



SmartGen
ideas for power

HLS300
POWER SHARE MODULE
USER MANUAL



SMARTGEN (ZHENGZHOU) TECHNOLOGY CO.,LTD.



Chinese trademark

SmartGen English trademark

SmartGen —make your generator *smart*

SmartGen Technology Co., Ltd

No. 28 Jinsuo Road

Zhengzhou City

P. R. China

Tel: +86-371-67988888

+86-371-67981888

+86-371-67991553

+86-371-67992951

+86-371-67981000 (overseas)

Fax: 0086-371-67992952

Web: <http://www.smartgen.com.cn>

<http://www.smartgen.cn>



Email: sales@smartgen.cn

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Software Version

Date	Version	Content
2015-05-21	1.0	Original release.
2015-09-07	1.1	Modify terminal 1, terminal2 description.
2017-03-09	1.2	Add "Power Regulation Limit" description in parameter setting item; modified default values of Rated Voltage, Load Ramp Rate and etc.

Sign	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

HLS300 Power Share Module is special design for genset power share. On the basis of the parameters, the module automatically shares power in genset running process.

The main function of HLS300 module is to share active load to each operating genset according to genset capacitance. The module is brief to operate, easy to install and widely used for ship genset and land genset.

2 PERFORMANCE AND CHARACTERISTICS

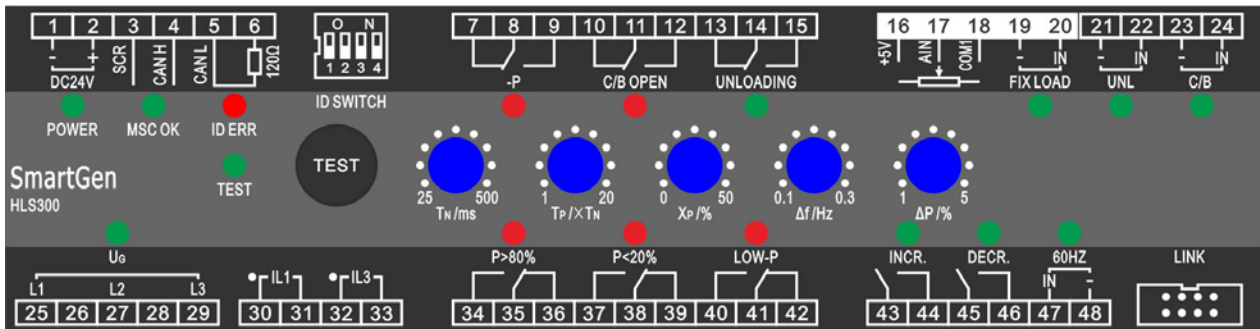
- Suitable for 3-phase 3-wire, single phase 2-wire systems with frequency 50/60/Hz;
- Adjustable potentiometer allows for set main parameters of power share.
- The operating parameters can be set via upper computer test software. LINK port should be connected to upper computer via SG72 module (USB to LINK)
- 8 relays output, 2 relays are used for INCR., DECR., 5 relays are used for -P, UNLOADING, P>80%, P<20%, LOW-P output, 1 relay is used for C/B OPEN;
- 1 FIXLOAD mode, 1 UNL, 1 close and 1 60Hz optional digital input;
- One test button, test relay output and panel indicators;
- 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 SPECIFICATION

Parameter	Details
Working Voltage	DC8.0V to 35.0V, continuous power supply.
Overall Consumption	≤2W(Standby mode≤0.5W)
AC Input	AC50V~ AC620 V (ph-ph)
AC Frequency	50Hz/60Hz
Relay Output	7A AC250V Volts free output
Case Dimensions	161.6mm x 89.7mm x 60.7mm
CT Secondary Current	Rated: 5A
Working Conditions	Temperature: (-25~+70)°C Humidity: (20~95)%
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	0.45kg

4 PANEL INDICATORS AND TERMINALS DESCRIPTION

Mask as below:



LEDs Definition:

Indicator	Color	Description	Note
Power	Green	Power indicator, the lamp illuminate when the power works well.	
MSC OK	Green	MSC communication normal indicator.	
ID ERR	Red	MSCID setting fault indicator, the lamp illuminate when the IDs of two modules is same.	
TEST	Green	Indicator test mode.	
-P	Red	When reverse power reaches set value and after the delay, the lamp will illuminate.	
C/B OPEN	Red	When the open relay is outputting, the lamp will illuminate.	
UNLOADING	Green	When the load is transferring, the lamp will illuminate.	
FIXLOAD	Green	Fixed load mode indicator, the lamp will illuminate.	
UNL	Green	When Unload is active, the lamp will illuminate.	
C/B	Green	When the main switch close is active, the lamp will illuminate.	
UG	Green	When gens normally, the lamp will illuminate; when gens failed, the lamp will glitter; when there is no power, the lamp will extinguish.	
P<20%	Red	When the load power falls down 20% of Pn, the lamp will illuminate.	
P>80%	Red	When the load power exceeds 80% of Pn, the lamp will illuminate.	
LOW-P	Red	When the load falls down set value and after the delay, the lamp will illuminate.	
INCR.	Green	When the raising speed pulse is sent, the lamp will illuminate.	
DECR.	Green	When the decreasing speed pulse is sent, the lamp will illuminate.	
60HZ	Green	When the two stitches– and IN are short circuit, while the rated frequency is 60Hz, the lamp will illuminate.	50/60HZ to chose

Potentiometer Description:

Potentiometer	Range	Description	Note
TN/ms control length of pulse	(25-500)ms	Control min. last time of pulse.	
T_p/xTN	(1-20)TN	Adjustable speed pulse period= $T_p \times T_N$	
$X_p/\%$ proportion range	(0-±50)% P_n (0-±2.5)Hz	In this area, pulse width and deviation value between P_n and rated frequency are in direct proportion.	P_n is rated power
$\Delta f/Hz$	(0.1-0.3)Hz	Frequency adjustable precision; the frequency won't adjust in setting area.	
$\Delta P/\%$	(1-5)% of P_n	Power adjustable precision; the power won't adjust in setting area.	

Terminal Description:

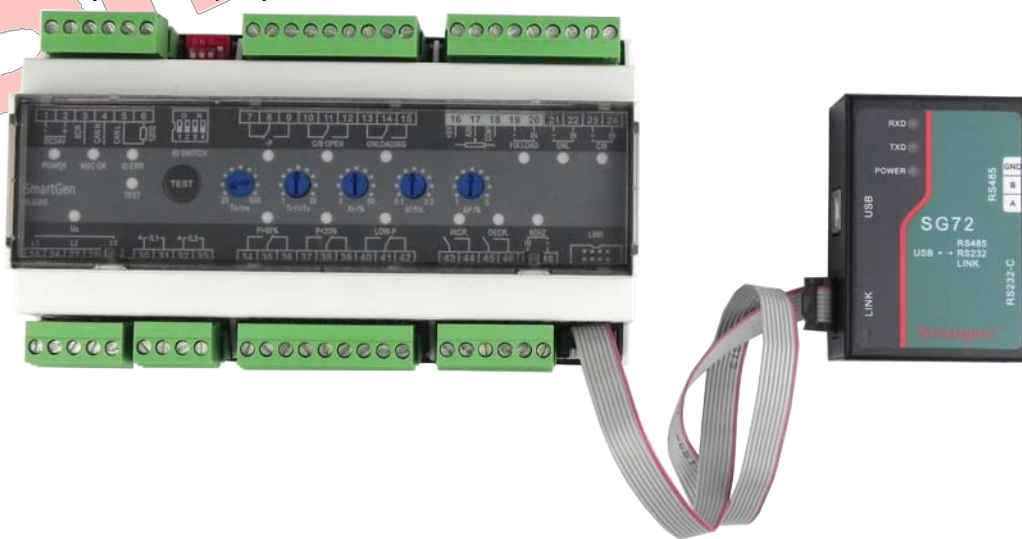
No.	Function	Cable	Note	
1	B-	1.0mm ²	Connected with negative of starter battery.	
2	B+	1.0mm ²	Connected with positive of starter battery.	
3	SCR	0.5mm ²	MSC communication.	
4	CANH	0.5mm ²		
5	CANL	0.5mm ²		
6	Terminal Resistance Match		If the terminal resistance match is needed, it needs to be short circuited to the terminal 5 or hang in the air.	
7	Reverse Power Output	Normally Close	Output when reverse power has exceeded set value and the delay over.	Normally open, close; Volts free output; 7A Rated
8		COM		
9		Normally Open		
10	Open Output	Normally Close	Output when open.	Normally open, close; Volts free output; 7A Rated
11		COM		
12		Normally Open		
13	Load Transfer Output	Normally Close	Output when load transfers.	Normally open, close; Volts free output; 7A Rated
14		COM		
15		Normally Open		
16	+5V	1.0mm	Power adjusts.	
17	AIN	1.0mm		
18	COM1	1.0mm		
19	FIXLOAD	-	Fixed power input, active when short circuits.	
20		IN		
21	UNL	-	Unload input, active when short circuits.	
22		IN		
23	C/B	-	Main switch close input, active when short circuits.	
24		IN		
25	L1	1.0mm ²	AC input.	
26				
27	L2	1.0mm ²		
28				



No.	Function		Cable	Note	
29	L3		1.0mm ²		
30	IL1		2.5mm ²	CT A-phase input; Externally connected to secondary coil of current transformer (rated 5A).	
31					
32	IL3		2.5mm ²	CT C-phase input; Externally connected to secondary coil of current transformer (rated 5A).	
33					
34	P>80% Output	Normally Open	2.5mm ²	Output when P>80%Pn and delay over.	Normally open, close; Volts free output; 7A Rated
35		COM			
36		Normally Close			
37	P<20% Output	Normally Open	2.5mm ²	Output when P>80%Pn and delay over.	Normally open, close; Volts free output; 7A Rated
38		COM			
39		Normally Close			
40	Underload Output	Normally Open	2.5mm ²	Output when P<10%Pn (it can be set to P<5%Pn or other value) and delay over.	Normally open, close; Volts free output; 7A Rated
41		COM			
42		Normally Close			
43	INCR.		2.5mm ²	Raise speed.	Normally open Volts free, 7A Rated.
44					
45	DECR.		2.5mm ²	Reduce speed.	Normally open Volts free, 7A Rated.
46					
47	Hz	-	1.0mm ²	50/60Hz to chose	Short circuit 60Hz
48		IN			
LINK	Used for parameters setting or software upgrade.				

PC Programme Connection Type

Parameters setting can be implemented via LINK port by using PC software and an SG72 adapter which produced by our company. As follows:



5 SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

No.	Items	Parameters	Defaults	Description
1	AC System	(0-1)	0	0: 3P3W, 1: 1P2W
2	Rated Voltage	(30-30000) V	400	
3	Volt Trans.	(0-1)	0	0: Disabled 1: Enabled
4	Volt Trans. Primary Voltage	(30-30000)V	100	
5	Volt Trans. Secondary Voltage	(30-1000)V	100	
6	Over Volt	(0-1)	1	0: Disabled 1: Enabled
7		(100-120) %	115	Threshold
8		(100-120) %	113	Returned
9		(0-3600) s	3	Delay
10	Under Volt	(0-1)	1	0: Disabled 1: Enabled
11		(70-100) %	75	Threshold
12		(70-100) %	77	Returned
13		(0-3600) s	3	Delay
14	Over Freq	(0-1)	1	0: Disabled 1: Enabled
15		(100-120) %	110	Threshold
16		(100-120) %	104	Returned
17		(0-3600) s	3	Delay
18	Under Freq	(0-1)	1	0: Disabled 1: Enabled
19		(80-100) %	90	Threshold
20		(80-100) %	96	Returned
21		(0-3600) s	3	Delay
22	Loss Of Phase	(0-1)	1	0: Disabled 1: Enabled
23	Phase Rotation Monitor	(0-1)	1	0: Disabled 1: Enabled
24	CT Ratio/5	(5-6000)	500	
25	Full Load Rated Current	(5-6000)A	500	
26	Rated Power	(0-6000)kW	500	
27	Reverse Power Threshold	(0-20)%	10	
28	Reverse Power Delay	(1-20)s	3	
29	Low Power Threshold	(0-20)%	10	
30	Low Power Delay	(1-20)s	3	
31	Address	(1-254)	1	
32	Load Ramp Rate	(0-100)%	2	
33	Load Ramp Rate Delay Percentage	(1-40)%	15	
34	Load Ramp Rate Delay	(0-30)s	5	




No.	Items	Parameters	Defaults	Description
35	Load Parallel Ramp Minimum	(0-100)%	5	
36	Load Feedback Percentage	(1-100)%	50	
37	Open Pulse Output	(1-1000)s	3	
38	Average Beat Freq	(0-1)	1	0: Disabled 1: Enabled
39	Power Regulation Limit	(0-50)%	30	When the max. output duty ratio of raise/drop speed relay is 0, the relay does not output.

▲Note: ID can be set via dial-up switch of terminal side; the IDs of modules which connected to a same CAN bus cannot be same.



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6 FUNCTION DESCRIPTION

The function of HLS300 Power Share Module is to proportionally share active load to each operating genset according to genset capacitance. When “FIXLOAD” is active, the module works in fixed power mode; otherwise the module works on power share mode. Press  button for 3s, it will enter into test mode (this mode is to test relay output and indicator).

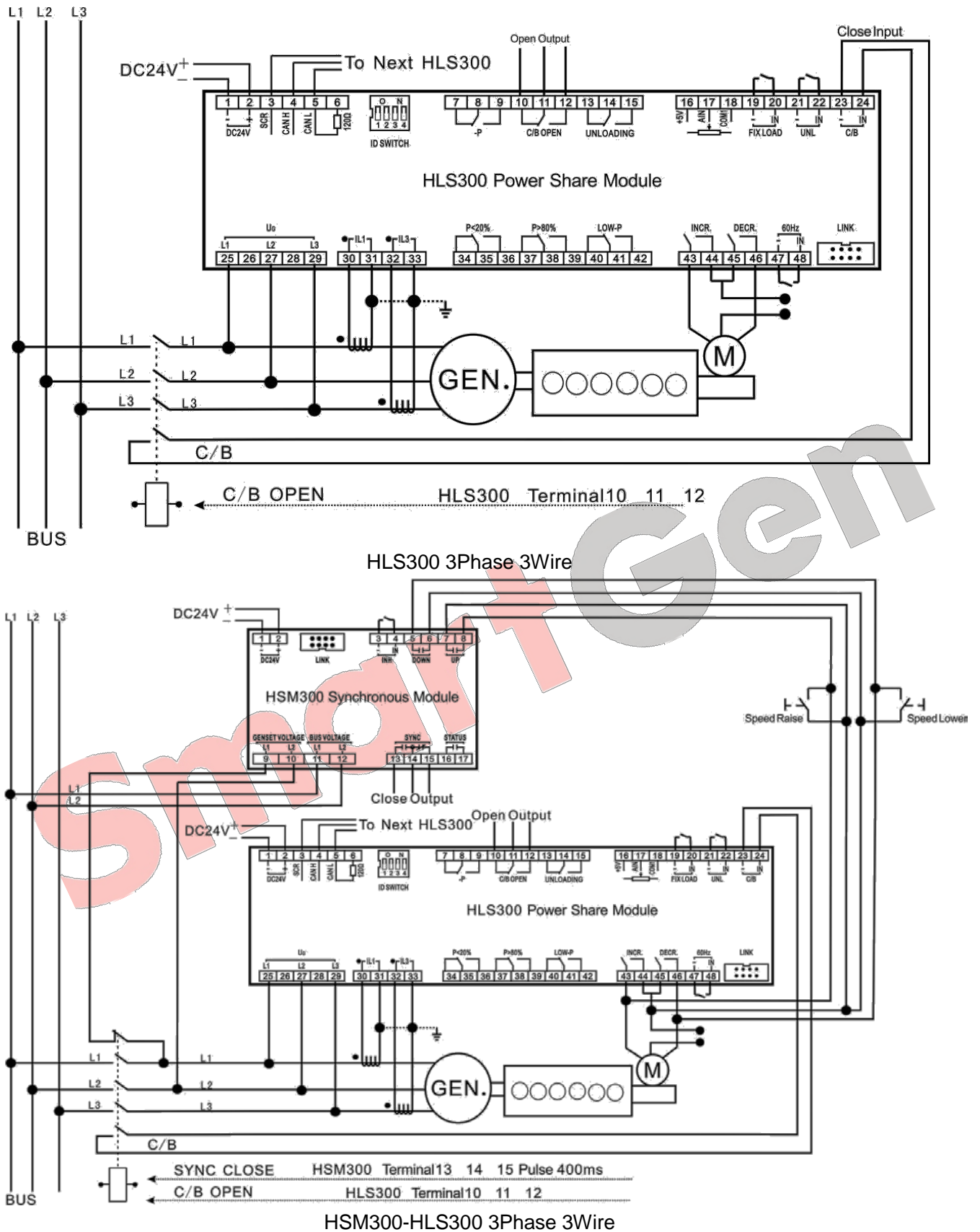
Fixed Power Mode: Target power can be set via external device connected with terminal 16, 17, 18. When close input is active, the module will adjust present power to target power and stabilize it between Δf and ΔP .

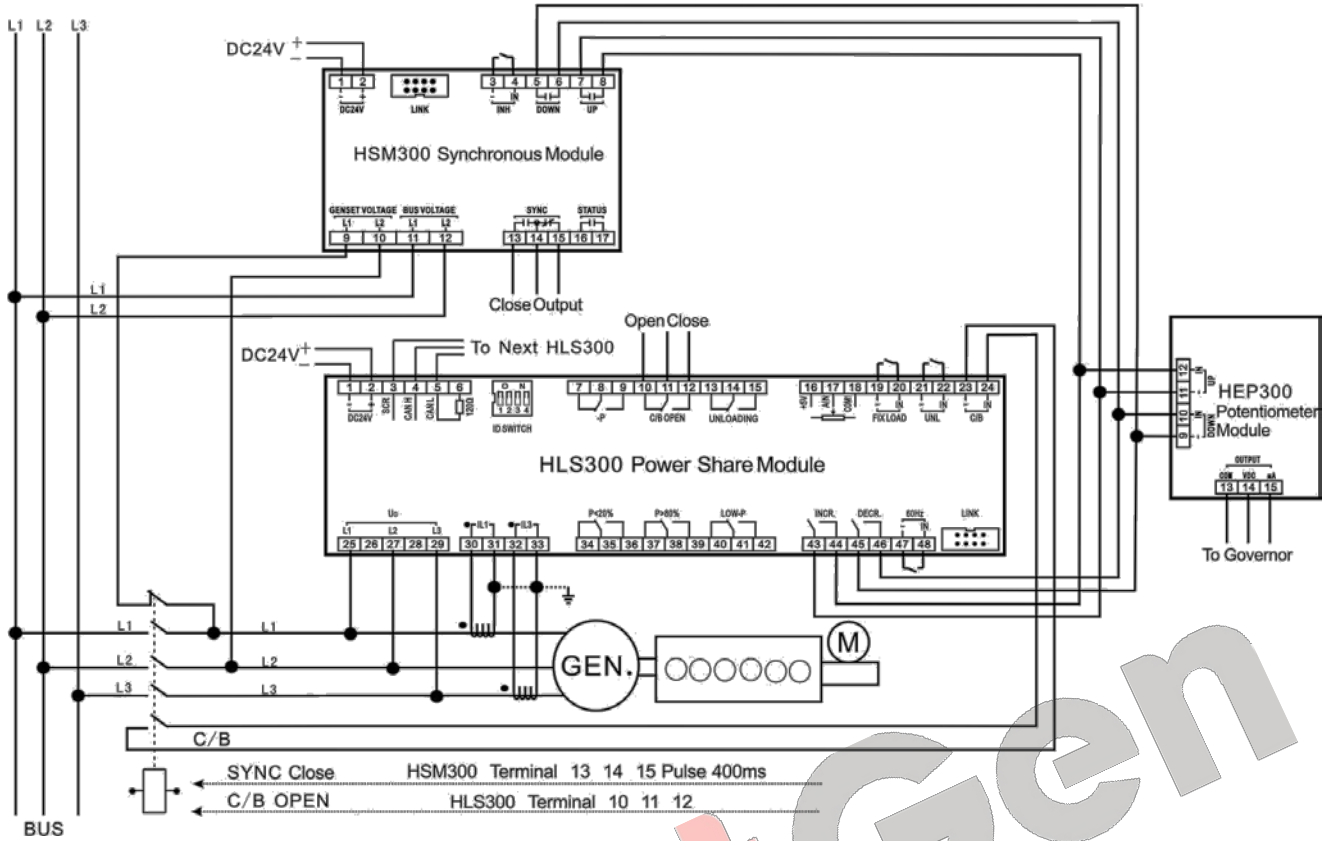
Power Share Mode: Multiple modules are connected with each other via CAN bus and operate in power share mode together. Target power is an average of present power sums of these modules. When close input is active, the module will adjust present power to target power and stabilize it between Δf and ΔP .

Test Mode: Press  button for 3s, the module will enter into test mode and the lamp will illuminate, in the mean time the other lamps irrelevant with relay output will illuminate, the -P relay output and the corresponding lamp will illuminate. In this mode, every time pressing  button, there will be a relay output and the corresponding lamp will illuminate. The module will quit test mode after relay output finished (every time there will be only one relay output and the corresponding lamp will illuminate). When it is in test mode, the module will automatically quit if there is no button pressed for about 18s.

▲Note: Test mode is prohibit when the module is operating (when close input is active).

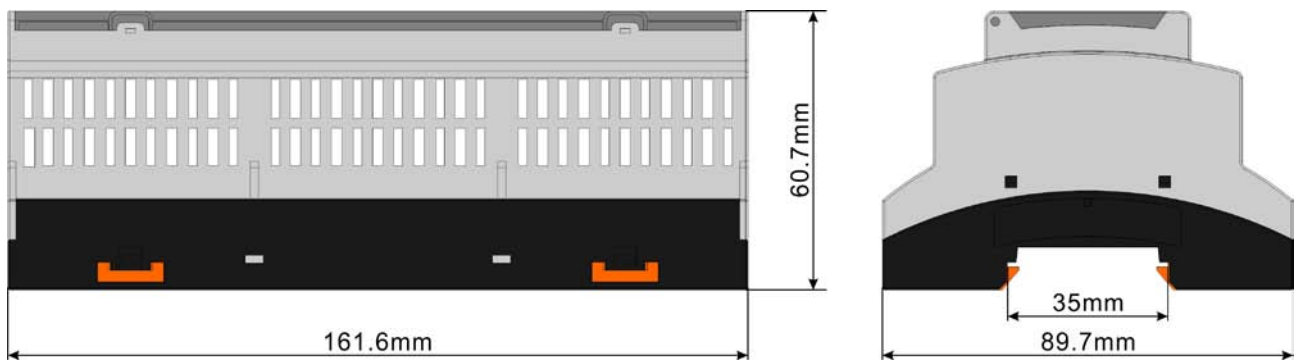
7 TYPICAL DIAGRAM





HSM300-HLS300-HEP300 3Phase 3Wire

8 CASE DIMENSION



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. Meanwhile the phases of CT and input voltage must be correct, otherwise the sampling current and active power may be incorrect.

▲ 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.