Current Transformer for Electronic Watt-Hour Meter

Applications

Electromechanical and Electronic Watt-Hour Meter

*High precision CT for meter 0.2/ 0.5/ 1.0 class*
JPJN series offer accurate measurement at low current level for industrial meter. They are complying with IEC 62053-22 or ANSI C12.20 of meter standard.

*DC tolerant (immune) CT for meter 0.5/ 1.0 class*
JDTN series are made of single core with DC immunity for Residential meter and conforms to 0.5PF grade. They are complying with IEC 62053-21 or ANSI C12.20 of meter standard.

*Shielded CT for Anti-tampering meter 0.5/ 1.0 class*
JDCT series are made of combined core with DC immunity and minimized influence from external magnetic field for Anti-external magnetic meter. It is recommended to use with shielding plates inside of meter case. They are complying with IEC 62053-21 or ANSI C12.20 of meter standard.

Industrial meter

- Meter-class: 0.5 / 0.2 / 0.1
- Standard: IEC 62053-22 or ANSI C12.xx
- Indirect connected (CT connected)
- $I = 0 .. 5 \text{ A (10A)}$
- Sensitivity: 2mA

Residential meter

- Meter-class: 1 .. 2
- Standard: IEC 62053-21, -23 or ANSI C12.xx
- Direct connected to the main
- $I = 0 .. 400 \text{ A}$
- Sensitivity: 10mA

Specification

<table>
<thead>
<tr>
<th>Watt-Hour Meter according to IEC 62053-21, -22, -23</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>class 0.1 and better</strong></td>
</tr>
<tr>
<td><strong>class 0.2...0.5</strong></td>
</tr>
<tr>
<td><strong>class 1.0 and 2.0</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Watt-Hour Meter according to ANSI C12.xx</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>class 0.1 and better</strong></td>
</tr>
<tr>
<td><strong>class 0.2...0.5</strong></td>
</tr>
<tr>
<td><strong>class 1.0 and 2.0</strong></td>
</tr>
</tbody>
</table>
Outline

JP & JN series

The JP & JN Series are high precision CT complied with Electronic Watt-Hour Meter (0.1 / 0.2 / 0.5 class) these are designed for power plant, distribution and industrial instruments. These have excellent properties of phase angle error and linearity error in the low current. The JP & JN Series are closer to zero on the temperature dependence. The JP & JN series for Electronic Watt-Hour Meter are complied with IEC 62053-22, ANSI C12.xx and EN 50470-3. We also design indirect connected CT (industrial meter) and direct connected CT to the main(residential meter).

JDTN series

The JDTN Series is designed to comply with IEC 62053-21, -23 & EN 50470-3 for regulation of Electronic Watt-Hour Meter. It has the current range from 20Adc to 120Adc and due to the low permeability, a phase angle error of typically 4° to 5° occurs which is easy to compensate on account of its high constancy of typically ± 0.05° by microprocessor.

Feature

JP & JN series

• Without DC-Tolerance
• 0.2/0.5 class meters in HVCT & MVCT for power station, sub-station and industrial complex
• Excellent coupling of primary and secondary current
• Minimal Phase Angle error
• High permeability
• UL, CSA, CE and RoHS available

JDT series

• With DC-Tolerance
• High linearity of hysteresis loop and DC-bias property
• Very low loss
• Customizing choice of primary current range : 5~400A (On request)
• Shield type: On request
• UL, CSA, CE and RoHS available

Reference of Model name

JP & JN series

Terminal type :
V=Pin type
W=Wire type

Rated Current in A (rms)
3 : 5 or 6A
4 : 40A
5 : 60 or 120A
6 : 200A
7 : 400A
12 : 60 or 100A
8 : 60A

Without DC-tolerance

JDT series

Terminal type :
V=Pin type
W=Wire type

Rated Current in A (rms)
20 : 20A
40 : 40A
60 : 60A
100 : 100A
120 : 120A

With DC-tolerance or shielded
### Specification without DC-Tolerance

**JP Series for 0.1/0.2 Class Meter Grade**

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary Current Range</th>
<th>Error</th>
<th>Turns Ratio</th>
<th>Characteristic Value</th>
<th>Terminal Structure</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP3V</td>
<td>6 -</td>
<td>0.10</td>
<td>1:2500</td>
<td>250</td>
<td>138</td>
<td>10</td>
</tr>
<tr>
<td>JP31V</td>
<td>6 -</td>
<td>0.12</td>
<td>1:1500</td>
<td>90</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>JP32V</td>
<td>6 -</td>
<td>0.14</td>
<td>1:2000</td>
<td>160</td>
<td>110</td>
<td>10</td>
</tr>
<tr>
<td>JP5V</td>
<td>120 -</td>
<td>0.10</td>
<td>1:2500</td>
<td>130</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td>JP51V</td>
<td>60 -</td>
<td>0.21</td>
<td>1:1000</td>
<td>22</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>JP52V</td>
<td>100 -</td>
<td>0.11</td>
<td>1:2000</td>
<td>85</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>JP3W</td>
<td>6 -</td>
<td>0.10</td>
<td>1:2500</td>
<td>250</td>
<td>138</td>
<td>10</td>
</tr>
<tr>
<td>JP315W</td>
<td>6 -</td>
<td>0.12</td>
<td>1:1500</td>
<td>90</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>JP32W</td>
<td>6 -</td>
<td>0.14</td>
<td>1:2000</td>
<td>160</td>
<td>110</td>
<td>10</td>
</tr>
<tr>
<td>JP5W</td>
<td>120 -</td>
<td>0.10</td>
<td>1:2500</td>
<td>130</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td>JP51W</td>
<td>60 -</td>
<td>0.21</td>
<td>1:1000</td>
<td>22</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>JP52W</td>
<td>100 -</td>
<td>0.11</td>
<td>1:2000</td>
<td>85</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>JP6W</td>
<td>200 -</td>
<td>0.10</td>
<td>1:2500</td>
<td>120</td>
<td>38</td>
<td>5</td>
</tr>
<tr>
<td>JP62W</td>
<td>200 -</td>
<td>0.11</td>
<td>1:2000</td>
<td>75</td>
<td>32</td>
<td>5</td>
</tr>
<tr>
<td>JP7W</td>
<td>400 -</td>
<td>0.20</td>
<td>1:4000</td>
<td>300</td>
<td>170</td>
<td>5</td>
</tr>
</tbody>
</table>

### JN Series for 0.2/0.5 Class Meter Grade

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary Current Range</th>
<th>Error</th>
<th>Turns Ratio</th>
<th>Characteristic Value</th>
<th>Terminal Structure</th>
<th>Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>JN1V</td>
<td>6 -</td>
<td>0.29</td>
<td>1:1500</td>
<td>35</td>
<td>46</td>
<td>10</td>
</tr>
<tr>
<td>JN2V</td>
<td>6 -</td>
<td>0.46</td>
<td>1:1600</td>
<td>60</td>
<td>143</td>
<td>10</td>
</tr>
<tr>
<td>JN3V</td>
<td>6 -</td>
<td>0.17</td>
<td>1:2500</td>
<td>200</td>
<td>138</td>
<td>50</td>
</tr>
<tr>
<td>JN315V</td>
<td>6 -</td>
<td>0.18</td>
<td>1:1500</td>
<td>70</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>JN32V</td>
<td>6 -</td>
<td>0.24</td>
<td>1:2000</td>
<td>120</td>
<td>110</td>
<td>50</td>
</tr>
<tr>
<td>JN4V</td>
<td>40 -</td>
<td>0.19</td>
<td>1:2500</td>
<td>230</td>
<td>200</td>
<td>25</td>
</tr>
<tr>
<td>JN12V</td>
<td>60 -</td>
<td>0.12</td>
<td>1:2500</td>
<td>260</td>
<td>150</td>
<td>7.5</td>
</tr>
<tr>
<td>JN8V</td>
<td>60 -</td>
<td>0.10</td>
<td>1:2000</td>
<td>250</td>
<td>92</td>
<td>10</td>
</tr>
<tr>
<td>JN3W</td>
<td>6 -</td>
<td>0.17</td>
<td>1:2500</td>
<td>200</td>
<td>138</td>
<td>50</td>
</tr>
<tr>
<td>JN315W</td>
<td>6 -</td>
<td>0.18</td>
<td>1:1500</td>
<td>70</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>JN32W</td>
<td>6 -</td>
<td>0.24</td>
<td>1:2000</td>
<td>120</td>
<td>110</td>
<td>50</td>
</tr>
<tr>
<td>JN4W</td>
<td>40 -</td>
<td>0.19</td>
<td>1:2500</td>
<td>230</td>
<td>200</td>
<td>25</td>
</tr>
<tr>
<td>JN8W</td>
<td>60 -</td>
<td>0.10</td>
<td>1:2000</td>
<td>250</td>
<td>92</td>
<td>10</td>
</tr>
</tbody>
</table>

### Explanation with/without DC-Tolerance

- **Imax**: maximum AC primary current with defined error
- **Ipeak**: maximum half wave rectified AC amplitude without saturation (IEC 62053 -21, -23) \( F(\text{Ipeak}) < 3\% \)
- **Ø(I)**: max. phase error for \( I < I_{\text{Imax}} \)
- **F(I)**: max. amplitude error for \( I < I_{\text{Imax}} \)
- **L**: inductance at moderate excitation level \( (I < I_{\text{Imax}}) \)
- **Rcu**: winding resistance
- **RB**: burden resistor
- **UB**: output voltage across burden resistor RB at \( I_{\text{Imax}} \)

---

Tel: +82-31-577-2280  E-mail: contact@hq sensing.com  http: www.hqsensing.com
## Specification with DC-Tolerance

New JDTN Series for 0.5/1.0 Class Meter Grade

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary Current Range</th>
<th>Characteristical Value</th>
<th>Terminal Structure</th>
<th>Dimension [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>JDTN20V</td>
<td>20</td>
<td>20</td>
<td>4.00</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN40V</td>
<td>40</td>
<td>40</td>
<td>3.96</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN60V</td>
<td>60</td>
<td>80</td>
<td>4.94</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN100V</td>
<td>100</td>
<td>110</td>
<td>4.08</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN20W</td>
<td>20</td>
<td>20</td>
<td>4.00</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN40W</td>
<td>40</td>
<td>40</td>
<td>3.96</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN60W</td>
<td>60</td>
<td>80</td>
<td>4.94</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN100W</td>
<td>100</td>
<td>110</td>
<td>4.08</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDTN120W</td>
<td>120</td>
<td>120</td>
<td>3.83</td>
<td>1:2500</td>
</tr>
</tbody>
</table>

### Shielded CT for 0.5 / 1.0 Class Meter Grade

* iSAST CT, JDCT series are made of combined core with DC immunity and minimized influence from external magnetic field for Anti-external magnetic meter. It is recommended to use with shielding plates inside of meter case. They are complying with IEC 62053-21 or ANSI C12.20 of meter standard.

* iSAST CT, JD3AS Series minimize external magnetic effect as shielding in side of meter housing. So we recommend you to use shielding plate in side of meter housing together to make it better accuracy. It complies with metering standard IEC62053-22.

### Diagram

- Example: JDCT100AS

Distance between magnet and CT [mm] | Shielding Plates (3mm) | Meter Case | Br=500mT

- Unshielded CT(120A)

Distance between magnet and CT [mm] | Amplitude error F(Iprim) [%]

- JDCT100AS

<table>
<thead>
<tr>
<th>Model</th>
<th>Primary Current Range</th>
<th>Characteristical Value</th>
<th>Terminal Structure</th>
<th>Dimension [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>JDCT100AS</td>
<td>100</td>
<td>100</td>
<td>0.12</td>
<td>1:2500</td>
</tr>
<tr>
<td>JDCT120AS</td>
<td>120</td>
<td>120</td>
<td>0.12</td>
<td>1:2500</td>
</tr>
<tr>
<td>JD3AS</td>
<td>6</td>
<td>21</td>
<td>0.21</td>
<td>1:2500</td>
</tr>
</tbody>
</table>
Dimensions with/without DC-Tolerance

3-1

Dimensions

3-2

Dimensions

3-3

Dimensions

3-4

Dimensions

3-5

Dimensions

3-6

Dimensions

3-7

Dimensions

3-8

Dimensions

3-9

Dimensions

3-10

Dimensions

3-11

Dimensions

3-12

Dimensions

3-13

Dimensions

3-14

Dimensions

3-15

Dimensions

3-16

Dimensions

3-17

Dimensions

3-18

Dimensions

*Unit: mm [inch]

J&D Tel: +82-31-577-2280 E-mail: contact@hqsensing.com http://www.hqsensing.com

J&D
Graph

**JP3V / JP3W**

- **Primary current** $I_{prim}$ [Arms]
- **Phase error** $f$ [°]
- **Amplitude error** $F$ [\%]

**JP315V / JP315W**

- **Primary current** $I_{prim}$ [Arms]
- **Phase error** $f$ [°]
- **Amplitude error** $F$ [\%]

**JP32V / JP32W**

- **Primary current** $I_{prim}$ [Arms]
- **Phase error** $f$ [°]
- **Amplitude error** $F$ [\%]

**JP5V / JP5W**

- **Primary current** $I_{prim}$ [Arms]
- **Phase error** $f$ [°]
- **Amplitude error** $F$ [\%]

**JP51V / JP51W**

- **Primary current** $I_{prim}$ [Arms]
- **Phase error** $f$ [°]
- **Amplitude error** $F$ [\%]

**JP52V / JP52W**

- **Primary current** $I_{prim}$ [Arms]
- **Phase error** $f$ [°]
- **Amplitude error** $F$ [\%]
Graph

**JDTN40V / JDTN40W**

- **F=50Hz**

  - Phase error vs. Primary current
  - Amplitude error vs. Primary current

**JDTN60V / JDTN60W**

- **F=50Hz**

  - Phase error vs. Primary current
  - Amplitude error vs. Primary current

**JDTN100V / JDTN100W**

- **F=50Hz**

  - Phase error vs. Primary current
  - Amplitude error vs. Primary current

**JDTN120V / JDTN120W**

- **F=50Hz**

  - Phase error vs. Primary current
  - Amplitude error vs. Primary current

**JD3AS**

- **F=50Hz**

  - Phase error vs. Primary current
  - Amplitude error vs. Primary current

**JDCT100AS/JDCT120AS**

- **F=50Hz**

  - Phase error vs. Primary current
  - Amplitude error vs. Primary current
Current type Voltage Transformer

JI / JIV

JI / JIV are designed for indirect measuring as current type. These VTs offer 1:1 (2mA: 2mA) transformation between input and output current. Especially, external resistor is recommended under 500 ohm. These VTs are the best solution for high accurate measuring of voltage.

Model & Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated Current (Input/Output)</th>
<th>Frequency Range</th>
<th>Turns Ratio</th>
<th>Second Burden Resistance</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>JI</td>
<td>2mA/2mA</td>
<td>50Hz to 400Hz</td>
<td>1250T:1250T</td>
<td>≤ 500Ω</td>
<td>0.5 Class</td>
</tr>
<tr>
<td>JIV</td>
<td>2mA/2mA</td>
<td>50Hz to 400Hz</td>
<td>1250T:1250T</td>
<td>≤ 500Ω</td>
<td>0.5 Class</td>
</tr>
</tbody>
</table>

Dimension & Circuit

General Diagram

Circuit

Front View

Side View
Direct Voltage Transformer
JIVD30 / JIVD50

JIVD30 / JIVD50 are designed for direct measuring as PCB mounted type. These VTs offer an optional transformation between input and output voltage. Input is available from 100V - 600V and output is from 100mV – 7V by customer needs. These VTs are the best solution for high accurate measuring of voltage.

### Model & Specification

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage(V)</th>
<th>Output Voltage</th>
<th>Excitation Current</th>
<th>Accuracy</th>
<th>Frequency</th>
<th>Isolation Voltage (1min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JIVD30</td>
<td>100, 150 220, 380</td>
<td>1V~5V</td>
<td>≤ 0.5mA</td>
<td>0.1 Class</td>
<td>50Hz to 400Hz</td>
<td>2500Vrms</td>
</tr>
<tr>
<td>JIVD50</td>
<td>300, 380 500, 600</td>
<td>100mV~7V (Optional)</td>
<td>≤ 0.5mA</td>
<td>0.1 Class</td>
<td>50Hz to 400Hz</td>
<td>2500Vrms</td>
</tr>
</tbody>
</table>

### Dimension & Circuit

Unit: mm[inch]