Instruction for LXI661 Generator Collector

Ver:1.0 Dade:2015-03-24

Version history

Date	Version	Content
2015-03-24	1.0	Initial release

Description of the symbols in this document:

Symbol	Description
 Attention!	This icon prompts or warns the operator to operate properly.
 Be careful!	This icon means that miss operation may cause damage to the equipment.
 Warning	This icon means that miss operation may cause death, serious personal injuries and significant property loss.

Definitions:

Noun	Explanation
Mode of generator:	Generator manufacturer product number
Power of generator:	The maximum output power of generator. VA and watt are transformed according to the power factor 0.8.
Phase:	Three phase generator and single phase generator
Fuel type:	Fuel 1，gasoline ,2，diesel
Date of production of generator:	It is the date for products leaving the factory after the manufactured generators pass through related test.
Correction factor of fuel consumption:	The longer the generator being used the larger the fuel consumption. For calculating the fuel consumption, it should be subject to the fuel consumption of new generator.
Generator area:	It means the manufacturing company or producing area of the generator.
Generator number:	Each generator has the unique number.
Duration:	The duration from starting power generation to generation outage of the generator.
Base station LAC/SID (G-net is LAC and C-net is SID):	Each base station has the unique region code internationally.
Base station Cell ID/BID (G-net is Cell ID and C-net is BID):	Each station has the unique plot number in the region. The position of base station can be determined in accordance with base station LAC/SID and base station Cell/ID/BID.
Own number:	It means the telephone number of SIM card.
GPRS regular report:	Users can choose different interval time for report or choose not to report. Data collector sends data to GPRS server regularly.
Short message regular report:	Users can choose different interval time for report or choose not to report. Data collector sends data to short message server regularly.
Long-term online:	It means data collector is always connected to GPRS server.
自检功能： Self-inspection function:	At 15:00 every day, the data collector reports its own state information to GPRS/short message server.
Battery energy:	Data collector comes with a lithium battery (2600mAH). Electric quantity means the rest power in the battery for equipment operation.

Safety notes:

Warning: it is forbidden to contact the product with water or other liquid. When you contact the product with water or other liquid accidentally, please cut off the input and output power supply. If you continue to use, it may cause electrical short circuit until the product is burnt or on fire.

Warning: please do not touch the product with wet hands. Otherwise, it may cause electrical short circuit or personal electric shock injury accident.

Warning: please do not keep the product close to fire or hot places.

Warning: Please don't make this product close to electromagnetic wave interference source. Otherwise, it will probably result in malfunction or the inaccuracy of data

Be careful: please keep the product properly. When the product is kept in moist and high-temperature place, it is easy to bring about electrical short circuit or fault.

Catalog

1. Product performance and technical indicator

1.1. Product outline

LXI661 is a industrial data collector with global positioning system (GPS) for GPRS wireless transmission. This product is integrated with high-performance low-power industrial GPS module and GPRS module, which is a new product with perfect combination of GPS technology and wireless GPRS communication technology.

LXI661 is based on ARM platform and built-in operation system, with built-in industrial module, which can be used in severe environment. The operating temperature range is between -25℃~70℃.

LXI661 can perform real-time acquisition and detection of generator operation, transmit the collected data to Internet cloud system through GPRS Internet for data service and management, and at the same time, send related short message information (including starting power generation, abnormal power generation, stopping power generation, etc.). This product is sturdy and durable, steady and reliable and easy to install and can be widely applied for loco-motors and in other related fields.

1.2. Parameters

Power consumption: AC input voltage 220VAC, AC 45mA, maximum power consumption 10W.

- **Input voltage:** AC 85V～265V wide input voltage, with output over Load protection, short circuit protection and self-recovery function.
- **Isolation voltage:** 2500VAC
- **Wireless transmission system:** GSM or GPRS network
- **CT secondary current:** rated current 5A
- **Input voltage of AC generator:** 15V～265 V AC (ph-N)
- **Working temperature:** -25℃～70℃
- **Relative humidity:** 10%～90%
- **Enclosure size:** 140*130*35mm
- **Weight: 0.6Kg**
- **Safety specifications: in accordance with** CE-RTTE(EMC,LVD,RF) EN301489, EN60950, EN300440 and EN62479 standard safety specifications.
- **Enclosure material:** cast aluminum enclosure, water-proof and anti-collision. The required protection level is IP55.
- **Three-phase voltage detection:** connect line marks Power Generation L1, L2, L3 and N.
- **Three-phase current detection:** connect line marks Power generation CT1, CT2 and CT3.
- **Single-phase commercial electricity detection:** connect line marks Commercial Electricity L1. Circuit 1 programmable sensor port and switching value input port (common ports)
- **GPS positioning function:** the location and tracks of equipment can be determined and uploaded to server.
- **GPRS wireless data communication function:** submitting and checking unit status data and control function timely.

1.3. Indicator light

❖ Indicator light for power generation:

1. When the generator does not work, the light is off.
2. When the generator starts to producing electricity, without load, the light flashes quickly.
3. When the generator starts producing electricity, without load for 30 minutes, the light flashes slowly.
4. After the generator is with load for 3 minutes, the light is constant on.

❖ Charging indicator light:

1. For power generation or external source connection, if the battery is not fully charged, the red light is on. Otherwise, the green light is on.
2. If the generator does not work without external power, the light is off.

❖ **Internet indicator light:**

1. If GPRS module is not working normally or there is no cellphone card, or cellphone card is poor contact, or there is no signal, the light is off.
2. When connected server, the light is on for 0.2 seconds and off for 0.2 seconds (flash quickly).
3. For logining server, the light is on for 1 second and off for 1 second （flash slowly)
4. When the server is successfully logined, the light is on for 1 second and off for 3 seconds (flash discontinuously).

❖ **Communication indicator light:**

1. When the equipment does not send GPRS data, the light is on for 0.2 seconds and off for 4 seconds.
2. When the equipment is sending GPRS data, the light is on for 0.1 seconds and off 0.1 seconds.
3. When the equipment is testing mode, the light is constant on.

❖ **Positioning indicator light:**

1. If the equipment does not receive GPS module data, the lamp is off.
2. When the equipment receives GPS module data but there is no satellite signals, the light is on for 0.2 seconds and off for 0.2 seconds.
3. When the equipment receives GPS module data and there is satellite signals, no positioning, the light is on for 1 second and off for 1 second.
4. When the equipment receives GPS module data and the satellite is positioned successfully, the light is on for 1 second and off for 3 seconds.

❖ **Connecting line for data collector:** there is a charging port and 3 current transformers at the end of the equipment. “Power generation L1”is connected to the red line of generator voltmeter and “power generation N” is connected to the black line of generator voltmeter.

❖ **CDMA/GSM antenna:** for data transmission and communication

❖ **GPS antenna:** for GPS positioning

1.4. Normal working process of data collector

1) After the normal starting of generator

① **Starting producing electricity:** the indicator light of data collector flashes. After the generating power reaches over 40Hz for 3min., the collector starts automatically and connects to server.

② **Successful power generation with load:** when the input current of generator is over 2A for 3min.(for normal power generation, the current is generally over 2A), collect the voltage and current parameters, base station location parameter and send related collected data through short messages and Internet.

Format of short message:

"LAC=***** CID=*****, East longitude: **°**′**′,Northern latitude: **°**′**′, Generator number=****, Generator area=*****, Extension=*****, Date (year, month and day) and time; Generating voltage: ***V, Generating current: ***A [Seeming AC]

Format of network:

Report of Power generation condition	
Command code	**Name of function**
GenStartTime	Start time of generator
GenVoltL1	Generator voltage L1
TOTCURRENT	Total current
KW energy	Total electric energy
CrankTimes	Crank times
BaseStation	Base station location
GensetNum	Generator number
GensetArea	Generator area
Extension	Extension
GenAlarm	Generator alarm
SeemingMain	Seeming main
GPSposition	GPS position
BatLowVoltAlarm	BatLowVoltAlarm

③ Generator is always no-load: if generator is still no-load after starting for 30min.(load current is less than 2A), related collected data will be sent through SMS and network.

SMS format: "LAC=***** CID=*****, **°**′**′east longitude, **°**′** north latitude, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (starting power generation); generating voltage ***V; for the generating current 0.0A, the generator is no-load [seeming mains]"

Network format:

Report of generator no load	
Command code	**Name of function**
DateClock	Date clock
BaseStation	Base station location
GensetNum	Generator number
GensetArea	Generator area
Extension	Extension
GenAlarm	Generating alarm
SeemingMain	Seeming Main
GPSposition	GPS position
BatLowVoltAlarm	Battery low voltage alarm

2) During power generation

① Sending the same SMS again due to network anomaly: if the SMS are not sent successfully by data collector (for example, base station network does not restore.), the data collector will search network automatically. Once the collector accesses network, it will send the SMS again in a timely manner.

② For abnormal power generation, related alarm information will be sent through SMS and network, such as generating over-voltage, under-voltage, over-frequency, under-frequency, over-current, under-voltage of the collector built-in battery, etc.

SMS format:

"LAC=***** CID=*****, **°**′**″east longitude, **°**′**″ north latitude, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (starting power generation); generating voltage ***V, generating current ***A, generating over-voltage/under-voltage/over-frequency/under-frequency/over-current/built-in battery low voltage alarm; [seeming mains]"

Network format

Report of abnormal alarm	
Command code	**Name of function**
BaseStation	Base station location
GensetNum	Generator number
GensetArea	Generator area
Extension	Extension
GenAlarm	Generating alarm
SeemingMain	Seeming main
GPSposition	GPS position
BatLowVoltAlarm	Battery low voltage alarm

③For generator unload, generator no load information will be sent through SMS and network.

SMS format: “LAC=***** CID=*****, **°**′**′east longitude, **°**′** north latitude, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (starting power generation); generating voltage ***V; for the generating current 0.0A, the generator is no-load [seeming mains]”.

Network format:

Report of generator no load	
Command code	**Name of function**
DateClock	Date clock
BaseStation	Base station location
GensetNum	Generator number
GensetArea	Generator area
Extension	Extension
GenAlarm	Generating alarm
SeemingMain	Seeming mains
GPSposition	GPS position
BatLowVoltAlarm	Battery low voltage alarm

④ Network server can read all the data status of collector in real time (including GPS, power generation data, load current, etc.)

Data status	Main frequency	MainFreq	Reactive power	ReactivePower
	AC voltage	MainVolt	Apparent power	ApparentPower
	Generating frequency	GenFreq	Base station location information	BaseStation
	Generating voltage L1	GenVoltL1	GPRS signal strength	CSQ
	Generating voltage L2	GenVoltL2	GPS position	GPSposition
	Generating voltage L3	GenVoltL3	Lithium battery voltage	LiBATVolt
	Generating voltage L12	GenVoltL12	Seeming mains	SeemingMain
	Generating voltage L23	GenVoltL23	Date clock	Date clock
	Generating voltage L31	GenVoltL31	Runnign period	RunningPeriod
	Generating current L1	GenCurrentL1	KW power	KWpower
	Generating current L2	GenCurrentL2	Generating alarm	GenAlarm

	Generating current L3	GenCurrentL3	Battery low voltage alarm	BatLowVoltAlarm
	Total generating current	TOTCurrent	Generating start time	GenStartTime
	Active power	ActivePower	Generating stop time	GenStopTime

3) After the completion of power generation

① If the SMS or network data cannot be sent after the competition of power generation, data collector will continue to search network within 4 hours. Once the collector accesses network, it will send the same SMS again in a timely manner. If the SMS cannot be sent successfully, the collector will not search network, it will cut off the power supply automatically to avoid a dead battery.

② **When generator stops producing electricity,** the power generation data will be sent through SMS and network.

SMS format: "LAC=***** CID=*****, **°**′**′east longitude, **°**′** north latitude, generator number=**** generator area=***** extension=*****; yy-mm-dd (starting power generation), hh:mm:ss (stopping power generation); running period: hh:mm, electricity quantity **** watt hour [seeming mains]"

Network format:

Report of power generation record	
Command code	**Name of function**
GenStartTime	Generating start time
GenStopTime	Generating stop time
BaseStation	Base station location
GensetNum	Generator number
GensetArea	Generator area
Extension	Extension
RunningPeriod	Running period
KWpower	KW power
GenAlarm	Generating alarm
SeemingMain	Seeming main
KWenergy	KW energy
CrankTimes	Crank times
GenRunTimes	Generating run times
GenRunPeriod	Generating run period
GPSposition	GPS position
BatLowVoltAlarm	Battery low voltage alarm

4) Self-inspection function

① Sending the self-inspection report (SMS and Internet) to manager (the first authorized number) at 15:00 every day.

②SMS format:

Self-inspection report: "LAC=***** CID=*****, **°**′**″ east longitude, **°**′**″ north latitude, generator number==****, generator area=*****, extension=*****; yy-mm-dd hh:mm:ss; battery voltage ***V; lithium battery voltage ***V"

Network format:

Self-inspection Report	
Command code	**Name of function**
DateClock	Data clock
BaseStation	Base station location
GensetNum	Generator number
GensetArea	Generator area
Extension	Extension
ExtBATVolt	External battery voltage
LiBATVolt	Li battery voltage
BatLowVoltAlarm	Battery low voltage alarm

1.5. Judgment method for receiving SMS

Item	Situation	Number of SMS	LXI660 SMS format
1	1. The network is normal and power generation is normal.	Two	1. Starting generating electricity: "LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (starting power generation); generating voltage ***V, generating current ***A [seeming mains]" 2. Completing generating electricity: "LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (completing power generation); running period: hh:mm; electric quantity ****watt hour;[seeming mains]"

2	2. Network is normal. No-load power generation	Two	1. Starting generating electricity: “LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (starting power generation); generating voltage ***V; when current is 0.0A, the generator is no load [seeming mains]” 2. Completing generating electricity: “LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (completing power generation); running period: hh:mm [seeming mains]”
3	3. For power generation, there is no signal and the data is stored by data collector. When there is signal, the data is transmitted again.	One	1.Starting generating electricity: “LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (starting power generation); generating voltage ***V, generating current***A [seeming mains]” 2. Completing generating electricity: “LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (completing power generation); running period: hh:mm [seeming mains]”
4	4. There is no signal during the whole process of power generation. When the generator has signal, the information will be sent again.	One	
5	5. There is signal during the whole process of power generation (until the stand-by battery is out of power). The information is sent again for next power generation.	One	After the standby battery is out of power or goes into sleep-mode, the SMS will be sent again for next power generation. “power generation record=***, LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss (stopping power generation); running period: hh:mm”
6	6. Self-inspection report (the self-inspection report is sent to the manager (the first authorized number) at 15:00 every day.	One	“self-inspection report: LAC=***** CID=*****, generator number=**** generator area=***** extension=*****; yy-mm-dd hh:mm:ss; battery voltage ***V; lithium battery ***V”

2. Description of the main function of hardware

- **Self-starting function:** after starting generator and open the power switch, the collector detects related information and starts to perform state inspection. If the generator stops or starts again after 3 minutes, the collector will regard it as invalid data, and it will not upload related information; if the generator continues to work normally for more than 3 minutes, the collector will get into normal starting and working status.
- **Generator starting inspection:** when generator is producing electricity with no load and the power switch is not turned on, the collector will only start voltage inspection function. When the power switch is open, the collector will start to collect and send data.
- **Current detection function:** the current value for the detected phase can be detected. The value can be used to judge whether the generator is in “no-load” or “load” state.
- **Voltage detection function:** the voltage value for the detected phase can be detected. This value can be used to judge whether the generator is in “over-voltage” or “under-voltage”state.
- **SMS and networking function:** the hardware can automatically acquire base station CID/LAC address information and send the voltage data, current data and other related data to background management software and relevant personnel through SMS.
- **SMS resending function:** when there is no signal or network, the hardware will save the current data (including the time for power generation, base station CID/LAC address information and other data required to be uploaded) and automatically upload the data again. In addition, 4 messages related to power generation and stopping power generation that are not sent can be recorded.
- **Chinese SMS operation:** all operation is represented by the mode: password + operation type+ operation content, which is easy to remember. The affiliated unit of generators can be named in Chinese. The generator can be numbered in Chinese.
- **Power generation record keeping function:** the hardware can save 50 power generation messages, including downtime, base station location, generator area, extension, running period, seeming mains, generator number, GPRS signal strength, external battery voltage, in-built battery voltage, Input 1 voltage, Input 2 voltage, Input 3 voltage, relay Input 1 status, relay Input 2 status, relay Output 3 status (reserved), relay 4 Output status (reserved), electric energy, start times, generating times, total running time, GPS position, etc.
- **Automatic synchronization of power generation record:** the server will synchronously save the power generation record in data collector each day to ensure users can know the detailed working condition of generators.
- **Built-in clock function:** this machine can automatically acquire base station time.
- **Built-in lithium battery:** the chargeable lithium battery (2600mAH) can meet the requirements for a time duration without AC power supply (mainly for sending data). When there is no signal for sending power generation data, it can support 4 hours for searching for networks and send the data. After the completion of power generation, the battery can provide 4-hour power supply to facilitate the users to query whether the generator is delivered to warehouse (the generator location can be known in accordance with the ID number of base station).

- **Vibration resistance and water resistance:** the module and instruments are of high vibration resistance, to ensure the generator can run properly during long-term vibration; the enclosure adopts waterproof design, with waterproof ring. It is recommended that the generator shall be mounted transversally or mounted longitudinally on the antenna side.
- **Appearance and prevention of burglary:** the mounting screws for the front cover and rear cover of this product at the bottom, which has a certain anti-theft function. In addition, the product is featured with GPS positioning, reporting position information regularly and tracking equipment location.

3. SIM card application and installation notes

- ✧ For application, make sure that SIM card has message and networking function and SMS receiving and sending as well as networking can be performed normally; check whether SIM card is set with power-on password. Generally, the initial password is 123456. Place SIM card in cellphone to cancel the power-on password setting.
- ✧ Open the bottom cover of data collector module, find the mounting position for SIM card. Then open the SIM card slot and place the card in accordance with the given direction (there is indicator), press the card slot and then push the card slightly until it is locked. Thus, SIM card installation is completed. Note: the card shall be locked. Otherwise, it is easy to fall off or in poor contact for vibration.

4. Operating description

Initial state of extension

4.1. **Initial password:** 123456

The password must be a 6-digit number. Remember the password as it is the authority to perform operation setup for extension. The password can be modified (see “password change”).

4.2. **Initial state of extension:** no alarm and deployment.

4.3. SMS operation

Description of SMS format	Example
“Operation” SMS format: password + command string	123456 query power generation record
“Reading” SMS format: password + “reading”+command string	123456 read own number
“Setting”SMS format: password+ “setting”+command string+separator (;)+command string	123456 set own number; 13812345678

4.4. Factory default configuration

In general, customers are not required to pay attention to some factory default configurations. However, we still provide these configuration permissions for customers to make them use products flexibly.

Name of function	Range of parameters	Example of short "message reading"	Example of short message "setting"
Equipment ID number	The unique equipment ID	123456 read equipment ID number	
Hardware version number	Such as V1.0	123456 read equipment hardware version number	
Software version number	Such as V1.0	123456 read equipment software version number	
APN name	"CMNET"defaults	123456 read APN name	123456 set APN name: CMNET
APN user name	Leave blank for default	123456 set APN user name:cm	123456 set APN user name;cm
APN access password	Leave blank for default	123456 read APN access password	123456 set APN access password;gars
DNS server	Such as 61.144.56.100	123456 read DNS server	123456 set DNS server; 61.144.56.100
Factory data center IP/domain name_port number	Maximum length: 45 characters	123456 read factory data center	123456 set factory data center; lxi660.liaise.com.9081
Number of connection	From 1 to 99	123456 read the number of connection	123456 set the number of connection: 2
Interval time of connection	From 1 to 65534 (unit: second)	123456 read the interval time of connection	123456 set the interval time of connection;20
Interval time of connection interruption	From 1 to 65534 (unit: minute)	123456 read the interval time of connection interruption	123456 set the interval time of connection interruption;60
Interval increment time of connection interruption	From 0 to 65534 (unit: minute)	123456 read interval increment time of connection interruption	123456 set interval increment time of connection interruption;10
Maximum interval time of connection interruption	From 0 to 65534 (unit: minute)	123456 read the maximum interval time of connection interruption	123456 set the maximum interval time of connection interruption;60
Interval time of heartbeat package	From 30 to 65534 (unit: second)	123456 read interval time of heartbeat package	123456 set interval time of heartbeat package;30
Timeout period of heartbeat	From 1 to 65534	123456 read the timeout period of heartbeat package	123456 set the timeout period of heartbeat package;20

package	(unit: second)		
Data setting of heartbeat package	ASCII character	123456 read the data setting of heartbeat package	123456 set the data setting of heartbeat package; Beat Data
GPS data type	GGA,GLL,GSA,RMC,VTG	123456 read GPS data type	123456 set GPS data type;GGA
Network reporting interval	0-99999 seconds (0 means no reporting)	123456 read network reporting interval	123456 set network reporting interval;0
SMS reporting interval	0-99999 seconds (0 means no reporting)	123456 read SMS reporting interval	123456 set SMS reporting interval;0
Current transformer	(5-5000) Unit: /5	123456 read current transformer	123456 set current transformer;500
Mains voltage correction	1000-65535	123456 read mains voltage correction	123456 set mains voltage correction;10000
Generating voltage L1 correction	1000-65535	123456 read generating voltage L1 correction	123456 set generating voltage L1 correction;10000
Generating voltage L2 correction	1000-65535	123456 read generating voltage L2 correction	123456 set generating voltage L2 correction;10000
Generating voltage L3 correction	1000-65535	123456 read generating voltage L3 correction	123456 set generating voltage L3 correction;10000
Generating voltage L12 correction	1000-65535	123456 read generating voltage L12 correction	123456 set generating voltage L12 correction;10000
Generating voltage L23 correction	1000-65535	123456 read generating voltage L23 correction	123456 set generating voltage L23 correction;10000
Generating voltage L31 correction	1000-65535	123456 read generating voltage L31 correction	123456 set generating voltage L31 correction;10000
Generating current L1 correction	1000-65535	123456 read generating current L1 correction	123456 set generating current L1 correction;10000
Generating current L2 correction	1000-65535	123456 read generating current L2 correction	123456 set generating current L2 correction;10000
Generating current L3 correction	1000-65535	123456 read generating current L3 correction	123456 set generating current L3 correction;10000
Battery voltage	1000-65535	123456 read battery voltage correction	123456 set battery voltage correction;10000

correction			
Lithium battery voltage correction	1000-65535	123456 read battery voltage correction	123456 set battery voltage correction;10000
Analogue input 1 correction coefficient	1000-65535	123456 read analogue input 1 correction coefficient	123456 set analogue input 1 correction coefficient;10000
Analogue input 2 correction coefficient	1000-65535	123456 read analogue input 2 correction coefficient	123456 set analogue input 2 correction coefficient;10000
Analogue input 3 correction coefficient (reserved)	1000-65535	123456 read analogue input 3 correction coefficient	123456 set analogue input 3 correction coefficient;10000
Active electric energy		123456 read active electric energy	123456 set active function;0
Start times	0-4294967295 watt hour	123456 read start times	123456 set start times;0
Generating times	0-4294967295	123456 read generating times	123456 set generating times;0
Generating time	0-999999999s	123456 read accumulated generating time	123456 set accumulated generating time;0
Voltage transformer primary	30-30000(V)	123456 read voltage transformer primary	123456 set voltage transformer primary;50
Voltage transformer secondary	30-30000(V)	123456 read voltage transformer secondary	123456 set voltage transformer secondary;500
Generating over-voltage threshold	30-30000(V)	123456 read generating over-voltage threshold	123456 set generating over-voltage threshold;264
Generating under-voltage threshold	30-30000(V)	123456 read generating under-voltage threshold	123456 set generating under-voltage threshold;196
Generating over-frequency	0-9999(0.01HZ)	123456 read generating over-frequency threshold	123456 set generating over-frequency threshold;57
Generating under-frequency threshold	0-9999(0.01HZ)	123456 read generating under-frequency threshold	123456 set generating under-frequency threshold;45
Generating over-current threshold	0-9999(A)	123456 read generating over-current threshold	123456 set generating over-current threshold;600
Built-in battery low voltage threshold	0-99(0.1V)	123456 read built-in battery low voltage threshold	123456 set built-in battery low voltage threshold;3.0
SMS language	Chinese / English / Spanish /Russian	123456 read SMS language	123456 set SMS language;Chinese

4.5. Customer configuration short messages

Note: for new machine installation, the customer is required to set the content of this table.

Name of function	Range of parameters	Example of short message "reading"	Example of "short message" setting
Own number	Such as "13712341234"(length: 11 digits)	123456 read own number	123456 set own number: 13712341234
Authorized user number 1/2/3/4/5/6	Only authorized cellphone can perform writing configuration and operating command for data collector (maximum length: 14 digits). Vacant number defaults	123456 read authorized user number 1 123456 read authorized user number 2 123456 read authorized user number 3 123456 read authorized user number 4 123456 read authorized user number 5 123456 read authorized user number 6	123456 set authorized user number 1: 15307695060 123456 set authorized user number 2: 13888888888 123456 set authorized user number3: 123456 set authorized user number 4: 123456 set authorized user number 5: 123456 set authorized user number 6:
Generator area	Any character (including Chinese characters)(maximum length: 20 Chinese characters)	123456 read generator area	123456 set generator area: Dongguan, Guangdong Province
Generator number	Any character (including Chinese characters)(maximum length: 20 Chinese characters)	123456 read generator number	123456 set generator number: Tuan Cheng 000001
Extension	Any character (including Chinese characters)(maximum length: 20 Chinese characters)	123456 read extension	123456 set extension: Extension 00001
Access password	The password for SMS operation. Any 6 numbers.	123456 read access password	123456 set access password: 123456
Main data center IP/domain name_port number	Such as "192.168.0.1.9081" or "lxi660.lixise.com.9081"(maximum length: 45 characters)	123456 read main data center	123456 set main data center;lxi660.lixise.com.9081
Self-inspection function	ON / OFF	123456 read self-inspection function	123456 set self-inspection function: OFF
Long-term online function	ON / OFF	123456 read long-term online function	123456 set long-term online function: OFF

4.6. Operation message

Name of function	Example of short message
Software reset	123456 software reset
Query extension information	123456 query extension information
Query alarm number	123456 query alarm number
Query power generation record	123456 query power generation record
Query generator operating conditions	123456 query generator operating conditions
Query output port voltage	123456 query output port voltage
Query input port voltage	123456 query input port voltage
Open/close Relay 1 output	123456 open Relay 1 output 123456 close Relay 1 output
Open/close Relay 2 output	123456 open Relay 2 output 123456 close Relay 2 output
Open/close Relay 3 output (reserved)	123456 open Relay 3 output 123456 close Relay 3 output
Open/close Relay 4 output (reserved)	123456 open Relay 4 output 123456 close Relay 4 output
Delete alarm number	123456 delete alarm number 1 123456 delete alarm number 2 123456 delete alarm number 3 123456 delete alarm number 4 123456 delete alarm number 5 123456 delete alarm number 6
Delete generator area	123456 delete generator area
Delete generator number	123456 delete generator number
Delete server IP	123456 delete server IP
Delete own number	123456 delete own number
Delete power generation record	123456 delete power generation record

4.7. Short messages for data condition

Name of function	Range of parameters	Examples of short message “reading”
Mains frequency	00.00 -> 75.00HZ	123456 read mains frequency
Mains voltage	000.0 -> 999.9V	123456 read mains voltage
Generating frequency	00.00 -> 75.00HZ	123456 read generating frequency

Generating voltage L1	000.0 -> 99999.9V	123456 read generating voltage L1
Generating voltage L2	000.0 -> 99999.9V	123456 read generating voltage L2
Generating voltage L3	000.0 -> 99999.9V	123456 read generating voltage L3
Generating voltage L12	000.0 -> 99999.9V	123456 read generating voltage L12
Generating voltage L23	000.0 -> 99999.9V	123456 read generating voltage L23
Generating voltage L31	000.0 -> 99999.9V	123456 read generating voltage L31
Generating current L1	0000.0 -> 9999.9A	123456 read generating current L1
Generating current L2	0000.0 -> 9999.9A	123456 read generating current L2
Generating current L3	0000.0 -> 9999.9A	123456 read generating current L3
Generating voltage phase 12	000.0 -> 359.9	123456 read generating voltage phase 12
Generating voltage phase 13	000.0 -> 359.9	123456 read generating voltage phase 13
Active power	-9999999 -> 9999999W	123456 read active power
Reactive power	-9999999 -> 9999999var	123456 read reactive power
Apparent power	-9999999 -> 9999999VA	123456 read apparent power
Power factor	-1.000 -> 1.000	123456 read power factor
Base station location information	ASCII character	123456 read base station location information
GPRS signal strength	0-99	123456 read GPRS signal strength
GPS position	ASCII character	123456 read GPS position
Battery voltage	00.0 -> 99.9V	123456 read battery voltage
Lithium battery voltage	00.0 -> 99.9V	123456 read lithium battery voltage
Input port 1 voltage	0000 -> 3300 mV	123456 read input port 1 voltage
Input port 2 voltage (reserved)	0000 -> 3300 mV	123456 input port 2 voltage
Input port 3 voltage (reserved)	0000 -> 3300 mV	123456 read input port 3 voltage
Relay 1 output state	Open / close	123456 read Relay 1 output

		state
Relay 2 output state	Open / close	123456 read Relay 2 output state
Relay 3 output state (reserved)	Open / close	123456 read Relay 3 output state
Relay 4 output state (reserved)	Open / close	123456 read Relay 4 output state
Number of power generation record	000-999	123456 read the number of power generation record
Seeming mains	YES / NO	123456 read seeming mains
Date ahd time	yy-mm-dd hh:mm:ss	123456 read date and time
Running period	hh:mm	123456 read running period
KW power	0-4294967295 watt hour	123456 read KW power
Generating alarm	Over-voltage, under-voltage, over-frequency, under-frequency, over-current and no load	123456 read generating alarm
Battery low voltage alarm	YES / NO	123456 read battery low voltage alarm
Generating start time	yy-mm-dd hh:mm:ss	123456 read generating start time
Generating stop time	yy-mm-dd hh:mm:ss	123456 read generating stop time
Battery low voltage alarm	YES / NO	123456 read battery low voltage alarm
Generating start time	yy-mm-dd hh:mm:ss	123456 read generating start time
Generating stop time	yy-mm-dd hh:mm:ss	12345 read generating stop time

Date and time settings: Message example

123456 set date and time: 12h 1min. 2sec. Dec.1, 2014,

5. Installation description

5.1. Installation preparation

1) **Unpacking inspection:** check the goods and accessories according to the packing list in the instruction. Please read the manual carefully before using this product, including the content related to the judgment method in received messages, normal operation steps as well as usual fault and disposing method.

2) Phase inspection: check whether the phase of generator is identical to the phase of data collector (single phase or three phase).

3)Testing SIM card: test SIM card on cellphone to check whether the card opens SMS and GPRS networking functions and the network is normal.

4) Check whether the equipment is normal: open the bottom shell of the product and long press TEST tact switch for 3 seconds. Then the collector starts to work and link server. When network indicator light is on for 1 second and off for 3 seconds, it means the collector has successfully connected to server and the product is working normally.

✧ **Note:** it is required to install GSM antenna and GPS antenna. Meanwhile, GPS antenna shall be placed outdoor.

Communication indicator: for starting the test mode of collector, the communication indicator light will be on. (After ten minutes, the test will automatically complete.)

Network indicator light:

1)The light is off as GPRS module does not work normally or there is no cellphone card. Or the cellphone card is poor contact or there is no signal.

2)for connecting to server, the light is on for 0.2 seconds and off for 0.2 seconds (flash quickly)

3)For logining server, the light is on 1 second and off for 1 second (flash slowly)

4)For logining server successfully, the light is on 1 second and off 3 seconds (flash discontinuously)

Positioning indicator light:

1) if no GPS module data is received by the equipment, the light is off.

2) if GPS module data is received by the equipment but there is no satellite signal, the light is on for 0.2 seconds and off for 0.2 seconds.

3) If GPS module data is received by the equipment and the satellite is found but there is no positioning, the light is on for 1 second and off for 1 second.

4)f GPS module data is received by the equipment and the satellite is positioned successfully, the light is on for 1 second and off for 3 seconds.

5) **Customer configuration SMS:** configure the parameter of the collector login server. The operation method is as shown in Chapter 4.5.

6) Data collector installation:

① **Location selection:** data collector shall be installed in the empty space behind the generator panel or on the left or right size of generator panel as far as possible. In order to avoid the damage to data collector due to the mutual collision of 2 generators during transport, please install the collector in the place away from exhaust pipe, with low temperature. Be remember!

② **Positioning:** in accordance with the installation dimension drawing in the packing case, stick on the drawing at the selected position, drill fixing holes at the designated place with the electric drill (φ5mm), fix the data collector on the mounting holes and tighten the screws firmly (for installation, use spring washers or lock screws).

7) Transformer installation

① For transformer installation, connect 220V power supply in front of air switch. After the transformer is connected to power line, it shall be fixed with ties.

② Data collector has two connectors (red one and black one) for generator connecting lines: (for wiring, please see wiring diagram)

- The red line shall be connected to the live wire of generator voltmeter;
- The black line shall be connected to the null line of generator voltmeter;
- Transformer wiring diagram: (if the transformer is installed in the wrong place, the collector will not be able to detect the current value of generator);

8) **Fill in installation table:** fill in the generator manufacturer, mode, phase, power, fuel type, generator number and related parameters. After the completion, save it table for future reference.

9) Starting generator test:

- **Starting generator:** after installation, the generator shall be started to test the data collector to check whether the SMS receiving, server information display and generating time, voltage and current are normal.
- **Indicator light identification:** after starting the generator, “generating light” is on. When network light is flashing discontinuously, it means the collector has logging server. At this time, the detailed data collected by module can be checked on the server.
- After stopping power generation, “generating light” and “charging light” are off. The alarm number set in collector will be receive the message for stopping power generation in about 1-2 minutes. At the same time, the message will also be uploaded to network management platform.

5.2. Installation notes

1) After the transformer is connected to power line, it shall be fixed with ties;

2) After installation, register the generator number, mode, power, production place, phase and SIM card number for data collector, improve the generator database with the registered information and upload the information to management platform;

3) For three phase generator, feed a live wire (in general, Phase A with the maximum current is selected) through the center hole of transformer. For single phase generator, only the live wire is required to be fed through the center hole of transformer;

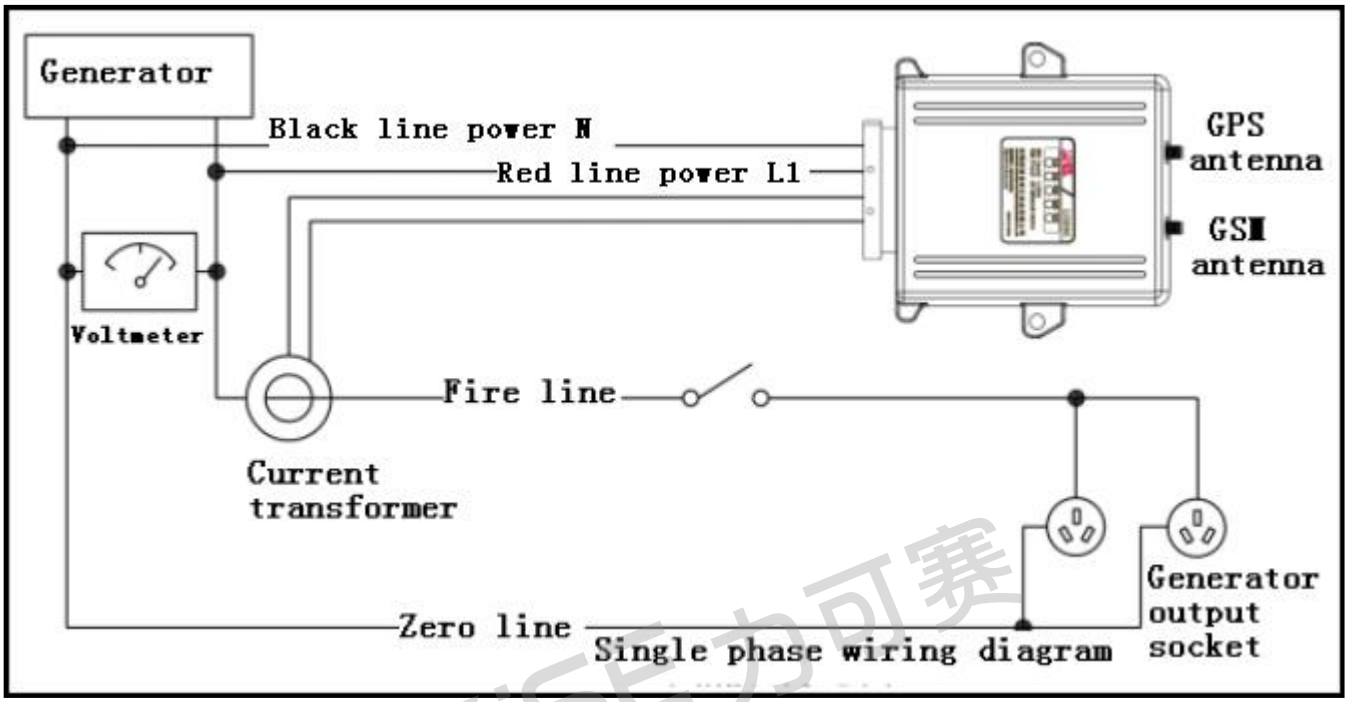
4)The red line of data collector shall be connected to the red line power L1 of generator voltmeter and the black line power N shall be connected to black line. If the output voltage switch of generator is broken, directly connect the data collector module to generator output socket;

5) Data collector shall be installed in the empty space behind the generator panel or on the left or right size of generator panel. Try to select the place near air side (with low temperature). In order to avoid the damage to data collector due to the mutual collision of 2 generators during transport, please install the collector in the place away from exhaust pipe, with low temperature. Be remember!

6) In accordance with the installation dimension drawing in the packing case, firstly, stick on the drawing at the selected position, drill fixing holes at the designated place with the electric drill (φ5mm);

7) Connect in accordance with the diagram of generator connection.

5.3. Wiring diagram



6. Trouble-shooting

Usual fault disposing method		
Fault	**Fault cause**	**Disposing method**

Usual fault disposing method		
Fault	**Fault cause**	**Disposing method**
Boot failure	1.Lithium battery level is too low;	1. Connect DC power supply and input the voltage (8～27Vdc) (round DC joint);
Network light is off.	1. Cellphone card is not inserted;	1. For equipment operation, the cellphone card shall be inserted;
	2. Cellphone card is not inserted in place;	2. Insert the cellphone card again;
	3. There is no antenna;	3. Connect antenna;
	4. There is no network signal;	4. Query signal strength;
	5. SIM card failure;	5. Place SIM card on the cellphone to test whether the card is normal.
	6. Cellphone card and bronze card are poor contact;	6. Take out cellphone card pry up the 6 copper sheet of card base lightly;
Generating light is off.	1. AC220V input is not well connected;	1. Connect the connecting line at the generating input end again;
	2. The protective tube on connecting line is damaged;	2. Replace 2A protective tube;
	3. 220V input is connected to 380V three-phase power supply by mistake;	3. Measure whether the input voltage is 220V. If the voltage 220V is normal, then it is required to replace the 2A protective tube.
The current is 0 A.	1. Transformer is placed in wrong position;	1. Choose total current output line (live line) and install the transformer again;
The battery power is 0%.	1. Lithium battery level is too low;	1. For power generation, charge automatically.
	2. Lithium battery is damaged;	2. If power generation continues for 1 hour but there is no power, please open the rear cover, replace with an intact battery and test again. If this problem still exists, return the battery to the manufacture for maintenance.
No networking	1. The cellphone card does not open networking function.	1. Open networking function;
	2.Incorrect server IP set	2. Reset server IP;
	3. Base station has no GPRS signal;	3. When there is no GPRS signal, the SMS will be resent.

Boot failure	1.Lithium battery level is too low;	1. Connect DC power supply and input the voltage (8～27Vdc) (round DC joint);
Network light is off.	1. Cellphone card is not inserted;	1. For equipment operation, the cellphone card shall be inserted;
	2. Cellphone card is not inserted in place;	2. Insert the cellphone card again;
	3. There is no antenna;	3. Connect antenna;
	4. There is no network signal;	4. Query signal strength;
	5. SIM card failure;	5. Place SIM card on the cellphone to test whether the card is normal.
	6. Cellphone card and bronze card are poor contact;	6. Take out cellphone card pry up the 6 copper sheet of card base lightly;
Generating light is off.	1. AC220V input is not well connected;	1. Connect the connecting line at the generating input end again;
	2. The protective tube on connecting line is damaged;	2. Replace 2A protective tube;
	3. 220V input is connected to 380V three-phase power supply by mistake;	3. Measure whether the input voltage is 220V. If the voltage 220V is normal, then it is required to replace the 2A protective tube.
The current is 0 A.	1. Transformer is placed in wrong position;	1. Choose total current output line (live line) and install the transformer again;
The battery power is 0%.	1. Lithium battery level is too low;	1. For power generation, charge automatically.
	2. Lithium battery is damaged;	2. If power generation continues for 1 hour but there is no power, please open the rear cover, replace with an intact battery and test again. If this problem still exists, return the battery to the manufacture for maintenance.
No networking	1. The cellphone card does not open networking function.	1. Open networking function;
	2.Incorrect server IP set	2. Reset server IP;
	3. Base station has no GPRS signal;	3. When there is no GPRS signal, the SMS will be resent.

SMS settings do not return	1, mobile phone card no SMS function;	1, the opening of SMS function;
	2, no message center number;	2, back into the mobile phone set center number (SIM card must first check center using a mobile phone number);
Can not receive SMS	1, set a wrong number;	1.Reset number;
	2. card arrears;	2. Recharge;
	3. No SMS center number;	3. Set the center back into the mobile phone number;
The generation time is not correct	1, set the server IP error;	1, re set IP;

7. Expense budget of cellphone card (short messages and flow)

(minimum recipients)

For power generation once, one person can receive short messages.	For power generation ten times, one person can receive short messages.	For power generation 20 times, one person can receive short messages.	For power generation 30 times, one person can receive short messages.
4 messages/person	40 messages/person	80 messages/person	120 messages/person

(recommendation)

For power generation once, one person can receive short messages.	For power generation ten times, two people can receive short messages.	For power generation 20 times, two people can receive short messages.	For power generation 30 times, two people can receive short messages.
4 messages/person	80 messages/2 people	160 messages/2 people	240 messages/2 people

(maximum recipients)

For power generation once, one person can receive short messages.	For power generation ten times, 6 people can receive short messages.	For power generation 20 times, 6 people can receive short messages.	For power generation 30 times, 6 people can receive short messages.
4 messages/person	240 messages/6 people	480 messages/6 people	720 messages/6 people

1) 6 message recipients can be set by one collector (2 message recipients are recommended).
2) For power generation once, 4 short messages can be received (not including the short message for abnormal alarm. If self-inspection function is activated, extra 60 messages are added every month.)
3）About 30M flow is required every month.

8. Electrical parameters

List of measurement accuracy of data collector LXI661	
Generating voltage/mains voltage	
Type of measurement	True RMS measurement mode
Phase line-null input resistance	300KΩ
Measurement range of phase voltage	7-400VAC (maximum)
Measurement range of line voltage	12.1-690VAC (maximum)
AC voltage measuring resolution	1V
Phase voltage measuring precision	±1% of full scale range
Line voltage measuring precision	±2% of full scale range
Minimum measuring precision	5Hz (phase voltage >5V)
Maximum measuring precision	100Hz
Frequency measuring resolution	0.01Hz
Frequency measuring precision	±0.1Hz

Generating current	
Type of measurement	True RMS measurement mode
Secondary current of current transformer	5A
Maximum continuous current	5A
Overload measurement	3 times normal measurement range
Current input resistance	0.02Ω
Maximum allowable common port to ground voltage	±2Vpp Note: the common port of transformer shall be grounded externally.
Current measuring resolution	0.5% of rated current
Current measuring precision	±1% Note: not including the error of external current transformer

Generating electric power	
Measuring resolution	1 watt hour
Measuring precision	±1% Note: not including the error of external current transformer

9. Product package

This product shall form a complete set with the following parts:

Packing List				
Number	**Name**	**Quantity**	**Place for storing**	**Note**
1	Data collector	1	In paper box	
2	Connecting line	2	In paper box	With transformer
3	Spare accessories	1	In paper box	
4	Installation positioning drawing	1	In file pocket	
5	Splitting protection strip	2	In file pocket	
6	Certificate	1	In file pocket	
7	Warranty card	1	In file pocket	
8	Instruction	1	In file pocket	
9	Mounting table	1	In file pocket	
10	Antenna	1	In file pocket	