

# MAX series

## Ordering information

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M3T ☐ -

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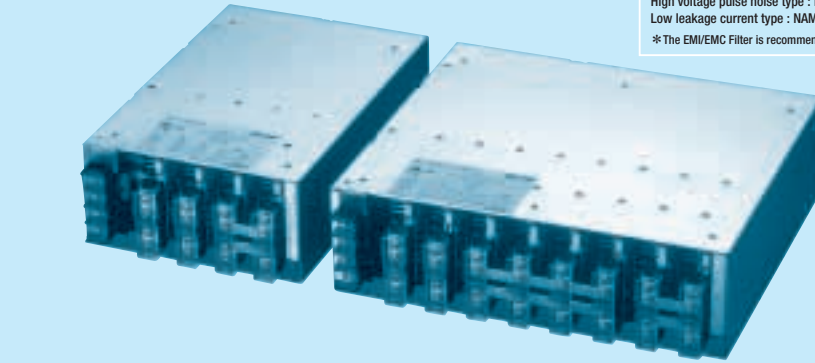
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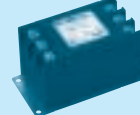
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**Recommended EMI/EMC Filter**  
MAX1600F **NAC-30-472**

High voltage pulse noise type : NAP series  
Low leakage current type : NAM series

\*The EMI/EMC Filter is recommended to connect with several devices.

MAX1600T **TAC-10-683**  
MAX3200T **TAC-20-683**


① Abbreviation type name of MAX series

M1F : MAX1600F

M1T : MAX1600T

M3T : MAX3200T

② Slot 8 Output module

③ Slot 7 Output module

④ Slot 6 Output module

⑤ Slot 5 Output module

⑥ Slot 4 Output module

⑦ Slot 3 Output module

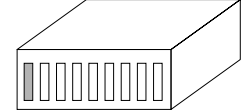
⑧ Slot 2 Output module

⑨ Slot 1 Output module

⑩ Parallel code

⑪ Series and option code \*7

Refer to instruction manual



8 7 6 5 4 3 2 1

Slot

\* The number of slot is different depending on the model.

## SPECIFICATIONS

|                             | MODEL                                   | MAX1600F (M1F)                                                                                                           | MAX1600T (M1T)                                   | MAX3200T (M3T)                                    |
|-----------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------|
| INPUT                       | VOLTAGE[V]                              | AC85 - 264 1 $\phi$ / DC120 - 350                                                                                        | AC170 - 264 3 $\phi$                             | AC170 - 264 3 $\phi$                              |
|                             | FREQUENCY[Hz]                           | 47 - 63                                                                                                                  | 47 - 63                                          | 47 - 63                                           |
|                             | CURRENT[A]                              | AC100V *1 19typ                                                                                                          | -                                                | -                                                 |
|                             |                                         | AC200V *2 10typ                                                                                                          | 6.5typ                                           | 13typ                                             |
|                             | POWER FACTOR                            | AC100V *1 0.99typ                                                                                                        | -                                                | -                                                 |
|                             |                                         | AC200V *2 0.95typ                                                                                                        | 0.95typ                                          | 0.95typ                                           |
|                             | INRUSH CURRENT [A]                      | AC100V 20/40typ (Primary inrush current/Secondary inrush current)                                                        | -                                                | -                                                 |
|                             |                                         | AC200V 40/40typ (Primary inrush current/Secondary inrush current)                                                        | 40typ                                            | 40typ                                             |
| OUTPUT                      | EFFICIENCY[%]                           | AC100V *1 78typ                                                                                                          | -                                                | -                                                 |
|                             |                                         | AC200V *2 82typ                                                                                                          | 85typ                                            | 85typ                                             |
|                             | LEAKAGE CURRENT [mA] *3                 | 1.5max                                                                                                                   | 2max                                             | 2max                                              |
|                             | NUMBER OF SLOT *4                       | 4                                                                                                                        | 4                                                | 8                                                 |
|                             | TOTAL MAXIMUM POWER[W]                  | AC90 - 150V *5 1500                                                                                                      | -                                                | -                                                 |
|                             |                                         | AC170 - 264V *5 1600                                                                                                     | 1600                                             | 3200                                              |
|                             | START-UP TIME [ms]                      | AC100V *1 700typ                                                                                                         | -                                                | -                                                 |
|                             |                                         | AC200V *2 500typ                                                                                                         | 500typ                                           | 500typ                                            |
| FUNCTION                    | HOLD-UP TIME[ms] *1                     | 20typ                                                                                                                    | 20typ                                            | 20typ                                             |
|                             | ALARM                                   | FAN ALARM                                                                                                                | FAN AND OPEN PHASE ALARM                         | FAN AND OPEN PHASE ALARM                          |
| ISOLATION                   | INPUT-OUTPUT, RC                        | AC3,000V 1minute, Cutoff current=25mA, DC500V 50M $\Omega$ min (At Room Temperature) (Cutoff current = 100mA : MAX3200T) |                                                  |                                                   |
|                             | INPUT-FG                                | AC2,000V 1minute, Cutoff current=25mA, DC500V 50M $\Omega$ min (At Room Temperature)                                     |                                                  |                                                   |
|                             | OUTPUT, RC-FG                           | AC500V 1minute, Cutoff current=100mA, DC500V 50M $\Omega$ min (At Room Temperature)                                      |                                                  |                                                   |
| ENVIRONMENT                 | OPERATING TEMP., HUMID. AND ALTITUDE *5 | -20 to +65°C, 20 - 90%RH (Non condensing) (Refer to DERATING CURVE), 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                               | 19.6m/s <sup>2</sup> , 10 - 55Hz, 3minutes period, 60minutes each along X, Y and Z axis                                  |                                                  |                                                   |
|                             | IMPACT                                  | 196.1m/s <sup>2</sup> , 11ms, once each X, Y and Z axis                                                                  |                                                  |                                                   |
| SAFTY AND NOISE REGULATIONS | AGENCY APPROVALS                        | UL60950-1, C-UL (CSA60950-1), EN60950-1, EN50178, Complies with DEN-AN (At only AC input)                                |                                                  |                                                   |
|                             | CONDUCTED NOISE                         | Complies with FCC-B, VCCI-B, CISPR22-B and EN55022-B                                                                     |                                                  |                                                   |
|                             | HARMONIC ATTENUATOR                     | Complies with IEC61000-3-2                                                                                               |                                                  |                                                   |
| OTHERS                      | CASE SIZE *6                            | 200×97×300mm (W×H×D)<br>[7.87×3.82×11.81 inches]                                                                         | 200×97×300mm (W×H×D)<br>[7.87×3.82×11.81 inches] | 340×97×300mm (W×H×D)<br>[13.39×3.82×11.81 inches] |
|                             | WEIGHT                                  | 7kg max                                                                                                                  | 7kg max                                          | 14kg max                                          |
|                             | COOLING METHOD                          | Forced cooling (built-in)                                                                                                |                                                  |                                                   |

\*1 It is a value when M1F-HFEC-00 (MAX1600F : 5V80A, 12V34A, 15V27A, 24V17A) outputs 1500W.  
The value changes by composing the output modules.

\*2 It is a value when M1F-HFEC-00 (MAX1600F : 5V80A, 12V34A, 15V27A, 24V17A) outputs 1600W or  
M1T-HFEC-00 (MAX1600T : 5V80A, 12V34A, 15V27A, 24V17A) outputs 1600W or  
M3T-HHFFEECC-00 (MAX3200T : 5V80A×2, 12V34A×2, 15V27A×2, 24V17A×2) outputs 3200W.  
The value changes by composing the output modules.

\*3 Complies with IEC60950 at AC240V 60Hz.

\*4 Each output module is insulated.

\*5 Refer to derating.

\*6 Case size contains neither the terminal blocks (cover) nor the screw.

\*7 Please contact us about safety approvals for the model with option.

## Output module specifications

| ITEM                                | CODE                         | A                                                   | B           | C           | D            | E             | F             | G             | H             | I             | O              |
|-------------------------------------|------------------------------|-----------------------------------------------------|-------------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|----------------|
| Number of slots used                |                              | 1                                                   | 1           | 1           | 1            | 1             | 1             | 1             | 1             | 1             | 1              |
| VOLTAGE[V]                          |                              | 2                                                   | 3.3         | 5           | 7.5          | 12            | 15            | 18            | 24            | 28            | BLANK<br>PANEL |
| CURRENT[A]                          |                              | 80                                                  | 80          | 80          | 54           | 34            | 27            | 22            | 17            | 14.5          |                |
| LINE REGURATION[mV]max              |                              | 20                                                  | 20          | 20          | 30           | 48            | 60            | 72            | 96            | 112           |                |
| LOAD REGURATION[mV]max              |                              | 40                                                  | 40          | 40          | 60           | 100           | 120           | 150           | 150           | 180           |                |
| RIPPLE<br>[mV]max                   | 0 to +50℃*1                  | 80                                                  | 80          | 80          | 120          | 120           | 120           | 120           | 120           | 120           |                |
|                                     | -20 to 0℃*1                  | 140                                                 | 140         | 140         | 160          | 160           | 160           | 160           | 160           | 160           |                |
| RIPPLE NOISE<br>[mV]max             | 0 to +50℃*1                  | 120                                                 | 120         | 120         | 150          | 150           | 150           | 150           | 150           | 150           |                |
|                                     | -20 to 0℃*1                  | 160                                                 | 160         | 160         | 180          | 180           | 180           | 180           | 180           | 180           |                |
| TEMPRATURE<br>COEFFICIENT[mV]max    | 0 to +50℃                    | 40                                                  | 40          | 50          | 75           | 120           | 150           | 180           | 240           | 280           |                |
|                                     | -10 to +50℃                  | 60                                                  | 60          | 75          | 120          | 180           | 225           | 270           | 360           | 420           |                |
| DRIFT[mV]max *2                     |                              | 12                                                  | 12          | 20          | 30           | 48            | 60            | 72            | 96            | 112           |                |
| OUTPUT VOLTAGE SETTING[V]           |                              | 2.00 - 2.06                                         | 3.30 - 3.40 | 5.00 - 5.15 | 7.50 - 7.80  | 12.00 - 12.48 | 15.00 - 15.60 | 18.00 - 18.72 | 24.00 - 24.96 | 28.00 - 29.12 |                |
| OUTPUT VOLTAGE ADJUSTMENT RANGE[V]  |                              | 1.98 - 2.20                                         | 2.64 - 3.63 | 4.00 - 5.50 | 6.00 - 8.25  | 9.60 - 13.20  | 12.00 - 16.50 | 14.40 - 19.80 | 19.20 - 26.40 | 22.40 - 30.80 |                |
| OVERCURRENT PROTECTION              |                              | Works over 105% of rated current automatic recovery |             |             |              |               |               |               |               |               |                |
| OVERVOLTAGE PROTECTION[V]           |                              | 4.00 - 5.50                                         | 4.00 - 5.50 | 5.75 - 7.00 | 8.63 - 10.50 | 13.80 - 16.80 | 17.25 - 21.00 | 20.70 - 25.20 | 27.60 - 33.60 | 32.20 - 39.20 |                |
| OUTPUT<br>CURRENT IN<br>PARALLEL[A] | TWO MODULES<br>IN PARALLEL   | 144                                                 | 144         | 144         | 97           | 61            | 49            | 40            | 31            | 26            | -              |
|                                     | THREE MODULES<br>IN PARALLEL | 216                                                 | 216         | 216         | 146          | 92            | 73            | 60            | 46            | 40            | -              |
|                                     | FOUR MODULES<br>IN PARALLEL  | 300                                                 | 300         | 300         | 195          | 125           | 100           | 80            | 63            | 54            | -              |
|                                     | FIVE MODULES<br>IN PARALLEL  | 360                                                 | 360         | 360         | 243          | 153           | 122           | 100           | 77            | 66            | -              |
|                                     | SIX MODULES<br>IN PARALLEL   | 444                                                 | 444         | 444         | 292          | 196           | 149           | 120           | 92            | 80            | -              |
|                                     | SEVEN MODULES<br>IN PARALLEL | 516                                                 | 516         | 516         | 341          | 217           | 173           | 140           | 107           | 94            | -              |
|                                     | EIGHT MODULES<br>IN PARALLEL | 600                                                 | 600         | 600         | 390          | 250           | 200           | 160           | 127           | 108           | -              |
| *3                                  |                              |                                                     |             |             |              |               |               |               |               |               |                |

MAX

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

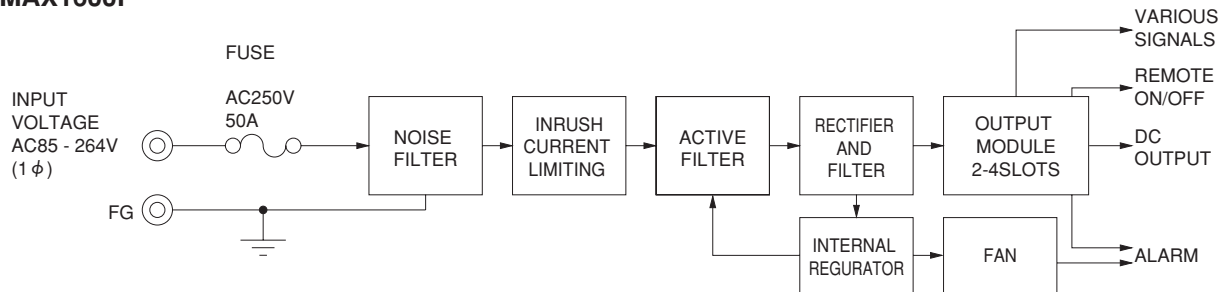
Ripple and Ripple Noise is measured by using measuring board with capacitor of 470 μF between 20mm to 100mm from the output terminal.

\*2 Drift is change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.

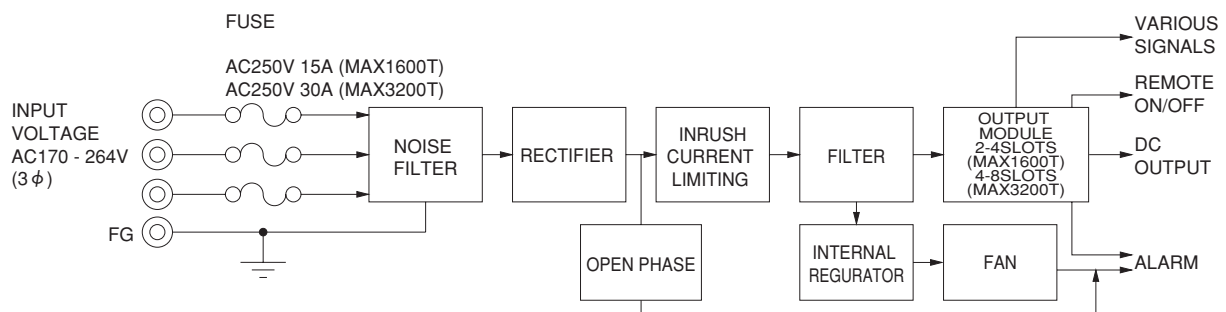
\*3 Modularity in parallel are built to order and are not possible for the user to assemble them.

## Block diagram

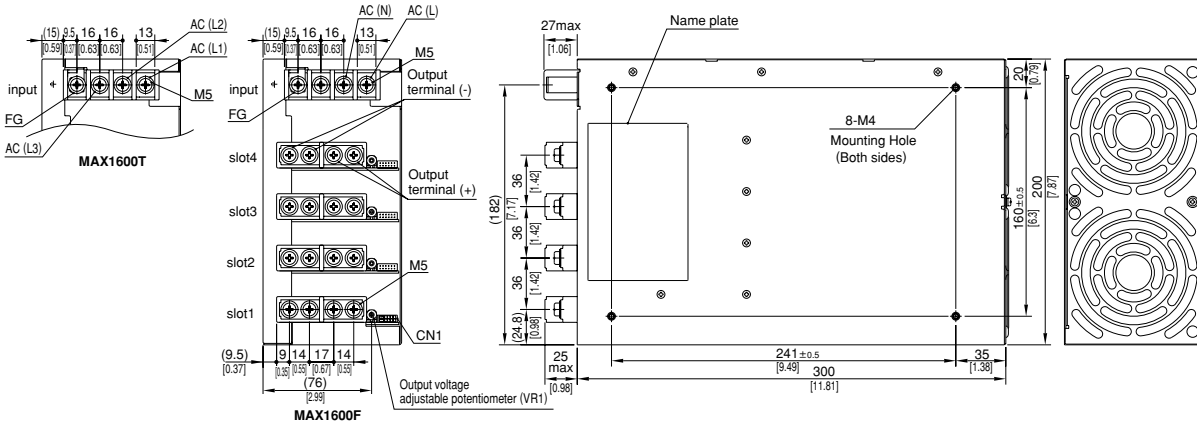
## ● MAX1600F



## ● MAX1600T / MAX3200T



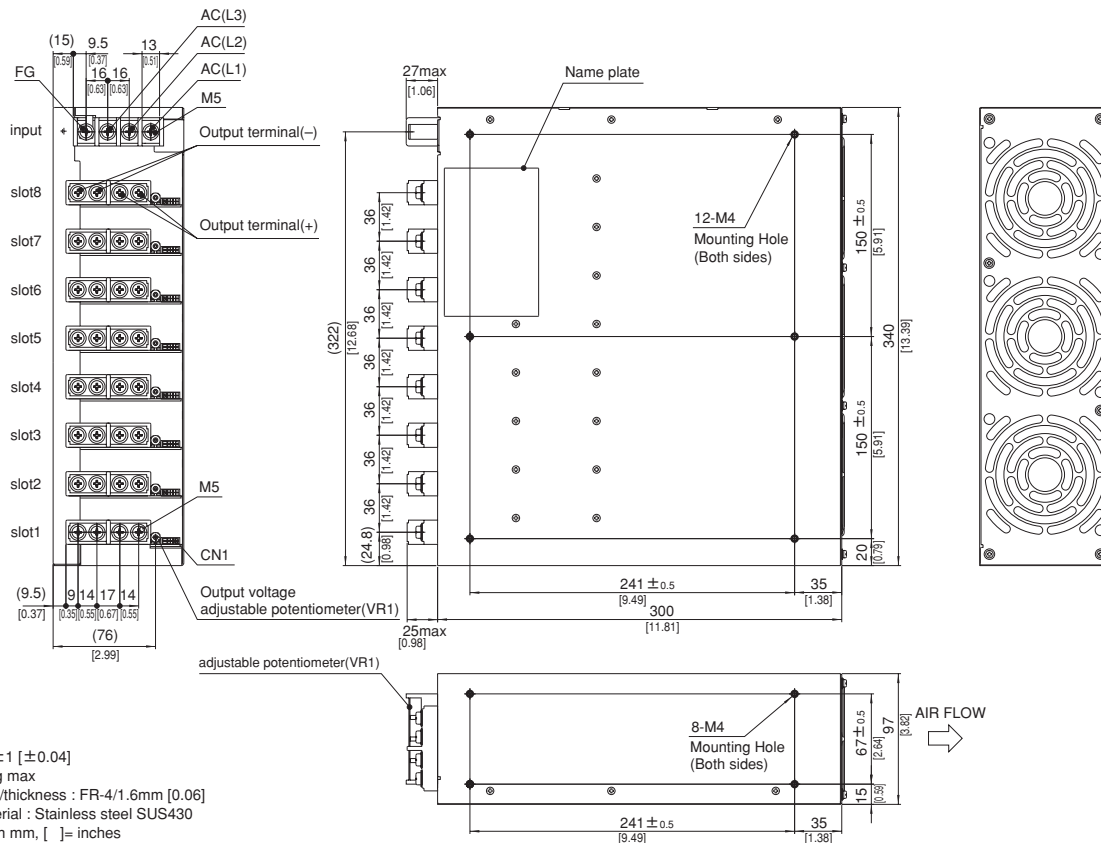
MAX1600F / MAX1600T external view



MAX

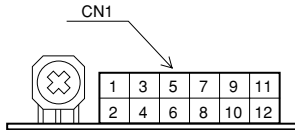
- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 7kg max
- ※ PCB Material/thickness : FR-4/1.6mm [0.06]
- ※ Chassis material : Stainless steel SUS430
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $1.5N \cdot m$  (16kgf  $\cdot$  cm) max
- ※ Keep drawing current per terminal below 80A of output terminal.
- ※ The housing for the remote sensing unused is mounted on CN1 of each output module.  
However, when the output module is connected in parallel, the housing is mounted on only master output module.
- ※ Output terminal covers are appended.

MAX3200T external view



- ※ Tolerance :  $\pm 1$  [ $\pm 0.04$ ]
- ※ Weight : 14kg max
- ※ PCB Material/thickness : FR-4/1.6mm [0.06]
- ※ Chassis material : Stainless steel SUS430
- ※ Dimensions in mm, [ ] = inches
- ※ Mounting torque :  $1.5N \cdot m$  (16kgf  $\cdot$  cm) max
- ※ Keep drawing current per terminal below 80A of output terminal.
- ※ The housing for the remote sensing unused is mounted on CN1 of each output module.  
However, when the output module is connected in parallel, the housing is mounted on only master output module.
- ※ Output terminal covers are appended.

## Function connector (CN1) pinassign



Mating connector and terminal of output module CN1

|     | Connector  | Mating connector | Terminal                                     | Mfr.  |
|-----|------------|------------------|----------------------------------------------|-------|
| CN1 | S12B-PHDSS | PHDR-12VS        | Chain : SPHD-002T-P0.5                       | J.S.T |
|     |            |                  | Loose : BPHD-001T-P0.5<br>: BPHD-002T-P0.5*1 |       |

\*1 Ratchet Hand is nothing

Pin connection and function of output module CN1

| Pin No. | Function                                |
|---------|-----------------------------------------|
| 1       | +M : +Output voltage monitoring         |
| 2       | -M : -Output voltage monitoring         |
| 3       | +S : +Remote sensing                    |
| 4       | -S : -Remote sensing, Signal ground     |
| 5       | TRM : Adjustment of output Voltage      |
| 6       | -S : -Remote sensing, Signal ground     |
| 7       | RC2 : Remote ON/OFF                     |
| 8       | -S : -Remote sensing, Signal ground     |
| 9       | RC3 : Remote ON/OFF                     |
| 10      | ALM : Fan alarm (and open phase alarm)* |
| 11      | IOG : Inverter operation monitor        |
| 12      | TMP : Thermal detection signal          |

\* MAX1600T / MAX3200T

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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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