

# MAX series

## Ordering information

M1 ☐ -

①

☐ ☐ ☐ ☐ - ☐ ☐ - ☐ ☐   
⑥ ⑦ ⑧ ⑨ ⑩ ⑪

M3T ☐ -

①

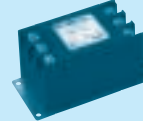
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② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪


RoHS

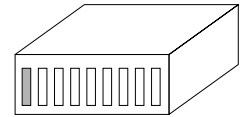
Recommended EMI/EMC Filter  
MAX1600F NAC-30-472

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<br>AC200V *2 10typ                                                                                                     | -<br>6.5typ                                      | -<br>13typ                                        |
|                             | POWER FACTOR                            | AC100V *1 0.99typ<br>AC200V *2 0.95typ                                                                                                 | -<br>0.95typ                                     | -<br>0.95typ                                      |
|                             | INRUSH CURRENT [A]                      | AC100V 20/40typ (Primary inrush current/Secondary inrush current)<br>AC200V 40/40typ (Primary inrush current/Secondary inrush current) | -<br>40typ                                       | -<br>40typ                                        |
|                             | EFFICIENCY[%]                           | AC100V *1 78typ<br>AC200V *2 82typ                                                                                                     | -<br>85typ                                       | -<br>85typ                                        |
|                             | LEAKAGE CURRENT [mA]                    | *3 1.5max                                                                                                                              | 2max                                             | 2max                                              |
|                             | NUMBER OF SLOT                          | *4 4                                                                                                                                   | 4                                                | 8                                                 |
| OUTPUT                      | TOTAL MAXIMUM POWER[W]                  | AC90 - 150V *5 1500<br>AC170 - 264V *5 1600                                                                                            | -<br>1600                                        | -<br>3200                                         |
|                             | START-UP TIME [ms]                      | AC100V *1 700typ<br>AC200V *2 500typ                                                                                                   | -<br>500typ                                      | -<br>500typ                                       |
|                             | 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           | -              |

MAX

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

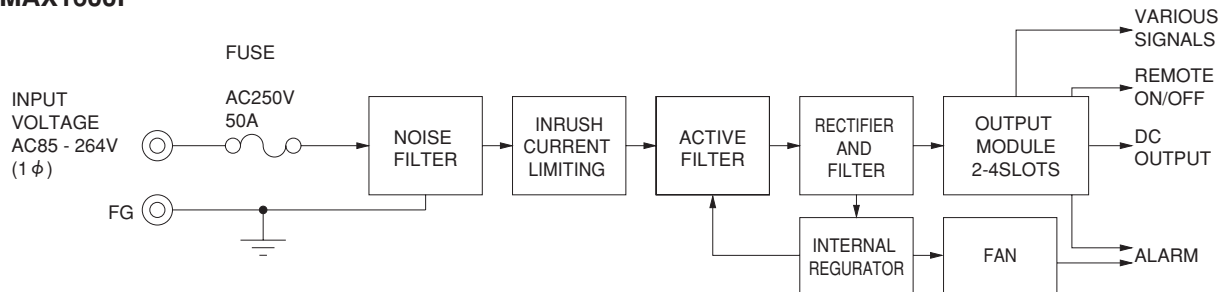
Ripple and Ripple Noise is measured by using measuring board with capacitor of 470 μF between 20mm to 100mm from the output terminal.

\*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.

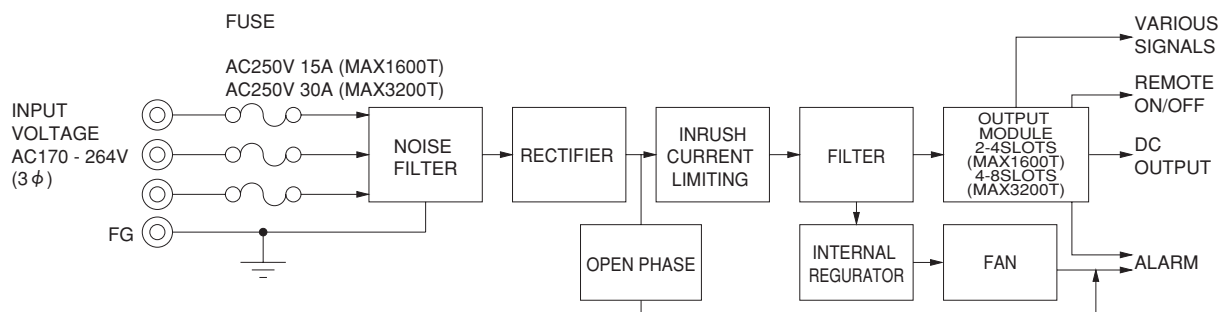
\*3 Modularity in parallel are built to order and are not possible for the user to assemble them.

## Block diagram

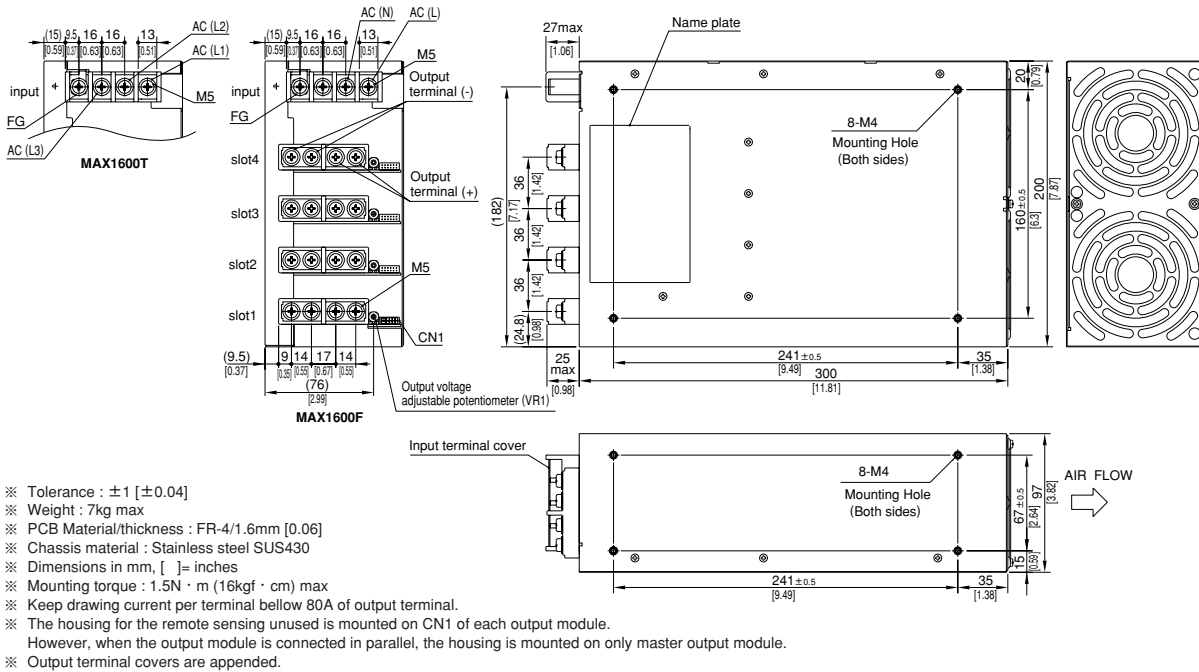
## ● MAX1600F



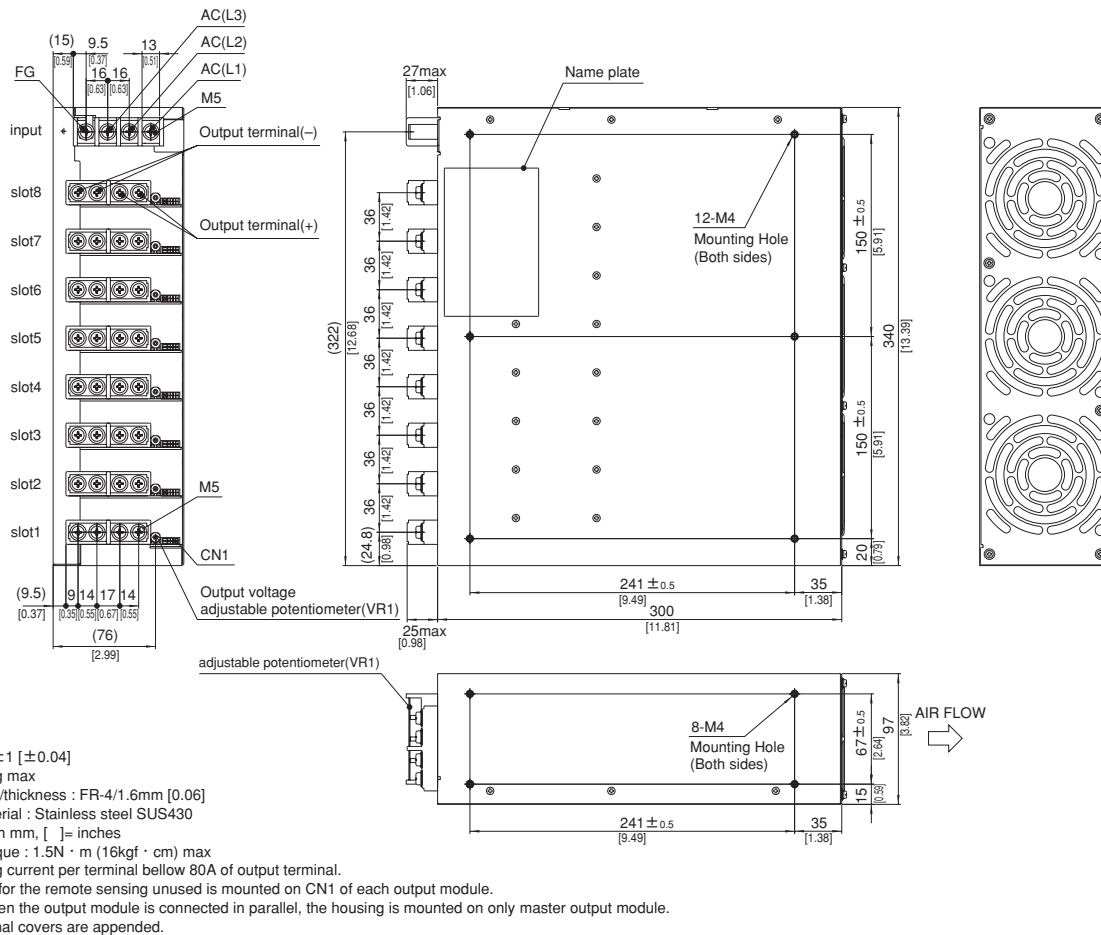
## ● MAX1600T / MAX3200T



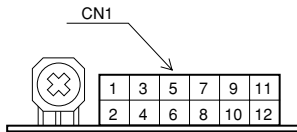
MAX1600F / MAX1600T external view



MAX3200T external view



## 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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