中国认可
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检测
TESTING
CNAS L2865

Security Code
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# TEST REPORT

Report No. DNW-20230250005

Name of Product Smart Power Sensor

Client Zhejiang Chint loT Technology Co., Ltd.

Tested Company Zhejiang Chint loT Technology Co., Ltd.

Type of Test Entrust Test

Zhejiang Institute of Metrology

Approval Date

2023 / 02 / 15

Year / Month / Date

浙江省计量
检验检测

# Zhejiang Institute of Metrology
# TEST REPORT

| | | |
|---|---|---|
| **Meter Under Test** | **Sample Name** | Meter Smart Power Sensor |
| | **Type** | DDSU666-IX |
| | **Specification** | 240V, 5(63)A, 50Hz |
| | **Accuracy Class** | Cl. 0.5 |
| | **Serial Number** | 202302080165 |
| | **Manufacturer** | Zhejiang Chint loT Technology Co., Ltd. |
| **Client** | Zhejiang Chint loT Technology Co., Ltd. | |
| **Test Standard** | **IEC62052-11:2020** *Electricity metering equipment-General requirements, tests and test conditions- Part 11: Metering equipment*<br>**IEC62053-21:2020** *Electricity metering equipment-Particular requirements-Part 21: Static meters for active energy(classes 0.5,1 and 2)* | |
| **Test Items** | Refer to "test content" | |
| **Date of Sample Received** | Feb. 9th, 2023 | |
| **Test period** | Feb. 9th, 2023～Feb. 13th, 2023 | |
| **Date issued** | Feb. 15th, 2023 | |
| **Summary** | For the request of the customer, the samples are tested according to the standard **IEC 62052-11:2020**, **IEC62053-21:2020**. All the test results are complied with the requirements of the standards.<br>（盖检验检测专用章）<br>（Quality Inspection Seal） | |
| **Note** | 1. The №1 in the report are corresponding to meter of 202302080165<br>2. The tests are performed using the first current channel in the first power module. | |

Approved by: 周振国 Checked by: 郑石中 Compiled by: 陈婧

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# 1. Accuracy requirements

## 1.1. Meter constant

**Test condition:** Voltage: $U_n$, current: $I_{max}$, frequency: $f_n$, room temperature: 22.6℃, relative humidity: 50%

**Test result:**

| Requirements of standard | Test result |
|---|---|
| | №1 |
| The relation between the test output and the indication in the display shall comply with the marking on the name-plate | Pass |

**Conclusion:** Pass

## 1.2. Initial start-up of the meter

**Test condition:** The meter is performed with only $I_{max}$ in the current circuit at start and then energized with nominal voltages $U_n$, the start-up time of the meter is measured from the moment of energizing the voltage circuits until the moment the test output produces the first pulse. Voltage: $U_n$, frequency: $f_n$, temperature: 22.6℃, relative humidity: 50%

**Test result:**

| Requirements of standard | Test result |
|---|---|
| | №1 |
| The meter shall be functional within 10s | Pass |

**Conclusion:** Pass

## 1.3. Test of no-load condition

**Test condition:** The voltage is applied to the voltage circuits with no current flowing in the current circuits, the test time is calculated according to the standard.
Frequency: $f_n$, room temperature: 23.0℃, relative humidity: 50%

**Test result:**

| Voltage | Current | Requirements of standard | Test result |
|---|---|---|---|
| | | | №1 |
| $1.1U_n$ | Open circuit | The test output shall not produce more than 1 pulse | Pass |

**Conclusion:** Pass

## 1.4. Starting current test

**Test condition:** The voltage is applied to the voltage circuits with starting current flowing in the current circuits, the test time is calculated according to the standard;
Voltage: $U_n$, frequency: $f_n$, room temperature: 23.0℃， relative humidity: 48%

**Test result:**

| cosφ | Current | Requirements of standard | Test result |
|---|---|---|---|
| | | | №1 |
| 1 | $0.004I_n$ | The meter shall start and continue to register at the starting current | Pass |

**Conclusion:** Pass

## 1.5. Limit of error due to variation of the current

**Test condition:** The test is performed using comparison test methods with the pulse output of the meter under reference conditions.
Voltage: $U_n$, frequency: $f_n$, room temperature: 22.6℃, relative humidity: 50%

**Test result:**

Positive:

| cosφ | Current | Limit of error (%) | Relative error(%) |
|---|---|---|---|
| | | | №1 |
| 1.0 | $0.05I_n$ | ±1.0 | 0.01 |
| | $0.1I_n$ | ±0.5 | 0.00 |
| | $0.5I_n$ | | -0.04 |
| | $I_n$ | | -0.06 |
| | $I_{max}/2$ | | -0.05 |
| | $I_{max}$ | | -0.02 |
| 0.5L | $0.1I_n$ | ±1.0 | 0.32 |
| | $0.2I_n$ | ±0.6 | 0.26 |
| | $0.5I_n$ | | 0.13 |
| | $I_n$ | | -0.01 |
| | $I_{max}/2$ | | -0.39 |
| | $I_{max}$ | | -0.42 |
| 0.8C | $0.1I_n$ | ±1.0 | -0.12 |
| | $0.2I_n$ | ±0.6 | -0.11 |
| | $0.5I_n$ | | -0.07 |
| | $I_n$ | | -0.03 |
| | $I_{max}/2$ | | 0.07 |
| | $I_{max}$ | | 0.05 |

Negative:

| cosφ | Current | Limit of error (%) | Relative error(%) |
|---|---|---|---|
| | | | №1 |
| 1.0 | $0.05I_n$ | ±1.0 | 0.01 |
| | $0.1I_n$ | ±0.5 | 0.00 |
| | $0.5I_n$ | | -0.04 |
| | $I_n$ | | -0.06 |
| | $I_{max}/2$ | | -0.05 |
| | $I_{max}$ | | -0.03 |
| 0.5L | $0.1I_n$ | ±1.0 | 0.26 |
| | $0.2I_n$ | ±0.6 | 0.18 |
| | $0.5I_n$ | | 0.04 |
| | $I_n$ | | -0.11 |
| | $I_{max}/2$ | | -0.27 |
| | $I_{max}$ | | -0.23 |
| 0.8C | $0.1I_n$ | ±1.0 | -0.12 |
| | $0.2I_n$ | ±0.6 | -0.11 |
| | $0.5I_n$ | | -0.07 |
| | $I_n$ | | -0.03 |
| | $I_{max}/2$ | | 0.11 |
| | $I_{max}$ | | 0.09 |

**Conclusion:** Pass

## 2、External static magnetic fields

**Test condition:** The voltage is applied to the voltage circuits with current flowing in the current circuits.
For electromagnet induction: magneto-motive force is 1000At (ampere-turns);
Voltage: $U_n$, frequency: $f_n$, room temperature: 22.7℃, relative humidity: 51%

**Test result:**

| Static magnetic field | Meter surface | Requirements of standard | Test result |
|---|---|---|---|
| | | | №1 |
| 1000At | Front | Criteria A | Pass |
| | Back | | Pass |
| | Top | | Pass |
| | Left | | Pass |
| | Right | | Pass |

Meter measurement characteristic during the test:

| Voltage | Current | cosφ | Static magnetic field | Meter surface | Variation limits of error (%) | Maximum variation of error (%) |
|---|---|---|---|---|---|---|
| | | | | | | №1 |
| $U_n$ | $I_n$ | 1 | 1000At | Front | ±2.0 | 0.04 |
| | | | | Back | | 0.05 |
| | | | | Top | | 0.07 |
| | | | | Left | | 0.05 |
| | | | | Right | | 0.06 |

**Conclusion:** Pass

## 3、Tests of immunity to other influence quantities

### 3.1. Frequency variation

**Test condition:** The error variation is measured compared to the error at $f_n$.
Voltage: $U_n$, room temperature: 22.6℃, relative humidity: 50%

**Test result:**

| Frequency | cosφ | Current | Variation limits of error(%) | Variation of relative error(%) |
|---|---|---|---|---|
| | | | | №1 |
| $0.98f_n$ | 1 | $0.05I_n$ | ±0.2 | 0.01 |
| | | $I_n$ | | -0.01 |
| | | $I_{max}$ | | -0.01 |
| | 0.5L | $0.1I_n$ | | 0.03 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.19 |
| $1.02f_n$ | 1 | $0.05I_n$ | | 0.03 |
| | | $I_n$ | | 0.01 |
| | | $I_{max}$ | | 0.01 |
| | 0.5L | $0.1I_n$ | | 0.04 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.07 |

**Conclusion:** Pass

## 3.2. Ambient temperature variation

**Test condition:** The temperature coefficient is determined for the specified operating temperature. The specified operating temperature is divided into sub-ranges between 15 K and 23 K.
The meter is placed in the climate chamber at the test temperature for more than 2h to get a stable state before error test.
Voltage: $U_n$, frequency: $f_n$, room temperature: 22.1℃, relative humidity: 50%

**Test result:**

| Temperature range | cosφ | Current | Limit of mean temperature coefficient(%/K) | Mean temperature coefficient(%/K) |
|---|---|---|---|---|
| | | | | №1 |
| -10℃~5℃ | 1 | $0.1I_n$ | ±0.03 | -0.008 |
| | | $I_n$ | | -0.003 |
| | | $I_{max}$ | | -0.009 |
| | 0.5L | $0.2I_n$ | ±0.05 | -0.038 |
| | | $I_n$ | | -0.006 |
| | | $I_{max}$ | | -0.025 |
| 5℃~23℃ | 1 | $0.1I_n$ | ±0.03 | -0.007 |
| | | $I_n$ | | -0.004 |
| | | $I_{max}$ | | -0.008 |
| | 0.5L | $0.2I_n$ | ±0.05 | -0.023 |
| | | $I_n$ | | -0.010 |
| | | $I_{max}$ | | 0.017 |
| 23℃~40℃ | 1 | $0.1I_n$ | ±0.03 | -0.005 |
| | | $I_n$ | | -0.005 |
| | | $I_{max}$ | | -0.003 |
| | 0.5L | $0.2I_n$ | ±0.05 | -0.013 |
| | | $I_n$ | | -0.009 |
| | | $I_{max}$ | | -0.049 |
| 40℃~55℃ | 1 | $0.1I_n$ | ±0.03 | -0.003 |
| | | $I_n$ | | -0.003 |
| | | $I_{max}$ | | -0.003 |
| | 0.5L | $0.2I_n$ | ±0.05 | -0.004 |
| | | $I_n$ | | -0.003 |
| | | $I_{max}$ | | -0.018 |

**Conclusion:** Pass

## 3.3. Voltage variation

**Test condition:** The error variation is measured compared to the error at $U_n$.
Frequency: $f_n$, room temperature: 22.6℃, relative humidity: 50%

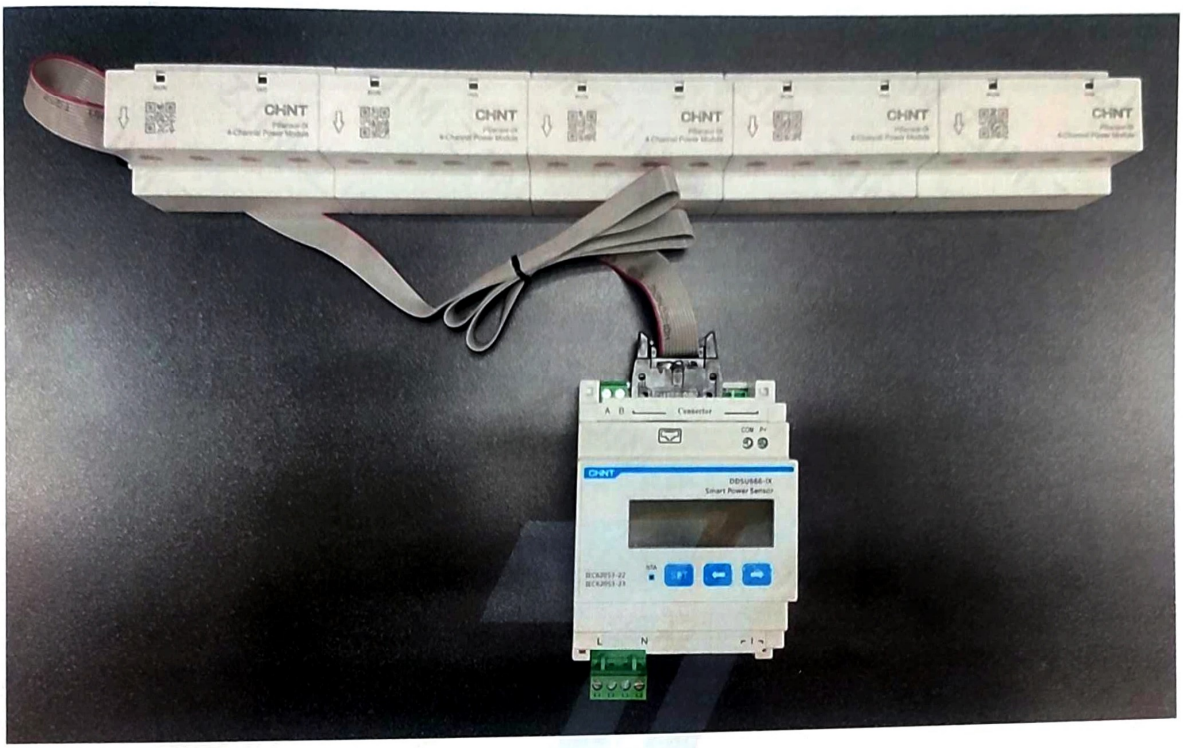
**Test result:**

| Voltage | cosφ | Current | Variation Limit of error(%) | Variation of relative error(%) |
|---|---|---|---|---|
| | | | | №1 |
| $0.8U_n$ | 1.0 | $0.05I_n$ | ±0.25 | 0.01 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.00 |
| | 0.5L | $0.1I_n$ | ±0.5 | 0.00 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.09 |
| $0.9U_n$ | 1.0 | $0.01I_n$ | ±0.25 | 0.00 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.01 |
| | 0.5L | $0.1I_n$ | ±0.5 | 0.01 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.01 |
| $1.1U_n$ | 1.0 | $0.01I_n$ | ±0.25 | 0.00 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.01 |
| | 0.5L | $0.1I_n$ | ±0.5 | 0.02 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | -0.05 |
| $1.15U_n$ | 1.0 | $0.01I_n$ | ±0.25 | 0.00 |
| | | $I_n$ | | 0.00 |
| | | $I_{max}$ | | 0.01 |
| | 0.5L | $0.1I_n$ | ±0.5 | 0.03 |
| | | $I_n$ | | 0.01 |
| | | $I_{max}$ | | -0.08 |

| Voltage | cosφ | Current | Limit of error(%) | Variation of relative error(%) |
|---|---|---|---|---|
| | | | | №1 |
| $0.7U_n$ | 1.0 | $I_n$ | -100~10 | -0.01 |
| $0.6U_n$ | | | | -0.01 |
| $0.5U_n$ | | | | -0.01 |
| $0.4U_n$ | | | | -0.02 |
| $0.3U_n$ | | | | -0.05 |
| $0.2U_n$ | | | | -0.13 |
| $0.1U_n$ | | | | -100 |

**Conclusion:** Pass

## Annex A Appearance




**Front view**

ZJIM

## Annex B Symbols in this report

| Symbol | Designation | Value |
|---|---|---|
| $U_n$ | Nominal voltage | 240V |
| $f_n$ | Nominal frequency | 50Hz |
| $I_n$ | Nominal current | 5A |
| $I_{max}$ | Maximum current | 63A |

# Annex C Main test equipments

| Device name | Type | Serial number |
|---|---|---|
| Three phase electricity meter test device | PTC-8320H | 1404137 |
| DC continuous magnet induction test device | MFDC1000 | 20130001 |
| Climatic test chamber | C7-340 | 54260000000010 |
| Three phase electricity meter test device | PTC-8320M | 1404138 |

**End of report**

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6、This test result is only valid for the test samples.

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