



**IP67**  
(Optional)



UL62368-1



EN62368-1

TPTC004

IEC62368-1



## Features

- Built-in active PFC function
- High efficiency up to 96%
- Fanless design, cooling by free air convection
- Aluminum case and filling with heat-conducted glue
- Withstand 10G vibration test
- -40 ~ +70°C wide operating range
- Charger for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese)
- Built-in default 2/3 stage charging curves and programmable curve
- Built-in PMBus protocol / Optional CANBus protocol
- Output voltage and constant current level programmable
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Built-in remote ON-OFF control
- DC OK active signal
- LED indicator for power on
- Optional wiring type with IP67 rating
- 6 years warranty

## Description

HEP-1000 is a 1000W industrial AC/DC power supply featuring the outstanding capability to operate under highly humid, dusty, oily, and high-vibration harsh environment. The entire series is housed with the aluminum case and fully potted with heat-conducted silicone. Adopting the full range 90~305VAC input, the entire series provides an output voltage line of 24V, 48V and 100V. In addition to the high efficiency up to 96%, that the whole series operates from -40°C ~ 70°C under air convection without fan. HEP-1000 has the complete protection functions and 10G anti-vibration capability ; It is complied with the international safety regulations such as TUV EN62368-1 UL62368-1, and the design refers to EN61558-1 and EN60335-1 HEP-1000 series serves as a high performance power supply solution for various industrial applications.

## Model Encoding

HEP - 1000 - 24  

- Communication protocol option
- Output voltage
- Rated wattage
- Series name

| Type  | Communication Protocol | Note       |
|-------|------------------------|------------|
| Blank | PMBus protocol         | In Stock   |
| CAN   | CANBus protocol        | By request |

## Certificates

- Safety: UL/EN62368-1
- EMC: EN 55032 / 55024

## Applications

- Industrial automation machinery
- Industrial control system
- Mechanical and electrical equipment
- Electronic instruments, equipments or apparatus
- Household appliances

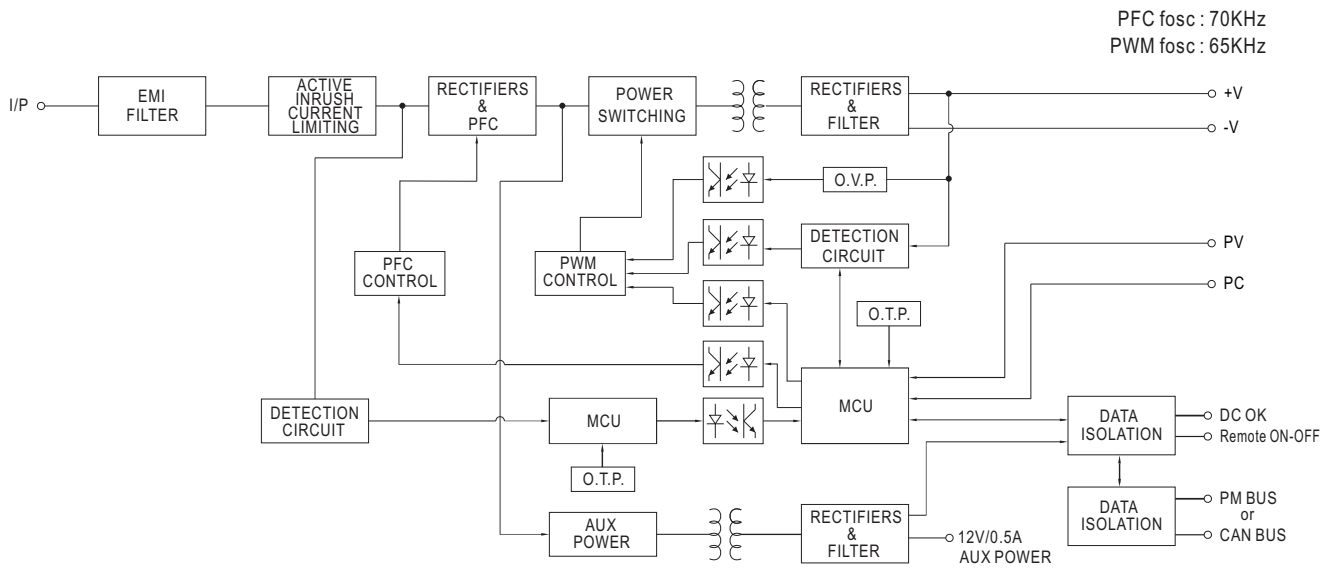
**SPECIFICATION FOR POWER SUPPLY**

| MODEL                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | HEP-1000-24                                                                                                                         |  | HEP-1000-48   |                   | HEP-1000-100                                                             |  |
|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--|---------------|-------------------|--------------------------------------------------------------------------|--|
| OUTPUT                                  | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 24V                                                                                                                                 |  | 48V           |                   | 100V                                                                     |  |
|                                         | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 42A                                                                                                                                 |  | 21A           |                   | 10A                                                                      |  |
|                                         | RATED POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1008W                                                                                                                               |  | 1008W         |                   | 1000W                                                                    |  |
|                                         | RIPPLE & NOISE (max.) <small>Note.2</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 200mVp-p                                                                                                                            |  | 250mVp-p      |                   | 500mVp-p                                                                 |  |
|                                         | VOLTAGE ADJ. RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | By built-in potentiometer, SVR                                                                                                      |  |               |                   |                                                                          |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 24 ~ 30V                                                                                                                            |  | 48 ~ 60V      |                   | 100 ~ 125V                                                               |  |
|                                         | VOLTAGE TOLERANCE <small>Note.3</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± 1.0%                                                                                                                              |  | ± 1.0%        |                   | ± 1.0%                                                                   |  |
|                                         | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± 0.5%                                                                                                                              |  | ± 0.5%        |                   | ± 0.5%                                                                   |  |
|                                         | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± 0.5%                                                                                                                              |  | ± 0.5%        |                   | ± 0.5%                                                                   |  |
| INPUT                                   | SETUP, RISE TIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1800ms, 80ms at full load      230VAC /115VAC                                                                                       |  |               |                   |                                                                          |  |
|                                         | HOLD UP TIME (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 16ms / 230VAC at 75% load      12ms / 230VAC at full load                                                                           |  |               |                   |                                                                          |  |
|                                         | VOLTAGE RANGE <small>Note.4</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 90 ~ 305VAC      250 ~ 431VDC                                                                                                       |  |               |                   |                                                                          |  |
|                                         | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 47 ~ 63Hz                                                                                                                           |  |               |                   |                                                                          |  |
|                                         | POWER FACTOR (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | PF>0.99/115VAC, PF>0.95/230VAC, PF>0.93/277VAC at full load                                                                         |  |               |                   |                                                                          |  |
|                                         | EFFICIENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 95%                                                                                                                                 |  | 96%           |                   | 96%                                                                      |  |
|                                         | AC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 10.1A / 115VAC      5.3A / 230VAC                                                                                                   |  | 4.5A / 277VAC |                   |                                                                          |  |
|                                         | INRUSH CURRENT(Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Cold start 40A at 230VAC                                                                                                            |  |               |                   |                                                                          |  |
| LEAKAGE CURRENT                         | <0.75mA / 240VAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                     |  |               |                   |                                                                          |  |
| PROTECTION                              | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 105~125% rated output power<br>Protection type : Constant current limiting, unit will shutdown after 5 sec, re-power on to recover. |  |               |                   |                                                                          |  |
|                                         | SHORT CIRCUIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Constant current limiting, unit will shutdown after 5 sec, re-power on to recover.                                                  |  |               |                   |                                                                          |  |
|                                         | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 30 ~ 35V                                                                                                                            |  | 60 ~ 70V      |                   | 125 ~ 145V                                                               |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Protection type :Shut down O/P voltage,re-power on to recover                                                                       |  |               |                   |                                                                          |  |
|                                         | OVER TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Protection type :Shut down O/P voltage, recovers automatically after temperature goes down                                          |  |               |                   |                                                                          |  |
| FUNCTION                                | OUTPUT VOLTAGE PROGRAMMABLE(PV) <small>Note 5</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Adjustment of output voltage is allowable to 50 ~ 125% of nominal output voltage<br>Please refer to the Function Manual.            |  |               |                   |                                                                          |  |
|                                         | OUTPUT CURRENT PROGRAMMABLE(PC) <small>Note 5</small>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Adjustment of constant current level is allowable to 20 ~ 100% of rated current.<br>Please refer to the Function Manual.            |  |               |                   |                                                                          |  |
|                                         | REMOTE ON/OFF CONTROL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Power ON : Short circuit      Power OFF : Open circuit                                                                              |  |               |                   |                                                                          |  |
|                                         | AUXILIARY POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12V @ 0.5A tolerance ±10%, ripple=150mVp-p                                                                                          |  |               |                   |                                                                          |  |
|                                         | DC-OK SIGNAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The TTL signal out, PSU turn on = 4.4 ~ 5.5V ; PSU turn off = -0.5 ~ 0.5V. Please refer to the Function Manual.                     |  |               |                   |                                                                          |  |
| ENVIRONMENT                             | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -40 ~ +70℃ (Refer to "Derating Curve")                                                                                              |  |               |                   |                                                                          |  |
|                                         | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 20 ~ 95% RH non-condensing                                                                                                          |  |               |                   |                                                                          |  |
|                                         | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -40 ~ +80℃, 10 ~ 95% RH non-condensing                                                                                              |  |               |                   |                                                                          |  |
|                                         | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ±0.03%/℃ (0 ~ 50℃)                                                                                                                  |  |               |                   |                                                                          |  |
|                                         | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 20 ~ 500Hz, 10G 12min./1cycle, period for 72min. each along X, Y, Z axes                                                            |  |               |                   |                                                                          |  |
| SAFETY & EMC<br><small>(Note.6)</small> | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | UL62368-1,TUV EN62368-1, EAC TP TC 004 approved; design refer to EN61558-1, EN60335-1(by request)                                   |  |               |                   |                                                                          |  |
|                                         | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | I/P-O/P:3KVAC    I/P-FG:2KVAC    O/P-FG:1.25KVAC                                                                                    |  |               |                   |                                                                          |  |
|                                         | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I/P-O/P, I/P-FG,O/P-FG:100M Ohms/500VDC/25℃ / 70%RH                                                                                 |  |               |                   |                                                                          |  |
|                                         | EMC EMISSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Parameter                                                                                                                           |  |               | Standard          | Test Level / Note                                                        |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Conducted                                                                                                                           |  |               | EN55032 (CISPR32) | Class B                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Radiated                                                                                                                            |  |               | EN55032 (CISPR32) | Class B                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Harmonic Current                                                                                                                    |  |               | EN61000-3-2       | Class A                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Voltage Flicker                                                                                                                     |  |               | EN61000-3-3       | -----                                                                    |  |
|                                         | EMC IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | EN55024 , EN61000-6-2                                                                                                               |  |               |                   |                                                                          |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Parameter                                                                                                                           |  |               | Standard          | Test Level / Note                                                        |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ESD                                                                                                                                 |  |               | EN61000-4-2       | Level 3, 8KV air ; Level 2, 4KV contact                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Radiated                                                                                                                            |  |               | EN61000-4-3       | Level 3                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | EFT / Burst                                                                                                                         |  |               | EN61000-4-4       | Level 3                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Surge                                                                                                                               |  |               | EN61000-6-2       | 2KV/Line-Line 4KV/Line-Earth                                             |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Conducted                                                                                                                           |  |               | EN61000-4-6       | Level 3                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Magnetic Field                                                                                                                      |  |               | EN61000-4-8       | Level 4                                                                  |  |
|                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Voltage Dips and Interruptions                                                                                                      |  |               | EN61000-4-11      | >95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods |  |
| OTHERS                                  | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 197.9K hrs min.    Telcordia SR-332 (Bellcore) ; 52.32K hrs min.    MIL-HDBK-217F (25℃)                                             |  |               |                   |                                                                          |  |
|                                         | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 310*144*48.5mm (L*W*H)                                                                                                              |  |               |                   |                                                                          |  |
|                                         | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 4Kg;4pcs/17Kg/1.04CUFT                                                                                                              |  |               |                   |                                                                          |  |
| NOTE                                    | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance :includes set up tolerance, line regulation and load regulation.<br>4. Derating may be needed under low input voltages. Please check the derating curve for more details.<br>5. PV/PC functions when users do not use SVR.<br>6. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 720mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on http://www.meanwell.com)<br>7. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft). |                                                                                                                                     |  |               |                   |                                                                          |  |

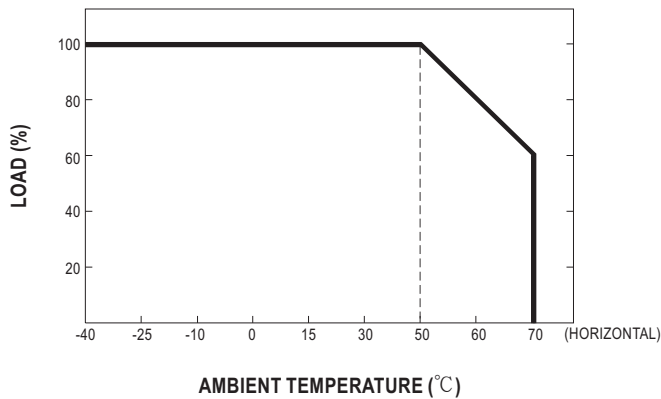
**SPECIFICATION FOR CHARGER**

| MODEL                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | HEP-1000-24                                                                                                     | HEP-1000-48       | HEP-1000-100                                                             |  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------|--|
| OUTPUT                   | BOOST CHARGE VOLTAGE $V_{boost}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 28.8V                                                                                                           | 57.6V             | 115.2V                                                                   |  |
|                          | FLOAT CHARGE VOLTAGE $V_{float}$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 27.6V                                                                                                           | 55.2V             | 110.4V                                                                   |  |
|                          | RECOMMENDED BATTERY CAPACITY(AMP HOURS)(Note 2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 120 ~ 350AH                                                                                                     | 60 ~ 175AH        | 30 ~ 85AH                                                                |  |
|                          | BATTERY TYPE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Open & Sealed Lead Acid                                                                                         |                   |                                                                          |  |
|                          | OUTPUT CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 35A                                                                                                             | 17.5A             | 8.7A                                                                     |  |
| INPUT                    | VOLTAGE RANGE <span style="float:right">Note 3</span>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 90 ~ 305VAC      250 ~ 431VDC                                                                                   |                   |                                                                          |  |
|                          | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 47 ~ 63Hz                                                                                                       |                   |                                                                          |  |
|                          | POWER FACTOR (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PF>0.99/115VAC, PF>0.95/230VAC, PF>0.93/277VAC at full load                                                     |                   |                                                                          |  |
|                          | EFFICIENCY (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 95%                                                                                                             | 96%               | 96%                                                                      |  |
|                          | AC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 10.1A / 115VAC      5.3A / 230VAC                                                                               | 4.5A / 277VAC     |                                                                          |  |
|                          | INRUSH CURRENT(Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Cold start 40A at 230VAC                                                                                        |                   |                                                                          |  |
|                          | LEAKAGE CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <0.75mA / 240VAC                                                                                                |                   |                                                                          |  |
| PROTECTION               | SHORT CIRCUIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Constant current limiting, unit will shutdown after 5 sec, re-power on to recover.                              |                   |                                                                          |  |
|                          | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 30 ~ 35V                                                                                                        | 60 ~ 70V          | 125 ~ 145V                                                               |  |
|                          | OVER TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Protection type :Shut down O/P voltage,re-power on to recover                                                   |                   |                                                                          |  |
| FUNCTION                 | REMOTE ON/OFF CONTROL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Power ON : Short circuit      Power OFF : Open circuit                                                          |                   |                                                                          |  |
|                          | AUXILIARY POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12V @ 0.5A tolerance $\pm 10\%$ , ripple=150mVp-p                                                               |                   |                                                                          |  |
|                          | DC-OK SIGNAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The TTL signal out, PSU turn on = 4.4 ~ 5.5V ; PSU turn off = -0.5 ~ 0.5V. Please refer to the Function Manual. |                   |                                                                          |  |
| ENVIRONMENT              | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -40 ~ +70℃ (Refer to "Derating Curve")                                                                          |                   |                                                                          |  |
|                          | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 20 ~ 95% RH non-condensing                                                                                      |                   |                                                                          |  |
|                          | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -40 ~ +80℃, 10 ~ 95% RH non-condensing                                                                          |                   |                                                                          |  |
|                          | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | $\pm 0.03\%/^{\circ}\text{C}$ (0 ~ 50℃)                                                                         |                   |                                                                          |  |
|                          | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20 ~ 500Hz, 10G 12min./1cycle, period for 72min. each along X, Y, Z axes                                        |                   |                                                                          |  |
| SAFETY & EMC<br>(Note.4) | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | UL62368-1,TUV EN62368-1, EAC TP TC 004 approved; design refer to EN61558-1, EN60335-1(by request)               |                   |                                                                          |  |
|                          | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | I/P-O/P:3KVAC    I/P-FG:2KVAC    O/P-FG:1.25KVAC                                                                |                   |                                                                          |  |
|                          | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | I/P-O/P, I/P-FG,O/P-FG:100M Ohms/500VDC/25℃ / 70%RH                                                             |                   |                                                                          |  |
|                          | EMC EMISSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Parameter                                                                                                       | Standard          | Test Level / Note                                                        |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Conducted                                                                                                       | EN55032 (CISPR32) | Class B                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Radiated                                                                                                        | EN55032 (CISPR32) | Class A                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Harmonic Current                                                                                                | EN61000-3-2       | Class A                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Voltage Flicker                                                                                                 | EN61000-3-3       | -----                                                                    |  |
|                          | EMC IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | EN55024 , EN61000-6-2                                                                                           |                   |                                                                          |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Parameter                                                                                                       | Standard          | Test Level / Note                                                        |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ESD                                                                                                             | EN61000-4-2       | Level 3, 8KV air ; Level 2, 4KV contact                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Radiated                                                                                                        | EN61000-4-3       | Level 3                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | EFT / Burst                                                                                                     | EN61000-4-4       | Level 3                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Surge                                                                                                           | EN61000-6-2       | 2KV/Line-Line 4KV/Line-Earth                                             |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Conducted                                                                                                       | EN61000-4-6       | Level 3                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Magnetic Field                                                                                                  | EN61000-4-8       | Level 4                                                                  |  |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Voltage Dips and Interruptions                                                                                  | EN61000-4-11      | >95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods |  |
| OTHERS                   | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 197.9K hrs min.    Telcordia SR-332 (Bellcore) ; 52.32K hrs min.    MIL-HDBK-217F (25℃)                         |                   |                                                                          |  |
|                          | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 310*144*48.5mm (L*W*H)                                                                                          |                   |                                                                          |  |
|                          | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4Kg;4pcs/17Kg/1.04CUFT                                                                                          |                   |                                                                          |  |
| NOTE                     | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. This is Mean Well's suggested range. Please consult your battery manufacturer for their suggestions about maximum charging current limitation.<br>3. Derating may be needed under low input voltages. Please check the derating curve for more details.<br>4. The power supply is considered a component which will be installed into a final equipment. All the EMC tests are been executed by mounting the unit on a 720mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on <a href="http://www.meanwell.com">http://www.meanwell.com</a> )<br>5. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft). |                                                                                                                 |                   |                                                                          |  |

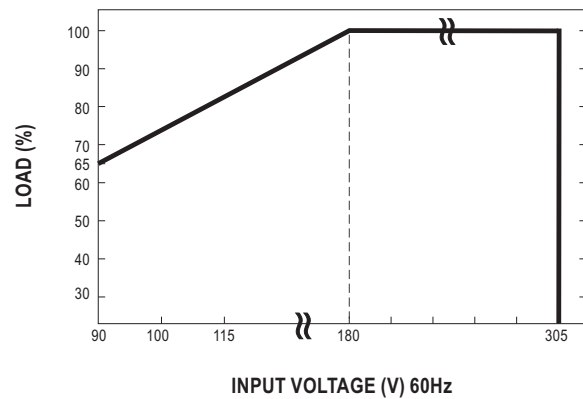
## BLOCK DIAGRAM



## DERATING CURVE



## STATIC CHARACTERISTICS



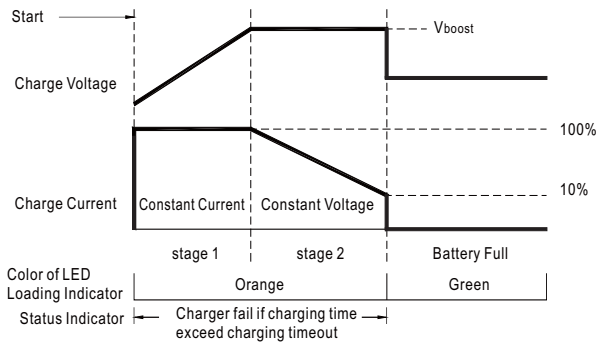
※ For 100V model charging mode, output current is 20% rated min. when operating temperature at -40°C, and can reach 100% above -30°C.

## FUNCTION MANUAL

### 1. Charging Curve

- ※ By default, the HEP-1000 operates in power supply mode, and it can be configured to charger mode by PMBus, CANBus, or SBP-001.
- ※ By factory default, this charger performs the default curve which can be programmed via PMBus and CANBus.
- ※ To accommodate the parameters of the charging curve, SBP-001, the smart battery charging programmer designed by MEAN WELL, and a personal computer are needed. Please contact MEAN WELL for details.

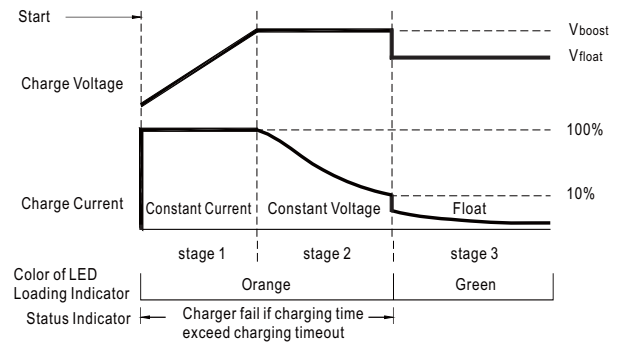
#### ※ Default 2 stage charging curve



| State              | HEP-1000-24 | HEP-1000-48 | HEP-1000-100 |
|--------------------|-------------|-------------|--------------|
| Constant Current   | 35A         | 17.5A       | 8.7A         |
| V <sub>boost</sub> | 28.8V       | 57.6V       | 115.2V       |

◎ Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).

#### ※ Default 3 stage charging curve



| State              | HEP-1000-24 | HEP-1000-48 | HEP-1000-100 |
|--------------------|-------------|-------------|--------------|
| Constant Current   | 35A         | 17.5A       | 8.7A         |
| V <sub>boost</sub> | 28.8V       | 57.6V       | 115.2V       |
| V <sub>float</sub> | 27.6V       | 55.2V       | 110.4V       |

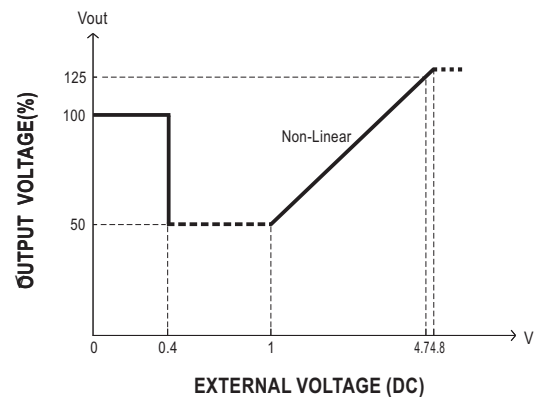
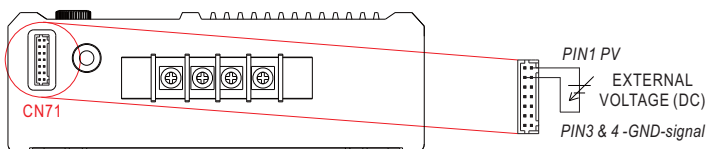
◎ Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).

### 2. Front Panel LED Indicators & Corresponding Signal at Function Pins

| LED            | Description                                                                                                                                                                                                                                     |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Green          | Float (stage 3)                                                                                                                                                                                                                                 |
| Orange         | Charging (stage 1 or stage 2)                                                                                                                                                                                                                   |
| Red            | Abnormal status (OTP, OLP, Charging timeout.)                                                                                                                                                                                                   |
| Red (Flashing) | The LED will flash with the red light when the internal temperature reaches 95°C; under this condition, the unit still operates normally without entering OTP. (In the meantime, an alarm signal will be sent out through the PMBus interface.) |

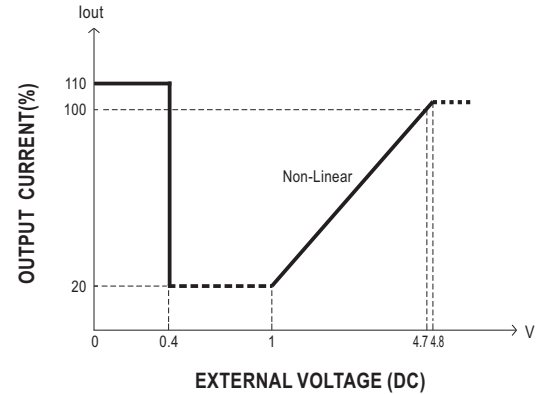
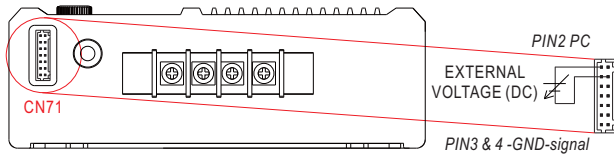
### 3. Output Voltage Programming (or, PV / remote voltage programming / remote adjust / margin programming / dynamic voltage trim)

- ※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed by applying EXTERNAL VOLTAGE.



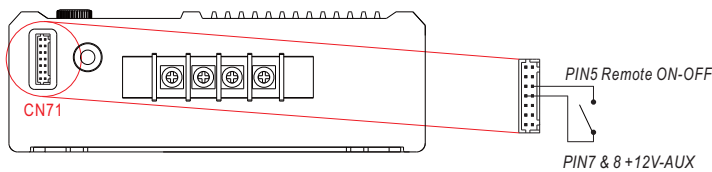
#### 4. Output Current Programming (or, PC / remote current programming / dynamic current trim)

※ The output current can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.



#### 5. Remote ON-OFF Control

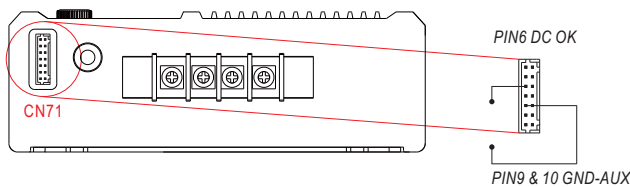
The power supply can be turned ON/OFF individually or along with other units in parallel by using the "Remote ON-OFF" function.



| Remote ON-OFF | Power Supply Status |
|---------------|---------------------|
| Short circuit | ON                  |
| Open circuit  | OFF                 |

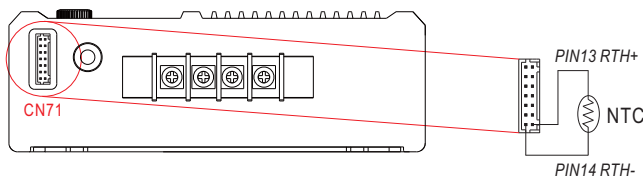
#### 6. DC-OK Signal

DC-OK signal is a TTL level signal. The maximum source current is 10mA and the maximum external voltage is 5.5V.



| DC-OK signal     | Power Supply Status |
|------------------|---------------------|
| "High" >4.4~5.5V | ON                  |
| "Low" <-0.5~0.5V | OFF                 |

#### 7. Temperature Compensation



- ◎ To exploit the temperature compensation function, please attach the temperature sensor, NTC, which is enclosed with the charger, to the battery or the battery's vicinity.
- ◎ The charger is able to work normally without the NTC.

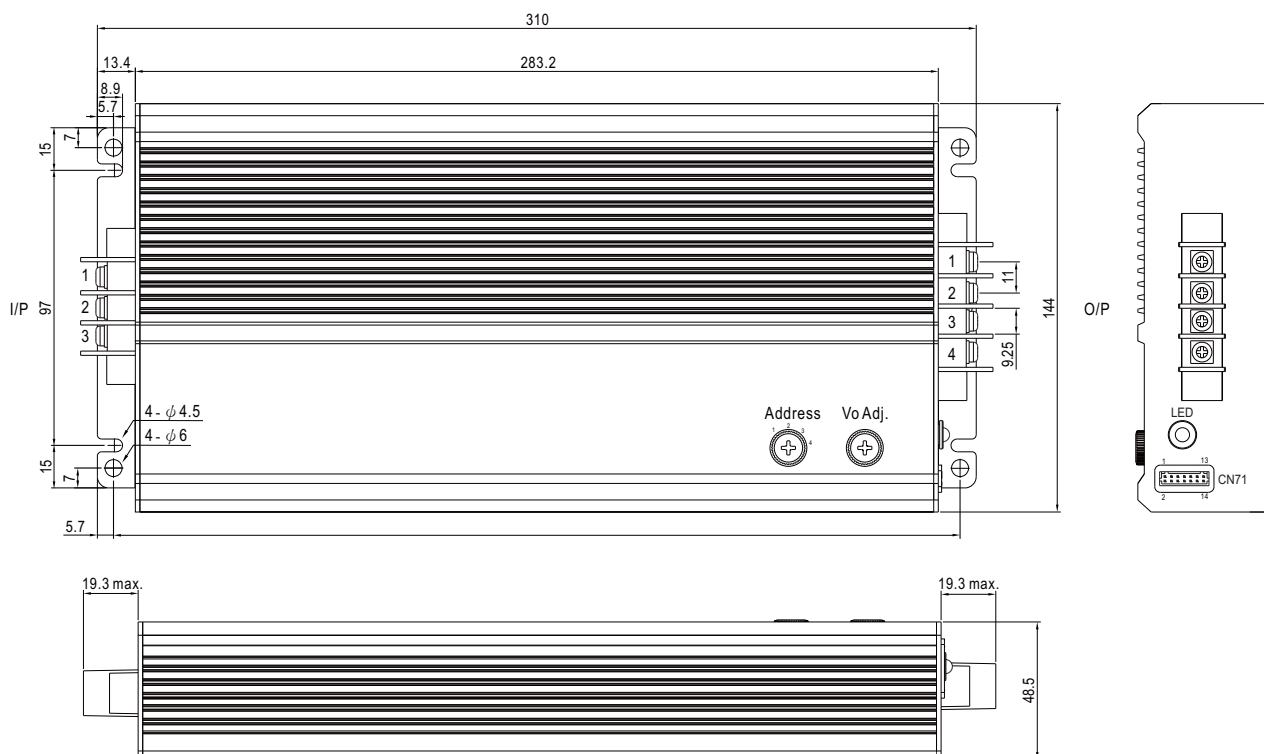
#### 8. PMBus Communication Interface

HEP-1000 supports PMBus Rev. 1.1 with maximum 100KHz bus speed, allowing information reading, status monitoring, output trimming, etc. For details, please refer to the User's Manual.

## MECHANICAL SPECIFICATION

Case No.228F

Unit:mm



- ※ Output voltage current level can be adjusted through internal potentiometer.(Vo Adj.)  
(Can access by removing the rubber stopper on the case.)
- ※ PMBus interface address selection.(Address)

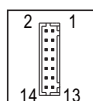
AC Input Terminal Pin No. Assignment

| Pin No. | Assignment |
|---------|------------|
| 1       | FG (⊕)     |
| 2       | AC/L       |
| 3       | AC/N       |

DC Output Terminal Pin No. Assignment

| Pin No. | Assignment |
|---------|------------|
| 1,2     | -V         |
| 3,4     | +V         |

※Control Pin No. Assignment(CN71) : JST S14B-PHDKS-B or equivalent



|                |                                  |
|----------------|----------------------------------|
| Mating Housing | JST PHDR-14VS or equivalent      |
| Terminal       | JST SPHD-001T-P0.5 or equivalent |

| Pin No. | Function      | Description                                                                                                                                                                                                                                               |
|---------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1       | PV            | Connection for output voltage programming.(Note1)                                                                                                                                                                                                         |
| 2       | PC            | Connection for constant current level programming.(Note.1)                                                                                                                                                                                                |
| 3,4     | GND (Signal)  | Negative output voltage signal.                                                                                                                                                                                                                           |
| 5       | Remote ON-OFF | The unit can turn the output ON/OFF by dry contact between Remote ON/OFF and +12-AUX.(Note.2)<br>Short (10.8 ~ 13.2V) : Power ON ; Open(0 ~ 0.5V) : Power OFF ; The maximum input voltage is 13.2V                                                        |
| 6       | DC-OK         | Low (-0.5 ~ 0.5V) : When Vout ≤ 77% ± 6% at power mode. Vout ≤ 66% ± 6% at charger mode.<br>High (4.4 ~ 5.5V) : When Vout ≥ 80% ± 6% at power mode. Vout ≥ 67% ± 6% at charger mode.<br>The maximum sourcing current is 10mA and only for output.(Note.2) |
| 7,8     | +12V-AUX      | Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX (pin9 & 10).<br>The maximum load current is 0.5A. This output is not controlled by "Remote ON-OFF".                                                                                           |
| 9,10    | GND-AUX       | Auxiliary voltage output GND.<br>The signal return is isolated from the output terminals (+V & -V).                                                                                                                                                       |
| 11      | SDA           | For PMBus model: Serial Data used in the PMBus interface. (Note.2)                                                                                                                                                                                        |
|         | CANH          | For CANBus model: Data line used in CANBus interface. (Note.2)                                                                                                                                                                                            |
| 12      | SCL           | For PMBus model: Serial Clock used in the PMBus interface. (Note.2)                                                                                                                                                                                       |
|         | CANL          | For CANBus model: Data line used in CANBus interface. (Note.2)                                                                                                                                                                                            |
| 13      | RTH+          | Temperature sensor(NTC, 5KOhm) comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage.                                                                                                       |
| 14      | RTH-          |                                                                                                                                                                                                                                                           |

Note1: Non-isolated signal, referenced to [GND(signal)].

Note2: Isolated signal, referenced to GND-AUX.

## INSTALLATION MANUAL

Please refer to : <http://www.meanwell.com/manual.html>