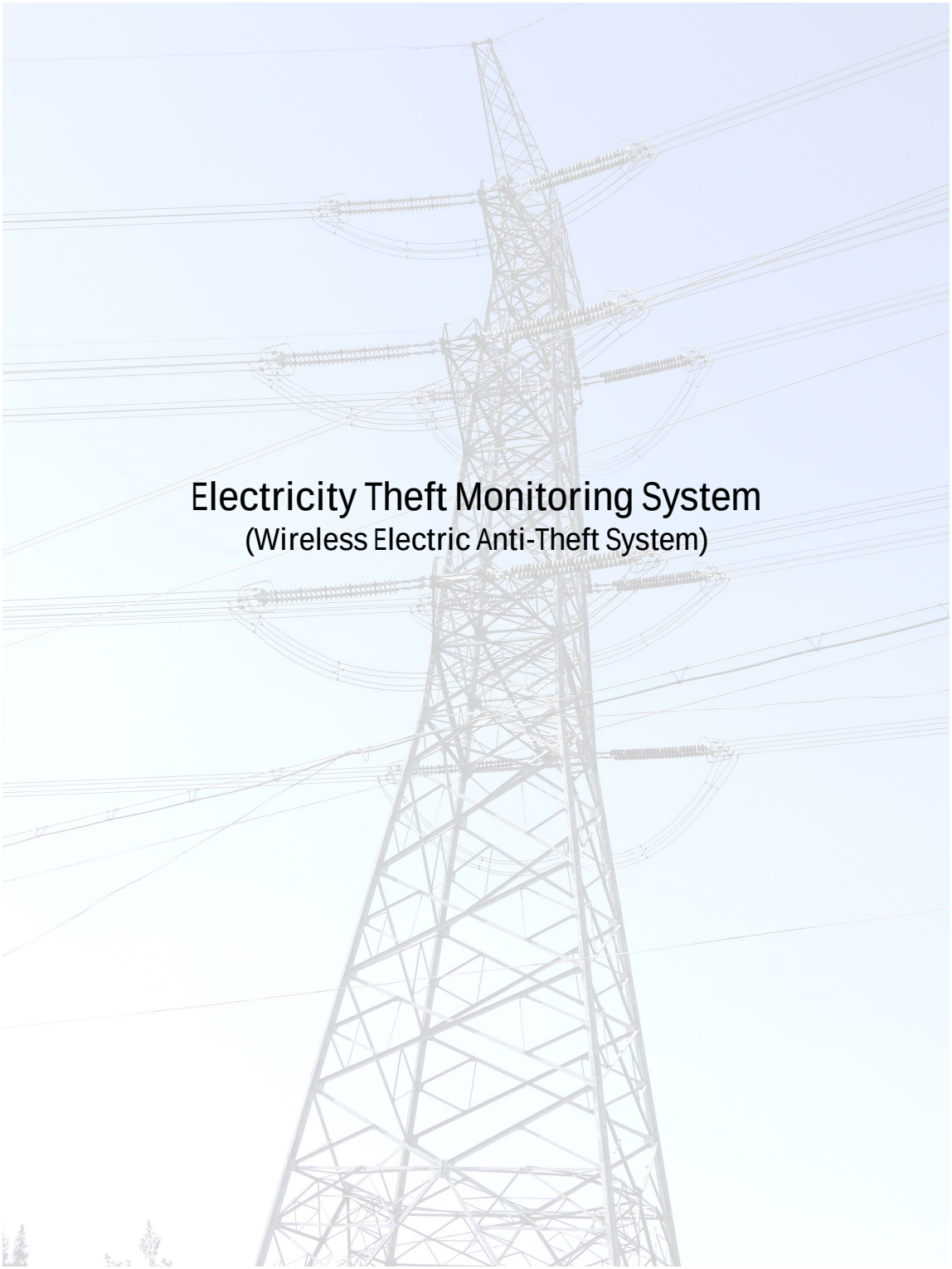


Electricity Theft Monitoring System

(Wireless Electric Anti-Theft System)

1.Introduction of Electricity Theft Monitoring System

Some enterprises or people,especially the high energy-consumption factories are addicted to stealing electricity to save the electricity cost,which caused the great loss to the electricity distribution companies and disordered the power industry. Because of the new electricity theft technology and the electricity theft devices are becoming more and more intelligent,the anti-theft job is faced with the unprecedented difficulty.

In order to solve these problems and help power distribution companies to detect the electricity-theft actions and crack down on the theft.Our company developed out a new “electricity theft monitoring system”. The system collect the first data by load detection device and compare it with the second data collected by user’s power meter.it can timely monitor the users’ electricity consumption value and avoid the theft.

The electric theft monitoring system is designed for monitoring the industrial and commercial consumption of electricity. The system is the outcome of our efforts for years in the power monitoring system.The system is quite effective and reliable,which is the good friend of power grid distribution enterprises

2.The Structure of the Anti-theft System(Especially for independent substation users)

The electricity theft monitoring system is applied into anti-theft field and it’s special for the industrial and commercial power consumers.The system consists of Load detection instrument,wireless data receiver and Master station. The system has 2 working modes

2 - 1 Topology of the anti-theft monitoring system

（1） Collection Mode

The load detection instrument collects the 3 phase current data of the the high voltage and send the data to the wireless data receiver and it calculates the apparent power of the high voltage side according to the received current value and default volage value.The data receiver transmits the high voltage side's voltage,current and apparent power to the special substation data collection terminal unit by RS485.The terminal unit then transmits both high and low voltage sides' data to the master station. The master station compares and analyze the data of the 2 groups(High and low voltage sides).If the differential value is out of the range of the defaulted value,the system judges that the customer is stealing the electricity.

（2）Independent Mode

The load detection instrument collects the 3 phase current data of the the high voltage and send the data to the wireless data receiver and it calculates the apparent power of the high voltage side according to the received current value and default volage value.The data receiver can monitor communication between the power meter and the data collection terminal unit via RS485 and record the power meter's voltage,current and apparent power.Then the data receiver sends the apparent power of both the high and low voltage sides to the master station by GPRS.The master station compares and analyze the data of the 2 groups(High and low voltage sides).If the differential value is out of the range of the defaulted value,the system judges that the customer is stealing the electricity.

The system is in compliance with the following standards：

Power industry standard:DL/T 645－1997 multi-functional meter communication protocol；

Power industry standard:：DL/T 645－2007 multi-functional meter communication protocol；

State Grid standard：Q/GDW 129－2005 Power load management system technology condition；

State Grid standard：Q/GDW 130－2005 Power load management system communication protocol；

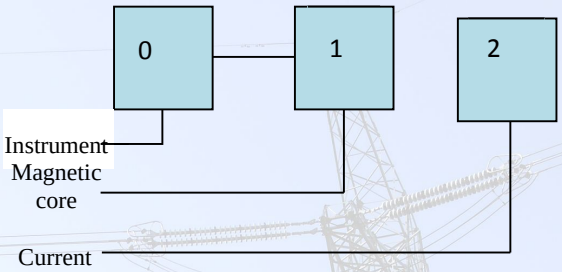
State standard：GB 311.1－1997 High voltage transmission equipment's insulation；

State standard：GB 1208－2006 Current transformer；

State standard：GB 4208－1993 Enclosure protection grade.

3.Load Detection Instrument

3.1 Model definition



3-1 Model definition chart

Parameter
[0][1][2]

0：Device name：CJQ－load detection instrument

1：Magnetic core material：P－molybdenum permalloy

2：Current specification：XXX（eg：300 means 300A）

3.2 Function:

The load detection instrument is directly installed to the transformer's first side cable,it collects,process and save user's special transformer's first side's 3 phase current data and sends the 3-phase current value to the data receiver by wireless channel.

The instrument is made of special material,which is suitable for high temperature,low temperature ,high humidity and strong magnetic interference environment

3-2 Load detection instrument

3.3 Technical specifications:

Current collection range：1.5A～300A

Line voltage grade：0.38～35kV

Current collection accuracy：≤3%

Wireless transmission distance：l00m（visional）

Basic consumption：≤l00mVA

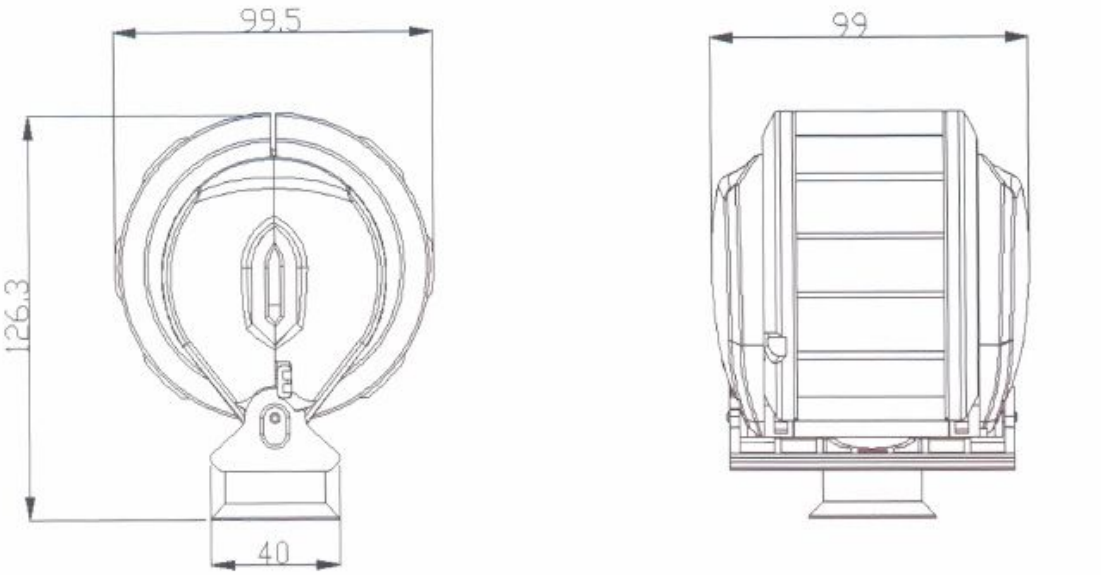
Wireless transmission power：l0dBm

Work temperature：－40℃～+75℃

Work humidity：≤95%

Weight：600g

3.4 Physical dimension



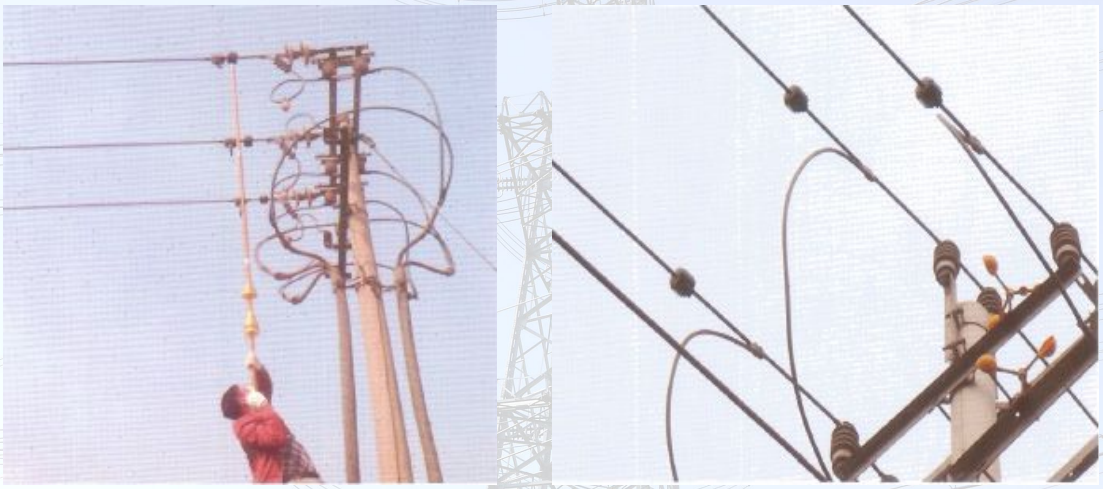
（Unit：mm）

3.5 Installation and Debug.

1. Please choose the most suitable way to mount the instrument。

2. Every 3 different address reference number instruments in a group，they are mounted to A、B、C 3 phases，The instrument with same ref number can't be in a group.

3. If more than 2 groups of detection instruments' distance between the same data receiver is all less than 100 meters,in this range all detection instruments must have different reference numbers.



3-4 The installation of the detection instrument

3.6 Cautions:

1. Installtion

The distance between detection instruments should be more than 250m.

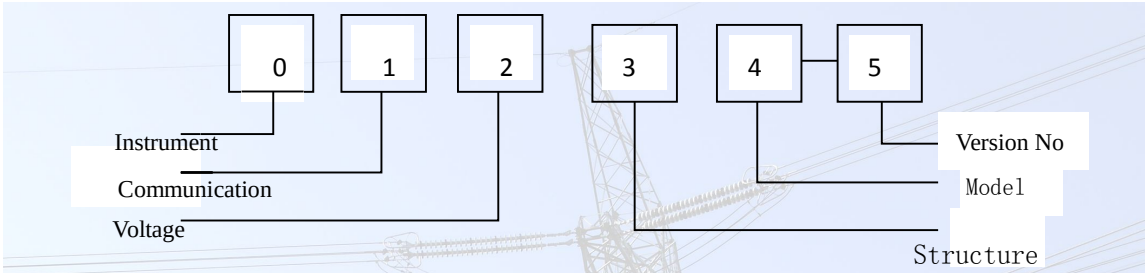
2. Debug

If the communication between detection instrument and wireless data receiver：

(1)If the current reaches the lowest condition of the detection instrument
(2)If the magnetic core's interfaces are closed down；
(3)If the distance between the detection instrument and the data receiver is less 100m ,if it's more than 100m,please strengthen the receiver's antenna.

4. Wireless Data Receiver

4.1 Model Definition



Parameters

[0][1][2][3][4]－[5]

0：Receiver number，J

1：Communication way：W－wireless，（G－Fiber（N/A），Z 一PLC（N/A）

2：Power supply：XXX（eg：220 means AC220V；012 means DC12V）

3：Structure：D－Independent mode，W－cap mode，Q－Embedded mode，M－Module mode

4.2 Function

1. Data receiving

The data receiver receives the current data of the transformer,process and save it.

2. Data conversion

After the receiver process the saved data，it submits it to the terminal device or portable monitoring device in DL/T－645 protocol

3. Data communication

Wireless with the detection instrument；

RS－485 with the terminal device；

RF with the portable meter reading device

4.3 Tech specs:

Power Consumption：≤1.5W

Power Supply：AC100/220

Wireless Distance：100m（visional）

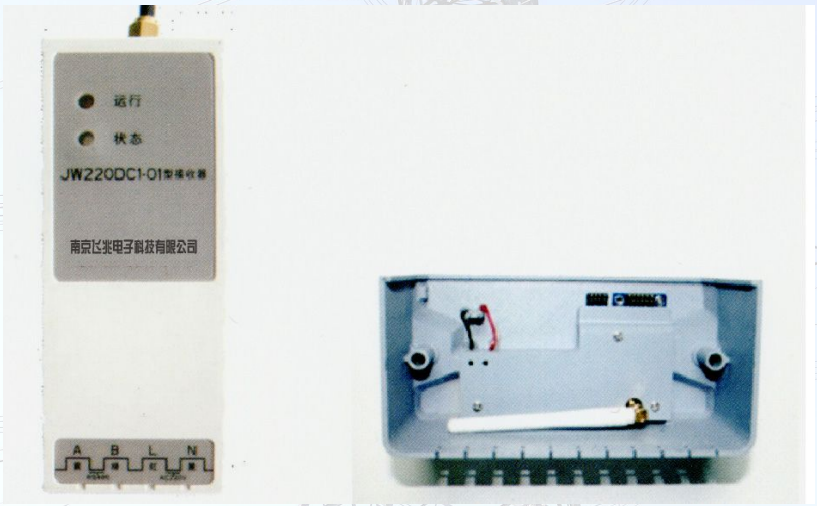
RF Power：10dBm，modulate way：GFSK

Work Temperature：－40℃～+75℃

Work Humidity：≤95%

4.4 Physical Dimension

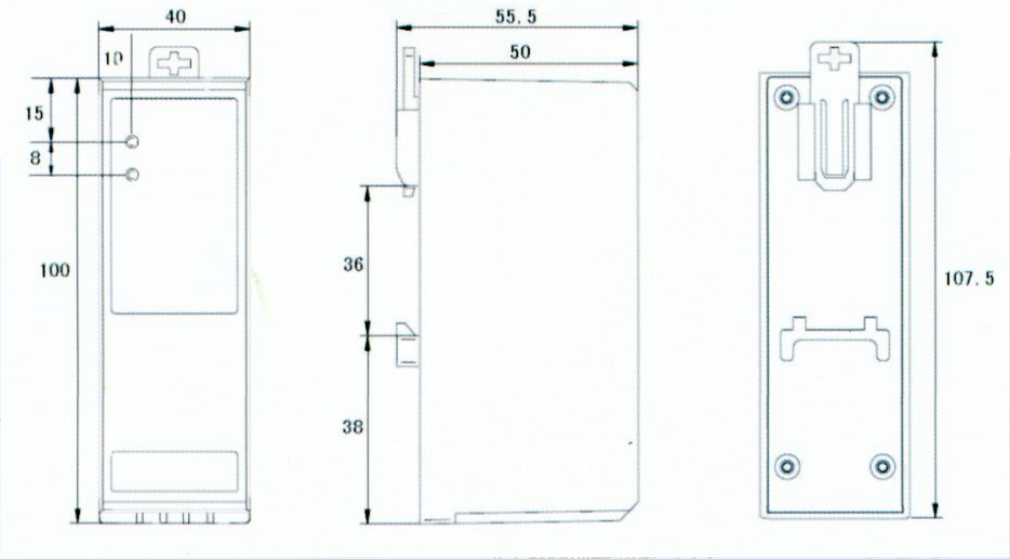
The receiver has 2 types：Independent and cap.



a） Independent model　　b）Cap model

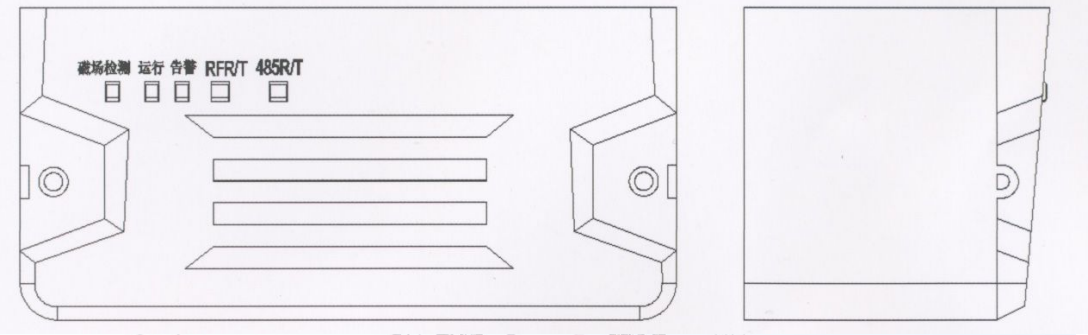
The independent model has model Ⅰ and model Ⅱ 2 types， model Ⅱ has GPRS module.They have independent enclosure,LED and power module,they are mounted to nearby the collection terminal device.The receiver communicates with collection terminal device in RS－485 and it can also monitor the low voltage second side power meter.

The cap model receiver has independent enclosure,LED and power module,they are mounted to nearby the extended module,the communication module is mounted to the cap and communicate with the terminal device via PINs in RS485 protocol.It’s only suitable for field terminal whose extended module interface is vacant.



（a）Front （b）Side （c）Rear

4-3 Independent receiver dimension（mm）



（a）Front （ b ）Side

4-4 Cap Model Dimension（单位：mm）

4.5 LED Indicator

4.5.1 Independent receiver works：Red LED flashes

LED off means no power supply or faulty；

Status ： Red and Green ； Red ： No wireless communication.Green：RS-485 communication

5. Data Collection Terminal Device.

The terminal device includes： Power load management terminal,Electricity consumption management terminal,distribution transformer detection terminal and.These terminals have differences in structure,interface and channels,but they all can transmit the collected data to master station,display the data and send out warning.

6.The Anti-theft Monitoring's Master Station

The system finds the theft after collecting the data and compare with the multi-functional energy meter.

7. The Advantages of the Electric theft monitoring System

1.High reliability,hard to be damaged

2.Timely monitoring

3.High efficiency,solve the theft from the root.

4.Economical, the system's cost is much lower than the amount of electricity that was stolen.

5.Easy and simple installation, can be installed even when there is electricity.