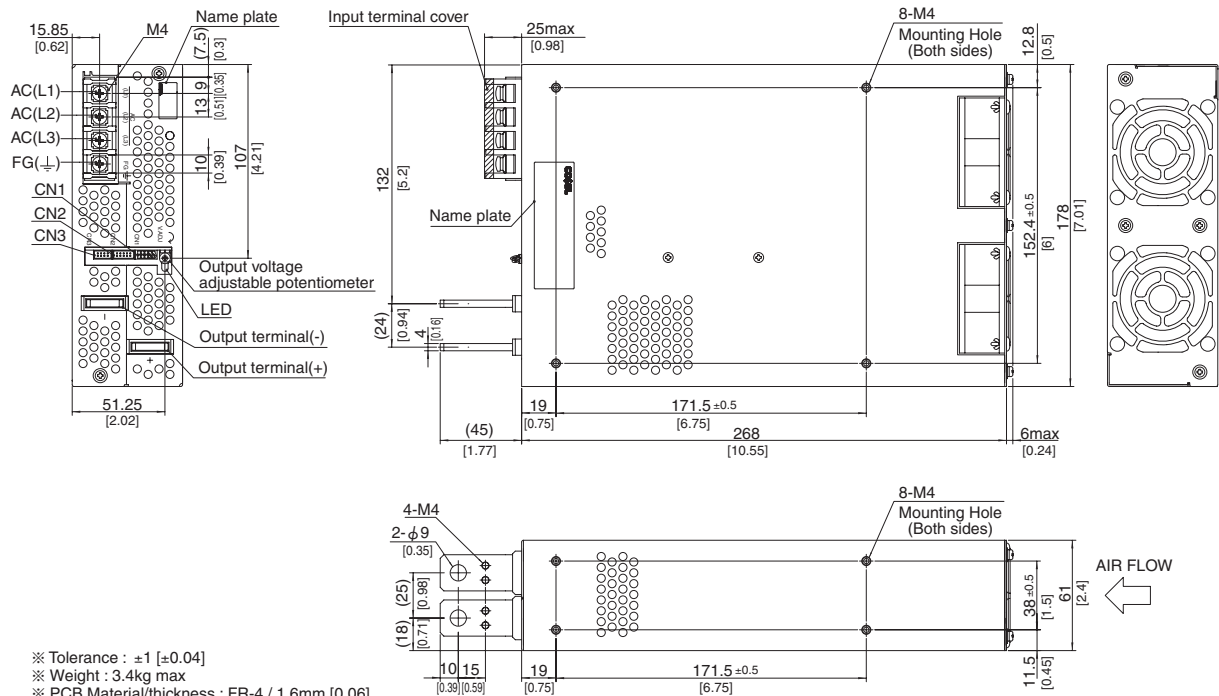
\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN :RM101).  
Ripple and ripple noise is measured on measuring board with capacitor of 22 μF within 150mm from the output terminal.  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 () means peak current. Peak loading for 10s. And Duty 35% max, refer to Instruction manual in detail.

\*4 Overvoltage protection circuit to follow to output voltage setting. Standard overvoltage protection circuit is please contact us for details.  
\*5 Derating is required. Consult us for details.  
\*6 Please contact us about safety approvals for the model with option.  
\* A sound may occur from power supply at pulse loading.

## Block diagram



## External view



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 3.4kg max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque : 1.2N · m (12.8kgf · cm) max
- ※ Screw tightening torque : 1.6N · m (16.9kgf · cm) max
- ※ The housing for the remote sensing unused is mounted on CN1
- ※ Please connect safety ground to unit in M4 holes.

## PBW15F

## Ordering information

PB

W

15

F

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①

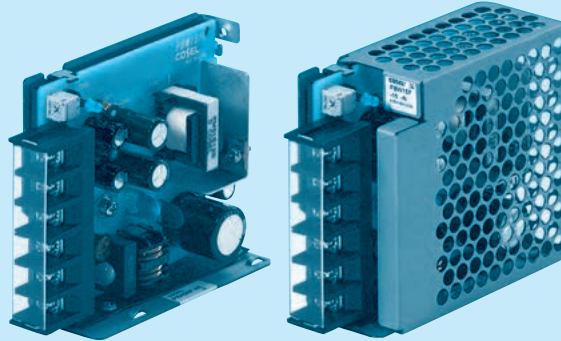
②

③

④

⑤

⑧



Example recommended EMI/EMC filter  
NAC-06-472



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  
② Dual output  
③ Output wattage  
④ Universal input  
⑤ Output voltage  
⑥ Optional \*10  
C : with Coating  
G : Low leakage current

E : Low leakage current and EMI class A

T : Vertical terminal block  
J1 : VH (J.S.T.) connector type  
N : with Cover  
N1 : with DIN rail  
V : Output voltage setting potentiometer externally

Cover is optional

\* 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                 | PBW15F-12                                                    | PBW15F-15                 |
|-----------------------|--------------------------------------------------------------|---------------------------|
| MAX OUTPUT WATTAGE[W] | 16.8                                                         | 15.0                      |
| DC OUTPUT             | VOLTAGE[V] ±12 ( +24 )<br>CURRENT1[A] 0.7<br>CURRENT2[A] 1.4 | ±15 ( +30 )<br>0.5<br>1.0 |

## SPECIFICATIONS

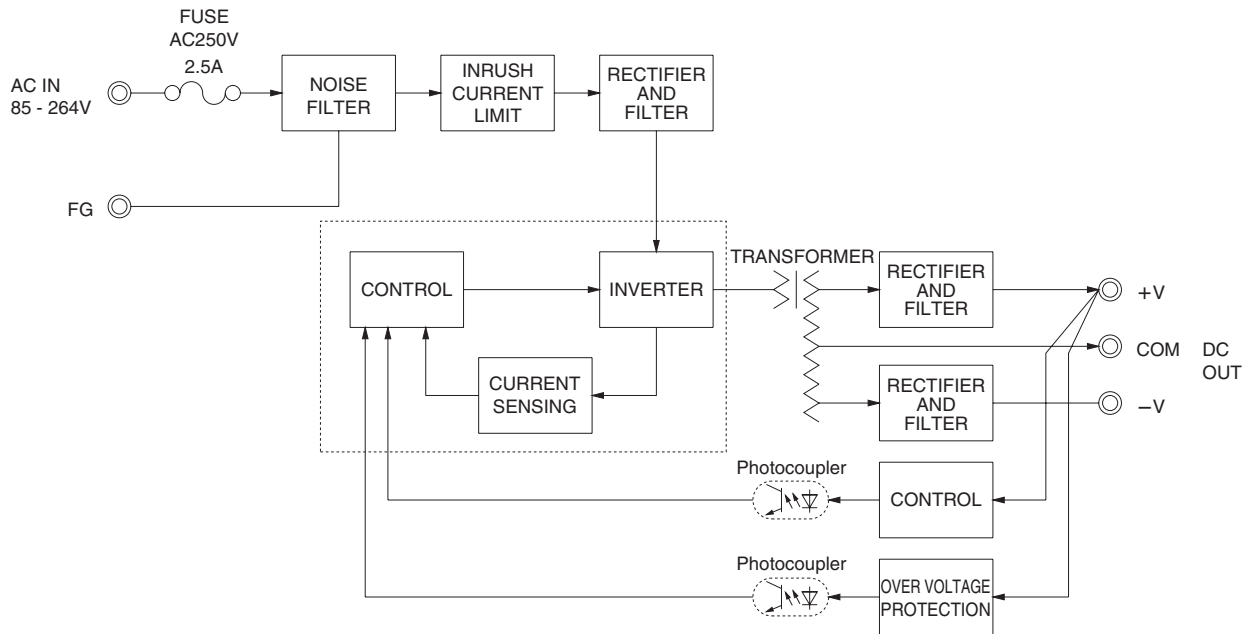
|                               | MODEL                                | PBW15F-12                                                                                                                                  | PBW15F-15                                           |
|-------------------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| INPUT                         | VOLTAGE[V]                           | AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *8)                                   |                                                     |
|                               | CURRENT[A]                           | ACIN 100V 0.40typ (CURRENT1)<br>ACIN 200V 0.20typ (CURRENT1)                                                                               |                                                     |
|                               | FREQUENCY[Hz]                        | 50/60 (47 - 440) or DC                                                                                                                     |                                                     |
|                               | EFFICIENCY[%]                        | ACIN 100V 74typ (CURRENT1)<br>ACIN 200V 77typ (CURRENT1)                                                                                   | 78typ (CURRENT1)<br>80typ (CURRENT1)                |
|                               | INRUSH CURRENT[A]                    | ACIN 100V 15typ (CURRENT1) (At cold start)<br>ACIN 200V 30typ (CURRENT1) (At cold start)                                                   |                                                     |
|                               | LEAKAGE CURRENT[mA]                  | 0.15/0.30max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1.DENAN)                                                                 |                                                     |
| OUTPUT                        | VOLTAGE[V]                           | ±12 / ( +24V reference number )                                                                                                            | ±15 / ( +30V reference number )                     |
|                               | CURRENT1[A]                          | 0.7 / 0.7                                                                                                                                  | 0.5 / 0.5                                           |
|                               | CURRENT2[A]                          | 1.4 / -                                                                                                                                    | 1.0 / -                                             |
|                               | LINE REGULATION[mV]                  | 60max / 96max                                                                                                                              | 60max / 96max                                       |
|                               | LOAD REGULATION 1[mV]                | 600max / 150max                                                                                                                            | 600max / 150max                                     |
|                               | LOAD REGULATION 2[mV]                | 750max / -                                                                                                                                 | 750max / -                                          |
|                               | RIPPLE[mVp-p]                        | 0 to +50°C *1 120max / 240max<br>-10 - 0°C *1 160max / 320max                                                                              | 120max / 240max<br>160max / 320max                  |
|                               | RIPPLE NOISE[mVp-p]                  | 0 to +50°C *1 150max / 300max<br>-10 - 0°C *1 180max / 360max                                                                              | 150max / 300max<br>180max / 360max                  |
|                               | TEMPERATURE REGULATION[mV]           | 0 to +50°C 120max<br>-10 to +50°C 150max                                                                                                   | 150max<br>180max                                    |
|                               | DRIFT[mV]                            | 48max                                                                                                                                      | 60max                                               |
|                               | START-UP TIME[ms]                    | 200typ (ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1 minute of applying input again from turning off the input voltage. |                                                     |
|                               | HOLD-UP TIME[ms]                     | 20typ (ACIN 100V, Io=100%)                                                                                                                 |                                                     |
| PROTECTION CIRCUIT AND OTHERS | OUTPUT VOLTAGE ADJUSTMENT RANGE[V]   | 9.60 - 13.2 (+V and -V are simultaneously adjusted)                                                                                        | 13.2 - 16.5 (+V and -V are simultaneously adjusted) |
|                               | OUTPUT VOLTAGE SETTING[V]            | 11.5 - 12.5 (+V and -V CURRENT1)                                                                                                           | 14.4 - 15.6 (+V and -V CURRENT1)                    |
|                               | OVERCURRENT PROTECTION               | Works over 105% of rated current and recovers automatically                                                                                |                                                     |
|                               | OVERVOLTAGE PROTECTION[V]            | 16.8 - 24.0                                                                                                                                | 20.0 - 29.0                                         |
| ISOLATION                     | OPERATING INDICATION                 | LED (Green)                                                                                                                                |                                                     |
|                               | REMOTE ON/OFF                        | None                                                                                                                                       |                                                     |
|                               | INPUT-OUTPUT                         | AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                                             |                                                     |
| ENVIRONMENT                   | INPUT-FG                             | AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                                             |                                                     |
|                               | OUTPUT-FG                            | AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)                                                               |                                                     |
|                               | OPERATING TEMP., HUMID. AND ALTITUDE | -10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                    |                                                     |
| SAFETY AND NOISE REGULATIONS  | STORAGE TEMP., HUMID. AND ALTITUDE   | -20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                          |                                                     |
|                               | VIBRATION                            | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                                |                                                     |
|                               | IMPACT                               | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                               |                                                     |
| OTHERS                        | AGENCY APPROVALS (At only AC input)  | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                                |                                                     |
|                               | CONDUCTED NOISE                      | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                   |                                                     |
|                               | HARMONIC ATTENUATOR                  | Complies with IEC61000-3-2 (Not built-in to active filter *7) *12                                                                          |                                                     |
| OTHERS                        | CASE SIZE/WEIGHT                     | 31 X 78 X 85mm [1.22 X 3.07 X 3.35 inches] (without terminal block) (W X H X D) / 200g max (with cover : 235g max)                         |                                                     |
|                               | COOLING METHOD                       | Convection                                                                                                                                 |                                                     |

- \*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN : RM101).  
\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.  
\*3 Figures for 0 to rated current 1. The current not measured side is fixed.  
\*4 Figures for 0 to rated current 2. The current not measured

- side is fixed.  
\*5 The sum of +power -power must be less than output power.  
\*6 ±12, ±15 can be used as +24 and +30.  
\*7 When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.  
\*8 Derating is required.  
\*9 Figures to rated current 1.

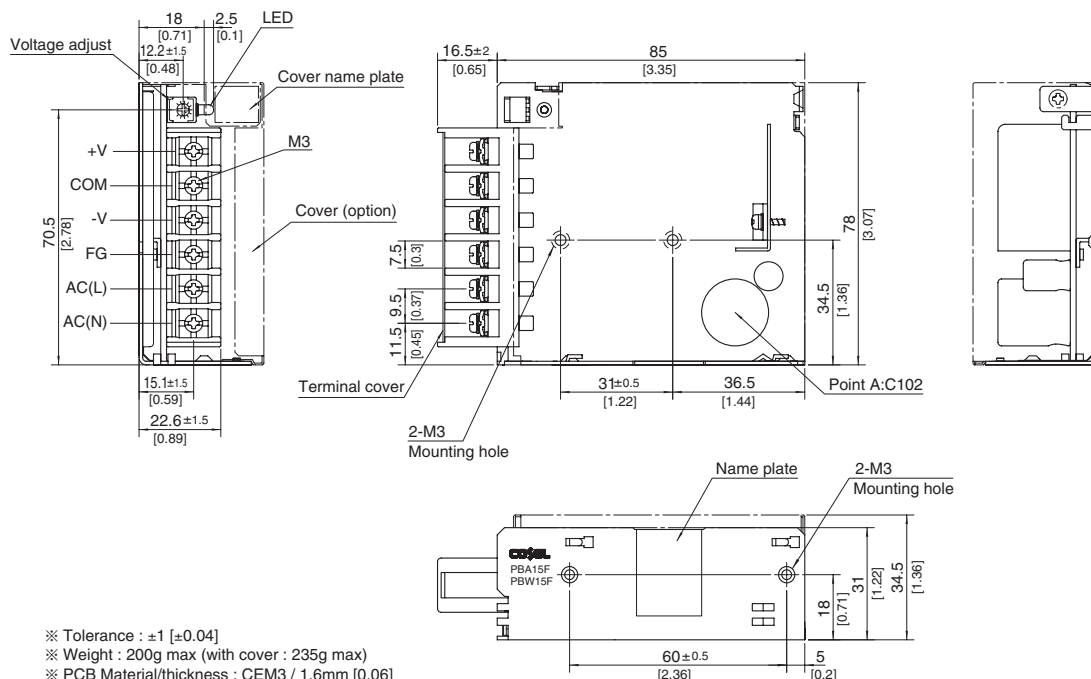
- \*10 Please contact us about safety approvals for the model with option.  
\*11 Please contact us about dynamic load and input response.  
\*12 Please contact us about class C.  
\* Parallel operation with other model is not possible.  
\* Derating is required when operated with cover.  
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

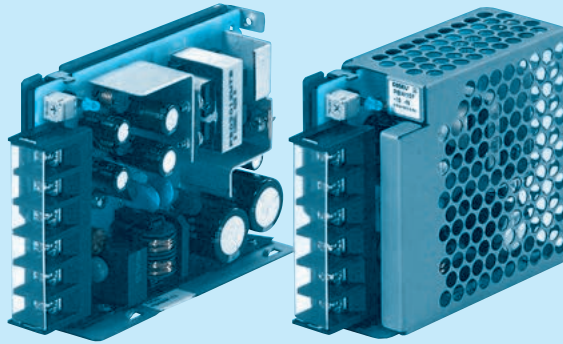
※ External size of option T, J1, N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



# PBW30F

## Ordering information

PB W 30 F - -



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Dual output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*10
- C : with Coating
- G : Low leakage current

E : Low leakage current and EMI class A

T : Vertical terminal block  
J1 : V.H (J.S.T.) connector type  
N : with Cover  
N1 : with DIN rail  
V : Output voltage setting potentiometer externally

Cover is optional

\*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                 | PBW30F-5        | PBW30F-12   | PBW30F-15   |
|-----------------------|-----------------|-------------|-------------|
| MAX OUTPUT WATTAGE[W] | 15              | 31.2        | 30.0        |
| VOLTAGE[V]            | ±5 ( +10 )      | ±12 ( +24 ) | ±15 ( +30 ) |
| DC OUTPUT             | CURRENT1[A] 1.5 | 1.3         | 1.0         |
|                       | CURRENT2[A] 2.0 | 1.7         | 1.4         |

## SPECIFICATIONS

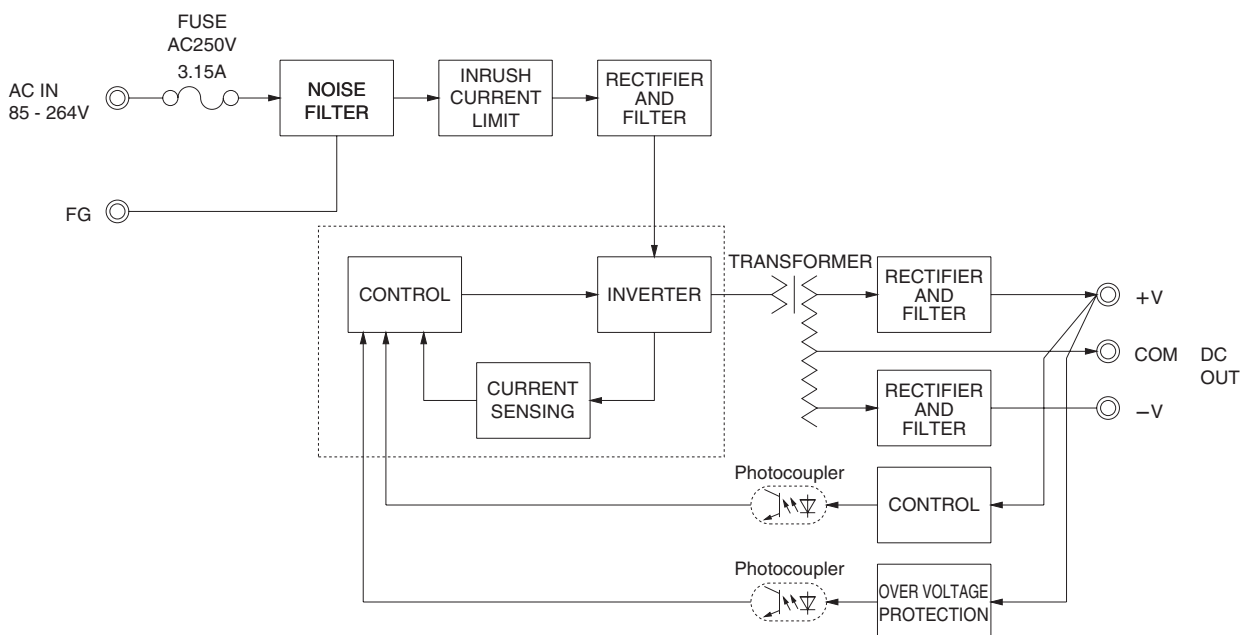
| MODEL                               | PBW30F-5                                                                                                                                 | PBW30F-12                                           | PBW30F-15                                           |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| VOLTAGE[V]                          | AC85 - 264 1 φ or DC110 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *8)                                 |                                                     |                                                     |
| CURRENT[A]                          | ACIN 100V 0.4typ (CURRENT1)                                                                                                              | 0.7typ (CURRENT1)                                   |                                                     |
|                                     | ACIN 200V 0.25typ (CURRENT1)                                                                                                             | 0.4typ (CURRENT1)                                   |                                                     |
| FREQUENCY[Hz]                       | 50/60 (47 - 440) or DC                                                                                                                   |                                                     |                                                     |
| EFFICIENCY[%]                       | ACIN 100V 75typ (CURRENT1)                                                                                                               | 77typ (CURRENT1)                                    | 78typ (CURRENT1)                                    |
|                                     | ACIN 200V 75typ (CURRENT1)                                                                                                               | 81typ (CURRENT1)                                    | 79typ (CURRENT1)                                    |
| INRUSH CURRENT[A]                   | ACIN 100V 15typ (CURRENT1) (At cold start)                                                                                               |                                                     |                                                     |
|                                     | ACIN 200V 30typ (CURRENT1) (At cold start)                                                                                               |                                                     |                                                     |
| LEAKAGE CURRENT[mA]                 | 0.30/0.65max (ACIN 100V/240V 60Hz, Io=100%, According to IEC62368-1.DENAN)                                                               |                                                     |                                                     |
| VOLTAGE[V]                          | ±5 / ( +10V reference number )                                                                                                           | ±12 / ( +24V reference number )                     | ±15 / ( +30V reference number )                     |
| CURRENT1[A]                         | 1.5 / 1.5                                                                                                                                | 1.3 / 1.3                                           | 1.0 / 1.0                                           |
| CURRENT2[A]                         | 2.0 / -                                                                                                                                  | 1.7 / -                                             | 1.4 / -                                             |
| LINE REGULATION[mV]                 | 20max / 36max                                                                                                                            | 60max / 96max                                       | 60max / 96max                                       |
| LOAD REGULATION 1[mV]               | 250max / 100max                                                                                                                          | 600max / 150max                                     | 600max / 150max                                     |
| LOAD REGULATION 2[mV]               | 500max / -                                                                                                                               | 750max / -                                          | 750max / -                                          |
| RIPPLE[mVp-p]                       | 0 to +50°C 80max / 240max                                                                                                                | 120max / 240max                                     | 120max / 240max                                     |
|                                     | -10 - 0°C 140max / 320max                                                                                                                | 160max / 320max                                     | 160max / 320max                                     |
| RIPPLE NOISE[mVp-p]                 | 0 to +50°C 120max / 300max                                                                                                               | 150max / 300max                                     | 150max / 300max                                     |
|                                     | -10 - 0°C 160max / 360max                                                                                                                | 180max / 360max                                     | 180max / 360max                                     |
| TEMPERATURE REGULATION[mV]          | 0 to +50°C 50max                                                                                                                         | 120max                                              | 150max                                              |
|                                     | -10 to +50°C 60max                                                                                                                       | 150max                                              | 180max                                              |
| DRIFT[mV]                           | 20max                                                                                                                                    | 48max                                               | 60max                                               |
| START-UP TIME[ms]                   | 200typ(ACIN 100V, Io=100%) *Start-up time is 700ms typ for less than 1minute of applying input again from turning off the input voltage. |                                                     |                                                     |
| HOLD-UP TIME[ms]                    | 20typ (ACIN 100V, Io=100%)                                                                                                               |                                                     |                                                     |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  | 4.99 - 6.00 (+V and -V are simultaneously adjusted)                                                                                      | 9.60 - 13.2 (+V and -V are simultaneously adjusted) | 13.2 - 16.5 (+V and -V are simultaneously adjusted) |
| OUTPUT VOLTAGE SETTING[V]           | 4.99 - 5.30 (+V and -V CURRENT1)                                                                                                         | 11.5 - 12.5 (+V and -V CURRENT1)                    | 14.4 - 15.6 (+V and -V CURRENT1)                    |
| OVERCURRENT PROTECTION              | Works over 105% of rated current and recovers automatically                                                                              |                                                     |                                                     |
| OVERVOLTAGE PROTECTION[V]           | 6.90 - 10.0                                                                                                                              | 16.8 - 24.0                                         | 20.0 - 29.0                                         |
| OPERATING INDICATION                | LED (Green)                                                                                                                              |                                                     |                                                     |
| REMOTE ON/OFF                       | None                                                                                                                                     |                                                     |                                                     |
| INPUT-OUTPUT                        | AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                                           |                                                     |                                                     |
| INPUT-FG                            | AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                                           |                                                     |                                                     |
| OUTPUT-FG                           | AC500V 1minute, Cutoff current = 25mA, DC500V 50MΩ min (At Room Temperature)                                                             |                                                     |                                                     |
| OPERATING TEMP.,HUMID.AND ALTITUDE  | -10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                                                  |                                                     |                                                     |
| STORAGE TEMP.,HUMID.AND ALTITUDE    | -20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                                        |                                                     |                                                     |
| VIBRATION                           | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                                              |                                                     |                                                     |
| IMPACT                              | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                                             |                                                     |                                                     |
| AGENCY APPROVALS (At only AC input) | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                                              |                                                     |                                                     |
| CONDUCTED NOISE                     | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                                                 |                                                     |                                                     |
| HARMONIC ATTENUATOR                 | Complies with IEC61000-3-2 (Not built-in to active filter *7) *12                                                                        |                                                     |                                                     |
| CASE SIZE/WEIGHT                    | 31 X 78 X 103mm [1.22 X 3.07 X 4.06 inches] (without terminal block) (W X H X D) / 270g max (with cover : 310g max)                      |                                                     |                                                     |
| COOLING METHOD                      | Convection                                                                                                                               |                                                     |                                                     |

- \*1 Measured by 20MHz oscilloscope or Ripple-Noise meter(equivalent to KEISOKU-GIKEN : RM101).
- \*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.
- \*3 Figures for 0 to rated current 1.The current not measured side is fixed.
- \*4 Figures for 0 to rated current 2.The current not measured

- side is fixed.
- \*5 The sum of +power -power must be less than output power.
- \*6 ±5, ±12, ±15 can be used as +10, +24 and +30.
- \*7 When two or more units are used, they may not comply with the harmonic attenuator. Please contact us for details.
- \*8 Derating is required.
- \*9 Figures to rated current 1.

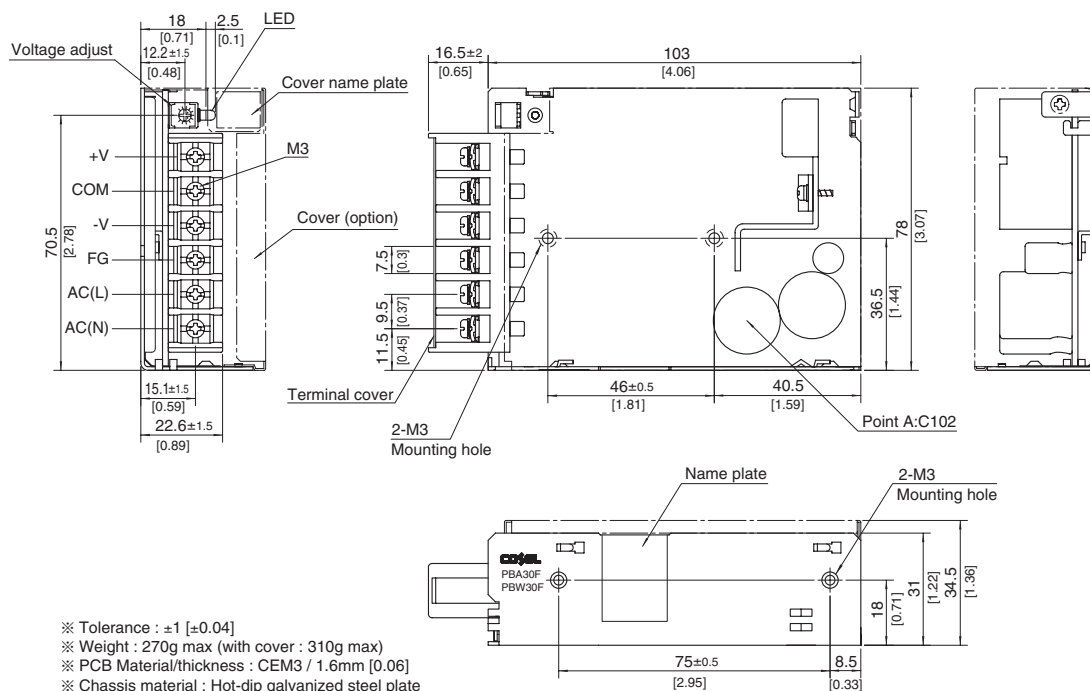
- \*10 Please contact us about safety approvals for the model with option.
- \*11 Please contact us about dynamic load and input response.
- \*12 Please contact us about class C.
- \* Parallel operation with other model is not possible.
- \* Derating is required when operated with cover.
- \* A sound may occur from power supply at peak loading.

## Block diagram



## External view

※ External size of option T,J1,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.

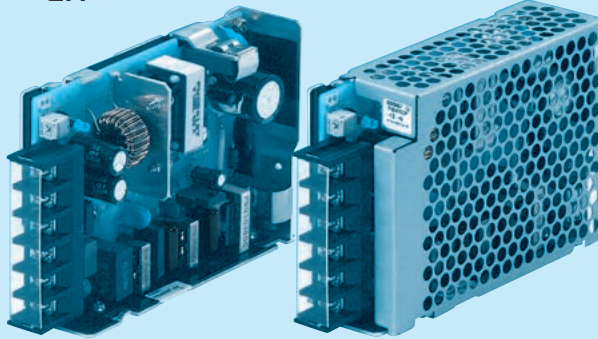


- ※ Tolerance :  $\pm 1$  [±0.04]
- ※ Weight : 270g max (with cover : 310g max)
- ※ PCB Material/thickness : CEM3 / 1.6mm [0.06]
- ※ Chassis material : Hot-dip galvanized steel plate
- ※ Dimensions in mm, [     ]= inches
- ※ Mounting torque : 0.6N · m(6.3kgf · cm)max
- ※ Screw tightening torque : M3 0.8N · m(8.5kgf · cm)max
- ※ Please connect safety ground to the unit in 2-M3 holes.

# PBW50F

PB W 50 F - -

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter  
NAC-06-472



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
- ② Dual output
- ③ Output wattage
- ④ Universal input
- ⑤ Output voltage
- ⑥ Optional \*9
- C : with Coating
- G : Low leakage current  
(0.15mA max / ACIN 240V)
- E : Low leakage current  
and EMI class A  
(0.5mA max / ACIN 240V)
- T : Vertical terminal block
- J1 : V.H (J.S.T.) connector type
- R : with Remote ON/OFF
- N : with Cover
- N1 : with DIN rail
- V : Output voltage setting  
potentiometer external-  
ly

Cover is optional

\*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                 | PBW50F-5    | PBW50F-12   | PBW50F-15   |
|-----------------------|-------------|-------------|-------------|
| MAX OUTPUT WATTAGE[W] | 30          | 50.4        | 51          |
| VOLTAGE[V]            | ±5 ( +10 )  | ±12 ( +24 ) | ±15 ( +30 ) |
| DC OUTPUT             | CURRENT1[A] | 2.1         | 1.7         |
|                       | CURRENT2[A] | 2.7         | 2.4         |

## SPECIFICATIONS

| MODEL                                | PBW50F-5                                                                                                            | PBW50F-12                                           | PBW50F-15                                           |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|
| VOLTAGE[V]                           | AC85 - 264 1 φ or DC120 - 370 (AC50 or DC70 Please refer to the instruction manual 1.1 Input voltage *3)            |                                                     |                                                     |
| CURRENT[A]                           | ACIN 100V 0.45typ (CURRENT1)                                                                                        | 0.70typ (CURRENT1)                                  |                                                     |
|                                      | ACIN 200V 0.30typ (CURRENT1)                                                                                        | 0.40typ (CURRENT1)                                  |                                                     |
| FREQUENCY[Hz]                        | 50/60 (47 - 63)                                                                                                     |                                                     |                                                     |
| EFFICIENCY[%]                        | ACIN 100V 76typ (CURRENT1)                                                                                          | 81typ (CURRENT1)                                    | 81typ (CURRENT1)                                    |
|                                      | ACIN 200V 77typ (CURRENT1)                                                                                          | 83typ (CURRENT1)                                    | 83typ (CURRENT1)                                    |
| POWER FACTOR(lo=100%)                | ACIN 100V 0.98typ                                                                                                   | 0.99typ                                             |                                                     |
|                                      | ACIN 200V 0.87typ                                                                                                   | 0.93typ                                             |                                                     |
| INRUSH CURRENT[A]                    | ACIN 100V 15typ (CURRENT1) (At cold start)                                                                          |                                                     |                                                     |
|                                      | ACIN 200V 30typ (CURRENT1) (At cold start)                                                                          |                                                     |                                                     |
| LEAKAGE CURRENT[mA]                  | 0.40/0.75max (ACIN 100V/240V 60Hz, lo=100%, According to IEC62368-1:DENAN)                                          |                                                     |                                                     |
| VOLTAGE[V]                           | ±5 / ( +10V reference number )                                                                                      | ±12 / ( +24V reference number )                     | ±15 / ( +30V reference number )                     |
| CURRENT1[A]                          | 3.0 / 3.0                                                                                                           | 2.1 / 2.1                                           | 1.7 / 1.7                                           |
| CURRENT2[A]                          | 4.0 / -                                                                                                             | 2.7 / -                                             | 2.4 / -                                             |
| LINE REGULATION[mV]                  | 20max / 36max                                                                                                       | 48max / 96max                                       | 60max / 96max                                       |
| LOAD REGULATION 1[mV]                | 250max / 100max                                                                                                     | 600max / 150max                                     | 600max / 150max                                     |
| LOAD REGULATION 2[mV]                | 500max / -                                                                                                          | 750max / -                                          | 750max / -                                          |
| RIPPLE[mVp-p]                        | 0 to +50°C *1 80max / 240max                                                                                        | 120max / 240max                                     | 120max / 240max                                     |
|                                      | -10 - 0°C *1 140max / 320max                                                                                        | 160max / 320max                                     | 160max / 320max                                     |
| RIPPLE NOISE[mVp-p]                  | 0 to +50°C *1 120max / 300max                                                                                       | 150max / 300max                                     | 150max / 300max                                     |
|                                      | -10 - 0°C *1 160max / 360max                                                                                        | 180max / 360max                                     | 180max / 360max                                     |
| TEMPERATURE REGULATION[mV]           | 0 to +50°C 50max                                                                                                    | 120max                                              | 150max                                              |
|                                      | -10 to +50°C 60max                                                                                                  | 150max                                              | 180max                                              |
| DRIFT[mV]                            | 20max                                                                                                               | 48max                                               | 60max                                               |
| START-UP TIME[ms]                    | 350typ (ACIN 100V, lo=100%)                                                                                         |                                                     |                                                     |
| HOLD-UP TIME[ms]                     | 20typ (ACIN 100V, lo=100%)                                                                                          |                                                     |                                                     |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V]   | 4.99 - 6.00 (+V and -V are simultaneously adjusted)                                                                 | 9.60 - 13.2 (+V and -V are simultaneously adjusted) | 13.2 - 16.5 (+V and -V are simultaneously adjusted) |
| OUTPUT VOLTAGE SETTING[V]            | 4.99 - 5.30 (+V and -V CURRENT1)                                                                                    | 11.5 - 12.5 (+V and -V CURRENT1)                    | 14.4 - 15.6 (+V and -V CURRENT1)                    |
| OVERCURRENT PROTECTION               | Works over 105% of rated current and recovers automatically                                                         |                                                     |                                                     |
| OVERVOLTAGE PROTECTION[V]            | 6.90 - 10.0                                                                                                         | 16.8 - 24.0                                         | 20.0 - 29.0                                         |
| OPERATING INDICATION                 | LED (Green)                                                                                                         |                                                     |                                                     |
| REMOTE ON/OFF                        | Optional (Required external power source)                                                                           |                                                     |                                                     |
| INPUT-OUTPUT · RC                    | AC3.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                      |                                                     |                                                     |
| INPUT-FG                             | AC2.000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)                                      |                                                     |                                                     |
| OUTPUT · RC-FG                       | AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)                                       |                                                     |                                                     |
| OPERATING TEMP., HUMID. AND ALTITUDE | -10 to +71°C (Refer to "Derating"), 20 - 90%RH (Non condensing) 3,000m (10,000feet) max                             |                                                     |                                                     |
| STORAGE TEMP., HUMID. AND ALTITUDE   | -20 to +75°C, 20 - 90%RH (Non condensing) 9,000m (30,000feet) max                                                   |                                                     |                                                     |
| VIBRATION                            | 10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60minutes each along X, Y and Z axis                         |                                                     |                                                     |
| IMPACT                               | 196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis                                                        |                                                     |                                                     |
| SAFETY APPROVALS (At only AC input)  | UL60950-1, C-UL(CSA60950-1), EN62368-1 Complies with DEN-AN                                                         |                                                     |                                                     |
| CONDUCTED NOISE                      | Complies with FCC Part15 classB, VCCI-B, CISPR22-B, EN55011-B, EN55022-B                                            |                                                     |                                                     |
| HARMONIC ATTENUATOR                  | Complies with IEC61000-3-2 *10                                                                                      |                                                     |                                                     |
| CASE SIZE/WEIGHT                     | 31 x 82 x 120mm [1.22 x 3.23 x 4.72 inches] (without terminal block) (W x H x D) / 280g max (with cover : 325g max) |                                                     |                                                     |
| COOLING METHOD                       | Convection                                                                                                          |                                                     |                                                     |

\*1 Measured by 20MHz oscilloscope or Ripple-Noise meter (equivalent to KEISOKU-GIKEN : RM101).

\*2 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C.

\*3 Derating is required.

\*4 Figures for 0 to rated current 1. The current not measured side is fixed.

\*5 Figures for 0 to rated current 2. The current not measured side is fixed.

\*6 The sum of +power -power must be less than output power.

\*7 RC is applied to remote ON/OFF option. RC is isolated with input/output and FG.

\*8 ±5, ±12, ±15 can be used as +10, +24 and +30.

\*9 Please contact us about safety approvals for the model with option.

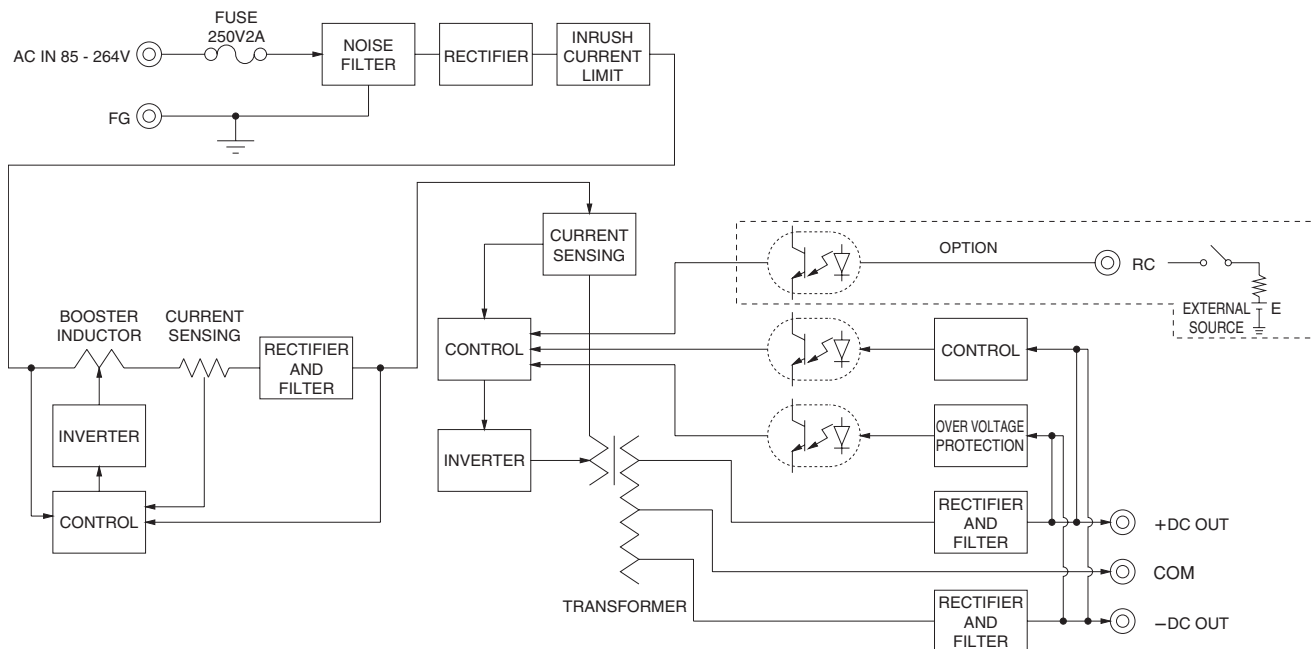
\*10 Please contact us about class C.

\* Parallel operation with other model is not possible.

\* Derating is required when operated with cover.

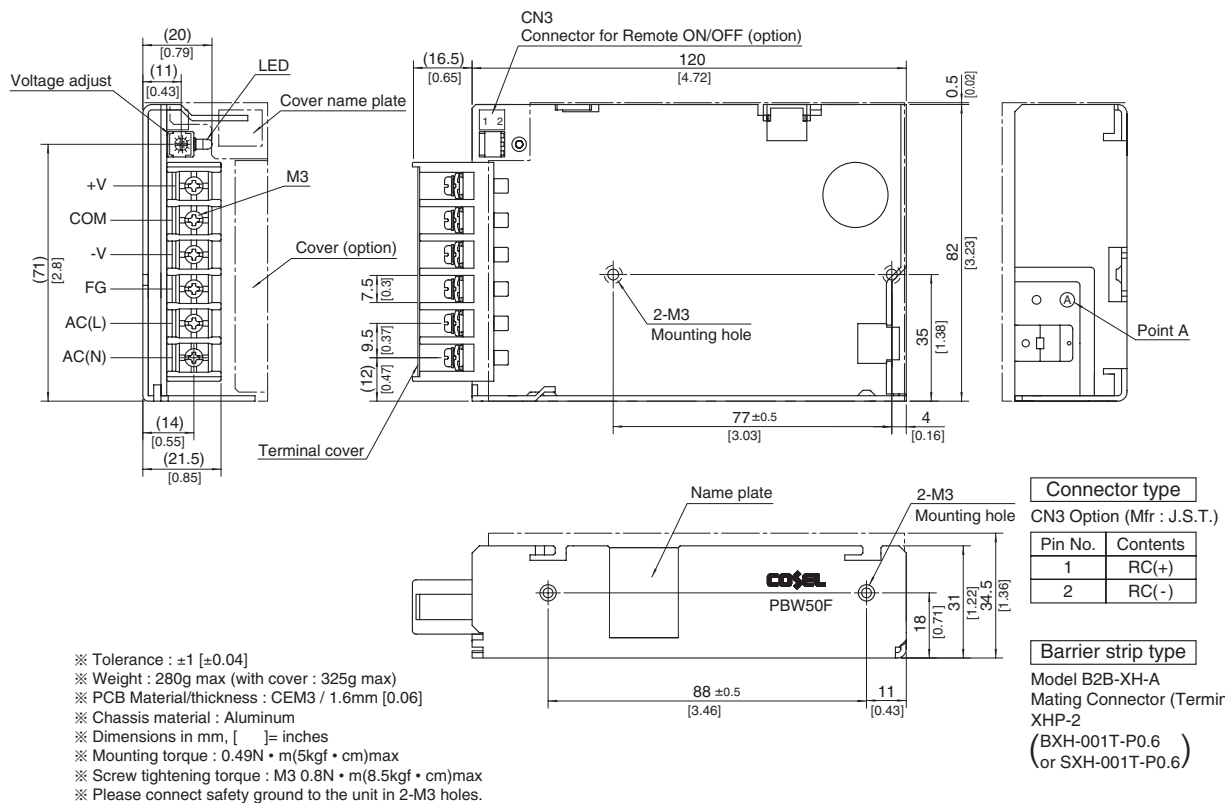
\* A sound may occur from power supply at peak loading.

## Block diagram



## External view

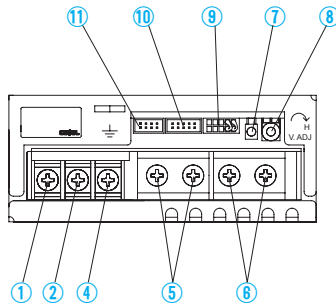
※ External size of option T,J1,R,N1 and V is different from standard model and refer to 7 Option of instruction manual for details.



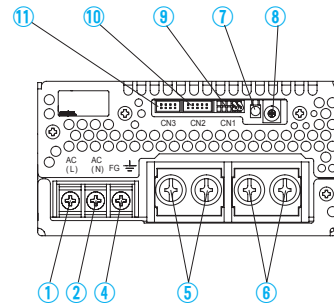
## Terminal Blocks

\* The following information covers PBA300F - 1500F. Please see External View for PBA10F - 150F and PBW15F - 50F.

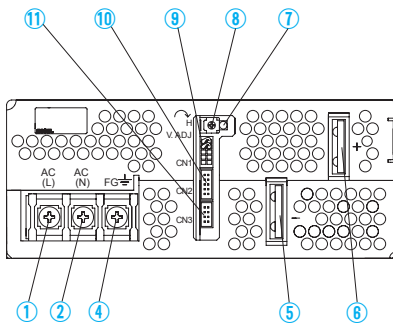
### ● PBA300F



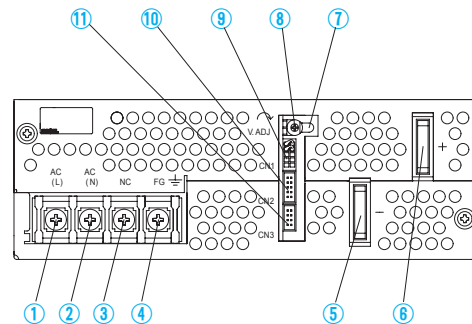
### ● PBA600F



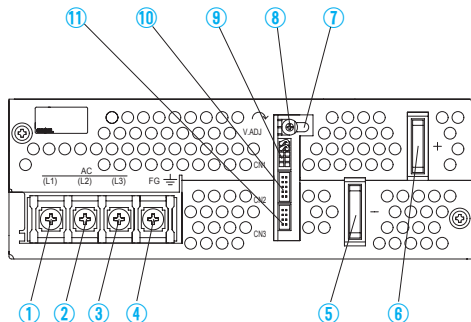
### ● PBA1000F



### ● PBA1500F



### ● PBA1500T



#### \*PBA300F - 1500F

- ①AC (L) } Input Terminals AC85 - 264V  $\phi$  47 - 63Hz
- ②AC (N) } (M4)
- ③NC
- ④Frame ground (M4  $\perp$ )
- ⑤-Output
- ⑥+Output
- ⑦LED
- ⑧Output voltage adjustable potentiometer
- ⑨CN1 } Connectors
- ⑩CN2 }
- ⑪CN3 }

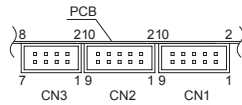
\* Please see Optional Parts for dedicated harnesses.

#### \*PBA1500T

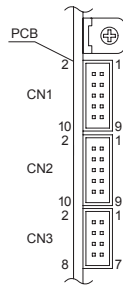
- ①AC (L1)
- ②AC (L2)
- ③AC (L3)
- ④Frame ground (M4  $\perp$ )
- ⑤-Output
- ⑥+Output
- ⑦LED
- ⑧Output voltage adjustable potentiometer
- ⑨CN1 } Connectors
- ⑩CN2 }
- ⑪CN3 }

## Terminal Blocks

## ● PBA300F, 600F Pin Configuration



## ● PBA1000F, 1500F Pin Configuration



Pin Configuration and Functions of CN1 and CN2

| Pin No. | Function                                                           |
|---------|--------------------------------------------------------------------|
| 1       | +M : Self sensing terminal. (Do not wire for external connection.) |
| 2       | +S : +Sensing                                                      |
| 3       | -M : Self sensing terminal. (Do not wire for external connection.) |
| 4       | -S : -Sensing                                                      |
| 5       | VB : Voltage balance                                               |
| 6       | CB : Current balance                                               |
| 7       | TRM : Adjustment of output voltage                                 |
| 8       | -S : -Sensing                                                      |
| 9       | RC2 : Remote ON/OFF                                                |
| 10      | RCG : Remote ON/OFF (GND)                                          |

Pin Configuration and Functions of CN3

| Pin No. | Function                          |
|---------|-----------------------------------|
| 1       | -S : -Sensing                     |
| 2       | -S : -Sensing                     |
| 3       | AUX : Auxiliary output (12V 0.1A) |
| 4       | RC1 : Remote ON/OFF               |
| 5       | AUXG : Auxiliary output (GND)     |
| 6       | N.C. : No connection              |
| 7       | PG : Alarm                        |
| 8       | PGG : Alarm (GND)                 |

\*Common signs among CN1, CN2 and CN3 such as -S represent the same potential.

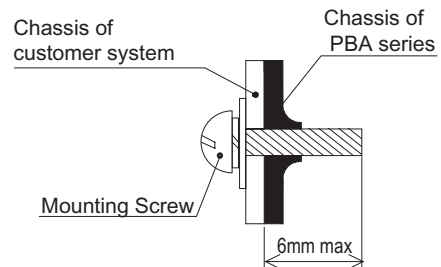
Matching connectors and terminals on CN1, CN2 and CN3

| Connector  | Housing                 | Terminal                                        | Mfr.   |
|------------|-------------------------|-------------------------------------------------|--------|
| CN1<br>CN2 | S10B-PHDSS<br>PHDR-10VS | Reel : SPHD-002T-P0.5<br>Loose : BPHD-001T-P0.5 | J.S.T. |
| CN3        | S8B-PHDSS<br>PHDR-08VS  |                                                 |        |

## Assembling and Installation Method

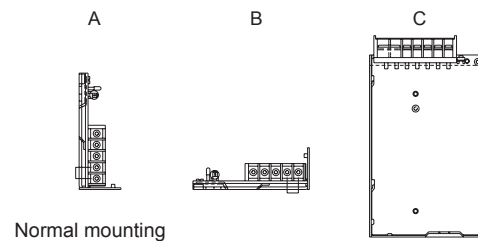
## Installation Method

- Do not insert a screw more than 6mm from the outside of a power supply to keep enough insulation distance between the screw and internal components.



## ● PBA10F, PBA15F, PBW15F, PBA30F, PBW30F, PBA50F, PBW50F, PBA75F, PBA100F and PBA150F

- If you use two or more power supplies side by side, please keep a sufficient distance between them to allow enough air ventilation.
- Ambient temperature around each power supply should not exceed the temperature range shown in "derating".

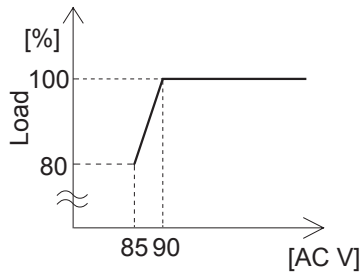


## ● PBA300F, PBA600F, PBA1000F, PBA1500F and PBA1500T

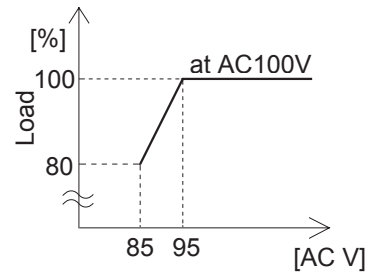
- The power supplies have a built-in forced cooling fan. Do not block ventilation at the suction side (terminal block side) and its opposite side (fan installation side). If you need to secure a power supply by screws, securely fix it, taking into consideration of its weight. You can install it in any direction.
- If you use a power supply in a dusty environment, it can give a cause for a failure. Please consider taking such countermeasures as installing an air filter near the suction area of the system to prevent a failure.
- In PBA300F, PBA1500F and PBA1500T, ventilation holes are located on the mounting side. If you would like to install the unit by using that side, please contact us for details.

## Derating

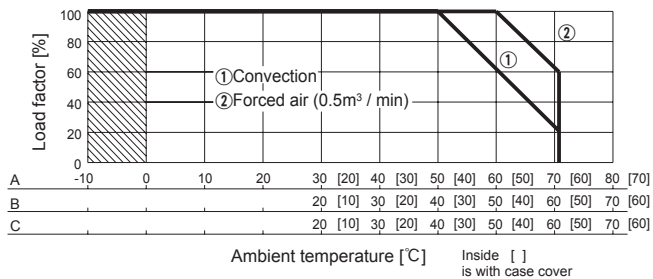
### ●PBA10F, PBA15F, PBW15F, PBA30F, PBW30F Input voltage Derating Curve



### ●PBA1500F Input voltage Derating Curve

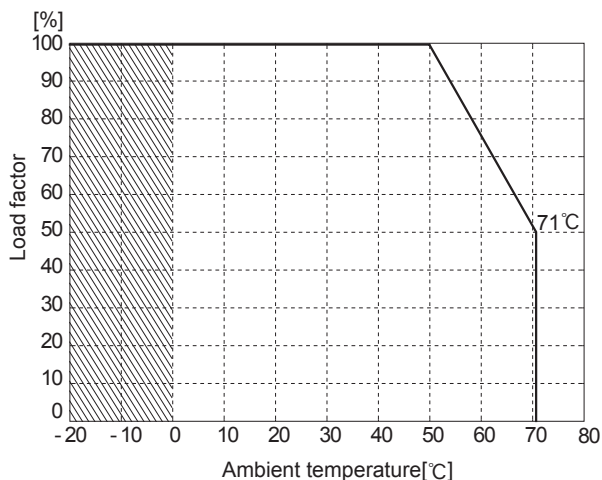


### ●PBA10F, PBA15F, PBW15F, PBA30F, PBW30F, PBA50F, PBW50F, PBA75F, PBA100F, PBA150F Ambient temperature derating curve



- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- The ambient temperature should be measured 5 to 10 cm away from the power supply so that it won't be influenced by the heat from the power supply. Please consult us for more details.
- Make sure the temperature at point A is less than the temperatures shown in Instruction Manual 4.

### ●PBA300F, PBA600F, PBA1000F, PBA1500F, PBA1500T Ambient temperature derating curve



- In the hatched area, the specification of Ripple, Ripple Noise is different from other area.
- Derating curve depending on an ambient temperature (temperature of air sucked in for a cooling purpose) is shown above.

## Instruction Manual

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

## Basic Characteristics Data

| Model    | Circuit method    | Switching frequency [kHz] | Input current [A] | Rated input fuse | Inrush current protection circuit | PCB/Pattern |              |              | Series/Parallel operation availability |                    |
|----------|-------------------|---------------------------|-------------------|------------------|-----------------------------------|-------------|--------------|--------------|----------------------------------------|--------------------|
|          |                   |                           |                   |                  |                                   | Material    | Single sided | Double sided | Series operation                       | Parallel operation |
| PBA10F   | Flyback converter | 100                       | 0.3               | 250V 2.5A        | LF                                | CEM-3       | Yes          |              | Yes                                    | *1                 |
| PBA15F   | Flyback converter | 100                       | 0.4               |                  | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
| PBA30F   | Flyback converter | 100                       | 0.7               | 250V 3.15A       | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
| PBA50F   | Active filter     | 60 - 550                  | 0.7               | 250V 2A          | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
|          | Forward converter | 130                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA75F   | Active filter     | 60 - 550                  | 1.0               | 250V 3.15A       | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
|          | Forward converter | 120                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA100F  | Active filter     | 60 - 550                  | 1.3               | 250V 3.15A       | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
|          | Forward converter | 120                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA150F  | Active filter     | 60 - 550                  | 2.0               | 250V 4A          | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
|          | Forward converter | 120                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA300F  | Active filter     | 230                       | 4.1               | 250V 10A         | SCR                               | FR-4        |              | Yes          | Yes                                    | Yes                |
|          | Forward converter | 330                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA600F  | Active filter     | 130                       | 8.2               | 250V 15A         | SCR                               | FR-4        |              | Yes          | Yes                                    | Yes                |
|          | Forward converter | 330                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA1000F | Active filter     | 130                       | 13                | 250V 30A         | SCR                               | FR-4        |              | Yes          | Yes                                    | Yes                |
|          | Forward converter | 280                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA1500F | Active filter     | 130                       | 19                | 250V 30A         | SCR                               | FR-4        |              | Yes          | Yes                                    | Yes                |
|          | Forward converter | 200                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBA1500T | Active filter     | 130                       | 6                 | 250V 16A         | SCR                               | FR-4        |              | Yes          | Yes                                    | Yes                |
|          | Forward converter | 200                       |                   |                  |                                   |             |              |              |                                        |                    |
| PBW15F   | Flyback converter | 100                       | 0.4               | 250V 2.5A        | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
| PBW30F   | Flyback converter | 100                       | 0.7               | 250V 3.15A       | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
| PBW50F   | Active filter     | 60 - 550                  | 0.7               | 250V 2A          | Thermistor                        | CEM-3       | Yes          |              | Yes                                    | *1                 |
|          | Forward converter | 130                       |                   |                  |                                   |             |              |              |                                        |                    |

\*1 Refer to Series/Parallel Operation of Instruction Manual.

\* The value of input current is at ACIN 100V and rated load, ACIN 200V 3 φ and rated load in PBA1500T.