Star Instrument


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R&D Center
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1. Introduction

1.1 Compilation purpose
This specification arms to list out the function, performance and other parameter of the energy meter which is to be developed as well as acts as the technical basis for communication with the customer.

1.2 Background
The Azerbaijan customer has started the pilot project of Advanced Metering Infrastructure (AMI) this year. Basically extending the functions of the CPU card prepayment watt-hour meter provided by Shenzhen Star Instrument at 2008, the meter in this project adopts STS code (instead of CPU card) as the prepayment data exchange media as well as IEC62056 communication standards to reinforce the requirements of AMR communication function.

1.3 Definition

1.4 Reference date
Technical Specification of Azerbaijan AMI Pilot Project
Single-phase Electronic Prepayment Energy Meter – Azerbaijan Latest Demand

2 Specification

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Voltage</td>
<td>220V / 240V</td>
</tr>
<tr>
<td>Nominal Current</td>
<td>5（60）A</td>
</tr>
<tr>
<td>Frequency</td>
<td>50Hz</td>
</tr>
<tr>
<td>Accuracy Class</td>
<td>1.0</td>
</tr>
<tr>
<td>Type</td>
<td>Single phase two wires</td>
</tr>
<tr>
<td>Starting current</td>
<td>0.4%lb</td>
</tr>
<tr>
<td>Constant</td>
<td>1600imp/kWh</td>
</tr>
</tbody>
</table>

3 Electrical performance

3.1 Working voltage scope

<table>
<thead>
<tr>
<th>Working voltage scope</th>
<th>150V-250V（rated voltage 220V）</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>/165V-275V（rated voltage 240V）</td>
</tr>
</tbody>
</table>

3.2 Impulse testing voltage

| Pulse testing voltage | 6kV |

3.2 Other electrical performance
The energy meter conforms to IEC62053-21:2003 relevant regulations
4 Application environment

<table>
<thead>
<tr>
<th>Specification</th>
<th>Single-phase Keypad Prepayment Watt-hour Meter</th>
</tr>
</thead>
</table>

| Storage temperature | -20℃～80℃ |
| Operation temperature | -25℃～45℃ |
| Humidity | ≤95% |

5 Functions of Single-phase keypad Prepayment Watt-hour Meter

5.1 Energy measuring function
a) The meter can measure total active power consumption and reversal active consumption
b) The meter has time-sharing measurement function, can measure total active power consumption in different time periods with each different tariffs respectively
c) The meter can memory relevant power consumption data of lasting 12 months, including monthly accumulated active power consumption, monthly accumulated reversal power consumption, active energy in each different tariff, etc. Storage data boundary interval can be set as integral time during the period from 1st to 28th monthly.

5.2 Maximum demand function
a) The meter can measuring monthly active maximum demand and its occurrence date and time
b) Demand measurement method can be programmable for slip type or interval type, demand cycle cab be selectable among 5, 10, 15, 30, 60 min; slip time of demand cycle can be selectable among 1, 2, 3, 5 min; demand cycle should be integer multiples of the sliding time and be less or equal to 5 times
c) The meter can memory the energy demand data of the lasting 12 months

5.3 Tariff interval and electricity price solution
a) One set of yearly time zone chart is applied and divides the whole year time into 12 time zones, each time zone can specify the starting date, daytime interval chart code and electricity price chart code
b) 8 daytime intervals charts are applied and each daytime interval can be programmable for 12 time intervals, each time interval can specify the starting time and tariff code. The minimal interval between time intervals is 1 min.
c) 4 sets of electricity price plans are applied, each electricity plan can be programmable for 4 tariffs in different time intervals.

5.4 Prepayment function
a) Prepayment function conforming to STS requirements
   The prepayment power vending management system will generate a 20 digits code (generated based on user’s information and purchasing amount). The user needs to input this code to the meter with keypad. The meter will decrypt the code and write the purchased energy into the meter after encryption key verification and will also add the energy into the balance energy and then save it. When the overdraft power consumption

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occurred, the meter will deduct this consumption first and then save the balance energy into the meter. When user uses the energy, the meter will deduct the balance energy according to relevant condition. The meter can power off the user load automatically when meter meets the condition of disconnection. The meter can recover power supply automatically when the meter meets the condition of recovery.

b) 2-stage low amount pre-warning function
c) Overdraft power consumption
d) Credit power consumption
   Power supply without disconnection at specific interval time and date even in overdue status
e) Monthly basic power consumption
f) Long-distance control of load switch
g) Record monthly power consumption of the lasting 12 months

5.5 Event monitor and record function
a) The meter can record the total number of power purchasing times and total purchasing amount as well as the date and amount of the lasting 10 power purchasing events
b) The meter can record the total number of time calibrations as well as the times before and after calibration in the lasting 10 actions.
c) The meter can record total number of meter cover opening times as well as the starting and ending date of lasting 10 actions.
d) The meter can record total number of terminal cover opening times as well as the starting and ending date of lasting 10 operations.
e) The meter can record the total number of tampering as well as the stating and ending date of lasting 10 tampering.
f) The meter has overload trip function, can record the total number of overload trip times as well as the starting and ending date of lasting 10 actions.
g) The meter can recording the total number of power disconnections as well as the starting and ending date of lasting 10 actions.
h) The meter has overvoltage trip function, can record the total number of overvoltage trip times as well as the starting and ending date of lasting 10 overvoltage trips.

5.6 Measurement function
The meter can measure, record and display current operational parameters (voltage, current, power, internal meter temperature, etc)

5.7 Alarm function
The meter has acousto-optic alarm function.

5.8 Time clock function
The meter adopts automatic transition of calendar, time and leap-year as well as automatic transition between Azerbaijan winter time and summer time.
5.9 **Electronic tags function**  
Reading electronic tag via the communication port

5.10 **Display**  
a) The meter can display setting parameter and measuring data by LCD  
b) The meter supports automatic scroll display, manual scroll display and self-diagnose display  
c) The meter can be programmable for display information setting.

5.11 **Communication function**  
a) The meter supports modulated infrared communication port and RS485 port  
b) The meter support optional PLC and RF communication port which both which either can be electable as data exchange access with concentrator.  
c) The meter communication agreements conforms to IEC 62056-21 Standards.

5.12 **Safety protection**  
a) The meter will carry out programming or other specific operation only after getting through command certification. The certification command will be invalid after a specified time or certified the disabled command.  
b) The meter will automatic disable the programming function for a period of 24 hours if 3 continuous times of incorrect certification occurs.

6 **Reliability**  
The useful life of energy meter is 15 years.