SmartGen HPD300 Multifunctional Protection Module User Manual

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HPD300 REVERSE POWER PROTECTION RELAY
MULTIFUNCTIONAL PROTECTION MODULE
User Manual

Chinese trademark
SmartGen English trademark
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Table 1- Version History

Date	Version	Content
2014-08-07	1.0	Original release.
2014-10-09	1.1	Rename the product.
2015-03-24	1.2	Add “Multifunctional Protection Module” to the name
2021-09-29	1.3	Modify the function of the TEST key.

Table 2 – Symbol Instruction

Symbol	Instruction
NOTE	Highlights an essential element of a procedure to ensure correctness.
CAUTION	Indicates a procedure or practice, that, if not strictly observed, could result in damage or des truction of equipment.

Contents

OVERVIEW

HPD300 reverse power protection relay is widely used in marine Genset fields and land Genset fields.
The power direction, instead of flowing predominantly from the generator to the Bus, as usual, flows back to the generator from the current system when the generator lost excitation or another failure occurs. That is to say, the generator works as an electromotor. HPD300 reverse power protection relay is in order to avoid the above situation and provide protection when an overpowering situation occurs.

PERFORMANCE AND CHARACTERISTICS

- Suitable for 3-phase 4-wire, 3-phase 3-wire, single phase 2-wire, and 2-phase 3-wire systems with frequency 50/60/400Hz;
- Collects 3-phase voltage, 3-phase current, frequency, and power parameters.

GEN
Line voltage (Uab, Ubc, and Uca)
Frequency (Hz)

- An adjustable potentiometer allows for set value adjusting and delay value setting.
- 2 relay output;
- One test button, test reverse power, over current, and indicator.
- Widely power supply range DC(8~35)V, suitable to different starting battery voltage environments;
- 35mm guide rail mounting;
- Modular design, pluggable terminal, compact structure with easy installation.

TECHNICAL PARAMETERS

Table 3 – Technical Parameters

Parameter	Details
Working Voltage	DC8. 0V to 35. 0V, continuous power supply
Overall Consumption	<0.9W (Standby mode: ≤0.28W)
AC Input:	AC30V~ AC620V (ph-ph)
Alternator Frequency	50Hz/60Hz/400Hz
Reverse Power Relay Output	5A AC250V Volts free output
Over Current Relay Output	5A AC250V Volts free output
Case Dimensions	89.7mm x 71.6mm x 60.7mm
CT Secondary Current	Rated 5A
Working Conditions	Temperature: (-25~+70)°C Humidity: (20~93)%RH
Storage Conditions	Temperature:(-25~+70)°C
Insulation Intensity	Apply AC2.2kV voltage between high voltage terminal and low voltage terminal; The leakage current is not more than 3mA within 1min.
Weight	0.24kg

PANEL BUTTON DESCRIPTION

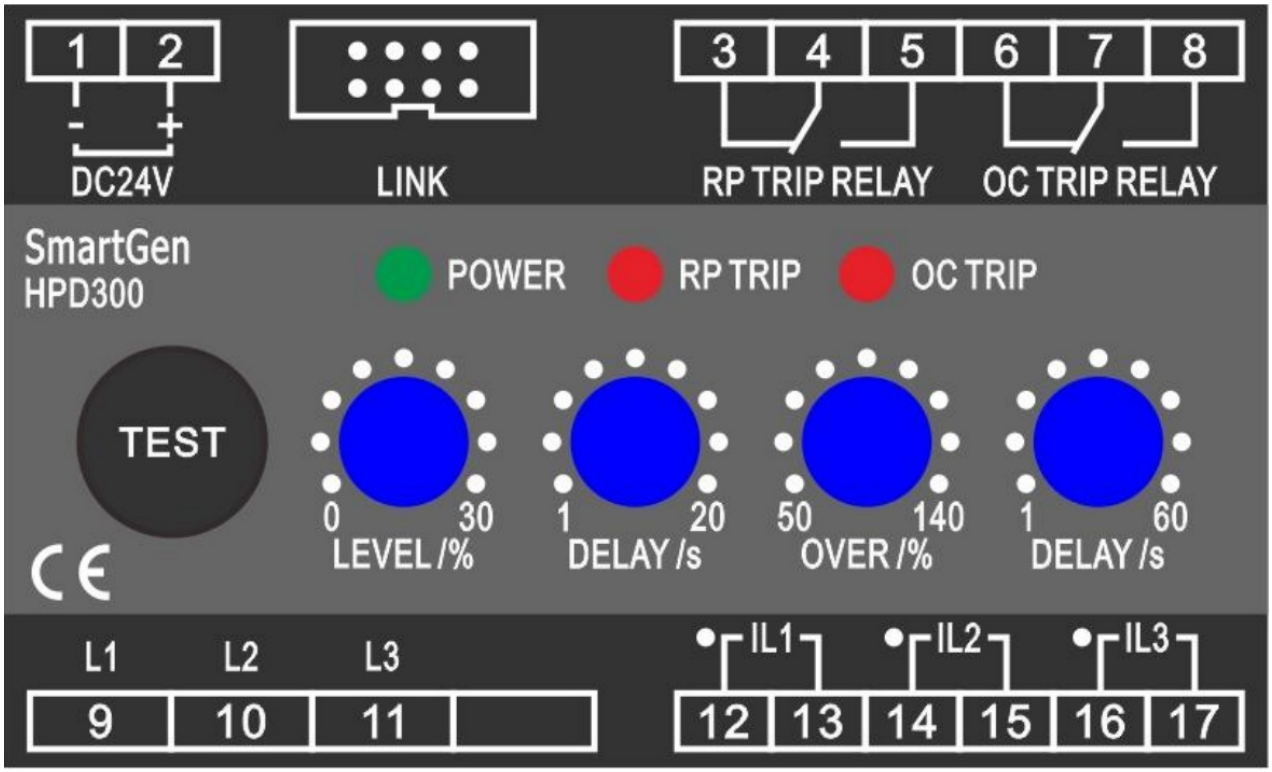

Fig.1 – Panel Drawing

Table 4 – Description of Terminal Connection

No.	Functions		Cable Size	Remark	
1	B-		1.0mm2	Connected with the negative of the starter battery.	
2	B+		1.0mm2	Connected with the positive of the starter battery.	
3	RP TRIP RELAY	Normally Close	2.5 mm2	Active when the reverse power has exceeded the set value and the delay timer has expired while deactivate after the power returns to normal.	Normally open; Volts free output; 5A Rated
4		COM			
5		Normally Open			
6	OC TRIP RELAY	Normally Close	2.5 mm2	Active when the load current has exceeded the set value and the delay timer has expired while deactivate after the current returns to normal.	
7		COM			
8		Normally Open			
9	L1		1.0 mm2	Phase Voltage Input	
10	L2		1.0 mm2		
11	L3		1.0 mm2		
12	IL1	Dotted Terminals	1.5 mm2	CT A-phase input; Externally connected to the secondary coil of the current transformer (rated 5A).	
13					
14	IL2	Dotted Terminals	1.5 mm2	CT B-phase input; Externally connected to the secondary coil of the current transformer (rated 5A).	
15					
16	IL3	Dotted Terminals	1.5 mm2	CT C-phase input; Externally connected to the secondary coil of the current transformer (rated 5A).	
17					
LINK	Used for parameters setting.				

No.	Functions	Cable Size	Remark
Port			

FUNCTION DESCRIPTION

Table 5 – Function Description

Item	Description
Power Indicator	Power supply indicator; It is illuminated when the relay is powered up. (green light)
RP TRIP Indicator	It flashes once per second when the reverse power has exceeded the set value and the RP TRIP indicator lights on when the delay timer has expired. The indicator is e xtinguished after power returns to normal. (red light)
OC TRIP Indicator	It flashes once per second when the load current has exceeded the set value and th e OC TRIP indicator lights on when the delay timer has expired. The indicator is exti nguished after the current returns to normal. (red light)
TEST Button	Press the button for 3 seconds and enter the Test Mode. The reverse relay and indicator output; Release and press the button again, over the current trip relay and indicator output. Press the button a third time to exit the Test Mode. Exit the Test Mo de after the 30s without any operation.
LEVEL /% Reverse Power Set Valu e Potentiometer	Used for adjusting reverse power set value. Range: (0~30)%; Setting value is the pe rcentage of the rated power value.
DELAY /s Delay Value Potentiomet er	Used for adjusting delay value. Range: (1~20)%; It is the delay timer of reverse pow er action.
OVER/% Over Current Set Value Potentiometer	Used for adjusting over a current set value. Range: (50~140)%; Setting value is the percentage of the rated power value.
DELAY /s Delay Value Potentiomet er	Used for adjusting delay value. Range: (1~60)s; It is the delay timer of over current action.

SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

Table 6 – Programmable Parameters

No.	Items	Parameters	Defaults	Description
1	AC System	(0-3)	0	0: 3P4W, 1: 3P3W 2: 2P3W, 3:1P2W
2	Gen Rated Voltage	(30-30000)V	380	
3	Gen Rated Frequency	(10.0-400.0)Hz	50.0	
4	Volt. Trans.(PT)	(0-1)	0	0: Disable 1: Enable
5	Primary Voltage	(30-30000)V	100	
6	Secondary Voltage	(30-1000)V	100	
7	CT Ratio	(5-6000)/5	500	
8	Full Load Rated Current	(5-6000)A	500	
9	Rated Power	(0-6000) kW	500	
10	Communication Address	(1-254)	1	

PC Program:
Parameters setting and real-time monitoring can be implemented via LINK port by using PC software and an SG72 adapter produced by our company. As follows:

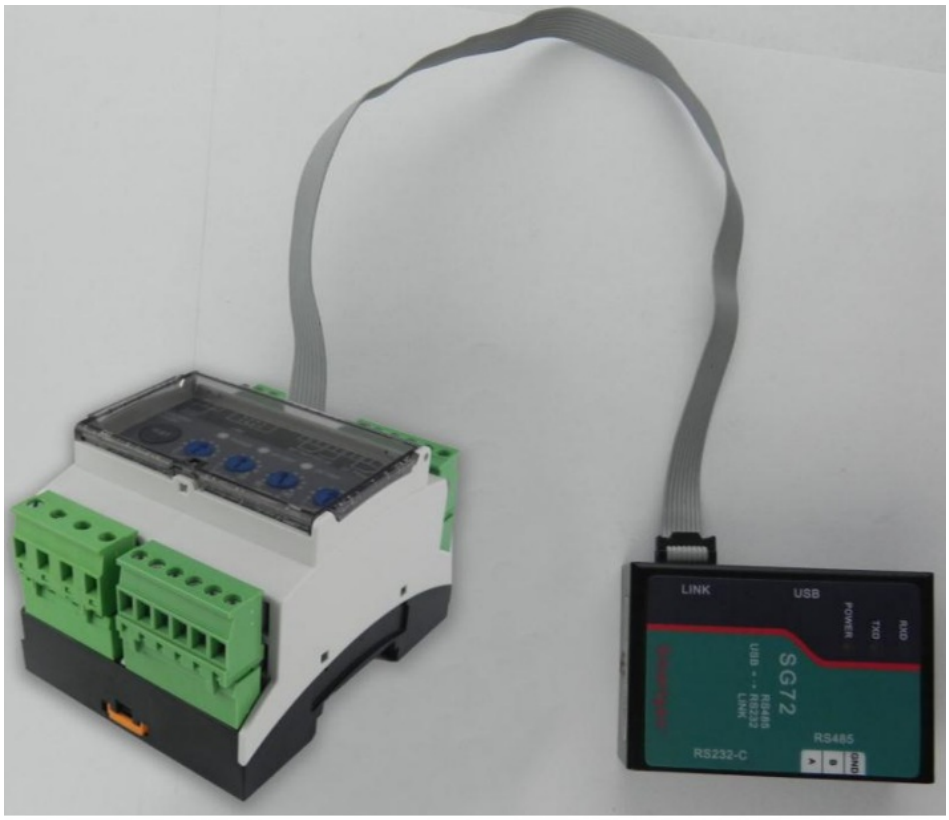

Fig.2 – PC Program Connection

TYPICAL DIAGRAM

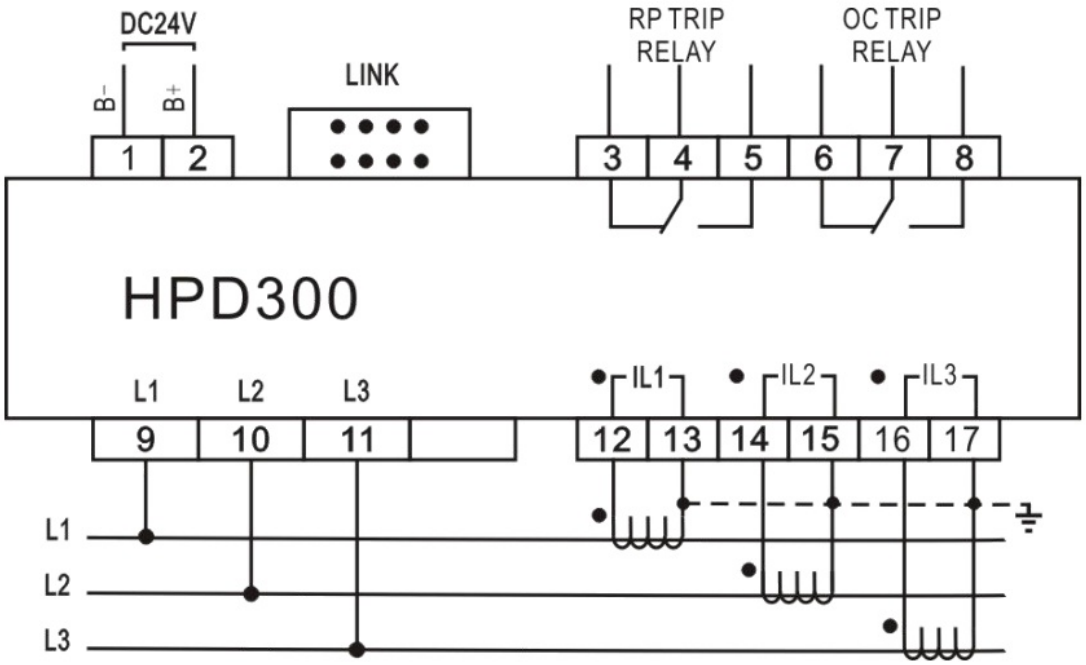

Fig.3 - 3 phase 3 wire/3 phase 4 wire

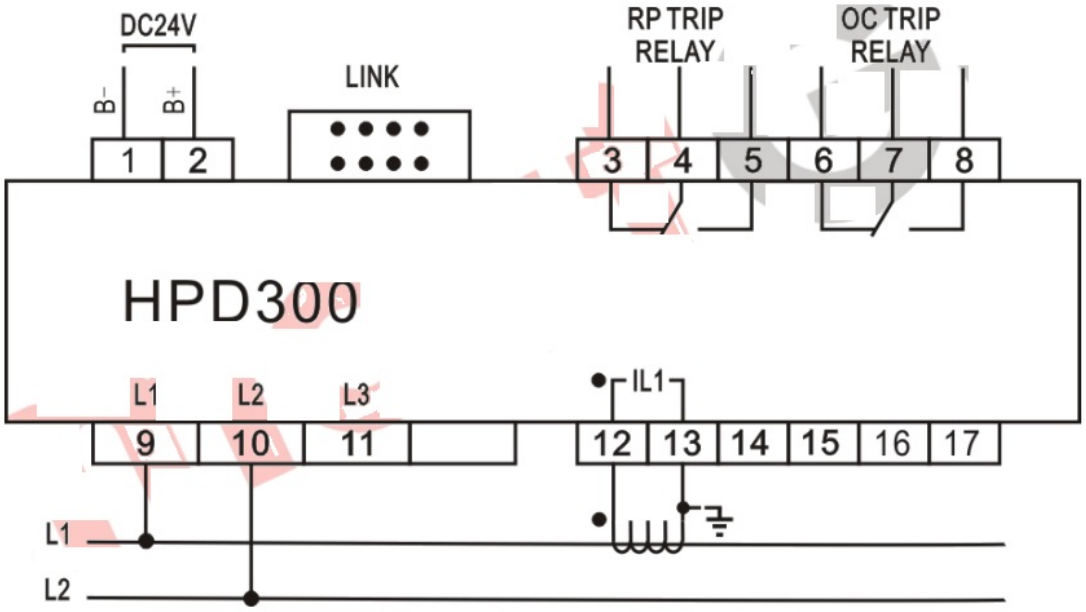

Fig.4 - Single phase 2 wire/2 phase 3 wire

INSTALLATION DIMENSIONS

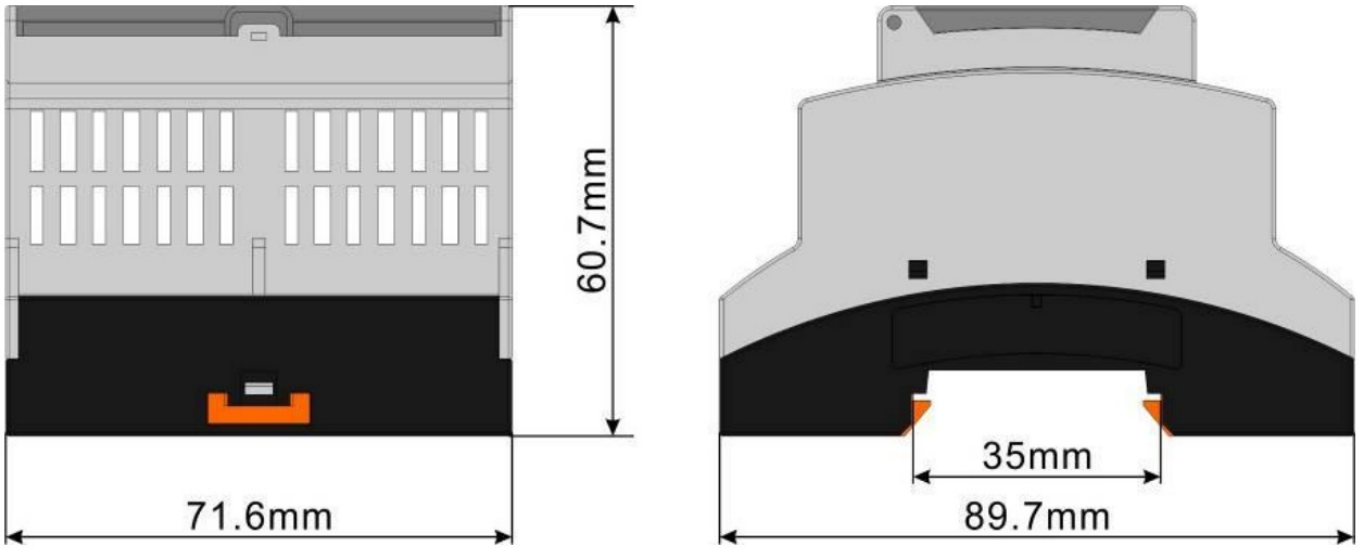

Fig.5 – Case Dimensions and Cutout

1. **Output And Expand Relays**

   All outputs are relay contact output types. If need to expand the relays, please add a freewheel diode to both ends expand the relay's coils (when coils of the relay have DC current), or, add a resistance-capacitance return circuit (when coils of the relay have AC current), in order to prevent disturbance to the controller or others equipment

2. **AC Input**

   Current input must be connected to the outside current transformer. And the current transformer's secondary side current must be 5A. At the same time, the phases of the current transformer and input voltage must be correct. Otherwise, the current of collecting and active power maybe not be correct.

   Note: When there is load current, the transformer's secondary side prohibits open circuits.

3. **Withstand Voltage Test**

   CAUTION! When the relay had been installed in the control panel, if need the high voltage test, please disconnect the relay's all terminal connections, in order to prevent high voltage into the relay and damaging it.

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Documents / Resources

	SmartGen HPD300 Multifunctional Protection Module [pdf] User Manual HPD300, Multifunctional Protection Module, HPD300 Multifunctional Protection Module, Protection Module, Module, Reverse Power Protection Relay

References

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