

SmartGen

MAKING CONTROL SMARTER

HMT300

MULTIFUNCTIONAL TRANSMITTER

USER MANUAL



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Table 1 Software Version

Date	Version	Note
2022-09-20	1.0	Original release.
2024-03-13	1.1	1. Modify No.14-15 the current output port remarks, delete "output direction can be set" and "Default (0~20)mA output" in Table 5; 2. Modify some setting items of current transmitter range in Table 6.

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1 OVERVIEW

HMT300 multifunctional transmitter integrates digital, intelligent and network technology, which is used for collecting voltage, current, power and frequency and outputting related actions if data errors occur, for the purpose of protecting the device.

HMT300 multifunctional transmitter adopts micro-processor technology, which makes it possible to precisely do parameter measuring, fixed value adjustment, set value adjusting etc. All parameters can be configured on front panel or through RS485 port via PC. It can be widely used for all types of power distribution devices with compact structure, simple wirings and high reliability.

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2 PERFORMANCE AND CHARACTERISTICS

Main features are as follows:

- RS485 communication port: through which data measuring and parameter setting can be done for the module on PC with software.
- Protections for over/under voltage, over/under frequency, reverse power, over power and over current.
- Current detection alarm makes it possible to do 3 times over current detection and corresponding alarms.
- With voltage harmonic test function, each phase voltage harmonic distortion rate and 3-31 times harmonic can be tested.
- With current harmonic test function, each phase current harmonic distortion rate and 3-31 times harmonic can be tested.
- Suitable for 3-phase 4-wire, 3-phase 3-wire, single phase 2-wire, and 2-phase 3-wire systems with frequency 50/60Hz;
- Collects and shows gen 3-phase voltage, 3-phase current, frequency and power parameters.

Generator

Line voltage (Uab, Ubc, and Uca)

Phase voltage (Ua, Ub, and Uc)

Frequency Hz

Load

Current Ia, Ib, Ic

A (unit)

Each phase and total active power P

kW (unit)

Each phase and total reactive power Q

kvar (unit)

Each phase and average power factor PF

- Parameter setting function: parameters can be modified and stored in internal FLASH memory and cannot be lost even in case of power outage; all of them can be adjusted on front panel of the controller.
- With -20mA~+20mA/-10V~+10V analog output function, corresponding data can be turned into analog data for output.
- Wide power supply range DC(8~35)V, which is suitable for different power voltage environments.
- All parameters apply digital adjustment, getting rid of conventional analog modulation with normal potentiometer, improving wholesome reliability and stability.
- Module is mounted with the 35mm guide rail.

3 SPECIFICATION OPERATION

Table 2 Technical Parameters

Item	Contents
Operating Voltage	DC8V to DC35V, DC reverse connection protection
Power Consumption	<3W (standby≤2W)
AC Voltage	Phase Voltage Range: AC15V ~ AC600V (ph-N) Resolution: 0.1V Accuracy: 0.3%
	Line Voltage Range: AC30V ~ AC1000V (ph-ph) Resolution: 0.1V Accuracy: 0.3%
AC Frequency	Range: 50Hz/60Hz Resolution: 0.01Hz Accuracy: 0.3%
AC Current	Rated: 5A Range: 0A ~ 15A Resolution: 0.1A Accuracy: 0.3%
Load Power	Range: -214748364.7 ~ 214748364.7 Resolution: 0.1kW/0.1kvar Accuracy: 0.5%
Accumulated Electrical Energy	Range: -2000000000 ~ 2000000000 Resolution: 1kWh/1kvarh Accuracy: 1%
Digital Output 1	5A AC250V volts free output
Digital Output 2	5A AC250V volts free output
Vibration	5Hz~8Hz: displacement=±7.5mm 8Hz~500Hz: a=±2g IEC 60068-2-6
Shock	50g, 11ms, half-sine, complete shock test from three directions, and 18 times shock for each test IEC 60068-2-27
Bump	25g, 16ms, half-sine IEC 60255-21-2
Safety Requirements	According to EN 61010-1 installation category (over voltage category) III, 300V, pollution class 2, altitude 3000m
Overall Dimension	107.6mm x 89.7mm x 60.7mm
Installation Method	35mm guide rail or M4 screw
Working Temperature	(-30~+70)°C
Working Humidity	(20~93)%RH
Storage Temperature	(-40~+80)°C

Item	Contents
Insulation Strength	Apply AC2.2kV voltage between high voltage terminal and low voltage terminal, and the leakage current is not more than 3mA within 1min.
Meeting Standard	GB/T 37089 Reciprocating internal combustion engine driven alternating current generating sets controller
Weight	0.30kg

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4 OPERATION

4.1 WARNING

When controller detects warning signal, panel alarm indicator will flash. Meanwhile, alarm data can be read via RS485 port.

Table 3 Controller Warning

No.	Type	Description
1	Over Volt Warn	When the module detects that the generator-set voltage has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
2	Under Volt Warn	When the module detects that the generator-set voltage has fallen below the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
3	Over Frequency Warn	When the module detects that the generator-set frequency has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be displayed on LCD.
4	Under Frequency Warn	When the module detects that the generator-set frequency has fallen below the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
5	Over Power Warn	When the module detects that the generator-set power (power is positive) has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
6	Over Current Pre-alarm	When module detects genset current is above the pre-set over current warning limits, module issues warning alarm signal, and alarm information will be sent via RS485 port.
7	Reverse Power Warn	When the module detects that the generator-set reverse power value (power is negative) has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
8	Input 1 Warn	When user configured input warning is active, module shall issue warning alarm signal, and corresponding alarm information will be sent via RS485 port.
9	Input 2 Warn	When user configured input warning is active, module shall issue warning alarm signal, and corresponding alarm information will be sent via RS485 port.
10	Volt. L1 THDu Over	When module detects Volt. L1 harmonic distortion rate is above preset limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
11	Volt. L2 THDu Over	When module detects Volt. L2 harmonic distortion rate is above preset limit, it will send out warning signal and the corresponding alarm information will be displayed on LCD sent via RS485 port.
12	Volt. L3 THDu Over	When module detects Volt. L3 harmonic distortion rate is above preset limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.

No.	Type	Description
13	Volt. L1 THu Over	When module detects Volt. L1 each time harmonic is above pre-set limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
14	Volt. L2 THu Over	When module detects Volt. L2 each time harmonic is above pre-set limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
15	Volt. L3 THu Over	When module detects Volt. L3 each time harmonic is above pre-set limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
16	Current. L1 THDi Over	When module detects Current L1 harmonic distortion rate is above preset limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
17	Current. L2 THDi Over	When module detects Current L2 harmonic distortion rate is above preset limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
18	Current. L3 THDi Over	When module detects Current L3 harmonic distortion rate is above preset limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
19	Current. L1 THi Over	When module detects Current L1 each time harmonic is above pre-set limit, it will send out warning signal and the corresponding alarm information will be displayed on LCD sent via RS485 port.
20	Current. L2 THi Over	When module detects Current L2 each time harmonic is above pre-set limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.
21	Current. L3 THi Over	When module detects Current L3 each time harmonic is above pre-set limit, it will send out warning signal and the corresponding alarm information will be sent via RS485 port.

4.2 TRIP ALARM

When controller detects trip alarm, it will initiate trip signal immediately and display type will be displayed.

Table 4 Trip Alarm

No.	Type	Description
1	Over Voltage Trip	When the module detects that the generator-set voltage has exceeded the pre-set value, it will initiate a trip alarm and the corresponding alarm information will be sent via RS485 port.
2	Under Voltage Trip	When the module detects that the generator-set voltage has fallen below the pre-set value, it will initiate a trip alarm and the corresponding alarm information will be sent via RS485 port.
3	Over Frequency Trip	When the module detects that the generator-set frequency has exceeded the pre-set value, it will initiate a trip alarm and the corresponding alarm information will be sent via RS485 port.
4	Under Frequency Trip	When the module detects that the generator-set frequency has fallen below the pre-set value, it will initiate a trip alarm and the corresponding alarm information will be sent via RS485 port.
5	Over Power Trip	When the module detects that the generator-set power (power is positive) has exceeded the pre-set value, it will initiate a trip alarm and the corresponding alarm information will be sent via RS485 port.
6	Over Current Short Trip	When the module detects that the generator-set current has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
7	Over Current Long Trip	When the module detects that the genset current has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
8	Reverse Power Trip	When the module detects that the generator-set reverse power value (power is negative) has exceeded the pre-set value, it will initiate a warning alarm and the corresponding alarm information will be sent via RS485 port.
9	Loss of Phase Trip	When the module detects that generator-set voltage phase loss, it will initiate trip alarm signals and the corresponding alarm information will be sent via RS485 port.
10	Reverse Phase Sequence Trip	When the module detects that generator-set voltage phase sequence wrong, it will initiate trip alarm signals and the corresponding alarm information will be sent via RS485 port.
11	Input 1 Trip	When user configured input trip is active and module will send trip alarm signal, and corresponding information will be sent via RS485 port.
12	Input 2 Trip	When user configured input trip is active and module will send trip alarm signal, and corresponding information will be sent via RS485 port.

5 WIRING CONNECTION

HMT300 panel is as follows:



Fig.1 HMT300 Panel Drawing

Table 5 Terminal Wiring Connection

No.	Function	Cable Size	Remarks	
1	B-	1.5mm ²	Connected with negative of starter battery, engine starter battery can be used directly.	
2	B+	1.5mm ²	Connected with positive of starter battery, engine starter battery can be used directly.	
3	120Ω	1.0mm ²	After short connecting with RS485, there is no need to externally connect with a 120Ω resistor.	
4	RS485A	1.0mm ²	RS485 communication port, which supports MODBUS communication protocol.	
5	RS485B	1.0mm ²		
6	Aux. Output 1	1.0mm ²	Relay normally open volt free contact, rated 5A, and volt free contact output.	For details see 6.2.
7		1.0mm ²		
8	Aux. Output 2	1.0mm ²	Relay normally open volt free contact, rated 5A, and volt free contact output.	
9		1.0mm ²		
10	COM1	0.5mm ²	Programmable input 1 common terminal.	For details see 6.3.
11	AUX. INPUT 1	0.5mm ²	Programmable input 1.	
12	COM2	0.5mm ²	Programmable input 2 common terminal.	
13	AUX. INPUT 2	0.5mm ²	Programmable input 2.	
14	AO(+)	0.5mm ²	Current output port, output range is -20mA~+20mA/-10V~+10V. (If voltage type signal is required, analog output terminal is required and a 500Ω resistor should be connected.)	For details see 6.1.
15	AO(-)	0.5mm ²		
19	Gen L1 Phase Voltage Monitoring Input	1.0mm ²	Connected with genset output U phase (2A fuse is recommended.)	
20	Gen L2 Phase Voltage Monitoring Input	1.0mm ²	Connected with genset output V phase (2A fuse is recommended.)	
21	Gen L3 Phase Voltage Monitoring Input	1.0mm ²	Connected with genset output W phase (2A fuse is recommended.)	
22	Gen N Wire Input	1.0mm ²	Connected with genset output N wire.	
33	CT A Phase Monitoring	2.5mm ²	External connected current transformer secondary coil (5A rated, maximum 15A).	
24		2.5mm ²		
25	CT B Phase Monitoring	2.5mm ²	External connected current transformer secondary coil (5A rated, maximum 15A).	
26		2.5mm ²		
27	CT C Phase Monitoring	2.5mm ²	External connected current transformer secondary coil (5A rated, maximum 15A).	
28		2.5mm ²		

6 SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

4.3 CONTENTS AND SCOPES OF PARAMETERS

Table 6 Parameter Settings and Scopes

No.	Items	Range	Default	Description
Voltage Setting				
1	AC System	(0-3)	1	0: 3P4W 1: 3P3W 2: 2P3W 3: 1P2W
2	Rated Voltage	(30-30000)V	400	Provide standard for over/under voltage and voltage on load. If voltage transformer is used, this value is primary voltage of transformer. When AC system is 3P3W, this setting value is line voltage; for other supply AC systems, it is phase voltage.
3	PT Fitted Enable	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, voltage value display in proportion can be realized on PT application.
4	Primary Voltage	(30-30000)	100	Primary voltage of voltage transformer.
5	Secondary Voltage	(30-1000)	100	Secondary voltage of voltage transformer.
6	Over Volt Warning Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect over voltage warning.
7	Over Volt Warning Value	(0-200)%	110	When generator voltage has exceeded the setting value and warning delay is expired, module will initiate over voltage warning alarm.
8	Over Volt Warning Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
9	Over Volt Trip Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect over voltage trip.
10	Over Volt Trip Value	(0-200)%	120	When generator voltage has exceeded the setting value and trip delay is expired, module will initiate over voltage trip alarm.
11	Over Volt Trip Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
12	Under Volt Warning Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect under voltage warning.
13	Under Volt Warning Value	(0-200)%	84	When generator voltage has fallen below the setting value and warning delay is expired, module will initiate under voltage

No.	Items	Range	Default	Description
				warning alarm.
14	Under Volt Warning Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
15	Under Volt Trip Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect under voltage trip.
16	Under Volt Trip Value	(0-200)%	80	When generator voltage has fallen below the setting value and trip delay is expired, module will initiate under voltage trip alarm.
17	Under Volt Trip Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
18	Loss of Phase Detection Enabled	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, loss of phase warning starts to be detected.
19	Reverse Phase Sequence Detection Enabled	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, phase sequence wrong warning starts to be detected.
20	Under Volt Threshold Voltage	(0-200)%	60	When threshold voltage is exceeded, module starts to detect under voltage trip.
21	Load Voltage	(0-200)%	90	When module detects voltage is above this limit, it allows voltage of load conditions is satisfied.
22	Volt. THDu Warn	(0-1) 0: Disabled 1: Enabled	0	After it is enabled, module starts to detect voltage harmonic distortion rate alarm.
23	Warn Value	(0-100)%	5	When module detects any one of voltage harmonic distortion rate is above the pre-set threshold, it shall issue alarm information.
24	Warn Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
25	Volt. THu Warn	(0-1) 0: Disabled 1: Enabled	0	After it is enabled, module starts to detect voltage harmonic alarm for each time.
26	Warn Value	(0-100)%	3	When module detects any one of voltage harmonic for each time is above the pre-set threshold, it will issue alarm information.
27	Warn Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
Frequency Setting				
28	Rated Frequency	(50.0-60.0)Hz	50.0	Provide standard for over/under frequency and frequency on load.

No.	Items	Range	Default	Description
29	Over Frequency Warning Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect over frequency warning.
30	Over Frequency Warning Value	(0-200)%	110	When generator frequency has exceeded the setting value and warning delay is expired, module will initiate over frequency warning alarm.
31	Over Frequency Warning Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
32	Over Frequency Trip Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect over frequency trip.
33	Over Frequency Trip Value	(0-200)%	114	When generator frequency has exceeded the setting value and warning delay is expired, module will initiate over frequency trip alarm.
34	Over Frequency Trip Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
35	Under Frequency Warning Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect under frequency warning.
36	Under Frequency Warning Value	(0-200)%	84	When generator frequency has fallen below the setting value and warning delay is expired, module will initiate under frequency warning alarm.
37	Under Frequency Warning Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
38	Under Frequency Trip Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect under frequency trip.
39	Under Frequency Trip Value	(0-200)%	80	When generator frequency has fallen below the setting value and warning delay is expired, module will initiate under frequency trip alarm.
40	Under Frequency Trip Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
41	Frequency On Load	(0-200)%	90	When module detects frequency has exceeded the setting value, it allows frequency of load conditions is satisfied.
Current Setting				
42	Rated Full-load Current	(5-6000)A	500	It is generator's rated current, and used for providing standard for load current.
43	CT Primary Ratio	(5-6000)	500	Externally connected current transformer ratio (Primary).
44	CT Secondary	1A/5A	5	Externally connected current transformer

No.	Items	Range	Default	Description
	Ratio			ratio (Secondary).
45	Over Current Long Trip	(0-1) 0: Disabled 1: Enabled	1	After enabled, module starts to detect for over current long trip.
46	Over Current Long Trip Value	(0-300)%	110	When current exceeds this value and this lasts for pre-set delay time, module issues over current long trip alarm.
47	Over Current Long Trip Delay	(0-999.9)s	10.0	Time from when module detects alarm to alarm is issued.
48	Over Current Long Delay Type	(0-1) 0: DMT 1: IDMT	0	If DMT is set, do alarm delay handle by setting fixed delay time; If IDMT is set, do alarm delay handle by setting multiplier.
49	Over Current Long Delay Multiplier	(1-36)	36	When IDMT is active, alarm delay can be done by setting this multiplier.
50	Over Current Short Trip	(0-1) 0: Disabled 1: Enabled	1	After enabled, module starts to detect for over current short trip.
51	Over Current Short Trip Value	(0-300)%	114	When current exceeds this value and this lasts for pre-set delay time, module issues over current short trip alarm.
52	Over Current Short Trip Delay	(0-999.9)s	2.0	Time from when module detects alarm to alarm is issued.
53	Over Current Short Delay Type	(0-1) 0: DMT 1: IDMT	0	If DMT is set, do alarm delay handle by setting fixed delay time; If IDMT is set, do alarm delay handle by setting multiplier.
54	Over Current Short Delay Multiplier	(1-36)	36	When IDMT is active, alarm delay can be done by setting this multiplier.
55	Current Pre-alarm Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect current pre-alarm.
56	Current Pre-alarm Value	(0-300)%	100	When current has exceeded this value and alarm delay is expired, module will initiate over current pre-alarm signal.
57	Current Pre-alarm Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
58	Current Pre-alarm Delay Type	(0-1) 0: DMT 1: IDMT	0	If DMT is set, do alarm delay handle by setting fixed delay time; If IDMT is set, do alarm delay handle by setting multiplier.
59	Current Pre-alarm Delay Multiplier	(1-36)	36	When IDMT is active, alarm delay can be done by setting this multiplier.
60	Current Harmonic Distortion Rate	(0-1) 0: Disabled	0	When it is enabled, module starts to detect current harmonic distortion rate.

No.	Items	Range	Default	Description
	Warning Enabled	1: Enabled		
61	Harmonic Distortion Rate Warning Value	(0-100%)	5	When module detects any one of current harmonic distortion rate is above the preset value, it shall initiate alarm information.
62	Harmonic Distortion Rate Warning Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
63	Current Harmonic Warning Enabled	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, module starts to detect current harmonic alarm for each time.
64	Harmonic Warning Value	(0-100%)	3	When module detects any one of current harmonic for each time is above the pre-set value, it shall initiate alarm information.
65	Harmonic Warning Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
Power Setting				
66	Rated Power	(0-6000)kW	276	It is generator's rated power, and used for providing standard for power detection.
67	Rated Reactive Power	(0-6000)kvar	200	It is generator's rated reactive power, and used for providing standard for reactive percentage.
68	Over Power Warning Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect over power warning.
69	Over Power Warning Value	(0-200)%	110	When generator current power (positive) has exceeded the setting value and warning delay is expired, module will initiate over power warning alarm.
70	Over Power Warning Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
71	Over Power Trip Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect over power trip.
72	Over Power Trip Value	(0-200)%	114	When generator current power (positive) has exceeded the setting value and trip delay is expired, module will initiate over power trip alarm.
73	Over Power Trip Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
74	Reverse Power Warning Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect reverse power warning.

No.	Items	Range	Default	Description
75	Reverse Power Warning Value	(0-200)%	20	When reverse power value (negative) has exceeded the setting value and warning delay is expired, module will initiate reverse power warning alarm.
76	Reverse Power Warning Delay	(0-3600)s	3	Time duration from alarm is detected to alarm is initiated.
77	Reverse Power Trip Enabled	(0-1) 0: Disabled 1: Enabled	1	When it is enabled, module starts to detect reverse power trip.
78	Reverse Power Trip Value	(0-200)%	30	When reverse power value (negative) has exceeded the setting value and trip delay is expired, module will initiate reverse power trip alarm.
79	Reverse Power Trip Delay	(0-3600)s	2	Time duration from alarm is detected to alarm is initiated.
NEL Trip Setting				
80	NEL1 Trip Enable	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, NEL trip alarm detection begins.
81	NEL1 Trip Value	(0-200)%	100	When current value is higher than it and holds set delay time, NEL 1 trip alarm information will be sent.
82	NEL1 Trip Delay	(0-3600)s	5	Time from detecting alarm to send alarm.
83	NEL2 Trip Enable	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, NEL trip alarm detection begins.
84	NEL2 Trip Value	(0-200)%	105	When current value is higher than it and holds set delay time, NEL 2 trip alarm information will be sent.
85	NEL2 Trip Delay	(0-3600)s	3	Time from detecting alarm to send alarm.
86	NEL3 Trip Enable	(0-1) 0: Disabled 1: Enabled	0	When it is enabled, NEL trip alarm detection begins.
87	NEL3 Trip Value	(0-200)%	110	When current value is higher than it and holds set delay time, NEL 3 trip alarm information will be sent.
88	NEL3 Trip Delay	(0-3600)s	2	Time from detecting alarm to send alarm.
Output Port Settings				
89	Aux. Output 1 Setting	(0-30)	0	Factory default: Not Used Please see Table 7 for output port function configuration.
90	Aux. Output 1	(0-1)	0	0: Normally open; 1: Normally close

No.	Items	Range	Default	Description
	Type			
91	Aux. Output Setting 2	(0-30)	0	Factory default: Not Used Please see Table 7 for output port function configuration.
92	Aux. Output Type 2	(0-1)	0	0: Normally open; 1: Normally close
Input Port Settings				
93	Aux. Input Setting 1	(0-20)	0	Factory default: Not Used Please see Table 9 for input port function configuration.
94	Aux Input 1 Type	(0-1)	0	0: Close to activate 1: Open to activate
95	Aux. Input Setting 2	(0-20)	0	Factory default: Not Used Please see Table 9 for input port function configuration.
96	Aux Input 2 Type	(0-1)	0	0: Close to activate 1: Open to activate
Module Setting				
97	Module Address	(1-254)	1	Module address for remote monitoring control.
98	RS485 Baud Rate	(0-4) 0: 9600bps 1: 19200bps 2: 38400bps 3: 57600bps 4: 115200bps	0	RS485 communication baud rate configuration.
99	Closing Time	(0-20.0)s	5.0	It is output time of allowing on load output after satisfying close conditions; when it is set to 0, it is constant output.
100	Alarm Output Latch Mode	(0-2) 0: Display and Output Latched 1: Display Latched, Output Not Latch 2: Display and Output Not Latch	0	Output in alarm or reset to clear when latch is displayed.
Analog Output Setting				
101	Current Transmitter Data Source	(0-18)	0	After selecting corresponding data source, output current will vary according to it. Detailed data source refers to Table 10.
102	Current Transmitter Positive Range(20mA)	(-8000~8000)	300	Output the corresponding value of 20mA.
103	Current Transmitter	(-8000~8000)	-300	Output the corresponding value of 20mA.

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No.	Items	Range	Default	Description
	Negative Range(-20mA)			

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4.4 DEFINED CONTENTS OF AUX. OUTPUT PORTS 1-2

Table 7 Defined Contents of Aux. Output Ports 1-2

No.	Items	Description
0	Not Used	Output port is deactivated when "Not Used" is selected.
1	Common Alarm	Output when module detects alarms.
2	Common Warning Alarm	Output when module detects warning alarms.
3	Common Trip Alarm	Output when module detects trip alarms.
4	Over Volt Trip Alarm	Output when over voltage trip alarms occur.
5	Under Volt Trip Alarm	Output when under voltage trip alarms occur.
6	Loss of Phase Trip Alarm	Output when loss of phase trip alarms occur.
7	Reverse Phase Sequence Trip Alarm	Output when reverse phase sequence trip alarms occur.
8	Over Frequency Trip Alarm	Output when over frequency trip alarms occur.
9	Under Frequency Trip Alarm	Output when under frequency trip alarms occur.
10	Over Current Short Trip Alarm	Output when over current short trip alarms occur.
11	Over Current Pre-alarm	Output when over current pre-alarms occur.
12	Over Power Trip Alarm	Output when over power trip alarms occur.
13	Reserved	Reserved
14	Reverse Power Trip Alarm	Output when generator reverse power trip alarms occur.
15	Over Volt Warning	Output when generator over voltage warning alarms occur.
16	Under Volt Warning	Output when generator under voltage warning alarms occur.
17	Allowing On-load Output	Output when on load conditions are satisfied.
18	Input 1 Active	Output when Aux. Input 1 is active.
19	Over Frequency Warning	Output when generator over frequency warning alarms occur.
20	Under Frequency Warning	Output when generator under frequency warning alarms occur.
21	Input 2 Active	Output when Aux. Input 2 is active.
22	Over Current Long Trip	Output when generator over current long trip alarms occur.
23	Reserved	Reserved
24	Over Power Warning	Output when generator over power warning alarms occur.
25	Voltage THDu Over	Output when any circuit of voltage harmonic distortion rate is over.
26	Reverse Power Warning	Output when generator reverse power warning alarms occur.
27	Custom Output	Define Column A output function and Column B output function; when one of both is active, it will output. For details please see Table 8.
28	Voltage THu Over	Output when any circuit of volt. harmonic for each time is over.
29	Current THDi Over	Output when any circuit of current harmonic distortion rate is over.
30	Current THi Over	Output when any circuit of current harmonic for each time is over.
31	Reserved	
32	Reserved	

No.	Items	Description
33	NEL 1 Trip	Output when NEL1 trip occurs.
34	NEL 2 Trip	Output when NEL2 trip occurs.
35	NEL 3 Trip	Output when NEL3 trip occurs.
36~40	Reserved	

Table 8 Custom Output Port List

No.	Custom Output Column A	Custom Output Column B
0	Over Volt Warning Alarm	Over Volt Warning Alarm
1	Under Volt Warning Alarm	Under Volt Warning Alarm
2	Over Frequency Warning Alarm	Over Frequency Warning Alarm
3	Under Frequency Warning Alarm	Under Frequency Warning Alarm
4	Over Power Warning	Over Power Warning
5	Over Current Long Trip	Over Current Long Trip
6	Reverse Power Warning	Reverse Power Warning
7	Reverse Phase Sequence Alarm	Reverse Phase Sequence Alarm
8	Over Volt Trip Alarm	Over Volt Trip Alarm
9	Under Volt Trip Alarm	Under Volt Trip Alarm
10	Over Frequency Trip Alarm	Over Frequency Trip Alarm
11	Under Frequency Trip Alarm	Under Frequency Trip Alarm
12	Over Power Trip Alarm	Over Power Trip Alarm
13	Over Current Short Trip	Over Current Short Trip
14	Reverse Power Trip Alarm	Reverse Power Trip Alarm
15	Loss of Phase Trip Alarm	Loss of Phase Trip Alarm
16	Over Current Pre-alarm	Over Current Pre-alarm
17	Over Current Trip	Over Current Trip
18	Input 1 Active	Input 1 Active
19	Input 2 Active	Input 2 Active
20	Voltage THDu Over	Voltage THDu Over
21	Voltage THu Over	Voltage THu Over
22	Current THDi Over	Current THDi Over
23	Current THi Over	Current THi Over

4.5 INPUT PORTS FUNCTION CONFIGURATION

Table 9 Input Ports Function Configuration

No.	Type	Function Description
0	Not Used	Input port function is inhibited.
1	User Configured	Users can define the following functions: Action: warning; when it is active, module shall issue input warning signal. Action: trip; when it is active, module will issue trip signal. Delay: Interval time from module detects input active to alarm is issued.
2	Alarm Reset	Alarm is reset when input is active.
3	Reserved	Reserved
4	Reserved	Reserved
5	Alarm ACK	Alarm ACK is enabled when input port is active.
6-20	Reserved	Reserved

4.6 ANALOG OUTPUT DATA SOURCE CONFIGURATION

Table 10 Analog Output Data Source Configuration

No.	Type	Function Description
0	Not Used	This function is inhibited.
1	Voltage A Phase	Select A phase voltage as analog output data source.
2	Voltage B Phase	Select B phase voltage as analog output data source.
3	Voltage C Phase	Select C phase voltage as analog output data source.
4	Voltage AB Phase	Select AB phase voltage as analog output data source.
5	Voltage BC Phase	Select BC phase voltage as analog output data source.
6	Voltage CA Phase	Select CA phase voltage as analog output data source.
7	Current A Phase	Select A phase current as analog output data source.
8	Current B Phase	Select B phase current as analog output data source.
9	Current C Phase	Select C phase current as analog output data source.
10	A Phase Active Power	Select A phase active power as analog output data source.
11	B Phase Active Power	Select B phase active power as analog output data source.
12	C Phase Active Power	Select C phase active power as analog output data source.
13	Total Active Power	Select total active power as analog output data source.
14	A Phase Reactive Power	Select A phase reactive power as analog output data source.
15	B Phase Reactive Power	Select B phase reactive power as analog output data source.
16	C Phase Reactive Power	Select C phase reactive power as analog output data source.
17	Total Reactive Power	Select total reactive power as analog output data source.
18	Frequency	Select frequency as analog output data source.

7 PARAMETERS SETTING

Parameters also can be set through PC software by connecting with SG72 module. When much more items need to be set (such as voltage and current calibration) or password is forgotten, please contact the factory.

NOTES:

- 1) Over voltage set value must be higher than under voltage set value, otherwise over voltage and under voltage conditions may occur simultaneously.
- 2) For unnecessary alarms please select "Disabled" in the alarm enabled selection.

8 CUSTOM PROTOCOL FUNCTION

HMT300 module supports custom protocol function. Customers can choose max.120 address data to conduct data reading among PC software settings based on their own demands. Starting address is 5000, and data of each address can select from "03" function code data of HMT300-2 external communication protocol.

Custom protocol is MODBUS communication protocol, and function code is 03.

Configuration interface is as below:

Custom Protocol		
Addr	Name	Content
5000	Custom Protocol Address 0	000 Common Alarm
5001	Custom Protocol Address 1	001 Trip Alarm
5002	Custom Protocol Address 2	002 Warning Alarm
5003	Custom Protocol Address 3	003 Harmonic violation limit
5004	Custom Protocol Address 4	004 Reserved
5005	Custom Protocol Address 5	005 input port
5006	Custom Protocol Address 6	006 Reserved
5007	Custom Protocol Address 7	007 output port
5008	Custom Protocol Address 8	008 Reserved
5009	Custom Protocol Address 9	009 Gen U&B
5010	Custom Protocol Address 10	010 Gen UBC
5011	Custom Protocol Address 11	011 Gen UCA
5012	Custom Protocol Address 12	012 Gen UA
5013	Custom Protocol Address 13	013 Gen UB
5014	Custom Protocol Address 14	014 Gen UC
5015	Custom Protocol Address 15	015 Gen UA Phase
5016	Custom Protocol Address 16	016 Gen UB Phase
5017	Custom Protocol Address 17	017 Gen UC Phase
5018	Custom Protocol Address 18	018 Gen Frequency
5019	Custom Protocol Address 19	019 Reserved

Fig.2 Custom Protocol Interface

9 TYPICAL APPLICATION

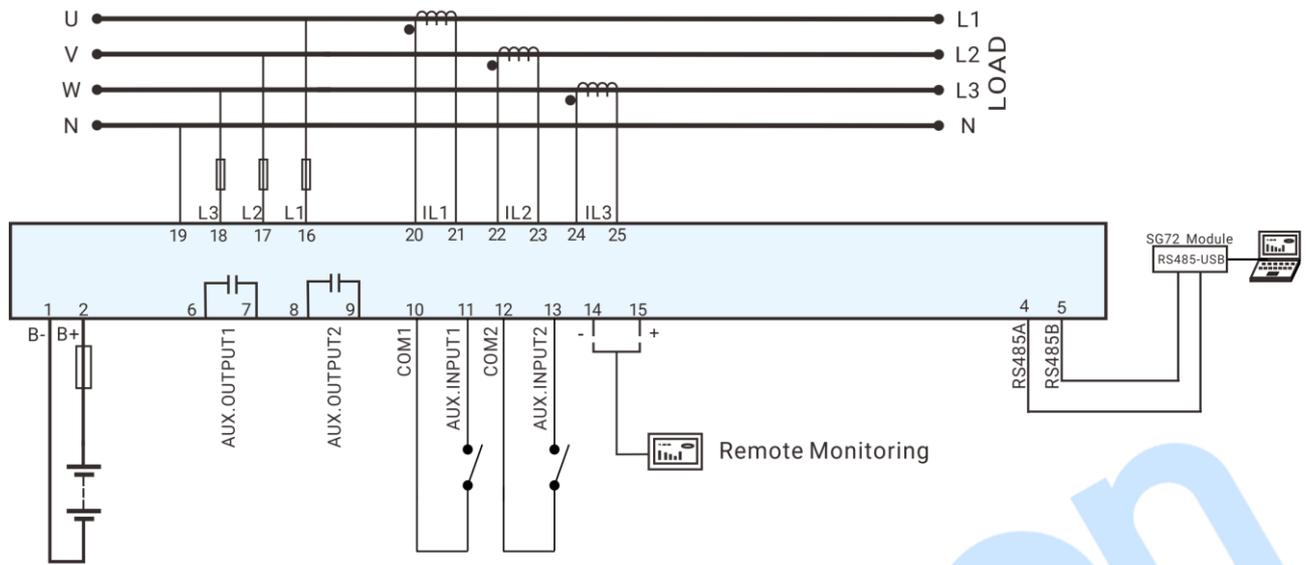


Fig.3 HMT300 Typical Application

10 INSTALLATION

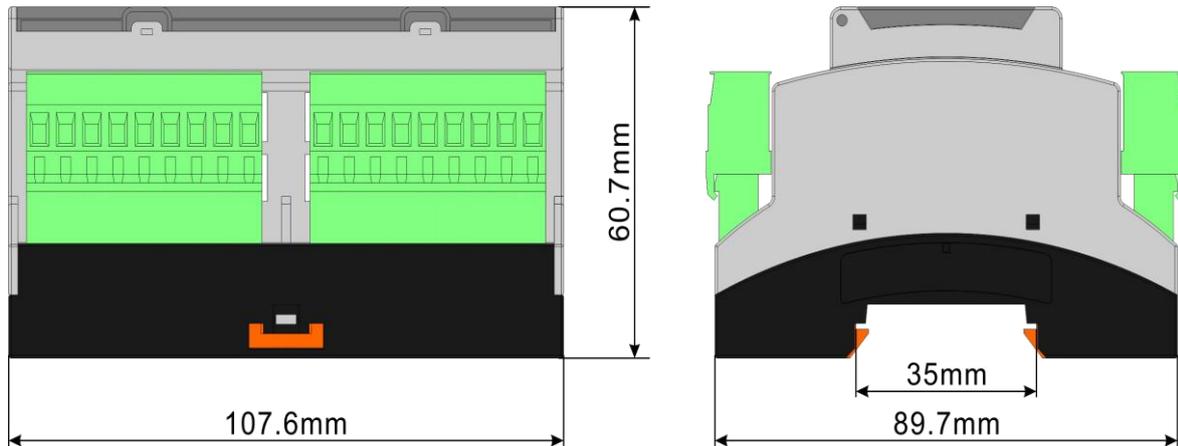


Fig.4 Overall Dimension and Cutout

NOTES:

❖ **OUTPUT AND EXPAND RELAYS**

All outputs are relay contact outputs. If it needs to expand the relays, please add freewheel diode to both ends of expand relay's coils (when coils of relay have DC current), or increase resistance-capacitance return circuit (when coils of relay have AC current), in order to prevent disturbance to controller or other equipments.

❖ **AC CURRENT INPUT**

Current input must be connected to outside current transformer. And the current transformer's secondary side current must be 5A (maximum can be 15A). At the same time, the phase of current transformer and input voltage phase must be correct. Otherwise, the collected current and active power may not be correct.

▲NOTE: When there is load current, transformer's secondary side is prohibited to open circuit.

❖ **WITHSTAND VOLTAGE TEST**

When relay has been installed on control panel, if high voltage test is to be done, please disconnect controller's all terminal connections, in order to prevent high voltage entering controller and damaging it.