

HEP-1000 series

























- Power or charger mode switchable by SBP-001(Terminal type)
- · High efficiency up to 96%
- Aluminum case fanless design and filling with heat-conducted glue and able to withstand 10G vibration test
- Wide operating temperature range -40 ~ +70°C
- 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
- Built-in PMBus protocol / CANBus protocol (optional)
- · Output voltage and constant current level programmable
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Built-in remote ON-OFF control (Terminal type)
- DC OK active signal and 12V Auxiliary power available
- LED indicator for power on (Terminal type)
- IP67 design for indoor or outdoor installation (Wiring type)
- 6 years warranty

#### Applications

- · Industrial automation machinery
- · Industrial control system at harsh environment
- · Mechanical and electrical equipment
- · Electronic instruments, equipments
- · 5G telecom equipments
- Robotic lawn mower/AMR/AGV
- · Equipments or instruments with back-up battery

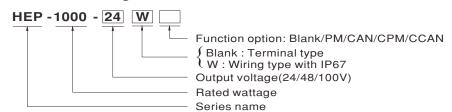
#### GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

## ■ 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 glue. Adopting the full range  $90 \sim 305$ VAC 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  $\sim$  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 BS EN/EN62368-1 UL62368-1, and the design refers to BS EN/EN61558-1 and BS EN/EN60335-1HEP-1000 series serves as a high performance power supply solution for various industrial and charger applications.

## ■ Model Encoding



I/O Type	Function type	Communication Protocol	Note
Torminal	Blank	PMBus and PV/PC programmable	In Stock
Terminal CAN		CANBus and PV/PC programmable	By request
	Blank	PV/PC programmable	By request
	PM	PMBus	By request
Wiring	CAN	CANBus	By request
	CPM	Charger with PMBus	By request
	CCAN	Charger with CANBus	By request

Note: Terminal type with charger function by programmer or PMBus/CANBus setting





# HEP-1000 series

## SPECIFICATION FOR POWER SUPPLY (Default Setting)

MODEL		HEP-1000-24 🔲 🔲	HEP-1000-48 🔲 🔲	HEP-1000-100						
	DC VOLTAGE	24V	48V	100V						
	RATED CURRENT	42A	21A	10A						
	RATED POWER	1008W	1008W	1000W						
	RIPPLE & NOISE (max.) Note.2	200mVp-p	250mVp-p	500mVp-p						
	,	By built-in potentiometer, SVR								
OUTPUT	VOLTAGE ADJ. RANGE	24 ~ 30V	48 ~ 60V	100 ~ 125V						
	VOLTAGE TOLERANCE Note.3	±1.0%	±1.0%	±1.0%						
	LINE REGULATION	±0.5%	±0.5%	±0.5%						
	LOAD REGULATION	±0.5%	±0.5%	±0.5%						
	SETUP, RISE TIME	1800ms, 80ms at full load 230VAC								
	HOLD UP TIME (Typ.)	,	30VAC at full load							
		90 ~ 305VAC 250 ~ 431VDC	000710 4174111044							
	FREQUENCY RANGE	47 ~ 63Hz								
	POWER FACTOR (Typ.)	PF>0.99/115VAC, PF>0.95/230VAC, PF>0.93/277VAC at full load								
NPUT	EFFICIENCY (Typ.)	95%	96%	96%						
NFUI		10.1A / 115VAC 5.3A / 230VAC	4.5A / 277VAC	90 /6						
	AC CURRENT (Typ.) INRUSH CURRENT(Typ.)	Cold start 40A at 230VAC	4.3A / 27 / VAC							
	LEAKAGE CURRENT	<0.75mA / 240VAC								
	LEARAGE CURRENT									
	OVERLOAD	105~125% rated current								
		* '	<u> </u>	ter O/P voltage falls, re-power on to recover						
PROTECTION	SHORT CIRCUIT	Constant current limiting, unit will shutdo		1						
	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	e goes down						
	OUTPUT VOLTAGE		ble to 50 ~ 125% of nominal output volta	age						
		Please refer to the Function Manual.	-11							
	OUTPUT CURRENT PROGRAMMABLE(PC) Note 5	Adjustment of constant current level is   Please refer to the Function Manual.	allowable to 20 ~ 100% of rated curren	IT.						
FUNCTION	REMOTE ON/OFF CONTROL	Power ON: Short circuit Power OFF: Open circuit								
	AUXILIARY POWER	12V @ 0.5A tolerance ±10%, ripple=150	<u>'</u>							
	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.								
	WORKING TEMP.	-40 ~ +70°C (Refer to "Derating Curve")								
	WORKING HUMIDITY	20 ~ 95% RH non-condensing	t							
ENVIRONMENT	STORAGE TEMP., HUMIDITY	-40 ~ +80°C, 10 ~ 95% RH non-condens	sing							
	TEMP. COEFFICIENT	±0.03%/°C (0~50°C)								
	VIBRATION	20 ~ 500Hz, 10G 12min./1cycle, period								
	SAFETY STANDARDS	, ,		3S EN/EN61558-1, BS EN/EN60335-1(by reques						
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P								
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG,O/P-FG:100M Ohms/50		I=						
		Parameter	Standard	Test Level / Note						
		Conducted	BS EN/EN55032 (CISPR32)	Class B						
	EMC EMISSION	Radiated	BS EN/EN55032 (CISPR32)	Class B						
SAFETY &		Harmonic Current	BS EN/EN61000-3-2	Class A						
EMC		Voltage Flicker	BS EN/EN61000-3-3							
(Note.7)		BS EN/EN55024 , BS EN/EN61000-6-2								
		Parameter	Standard	Test Level / Note						
		ESD	BS EN/EN61000-4-2	Level 3, 8KV air ; Level 2, 4KV contact						
		Radiated	BS EN/EN61000-4-3	Level 3						
	EMC IMMUNITY	EFT / Burst	BS EN/EN61000-4-4	Level 3						
		Surge	BS EN/EN61000-6-2	2KV/Line-Line 4KV/Line-Earth						
		Conducted	BS EN/EN61000-4-6	Level 3						
		Magnetic Field	BS EN/EN61000-4-8	Level 4						
		Voltage Dips and Interruptions	BS EN/EN61000-4-11	>95% dip 0.5 periods, 30% dip 25 period						
	MTBF	583.7K hrs min. Telcordia SR-332 (Be	ellcore); 52.3K hrs min. MIL-HDBK-21	>95% interruptions 250 periods						
OTHERS	DIMENSION	310*144*48.5mm (L*W*H)	5.00.07, 02.0K 113 HIII. WIL-HDBR-2	(200)						
	PACKING	4Kg;4pcs/17Kg/1.04CUFT								
NOTE	All parameters NOT special     Ripple & noise are measure     Tolerance :includes set up b     Derating may be needed ur     PV/PC functions when user     In power mode: When O/P     The power supply is consid     a 720mm*360mm metal pla	ly mentioned are measured at 230VAC and at 20MHz of bandwidth by using a 12 tolerance, line regulation and load regulader low input voltages. Please check this do not use SVR. voltage is below < 80% of Vset for 5 seered a component which will be installed the with 1mm of thickness. The final equite	" twisted pair-wire terminated with a 0.1 tion. e derating curve for more details. c. the unit will shut down afterwards. I into a final equipment. All the EMC tes	luf & 47uf parallel capacitor.  sts are been executed by mounting the unit on meets EMC directives. For guidance on how to						





# 1000W Switching Power Supply for Harsh Environment HEP-1000 series

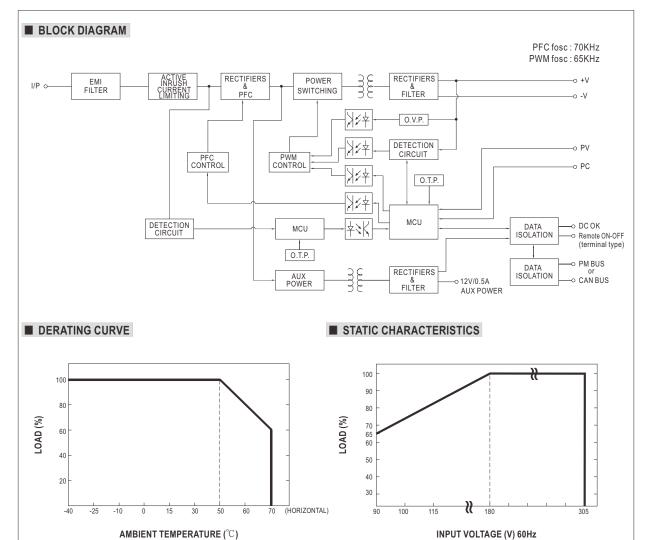
## **SPECIFICATION FOR CHARGER (Option function)**

MODEL		HEP-1000-24 🔲 🔲	HEP-1000-48	HEP-1000-100 🔲 🔲					
	BOOST CHARGE VOLTAGE Vboost	28 8V	57.6V	115.2V					
	FLOAT CHARGE VOLTAGE Viloat		55.2V	110.4V					
	RECOMMENDED BATTERY	21.04	00.27	110.17					
OUTPUT	CAPACITY(AMP HOURS)(Note 2)	120 ~ 350AH	60 ~ 175AH	30 ~ 85AH					
	BATTERY TYPE	Open & Sealed Lead Acid							
	OUTPUT CURRENT	35A	17.5A	8.7A					
	VOLTAGE RANGE Note 3	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							
INPUT	EFFICIENCY (Typ.)	95% 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							
	SHORT CIRCUIT	Constant current limiting, unit will shutdow							
PROTECTION	OVER VOLTAGE	30 ~ 35V	60 ~ 70V	125 ~ 145V					
	OVER VOEINGE	Protection type :Shut down O/P voltage,re	-power on to recover						
	OVER TEMPERATURE	, ,	ecovers automatically after temperature goe	es down					
	REMOTE ON/OFF CONTROL	Power ON: Short circuit Power OFF	: Open circuit						
FUNCTION	AUXILIARY POWER	12V @ 0.5A tolerance ±10%, ripple=150m							
	DC-OK SIGNAL	•	5.5V; PSU turn off = -0.5 ~ 0.5V. Please re	fer to the Function Manual.					
	WORKING TEMP.	-40 ~ +70°C (Refer to "Derating Curve")							
	WORKING HUMIDITY	20 ~ 95% RH non-condensing							
ENVIRONMENT	STORAGE TEMP., HUMIDITY	$-40 \sim +80^{\circ}\text{C}$ , $10 \sim 95\%$ RH non-condensing							
	TEMP. COEFFICIENT	±0.03%°C (0~50°C)							
	VIBRATION	20 ~ 500Hz, 10G 12min./1cycle, period for 72min. each along X, Y, Z axes							
	SAFETY STANDARDS	UL62368-1,TUV BS EN/EN62368-1, EAC TP TC 004 approved; design refer to BS EN/EN61558-1, BS EN/EN60335-1(by request)							
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-F	G:1.25KVAC						
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG,O/P-FG:100M Ohms/500\							
		Parameter	Standard	Test Level / Note					
		Conducted	BS EN/EN55032 (CISPR32)	Class B					
	EMC EMISSION	Radiated	BS EN/EN55032 (CISPR32)	Class A					
SAFETY &		Harmonic Current	BS EN/EN61000-3-2	Class A					
EMC		Voltage Flicker	BS EN/EN61000-3-3						
(Note.5)		BS EN/EN55024 , BS EN/EN61000-6-2		I =					
		Parameter	Standard	Test Level / Note					
		ESD	BS EN/EN61000-4-2	Level 3, 8KV air ; Level 2, 4KV contact					
		Radiated	BS EN/EN61000-4-3	Level 3					
	EMC IMMUNITY	EFT / Burst	BS EN/EN61000-4-4	Level 3					
		Surge	BS EN/EN61000-6-2	2KV/Line-Line 4KV/Line-Earth					
		Conducted	BS EN/EN61000-4-6	Level 3					
		Magnetic Field	BS EN/EN61000-4-8	Level 4					
		Voltage Dips and Interruptions	BS EN/EN61000-4-11	>95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods					
	MTBF	583.7K hrs min. Telcordia SR-332 (Bellcore) ; 52.3K hrs min. MIL-HDBK-217F (25°C)							
OTHERS	DIMENSION	310*144*48.5mm (L*W*H)							
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. This is Mean Well's suggested range. Please consult your battery manufacturer for their suggestions about maximum charging current limitation. 3. Derating may be needed under low input voltages. Please check the derating curve for more details. 4. In charge mode: When O/P voltage < 67% of Vset for 5 sec. the unit will shut down afterwards. 5. 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) 6. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft).								





# HEP-1000 series



% For 100V model charging mode, output current is 20% rated min. when operating tempature at -40 $^{\circ}$ C, and can reach 100% above -30 $^{\circ}$ C.

## **■ TABLE OF FUNCTION**

I/O TYPE	Function type	Power Supply Function	Charging Function	PV/PC Programmable	PMBus Protocol			Remote On/Off	DC-OK Signal	Temperature Compensation	12V/0.5A Aux. output
Terminal	Blank	V(default)	V	V	V		V	V	V	V	V
type	CAN	V(default)	V	V		V	V	V	V	V	V
	Blank	V		V					V		V
	PM	V			V				V		V
Wiring type	CAN	V				V			V		V
,,,	СРМ		V		V				V	V	V
	CCAN		V			V			V	V	V



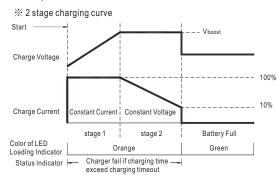


# HEP-1000 series

#### **■ FUNCTION MANUAL**

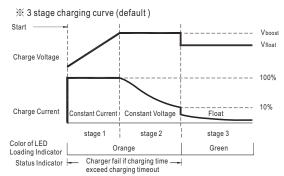
#### 1. Charging Curve (For charger type or setting HEP-1000 to charger mode)

- 💥 By factory default, this charger performs the default curve which can be programmed via PMBus and CANBus.
- X 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.



State	24	48	100
Constant Current	35A	17.5A	8.7A
Vboost	28.8V	57.6V	115.2V

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



State	24	48	100
Constant Current	35A	17.5A	8.7A
Vboost	28.8V	57.6V	115.2V
Vfloat	27.6V	55.2V	110.4V

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

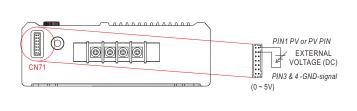
#### 2. Front Panel LED Indicators & Corresponding Signal at Function Pins (Terminal type)

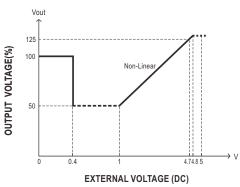
LED	Description
Green	Float (stage 3)
Orange	Charging (stage 1 or stage 2)
Red	Abnormal status (OTP, OLP, Charging timeout.)
Red (Flashing)	The LED will flash with the red light when the internal temperature reaches $95^{\circ}$ C; under this condition, the unit still operates normally without entering 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.

(For Blank type of Terminal and wiring)





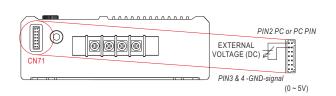




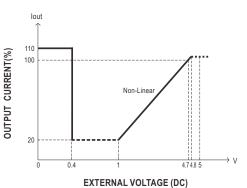
# HEP-1000 series

#### 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. (For Blank type of Terminal and wiring)

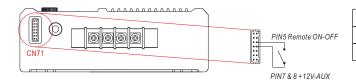


When O/P voltage is below 80% of Vset for 5 sec, the unit will shut down afterwards, re-power on to recover.



#### 5. Remote ON-OFF Control (Terminal type)

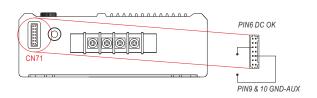
The power supply can be turned ON/OFF individually or along with other units in parallel by using the "Remote ON-OFF" function.



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

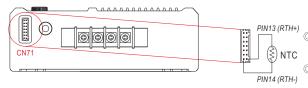
#### 6.DC-OK Signal

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.

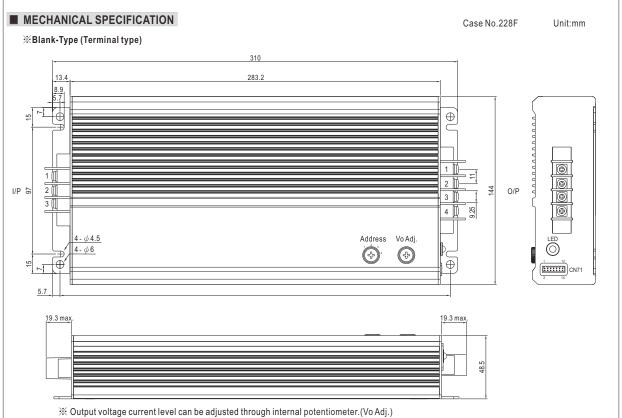
#### 8.PMBus Communication Interface

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.





# HEP-1000 series



(Can access by removing the rubber stopper on the case.)

※ PMBus interface address selection.(Address)

AC Input To

ermina	l 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



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)
		Short (10.8 $\sim$ 13.2V) : Power ON; Open(0 $\sim$ 0.5V) : Power OFF; The maximum input voltage is 13.2V
6	DC-OK	Low (-0.5 ~ 0.5V): When Vout $\leq$ 77% $\pm$ 6% at power mode. Vout $\leq$ 66% $\pm$ 6% at charger mode.
		High (4.4 ~ 5.5V): When Vout $\ge$ 80% $\pm$ 6% at power mode. Vout $\ge$ 67% $\pm$ 6% at charger mode.
		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).
		The maximum load current is 0.5A. This output is not controlled by "Remote ON-OFF".
0.40	GND-AUX	Auxiliary voltage output GND.
9,10		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
14	RTH-	compensation of the charging voltage.

Note1: Non-isolated signal, referenced to [GND(signal)]. Note2: Isolated signal, referenced to GND-AUX.





# HEP-1000 series

# 310 283.2 4. φ4.5 350±20 300±20 Vo+(Red) Vo-(Red) Vo

※ Output voltage current level can be adjusted through internal potentiometer. (Can access by removing the rubber stopper on the case.)

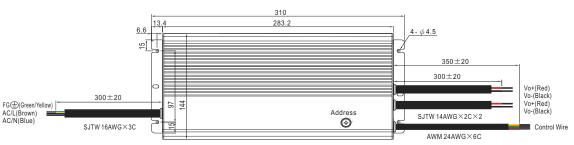
#### % Control Wire Assignment : (AWM 24AWG $\times$ 6C)

Color	Function	Description
Yellow	PV	Connection for output voltage programming.(Note1)
Orange	PC	Connection for constant current level programming.(Note.1)
Green	GND (Signal)	Negative output voltage signal.(PV/PC GND)
Brown DC	DC-OK	Low (0 ~ 0.5V): When Vout≦77%±6% at power mode. Vout≦66%±6% at charger mode.
		High (4.4 ~ 5.5V): When Vout≧80%±6% at power mode. Vout≧67%±6% at charger mode.
		The maximum sourcing current is 10mA and only for output.(Note.2)
Red	+12V-AUX	Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX.
		The maximum load current is 0.5A.
Black	GND-AUX	Auxiliary voltage output GND.
		The signal return is isolated from the output terminals (+V & -V).

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

Note2: Isolated signal, referenced to GND-AUX (GND for CANBus and PMBus protocal).

#### %W-Type (Wiring type with charger)





※ Output voltage current level can be adjusted through internal potentiometer. (Can access by removing the rubber stopper on the case.)

## ※ Control Wire Assignment : (AWM 24AWG × 6C)

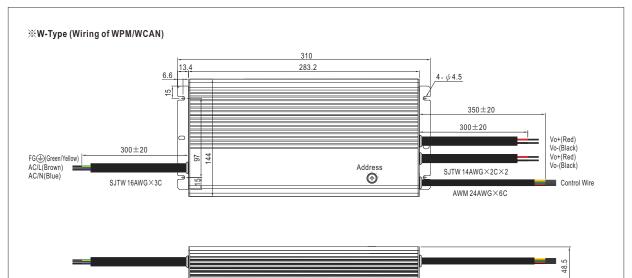
	A Control With Control (With 24 Will Control (Will Control (With 24 Will Control (Will Control		
Color	Function	Description	
Yellow	SDA	For PMBus model: Serial Data used in the PMBus interface. (Note.1)	
	CANH	For CANBus model: Data line used in CANBus interface. (Note.1)	
Orange	SCL	For PMBus model: Serial Clock used in the PMBus interface. (Note.1)	
	CANL	For CANBus model: Data line used in CANBus interface. (Note.1)	
Green	RTH-	Temperature sensor(NTC, 5KOhm) comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage.	
Brown	RTH+		
Dad	+12V-AUX	Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX.	
Red		The maximum load current is 0.5A.	
Black	GND-AUX	Auxiliary voltage output GND.	
		The signal return is isolated from the output terminals (+V & -V).	

Note1: Isolated signal, referenced to GND-AUX.





# HEP-1000 series



※ Output voltage current level can be adjusted through internal potentiometer. (Can access by removing the rubber stopper on the case.)

#### ※ Control Wire Assignment : (AWM 24AWG × 6C)

Color	Function	Description
Yellow	SDA	For PMBus model: Serial Data used in the PMBus interface. (Note.1)
	CANH	For CANBus model: Data line used in CANBus interface. (Note.1)
Orange	SCL	For PMBus model: Serial Clock used in the PMBus interface. (Note.1)
	CANL	For CANBus model: Data line used in CANBus interface. (Note.1)
Green	GND (Signal)	Negative output voltage signal.(PV/PC GND)
Brown	DC-OK	$Low (0 \sim 0.5 \text{V}): When \ Vout \leq 77\% \pm 6\% \ at \ power \ mode. \ Vout \leq 66\% \pm 6\% \ at \ charger \ mode.$
		High (4.4~5.5V): When Vout≧80%±6% at power mode. Vout≧67%±6% at charger mode.
		The maximum sourcing current is 10mA and only for output. (Note.1)
Red	+12V-AUX	Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX.
		The maximum load current is 0.5A.
Black	GND-AUX	Auxiliary voltage output GND.
DIACK		The signal return is isolated from the output terminals (+V & -V).

Note1: Isolated signal, referenced to GND-AUX.





# We are here for you. Addresses and Contacts.

Headquarter Switzerland:

Angst+Pfister Sensors and Power AG
Thurgauerstrasse 66
CH-8050 Zurich
Phone +41 44 877 35 00
sensorsandpower@angst-pfister.com

Office Germany:

Angst+Pfister Sensors and Power Deutschland GmbH
Edisonstraße 16
D-85716 Unterschleißheim
Phone +49 89 374 288 87 00
sensorsandpower.de@angst-pfister.com

Scan here and get an overview of personal contacts!



sensorsandpower.angst-pfister.com