

SmartGen

MAKING CONTROL SMARTER

HPD300

REVERSE POWER PROTECTION RELAY MULTIFUNCTIONAL PROTECTION MODULE

USER MANUAL



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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 TEST key.
2024-12-16	1.4	Update the logo of SmartGen and the information of company.

Table 2 - Symbol Instruction

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

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1 OVERVIEW

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

2 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	LOAD
Line voltage (Uab, Ubc, and Uca)	Current IA, IB, IC
Frequency (Hz)	Active Power kW
- 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 environment;
- 35mm guide rail mounting;
- Modular design, pluggable terminal, compact structure with easy installation.

3 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

4 PANEL BUTTON DESCRIPTION

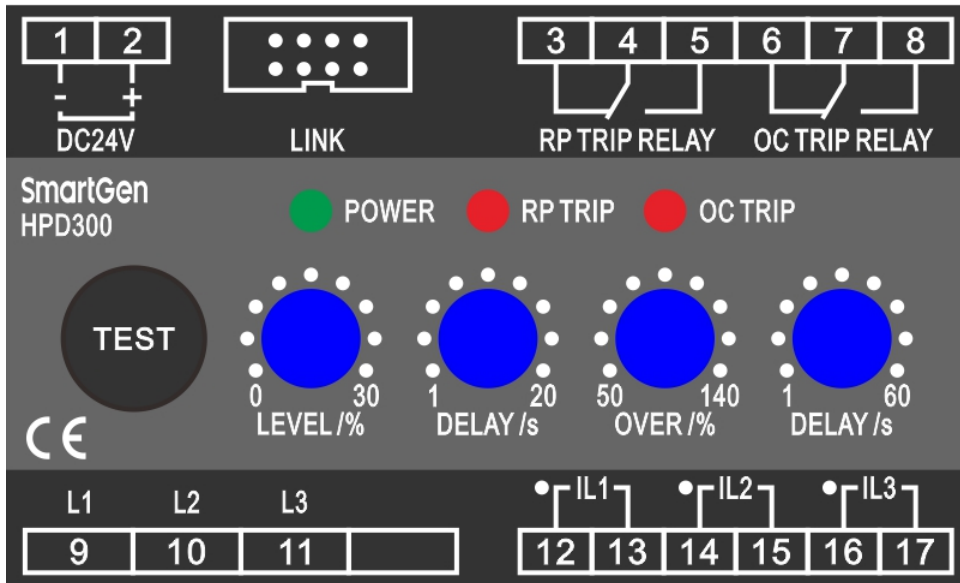


Fig.1 – Panel Drawing

Table 4 - Description of Terminal Connection

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

5 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 RP TRIP indicator light on when the delay timer has expired. The indicator extinguished 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 OC TRIP indicator light on when the delay timer has expired. The indicator extinguished after 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 current trip relay and indicator output. Press the button a third time to exit the Test Mode. Exit the Test Mode after 30s without any operation.
LEVEL /% Reverse Power Set Value Potentiometer	Used for adjusting reverse power set value. Range: (0~30)%; Setting value is the percentage of rated power value.
DELAY /s Delay Value Potentiometer	Used for adjusting delay value. Range: (1~20)%; It is the delay timer of reverse power action.
OVER/% Over Current Set Value Potentiometer	Used for adjusting over current set value. Range: (50~140)%; Setting value is the percentage of rated power value.
DELAY /s Delay Value Potentiometer	Used for adjusting delay value. Range: (1~60)s; It is the delay timer of over current action.

6 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 which produced by our company. As follows:



Fig.2 – PC Program Connection

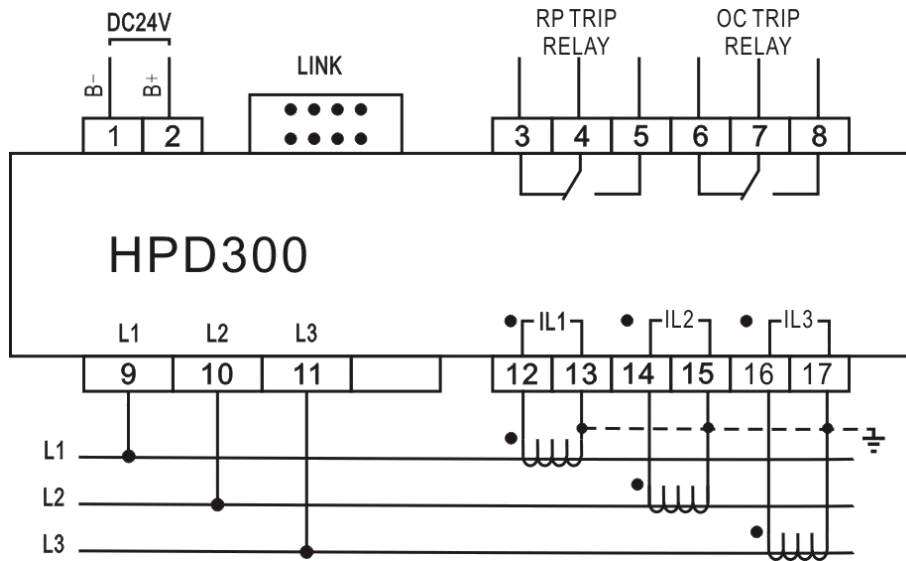


Fig.3 - 3 phase 3 wire/3 phase 4 wire

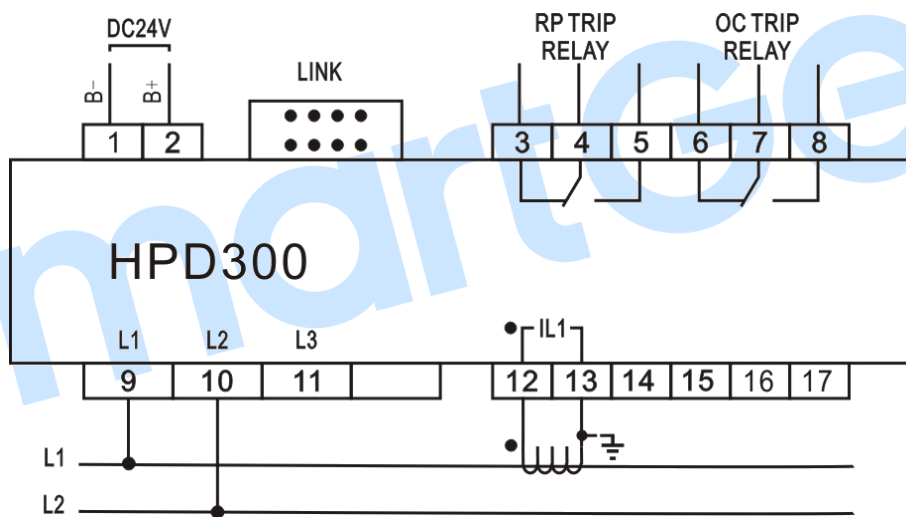


Fig.4 - Single phase 2 wire/2 phase 3 wire

8 INSTALLATION DIMENSIONS

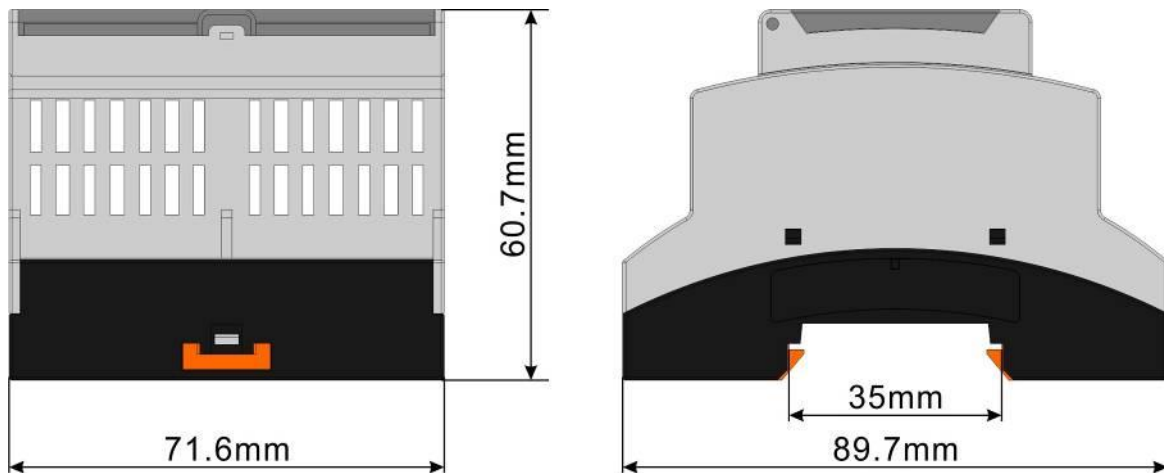


Fig.5 – Case Dimensions and Cutout

1) Output And Expand Relays

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

2) AC Input

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

⚠ Note: When there is load current, transformer's secondary side prohibit open circuit.

3) Withstand Voltage Test

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