## Ohio Semitronics, Inc.
### Product Selection Guide

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**Current Transformers**
MCCT | 6 | Metering Class Current Transformers, UR
21279 | 7 | Current Transformer (0.1A Secondary)
21280 | 7 | Current Transformer (0.1A Secondary)
21281 | 7 | Current Transformer (0.1A Secondary)
CCT-800 | 8 | Precision AC Current Transformer, Compensated
ECT | 9 | Neutral Current Transformer, Electronic, Split-Core
CTY | 10 | Split-Core Current Transformers, UR
CTI | 11 | Split-Core Current Transformers
FSCCT | 12 | Flexible Split-Core Current Transformers, UR
LCCT | 16 | Low-Cost Current Transformers, UR

**Current Measurement (Average Measuring)**
ACT | 17 | Current Transducer, 1Φ, UL, CE
3ACT | 19 | Current Transducer, 3Φ, UL, CE
CTC, CTD | 21 | Current Transducer, 1Φ, UL, CE
MCT5 | 23 | Current Transducer, 1Φ, UL, DIN
SCT | 25 | Split-Core Current Transducer, 1Φ, UL
DCT | 26 | Current Transducer, 1Φ, DIN, CSA, CE

**Current Switches**
CRD | 27 | Programmable Current Setpoint Relay/Transducer, 1Φ
CPD-4715 | 29 | AC Current Present Detector, 1Φ, UL, CE
DSO-102 | 30 | AC Current Switch, 1Φ

**Current Measurement (RMS Measuring)**
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ACTR | 32 | Current Transducer, 1Φ, UL
3CTR | 33 | Current Transducer, 3Φ
CTRS | 34 | Current Transformer/Transducer, 1Φ, Split-Core
MCTR | 36 | Current Transformer, 1Φ, Loop-Powered, DIN
DCTR | 38 | Current Transducer, 1Φ, DIN, CSA, CE
CT7 | 39 | Current Transducer (shunt isolator)
CT8 | 39 | Current Transducer (shunt isolator)

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**Measured Inputs** | **Output Options**
--- | ---
Direct Connect | Non-Contact | Measured Frequency Range (Hz) | AC Phase Fired | AC Zero Crossing | AC PWM | DC | AC | Digital | Local Display | Relay Output
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---

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- **Non-Contact**
- **Measured Frequency Range (Hz)**
- **AC Phase Fired**
- **AC Zero Crossing**
- **AC PWM**
- **DC**
- **AC**

#### Output Options
- **Digital**
- **Local Display**
- **Relay Output**

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**Current Measurement, Hall-Effect, Open Loop**

- **CTL 40 Current Transducer, 1Φ, 0-35A to 0-40kA, UL**
- **CTA 44 Signal Conditioner, 1Φ (for use with CTL Series)**
- **CTG 46 Current Transducer, Built-in Amplifier, 1Φ, UL**
- **CTH 48 Current Transducer, Built-in Amplifier, 1Φ**
- **CTLC 50 Current Transducer, Built-in Amplifier, 1Φ, Terminal Strip**
- **ISC 52 Current Transducer, Hall-Effect, 1Φ, UL, ATEX, CE**
- **CTLP 54 Current Transducer, Hall-Effect, 1Φ, Loop-Powered**

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**Current Measurement, Hall-Effect, Closed Loop**

- **CTF 55 Hall-Effect Current Transducer, 1Φ, 0.1% linearity**
- **CTFB 55 Hall-Effect Current Transducer, 1Φ, 0.1% linearity, PCB**
- **CTGF 56 AC/DC/Pulse Current Transducer, 1Φ**

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**Current Measurement, Ultra-high Accuracy**

- **UFG 57 Precision AC/DC Current Transducer, 1Φ, 0.01% Accuracy**

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**Hall-Effect Transducer Power Supplies**

- **CTA800 58 Signal Conditioner (for use with closed-loop sensors)**
- **PS-4753 59 Universal Power Supply for CTL, CTG & CTH**

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**Current Measurement, Rogowski Coil**

- **MFC150 60 Flexible Rogowski Coil**
- **RPS50 62 Single-Channel, Multi-Scale Integrator, DIN**
- **FCA3000 63 Three-Channel Integrator, DIN**

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**Voltage Measurement (Average Measuring)**

- **AVT 64 Voltage Transducer, 1Φ, UL, CE**
- **3AVT 66 Voltage Transducer, 3Φ, UL, CE**
- **MVT 68 Voltage Transducer, 1Φ, UL, DIN**
- **DVT 70 Voltage Transducer, 1Φ, DIN, CSA, CE**

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**Voltage Measurement (RMS Measuring)**

- **AVTR 71 Voltage Transducer, 1Φ, UL**
- **3VTR 72 Voltage Transducer, 3Φ**
- **MVTR 73 Voltage Transducer, 1Φ, Loop Power, DIN**
- **DVTR 74 Voltage Transducer, 1Φ, DIN, CSA, CE**
- **VT8 75 Voltage Transducer, 1Φ**

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#### DC Voltage Isolators

- **DC Voltage Transducer/High-Voltage Isolator**: VT7, DVT7E, VTU, VTH

#### AC Watt/Watthour/VAR Transducers

- **PC5/PC4**: AC Watt Transducer, 1-2-3 Element
- **W/W4**: AC Watt/Watthour Transducer, 1-2-3 Element
- **AGW**: Precision AC Watt Transducer, 1-2-3 Element, UL
- **GW5**: AC Watt Transducer, 1-2-3 Element
- **GV5**: AC VAR Transducer, 1-2-3 Element
- **GWV5**: Precision AC Watt/VAR Transducer, 1Φ, 3Φ
- **DW5**: AC Watt Transducer, DIN, CSA, CE, 1Φ, 3Φ
- **DWV**: AC Watt/VAR Transducer, DIN, CSA, CE, 1Φ, 3Φ
- **AGH**: Precision AC Watt/Watthour Transducer, UL, 1Φ, 3Φ
- **GH**: AC Watt/Watthour Transducer, 1Φ, 3Φ
- **VGH**: AC VAR/VARhour Transducer, 1Φ, 3Φ
- **P**: Variable-Frequency AC Watt Transducer, 1-2-3 Element
- **PC8**: DC & Variable-Frequency AC Watt Transducer, 1Φ
- **PC20**: AC Watt/Power Factor/Volt-Amp Transducer, 1Φ, 3Φ
- **MT**: Multiplier (DC or AC Watt Transducer)
- **SWH**: AC Watt-hour Transducer/Transformer, UL, 1Φ
- **ESP3**: Energy Scout+ Watt/Varhour Meter, DIN, CE, 1Φ, 3Φ

#### Power Factor Transducers

- **PF5**: Phase Angle Transducer, 1Φ, 3Φ

#### Frequency Transducers

- **AFT**: Frequency Transducer, Wide-Range, UL, 1Φ
- **DFT**: Frequency Transducer, DIN, CSA, CE, 1Φ
- **DFTA**: Frequency Transducer, Wide-Range, DIN, CSA, CE, 1Φ

#### Process Signal Conditioners

- **SG**: Process Signal Conditioner, 1Φ
- **MSG**: Process Signal Conditioner, DIN, 1Φ

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### Measured Inputs

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### Multifunction Power Meters

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### Key to Symbols

- Applies to most models. See product spec sheet for more complete specifications and options.
- Recommend calling OSI Technical Support to discuss your application prior to purchase.
- Some models may require connection to a divider box. (provided)
- Opt Available as an option or with the purchase of an optional accessory.
- Double Insulated

**RoHS-Compliant Models Available! Consult Factory**

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**Ohio Semitronics, Inc.**

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[WWW.OHIOSEMITRONICS.COM](http://WWW.OHIOSEMITRONICS.COM) * 1-800-537-6732

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<td>MVT</td>
<td>68</td>
</tr>
<tr>
<td>MVTR</td>
<td>73</td>
</tr>
<tr>
<td>OFC</td>
<td>142</td>
</tr>
<tr>
<td>OFM</td>
<td>142</td>
</tr>
<tr>
<td>OFT</td>
<td>142</td>
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<tr>
<td>P</td>
<td>108</td>
</tr>
<tr>
<td>PA</td>
<td>(BC)</td>
</tr>
<tr>
<td>PC4</td>
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<tr>
<td>PC5</td>
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<td>(PTB)</td>
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<td>(ESP3)</td>
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<td>(BC)</td>
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<td>W4</td>
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<td>Legacy Models</td>
<td>(BC)</td>
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<td>Glossary</td>
<td>148</td>
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<tr>
<td>Test Certificates</td>
<td>150</td>
</tr>
</tbody>
</table>

Red font indicates a new product introduction!

Click model names above to jump to related catalog page.

OHIO SEMITRONICS, INC.

4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
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Page 5
METERING-CLASS CURRENT TRANSFORMERS

DESCRIPTION
The UL-Recognized metering-class current transformers provide the most accurate method of measuring AC current available. These transformers are typically used with AGW, GW5, GV5 and GH series Watt/Wattour and VAR transducers to provide accurate, reliable power measurements.

ACCURATE TO 0.3%

FEATURES
- For use with high-accuracy AGW, GW5, GV5 and GH series Watt/Wattour and VAR transducers.
- Meets ANSI specifications for sub-metering applications.
- An open-secondary protection device is available separately. See LDB-40 specification sheet for details.

5 YEAR WARRANTY

SPECIFICATIONS
Frequency.......................................................... 50-400Hz
Insulation Class ..................................................... 600V
Impulse Level ...................................................... 10kV, full-wave
Continuous Thermal Current Rating Factor.............................. 1.33 at 30°C ambient, 1.0 at 55°C ambient
Terminals ........................................................... #8 - 32

CURRENT RATIO | DIM. DRAWING | PART NUMBER | WT. (LBS) | ANSI METERING-CLASS ACCURACY (60HZ) | RELAY CLASS
--- | --- | --- | --- | --- | ---
100:5 | 1 | 12973 | 5.5 | 0.6 | 0.6 | 2.4 | 4.8 | - | - | C10
150:5 | 1 | 12974 | 5.5 | 0.3 | 0.3 | 1.2 | 1.2 | 2.4 | 2.4 | C10
200:5 | 1 | 12975 | 5.5 | 0.3 | 0.3 | 0.6 | 1.2 | 1.2 | 2.4 | C20
250:5 | 1 | 12976 | 5.5 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | 2.4 | C20
300:5 | 1 | 12977 | 5.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C20
400:5 | 1 | 12978 | 5.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C20
400:5 | 3 | 12316 | 13.8 | 0.3 | 0.3 | 0.3 | 0.6 | 1.2 | 1.2 | C20
500:5 | 2 | 13480 | 3.5 | 0.3 | 0.3 | 0.3 | 0.6 | 1.2 | 1.2 | C10
500:5 | 3 | 13481 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
600:5 | 2 | 13482 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
600:5 | 3 | 13483 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
800:5 | 2 | 13484 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
800:5 | 3 | 13485 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
1000:5 | 2 | 13486 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
1000:5 | 3 | 13487 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
1200:5 | 2 | 13488 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
1200:5 | 3 | 13489 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
1500:5 | 2 | 13490 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
1500:5 | 3 | 13491 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
2000:5 | 2 | 13492 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
2000:5 | 3 | 13493 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
2500:5 | 2 | 13494 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
2500:5 | 3 | 13495 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10
3000:5 | 3 | 13496 | 3.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.6 | 0.6 | C10

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CURRENT TRANSFORMERS (0.1A SECONDARY)

0.3% Metering Class
Low Cost

FEATURES
• 0.3% metering class accuracy.
• Secondary open-circuit voltage limited to less than 8.0Vac.

APPLICATIONS
• For use with any indicating device or ammeter requiring 0.1A input.
• Ideal for use with watt transducers, current transducers, and energy management systems.

MODEL SELECTION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>INPUT AC AMPS</th>
<th>CURRENT RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>21279</td>
<td>100</td>
<td>1000:1</td>
</tr>
<tr>
<td>21280</td>
<td>200</td>
<td>2000:1</td>
</tr>
<tr>
<td>21281</td>
<td>400</td>
<td>4000:1</td>
</tr>
</tbody>
</table>

For use over insulated conductors only.

SPECIFICATIONS

INPUT
Current .......................................................... See Table
Over-current (without damage) .................. 2X Rating
Frequency Range ........................................ 57-63Hz

ACCURACY ................................................ 0.3% Class

TEMPERATURE
Operating Range ...................................... -10ºC to 55ºC

OUTPUT
Type .............................................................. 0-0.1Aac
Burden ........................................................... 0.1VA

PHYSICAL
Termination .................................................. 72”, 16AWG
(X1) .................................................. Black w/Yellow or Yellow w/Black
(X2) .................................................. Yellow

CASE DIMENSIONS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SENSOR DIMENSIONS (inches)</th>
<th>WEIGHT</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>21279</td>
<td>0.75</td>
<td>2.28</td>
<td>0.75</td>
</tr>
<tr>
<td>21280</td>
<td>0.75</td>
<td>2.28</td>
<td>0.75</td>
</tr>
<tr>
<td>21281</td>
<td>1.40</td>
<td>3.25</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Dwg.# 0902-00622-B Rev B (mod.)
DESCRIPTION
The CCT-800 is an 800:0.2A solid-core, compensated CT. A compensated CT uses additional windings and electronic circuitry to compensate for losses within the transformer. This technique provides high accuracy across a wide dynamic range of input and is especially useful at the low end of the input range (0-10%).

FEATURES
• ±0.1% Ratio Accuracy
• ±5.0 Minutes Phase Accuracy
• 100:1 Dynamic Range

APPLICATIONS
• Precision Measurements
• Standards

SPECIFICATIONS

INPUT
- Current (Primary) ...................... I_P = 800Aac, max.
- Overrange without damage ........... 1.2 X rating
- Frequency Range...................... 16 to 400Hz

DIELECTRIC TEST
- Input/Output/Case ................. 2200Vac

INSTRUMENT POWER
- Type ................................................. ±15Vdc ±20%
- Current ....................................... ≤10mAac

OUTPUT
- Scaling ........... 0-800A Input = 0-0.2A Output (I_P/4000)
- Burden ........................................... 0.1VA, max.

ACCURACY
- Ratio .................. 1-100% F.S. .............. ±0.1% Rdg.
- Phase ............. 1-100% F.S. .............. ±5.0 minutes

TEMPERATURE AND ENVIRONMENTAL
- Operating Temperature Range ...... -10 to 55°C
- Storage Temperature Range ........ -25 to 60°C
- Operating Humidity ........... 0-95% RH, non-condensing

PHYSICAL
- Weight .................................................. 0.80 lbs.
- Termination, Instrument Power
- 3-Cond., PVC, shielded, brown ......22AWG, 6ft.
- Termination, Output
- Twisted-pair, black/white .......... 16AWG, 6ft.
- Enclosure ...................................... ABS, Black

DIMENSIONS AND CONNECTIONS

All dimensions in inches
Tolerance - 0.00 ± 0.03 (Unless otherwise specified)
NEUTRAL CURRENT TRANSFORMER

MODEL ECT-NEUTRAL CURRENT TRANSFORMER

FEATURES

• Split-core
• Large window

APPLICATIONS

• Neutral current measurement
• Multiple conductors

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT (Aac)</th>
<th>STANDARD OUTPUTS</th>
<th>MODEL ECT-SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>0-0.333 Vac</td>
<td>0-1.0 Vac C</td>
</tr>
<tr>
<td>0-10</td>
<td>10C-3V</td>
<td>10C-1V D</td>
</tr>
</tbody>
</table>

DIMENSIONS & CONNECTIONS (D)

<table>
<thead>
<tr>
<th>WIRE COLOR</th>
<th>SIGNAL</th>
<th>SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>+</td>
<td>Instrument Power</td>
</tr>
<tr>
<td>Black</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>+</td>
<td>Output</td>
</tr>
<tr>
<td>White</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

SPECIFICATIONS

For use over insulated conductors only!

INPUT

Current: 0-10Aac
Over-current: 1.2 X F.S.
Frequency Range: 50-60Hz

OUTPUT

Type: See Table
Loading: ≥500kΩ

INSTRUMENT POWER

Type: 24Vac/dc, ±10%, <12mA

DIELECTRIC TEST

Input to Output/Instr. Pwr.: 2500Vac, 1min.

ACCURACY

10-100% F.S.: 0.30% Reading

PHYSICAL

Weight: 5.5lbs., approx.
Leads: Stripped and tinned
Instrument Power: .96", 20AWG
Output: .96", 20AWG

ENVIRONMENTAL

Operating Temperature: 0-55ºC
Operating Humidity: 0-95% Non-condensing

DIMENSIONS & CONNECTIONS (C)

<table>
<thead>
<tr>
<th>SENSOR SIZE</th>
<th>DIMENSIONS (inches)</th>
<th>WT. (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>A  5.50</td>
<td>B  4.90</td>
</tr>
<tr>
<td></td>
<td>C  1.60</td>
<td>D  3.15</td>
</tr>
<tr>
<td></td>
<td>E  3.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.5</td>
</tr>
</tbody>
</table>
FEATURES
- 0.5% Linearity
- Split-core
- AC Outputs 0.1A, 1A, 5A, 0.333V, 1V, 5V

LOW COST

APPLIEDS
- For use with OSI Watt transducers
- For use with OSI Current transducers
- Ideal for Ammeters, Wattmeters

<table>
<thead>
<tr>
<th>INPUT AC AMPS</th>
<th>STANDARD OUTPUTS MODEL CTY-</th>
<th>SENSOR SIZE</th>
</tr>
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<tbody>
<tr>
<td>0-0.1Aac</td>
<td>0-1Aac</td>
<td>0-5Aac</td>
</tr>
<tr>
<td>0-0.33V ac</td>
<td>0-1Aac</td>
<td>0-5Aac</td>
</tr>
<tr>
<td>0-5V ac</td>
<td>0-1Aac</td>
<td>0-5Aac</td>
</tr>
<tr>
<td>0-50</td>
<td>050A-1</td>
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<td>0-100</td>
<td>100A-1</td>
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<td>0-200</td>
<td>200A-1</td>
<td>200A-1</td>
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<tr>
<td>0-100</td>
<td>100B-1</td>
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<td>0-200</td>
<td>200B-1</td>
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<td>0-2000</td>
<td>2000C-1</td>
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</tr>
<tr>
<td>0-2500</td>
<td>2500C-1</td>
<td>2500C-1</td>
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</tbody>
</table>

Optional inputs and outputs are available, consult factory.

* 0.1Aac output models have an internal voltage-clamping circuit which limits the output voltage to less than 8Vac. CT secondaries may be opened safely without disconnecting the primary. These models are also suitable for use with WL50 series Watt/Watthour transducers.

** UL Recognition does not apply to C-size sensors.

SPECIFICATIONS
For use over insulated conductors only!

INPUT
Current ................................................. See Table
Over-current ........................................... 1.2 X rating
Frequency Range ................................. 50-60Hz

OUTPUT
Signal ...................................................... See Table
Burden, Sensor Size A
1Aac models .......................... 0.2VA
100Aac ............................................ 0.5VA
200Aac ............................................ 1VA

Burden, Sensor Sizes B, C and D
1Aac, 5Aac models ............... 1VA
200Aac, 300Aac ......................... 2VA
400Aac through 800Aac .............. 5VA
1000Aac through 2500Aac .......... 10VA

Loading .......... 0.33Vac, 1Vac, 5Vac models ≥500kΩ
0.1Aac models ........................ ≤10Ω

DIELECTRIC TEST
Input to Output ...................................... 2500Vac, 1min.

ACCURACY
0-0.1Aac models ................. 0.30% Metering Class
0-1Aac models, sensor size “A”  ±1% F.S.
0-5Aac models ........................ ±1% F.S.
All other models ........................ ±0.5% F.S.

MECHANICAL
Operating Temperature ......................... 55°C Max.

ORDERING INFORMATION
Example: 1500A Input, with a 0.333V Output. Sensor size D CTY-1500D-3V

SENSOR DIMENSIONS

<table>
<thead>
<tr>
<th>SENSOR SIZE</th>
<th>DIMENSIONS (inches)</th>
<th>WT. (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>2.80</td>
<td>2.00</td>
<td>1.12</td>
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<tr>
<td>3.85</td>
<td>3.80</td>
<td>1.30</td>
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<tr>
<td>5.50</td>
<td>4.90</td>
<td>1.60</td>
</tr>
<tr>
<td>7.75</td>
<td>13.00</td>
<td>2.20</td>
</tr>
</tbody>
</table>

LEAD LENGTHS
5Aac models .................... 24”, 14AWG, White (X1) & Black
0.1Aac models .................. 72”, 16AWG, Blk/Yel (X1) & Yellow
All other models ................ 72”, 16AWG, White (X1) & Black

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Page 10
FEATURES
- Low Current Ranges
- Easy Installation (Split-Core)

APPLICATIONS
- Current Measurement
- Power Measurement

MODEL SELECTION

<table>
<thead>
<tr>
<th>CURRENT RATIO</th>
<th>MODEL</th>
<th>BURDEN</th>
<th>ACCURACY* (F.S.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100:5A</td>
<td>CTI-100</td>
<td>0.5VA</td>
<td>±3%</td>
</tr>
<tr>
<td>150:5A</td>
<td>CTI-150</td>
<td>0.5VA</td>
<td>±2%</td>
</tr>
<tr>
<td>200:5A</td>
<td>CTI-200</td>
<td>1.0VA</td>
<td>±1%</td>
</tr>
<tr>
<td>250:5A</td>
<td>CTI-250</td>
<td>2.0VA</td>
<td>±1%</td>
</tr>
<tr>
<td>300:5A</td>
<td>CTI-300</td>
<td>2.0VA</td>
<td>±1%</td>
</tr>
<tr>
<td>400:5A</td>
<td>CTI-400</td>
<td>2.5VA</td>
<td>±1%</td>
</tr>
</tbody>
</table>

*Note: Can be calibrated with OSI transducers for better accuracy - consult factory.

ORDERING INFORMATION
Example:
100A Input with 5A Output
CTI-100

SPECIFICATIONS

INPUT
Current Range ............................................ See Table
Frequency .................................................. 60Hz

TEMPERATURE
Continuous Thermal Current Rating Factor
At 30°C Ambient ............................................. 1.33
At 55°C Ambient ............................................. 1.0

DIELECTRIC RATING
Rated for installation on 600Vac lines.

PHYSICAL
Case Material ......................... Noryl SE1X, Black
Termination ............................... 14AWG Wire, 30in.
Weight ................................................. 1lb

OUTPUT
Type ............................................................ 0-5Aac

SENSOR DIMENSIONS

NOTE: For positive output on white cable, insert positive current cable through the “polarity dot” side of the sensor.
CIRCULAR AND RECTANGULAR WINDOW (BUS BAR) MODELS

DESCRIPTION
The OSI flexible split-core current transformers provide the lowest cost installation available. All models are made of a silicon steel core which allows the units to be split and twisted around existing conductors for easy installation. The units are encapsulated in silicon rubber to protect against moisture, dirt, oil and corona.

A wide variety of standard transformer ratios and sizes are available. Current ratings range from 200A to 6000A with circular window diameters from 4 to 18 inches, and rectangular windows from 2.75 x 6.63 inches to 4 x 11 inches. Custom input ranges and sizes are also available. Consult factory for details.

FEATURES
• Flexible split-core configuration provides for easy installation around existing conductors.
• Unit is encapsulated in silicon rubber to protect against moisture, dirt, oil and corona.

APPLICATIONS
• For use with any indicating device or Ammeter which is designed for 1A, 5A, 0.333V or 1V input.
• Ideal for use with OSI Watt transducers, current transducers and energy management systems.

SPECIFICATIONS

INPUT
Current ...................................................... See Tables
Frequency Range ...................................... 50 to 400Hz

INSULATION LEVEL
Insulation ............................................. 720V, BIL 10kV, Full Wave

OUTPUT
Type .................................................. See Tables
Burden .................................................. See Tables

ACCURACY (at 60Hz)
200:5 thru 300:5 ......................................... 4% F.S.
400:5 thru 500:5 ......................................... 3% F.S.
600:5 thru 800:5 ......................................... 2% F.S.
All others ............................................. 1% F.S.

TEMPERATURE AND ENVIRONMENTAL
Operating Range ..................................... -45°C to 55°C
Thermal Rating Factor ...................... 1.25 @ 30°C, 1.0 @ 55°C
Altitude .................................................... 4000m, max.

PHYSICAL
Encapsulation ................................... Silicon Rubber, Red
Sensor Dimensions ................................ See Tables
Weight .................................................. See Tables
Output Cable ....................................... 12ft., yellow
<800A Input Models ............... 12AWG, Black (X1), White
>800A Input Models ............... 16AWG, Black (X1), White
Termination ...................................... #8 Spade Terminals
All models meet IEC 60044-1 standards.

INSTALLATION

Step 1: Expand CT opening only enough to separate core.

Step 2: Twist upper and lower sections to open.

Note: Open split core with a twisting motion only!
## Flexible Split-Core Current Transformers

### Models with 1A Secondary

<table>
<thead>
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<th>Ratio</th>
<th>Window Dimensions (in inches)</th>
<th>Burden at 60Hz (VA)</th>
<th>Accuracy at 60Hz (±%)</th>
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**Sensor Size**

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*Average weight for each sensor size*

### Models with 5A Secondary

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**Sensor Size**

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*Average weight for each sensor size*
### Models with 0.333V Secondary

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<th>ACCURACY AT 60Hz (±%)</th>
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<th>2.75 x 6.63</th>
<th>4 x 11</th>
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* Average for sensor size

### Models with 1V Secondary

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<th>RATIO</th>
<th>WINDOW DIMENSIONS (in inches)</th>
<th>Rectangular (H x W)</th>
<th>ACCURACY AT 60Hz (±%)</th>
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<tr>
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<td>Circular (ID)</td>
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* Average for sensor size
FLEXIBLE SPLIT-CORE CURRENT TRANSFORMERS

SENSOR DIMENSIONS

CIRCULAR WINDOW MODELS

RECTANGULAR WINDOW MODELS

<table>
<thead>
<tr>
<th>WINDOW SIZE (ID)</th>
<th>SENSOR DIMENSIONS (in inches)</th>
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<table>
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<td>13.38</td>
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INSTALLATION INSTRUCTIONS

1. Installation should be performed by qualified electricians only!
2. Make sure electrical service is disconnected before making any electrical connections.
3. Transformers are suitable for installation on 720Vac lines.
4. For best accuracy, install with measured conductor centered in sensor window.
5. Branch circuit protection is required to be provided in accordance with the National and Local codes of the inspection authority.
6. De-energize all services of supply to measuring circuit before disconnecting output leads to prevent dangerous voltages and possible damage to the current sensor.
7. To prevent contact with live circuits, when installed on a bare bus bar, the transducer is required to be mounted in an enclosure that requires the use of a tool for access. When installed on an insulated cable, this second enclosure is not required.

OPERATING INSTRUCTIONS

1. This unit is intended for indoor use at altitudes up to 4000 meters.
2. If cleaning of the exterior surface is necessary, de-energize all services of supply (both measuring and instrument power circuits) and brush with a soft brush or blow off with low-pressure air. Use appropriate eye protection. Not suitable for hose-down cleaning.
3. Maximum operating temperature range is -45°C to 55°C.

UL recognized for USA and Canada

WARRANTY STATEMENT

Ohio Semitronics Inc. warrants this unit to be free of defects in material and workmanship for a period of five years from date of shipment. This unit must not be used in any manner other than as specified in this document.

OHIO SEMITRONICS, INC.
# LOW-COST CURRENT TRANSFORMERS

## FREQUENCY RANGE 50-400 HERTZ

### FEATURES
- Manufactured to meet requirements of UL 1244 and revisions
- All models on this page UL recognized - file number E134271.

### APPLICATIONS
- For use with OSI PC5 series and model W series Watt/Watthour transducers.
- Ideal for use with Ammeters, relays and Watt transducers.

### MODEL SELECTION

#### 50-400 HERTZ CURRENT TRANSFORMER

<table>
<thead>
<tr>
<th>CURRENT RATIO</th>
<th>ACCURACY AT 60Hz (%)</th>
<th>BURDEN AT 60Hz (VA)</th>
<th>PART NUMBER</th>
<th>WT. (LBS)</th>
<th>TRANSFORMER DIMENSIONS (INCHES)</th>
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<td>B</td>
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* Not UL Recognized

#### DIMENSIONS

![Transformer Diagram]

#### SPECIFICATIONS

- Frequency: 50-400Hz
- Insulation Class: 0.6kV BIL, 10kV full-wave
- Lead Wire: UL1015, 105ºC, CSA approved
- Size: 16 AWG, 24’ length
- Termination: No. 8 ring terminal

**Caution:** It is recommended that the incoming power be de-energized before installation. Current Transformer must have its secondary terminals shorted or the burden connected BEFORE ENERGIZING the primary.

**FOR INDOOR USE ONLY.**
SINGLE-PHASE AC CURRENT TRANSUDER MODEL ACT-

DESCRIPTION
The model ACT is a UL-, CUL-, and CE-approved AC current transducer which provides an isolated DC analog output that is directly proportional to the current input. The output is derived from the average absolute value of the input waveform and calibrated in terms of the RMS value of an input sine wave. With the exception of models which provide 4-20mA output, all other models require no external power connections.

FEATURES
- Accurate, reliable current measurement
- Rugged metal construction
- Designed to withstand motor start-up transients
- Average reading calibrated RMS
- Low Cost

APPLICATIONS
- Designed for use in applications which require inexpensive current measurement.
- Designed for use in applications where UL-, CUL-, or CE-approved measurement is required.

ORDERING INFORMATION
Example: 200 Amp AC input with 4-20mA Output and 230Vac instrument power
ACT-200E-22

400Hz models are available - consult factory for the CT5 series, which is not UL-, CUL- or CE-approved.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC AMPS</th>
<th>SENSOR SIZE</th>
<th>STANDARD OUTPUT MODELS ACT-1, CUL &amp; CE</th>
<th>UL &amp; CUL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1</td>
<td>INT</td>
<td>0-1mAdc*</td>
<td>4-20mA&amp;CE</td>
</tr>
<tr>
<td>0 - 5</td>
<td>INT</td>
<td>005A</td>
<td>005E</td>
</tr>
<tr>
<td>0 - 10</td>
<td>INT</td>
<td>020A</td>
<td>020E</td>
</tr>
<tr>
<td>0 - 25 †</td>
<td>W</td>
<td>025A</td>
<td>025E</td>
</tr>
<tr>
<td>0 - 50</td>
<td>W</td>
<td>050A</td>
<td>050E</td>
</tr>
<tr>
<td>0 - 100</td>
<td>W</td>
<td>100A</td>
<td>100E</td>
</tr>
<tr>
<td>0 - 200</td>
<td>W</td>
<td>200A</td>
<td>200E</td>
</tr>
<tr>
<td>0 - 300</td>
<td>W</td>
<td>300A</td>
<td>300E</td>
</tr>
<tr>
<td>0 - 400</td>
<td>X</td>
<td>400A</td>
<td>400E</td>
</tr>
<tr>
<td>0 - 500</td>
<td>X</td>
<td>500A</td>
<td>500E</td>
</tr>
<tr>
<td>0 - 600</td>
<td>X</td>
<td>600A</td>
<td>600E</td>
</tr>
<tr>
<td>0 - 800</td>
<td>X</td>
<td>800A</td>
<td>800E</td>
</tr>
<tr>
<td>0 - 1000</td>
<td>Y</td>
<td>1000A</td>
<td>1000E</td>
</tr>
<tr>
<td>0 - 1500</td>
<td>Y</td>
<td>1500A</td>
<td>1500E</td>
</tr>
</tbody>
</table>

* “A”, “C”, and “CX5” models are self-powered from measured line.
** “E2” models are loop-powered, and require 15-24Vdc instrument power.
† Indicates two turns required through transformer window.

SPECIFICATIONS

INPUT
Frequency Range........................................... 50/60Hz
Burden....................................................... 1.0VA F.S.
Current Overload (continuous)
20A model.................. 1.25 X F.S. rating
all other models ............ 2 X F.S. rating

DIELECTRIC TEST
Input/Output/Case..............................2200Vac

INSTRUMENT POWER
“A”, “C”, “CX5” models...............................Self-powered
“E2” models.........................................15-24Vdc
“E” models...............................115Vac, 50/60Hz, ±15%, 10VA
“-22” option..............................230Vac, 50/60Hz, ±15%, 10VA

OUTPUT
Response..................................................400ms
Loading
“A” models .... (0-1mA output).................... 0-10kΩ
“E” models .... (4-20mA output).................. 0-1kΩ
“E2” models .... (4-20mA output)............... 0-600Ω at 24V
“C” & “CX5” models (5Vdc, 10Vdc output)...... ≥10MΩ
Field Adjustable Cal. ..................................±5%

ACCURACY
Internal sensor ........... ±0.25% F.S. @ 60Hz
External sensor ........... ±0.5% F.S. @ 60Hz
Includes effects of linearity and setpoint
Output Ripple ...................... <1.0% F.S.

TEMPERATURE
Operating Range.......................-20°C to +60°C
Effect............................................. ±1.0% Rdg.

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CURRENT MEASUREMENT (AVG)

CASE DIMENSIONS & CONNECTION DIAGRAMS

MODEL ACT-

“A”, “C”, “CX5” OR “E2” MODELS

INTERNAL SENSOR

EXTERNAL SENSOR

INTERNAL SENSOR

EXTERNAL SENSOR

SENSOR DIMENSIONS

<table>
<thead>
<tr>
<th>SENSOR SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>J</th>
<th>M</th>
<th>WT. LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>4.50</td>
<td>3.7</td>
<td>1.25</td>
<td>1.25</td>
<td>1.94</td>
<td>3.88</td>
<td>0.34</td>
<td>0.27 x 0.44</td>
<td>1.43</td>
</tr>
<tr>
<td>X</td>
<td>6.50</td>
<td>4.7</td>
<td>1.25</td>
<td>2.50</td>
<td>2.46</td>
<td>5.75</td>
<td>0.39</td>
<td>0.28</td>
<td>1.61</td>
</tr>
<tr>
<td>Y</td>
<td>6.50</td>
<td>4.7</td>
<td>1.25</td>
<td>2.50</td>
<td>2.46</td>
<td>5.75</td>
<td>0.39</td>
<td>0.28</td>
<td>1.10</td>
</tr>
</tbody>
</table>

Lead Length..........24 Inches
THREE-PHASE AC CURRENT TRANSDUCER  
MODEL 3ACT-

DESCRIPTION
The model 3ACT is a three-phase UL-, CUL-, and CE-approved ac current transducer which provides three isolated dc outputs which are directly proportional to the three current inputs.
The output is derived from the average absolute value of the input and is calibrated in terms of the RMS value of the input sine wave.
Models with full-scale input ranges of 25A and higher use external sensors (CTs).
With the exception of models which provide 4-20mA outputs, all models are self-powered from the measured line.

FEATURES
• Accurate, reliable current measurement
• Rugged metal construction
• Designed to withstand motor start-up transients
• Average reading calibrated RMS
• Low Cost

APPLICATIONS
• Designed for use in applications which require inexpensive current measurement.
• Designed for use in applications where UL, CUL, or CE compliance is required.

ORDERING INFORMATION
Example: Three 200Aac Inputs with Three 4-20mA Outputs.
3ACT-200E

OSI
OHIO SEMITRONICS, INC.
1000
025
200
500
300
outputs, all -, and C
010
a
1500
l
F
400
e
in -, CU
050
a
y
a
loop-powered, and require 15-24

5 YEAR WARRANTY

<table>
<thead>
<tr>
<th>INPUTS AC AMPS</th>
<th>SENSOR SIZE</th>
<th>STANDARD OUTPUT MODELS 3ACT-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0-1mA dc*</td>
</tr>
<tr>
<td>0 - 1</td>
<td>INT</td>
<td>001A</td>
</tr>
<tr>
<td>0 - 5</td>
<td>INT</td>
<td>005A</td>
</tr>
<tr>
<td>0 - 10</td>
<td>INT</td>
<td>010A</td>
</tr>
<tr>
<td>0 - 20</td>
<td>INT</td>
<td>020A</td>
</tr>
<tr>
<td>0 - 25 †</td>
<td>W</td>
<td>025A</td>
</tr>
<tr>
<td>0 - 50</td>
<td>W</td>
<td>050A</td>
</tr>
<tr>
<td>0 - 100</td>
<td>W</td>
<td>100A</td>
</tr>
<tr>
<td>0 - 200</td>
<td>W</td>
<td>200A</td>
</tr>
<tr>
<td>0 - 300</td>
<td>W</td>
<td>300A</td>
</tr>
<tr>
<td>0 - 400</td>
<td>X</td>
<td>400A</td>
</tr>
<tr>
<td>0 - 500</td>
<td>X</td>
<td>500A</td>
</tr>
<tr>
<td>0 - 600</td>
<td>X</td>
<td>600A</td>
</tr>
<tr>
<td>0 - 800</td>
<td>X</td>
<td>800A</td>
</tr>
<tr>
<td>0 - 1000</td>
<td>Y</td>
<td>1000A</td>
</tr>
<tr>
<td>0 - 1500</td>
<td>Y</td>
<td>1500A</td>
</tr>
</tbody>
</table>

* “A”, “C”, and “CX5” models are self-powered from measured line.
** “E2” models are 4-20mA loop-powered, and require 15-24Vdc.
† Indicates two turns required through transformer window.

Standard “E” models require 115Vac instrument power.
For optional 230Vac instrument power - add suffix “-22”.

For optional “3 outputs summed” - add suffix “Y05”.
(NOTE: Not UL, CUL or CE listed.)

SPECIFICATIONS
INPUT
Frequency Range ..............................................50/60Hz
Burden .........................................................1.0VA F.S. (each input)
Current Overload (continuous)
20A model ...........................................1.25 X F.S. rating
All other models ..........................................2 X F.S. rating

DIELECTRIC TEST
Input/Output/Case ........................................2200Vac

INSTRUMENT POWER
“E” models ................................Standard .......115Vac, 50/60Hz, ±15%, 10VA
“-22” option ...........................................230Vac, 50/60Hz, ±15%, 10VA
“E2” models .............................................15-24Vdc loop powered
All other models ..............................................Self-powered

OUTPUT
Response .......................................................400ms
Loading
“A” models .............................................(0-1mA dc) .....0-10kΩ
“E” models .............................................(4-20mA dc) ..0-1kΩ
“E2” models .............................................(4-20mA dc) ..0-600Ω at 24V
“CX5” models .............................................(0-5Vdc, 0-10Vdc) ..±10MΩ
Field Adjustable Cal. ..........................................±5%

ACCURACY
Internal sensor ..............................................±0.25% F.S. @ 60Hz
External sensor ............................................±0.5% F.S. @ 60Hz
Includes effects of linearity and setpoint
Output Ripple ..............................................<1.0% F.S.

TEMPERATURE
Operating Range ...........................................-20ºC to +60ºC
Effect ..........................................................±1.0% Rdg.

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CURRENT MEASUREMENT (AVG)

CASE DIMENSIONS & CONNECTION DIAGRAMS

MODELS WITH A, C, CX5 OR E2 OPTION

MODELS WITH E OPTION

MODELS WITH A, C & CX5 OPTIONS - INTERNAL SENSOR

MODELS WITH E OPTION - INTERNAL SENSOR

MODELS WITH A, C & CX5 OPTIONS - EXTERNAL SENSOR

MODELS WITH E OPTION - EXTERNAL SENSOR

EXTERNAL SENSOR DIMENSIONS

SENS. SIZE

SENSOR DIMENSIONS (INCHES)

WT. LBS.

W 4.50 3.7 1.25 1.25 1.94 3.88 0.34 0.27 x 0.44 1.43

X 6.50 4.7 1.25 2.50 2.46 5.75 0.39 0.28 1.61

Y 6.50 4.7 1.25 3.00 2.46 5.75 0.39 0.28 1.10
DESCRIPTION
The CTC & CTD units provide a self-powered 5Vdc, 10Vdc, or 1mAdc output, or a loop-powered 4-20mAdc output proportional to window currents, with input ranges up to 2000 Amperes at 50-400Hz. The dc output is proportional to the average absolute value of the input and is calibrated with the sine wave inputs.

FEATURES
- Insensitive to polarity
- Easy to install
- Accurate & reliable 50-400Hz.

APPLICATIONS
- Designed for applications requiring accurate current measurements.

<table>
<thead>
<tr>
<th>INPUT AC AMPS</th>
<th>STANDARD OUTPUT</th>
<th>MODEL CTC-</th>
<th>CASE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>005CX5</td>
<td>005C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 10</td>
<td>010CX5</td>
<td>010C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 15</td>
<td>015CX5</td>
<td>015C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 20</td>
<td>020CX5</td>
<td>020C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 25</td>
<td>025CX5</td>
<td>025C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 30</td>
<td>030CX5</td>
<td>030C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 35</td>
<td>035CX5</td>
<td>035C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 40</td>
<td>040CX5</td>
<td>040C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 50</td>
<td>050CX5</td>
<td>050C</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT AC AMPS</th>
<th>STANDARD OUTPUT</th>
<th>MODEL CTD-</th>
<th>CASE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 50</td>
<td>050CX5</td>
<td>050C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 100</td>
<td>100CX5</td>
<td>100C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 150</td>
<td>150CX5</td>
<td>150C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 200</td>
<td>200CX5</td>
<td>200C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 300</td>
<td>300CX5</td>
<td>300C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 400</td>
<td>400CX5</td>
<td>400C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 500</td>
<td>500CX5</td>
<td>500C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 600</td>
<td>600CX5</td>
<td>600C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 800</td>
<td>800CX5</td>
<td>800C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 1000</td>
<td>1000CX5</td>
<td>1000C</td>
<td>-</td>
</tr>
<tr>
<td>0 - 2000</td>
<td>2000CX5</td>
<td>2000C</td>
<td>-</td>
</tr>
</tbody>
</table>

AC CURRENT TRANSCLUDER MODELS CTC- & CTD-

CTC CASE STYLES
- A Case
- B Case
- C Case
- D Case

CTD CASE STYLES
- C Case

ORDERING INFORMATION
Example: 25 Amps ac Input with 4-20mA loop-powered Output
CTC-025E2

SPECIFICATIONS

INSTRUMENT POWER
- "A", "C", "CX5" models.............Self-Powered
- "E2" models....................24Vdc, ±4Vdc, loop powered

OUTPUT
- Type........................................See Table
- Loading..............................0-10kΩ
- "C", "CX5" models..............>0.25% F.S.
- "E2" models......................<±0.5% F.S.

ACCURACY (linearity, setpoint, repeatability @ 60Hz)
- CTC................................................................5A-50A models ±0.25% F.S.
- All others...............................±0.5% F.S.
- Output Ripple..................All models ±0.5% F.S.

TEMPERATURE
- Operating Range......................-20 to 60ºC
- Effect.................................±1.0% Rdg.

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Page 21
CONNECTIONS & CASE DIMENSIONS  
MODEL CTC- & CTD-

A CASE

B CASE

C CASE

A & C CASE CONNECTIONS

B CASE CONNECTIONS

D CASE DIMENSIONS AND CONNECTIONS

OHIO SEMITRONICS, INC.
SINGLE-PHASE AC CURRENT TRANSDUCER  
MODEL MCT5-

DIN-RAIL-MOUNTED AC CURRENT TRANSDUCER  
0.25% ACCURACY

FEATURES
• Ruggedized Polyamide DIN-mount case.
• Slim profile allows maximum use of available space.
• Field-selectable analog outputs.
• Recessed terminals provide increased safety.

APPLICATIONS
• Ideal for use in enclosures with dimensional constraints.
• Designed for industrial environments.
• OEM measurement systems.
• Designed for use with OSI current transformers.
• Easily integrated into control systems.

INPUT
<table>
<thead>
<tr>
<th>AC AMPS</th>
<th>STANDARD OUTPUTS MODEL MCT5-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mA: 20mA*A</td>
</tr>
<tr>
<td>0-5.0</td>
<td>005A</td>
</tr>
</tbody>
</table>

* Models are self-powered from measured AC input line with DIP-switch-selectable 0-1mA, 0-5Vdc, or 0-10Vdc output.
** Denotes 4-20mA loop-powered unit, requires 15-40Vdc instrument power.
Standard 4-20mA models require 85-135 Vac instrument power.

SPECIFICATIONS

INSTRUMENT POWER
“E” models... (4-20mA)...... 85-135Vac, 50-60Hz, 3VA
“E2” models.. (Loop-Powered 4-20mA)..... 15-40Vdc
“A” models........................................ Self-Powered

ACCURACY
Accuracy ........................................+±0.25% F.S.@ 60Hz
Includes effects of linearity and setpoint.
Output Ripple .......................................<1.0% F.S.

TEMPERATURE
Effect
“A” & “E2” models (-20°C to +65°C).........±1.0%
“E” models.....(-20°C to +40°C).............±1.0%

PHYSICAL
Termination.................wire size 22AWG to 12AWG
Net Weight............................0.4 lb

ORDERING INFORMATION
Example: 0-5A Input with 4-20mA Output.
MCT5-005E

5 YEAR WARRANTY

Measuring Equipment 7N93

WARRANTY

WARRANTY

WARRANTY

http://www.ohiometrics.com

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Page 23
DIMENSIONS AND CONNECTION DIAGRAMS  

MODEL MCT5-

CURRENT MEASUREMENT (AVG)

DIRECT CONNECTION

EXTERNAL CURRENT TRANSFORMERS

"A" MODELS (SELF-POWERED)

LINE

LOAD

OUTPUT

"E2" MODELS (LOOP-POWERED)

LINE

LOAD

OUTPUT

"E" MODELS (4-20mA OUTPUT)

LINE

LOAD

OUTPUT

INST POWER

CASE DIMENSIONS

UNIT CAN BE MOUNTED ON:
STANDARD 35MM TOP-HAT DIN-RAIL
(DIN3) PER EN 50022 OR STANDARD
32MM "G" DIN-RAIL (DIN1) PER EN 50035.

"A" MODEL OUTPUT SELECTION

UNITS ARE SHIPPED WITH 0-1mA SETTING. REMOVE SNAP BUTTON FOR ACCESS TO DIP SWITCHES.

<table>
<thead>
<tr>
<th>OUTPUT REQUIRED</th>
<th>SWITCH 1 POSITION</th>
<th>SWITCH 2 POSITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1mA</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>0-5V</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>0-10V</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

ALL DIMENSIONS IN INCHES.

Dwg# 0902-00572-B Rev B

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Page 24
**DESCRIPTION**

The SCT is a split-core current transformer integrated with a current transducer to provide current measurement ranges up to 500 Aac. Outputs of 0-1 mA dc, 0-5 Vdc, or loop-powered 4-20 mA dc are available.

The output is proportional to the average absolute value of the input and is calibrated to represent the RMS value of a sine wave.

**FEATURES**

- Insensitive to polarity
- Split-core design for easy installation
- Accurate and reliable from 50-400 Hz.

**APPLICATIONS**

- Designed for applications requiring accurate current measurements.

**INPUT**

Current .................................................... See Table
Frequency Range ................................... 50 to 400 Hz
Burden .............................................. 0.5 VA max.
Current overload ............................. 5 X rating for 10 s/hr

**DIELECTRIC TEST**

Input/Output/Case ........................................ 1800 Vac

**INSTRUMENT POWER**

“A” & “CX5” models ...................................... Self-powered
“E2” models ................................................ 15-40 Vdc

**ORDERING INFORMATION**

Example: 100 Amp AC Input with 4-20 mA Loop-Powered Output.
SCT-100E2

* models are self-powered from measured line.
** 4-20 mA loop-powered models require 15-40 Vdc supply.

**SPECIFICATIONS**

**INPUT AC AMPS**

<table>
<thead>
<tr>
<th>STANDARD OUTPUTS MODEL</th>
<th>SCT-0-1mA dc</th>
<th>4-20 mA dc **</th>
<th>0-5 Vdc **</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50</td>
<td>050A</td>
<td>050E2</td>
<td>050CX5</td>
</tr>
<tr>
<td>0-100</td>
<td>100A</td>
<td>100E2</td>
<td>100CX5</td>
</tr>
<tr>
<td>0-200</td>
<td>200A</td>
<td>200E2</td>
<td>200CX5</td>
</tr>
<tr>
<td>0-300</td>
<td>300A</td>
<td>300E2</td>
<td>300CX5</td>
</tr>
<tr>
<td>0-400</td>
<td>400A</td>
<td>400E2</td>
<td>400CX5</td>
</tr>
<tr>
<td>0-500</td>
<td>500A</td>
<td>500E2</td>
<td>500CX5</td>
</tr>
</tbody>
</table>

**OUTPUT**

Response ...................(to 90%) ..................<300 ms
Loading
  “A” models ......... 0-1 mA models ............. 0-10 kΩ
  “CX5” models ... 0-5 Vdc models ............. >100 kΩ
  “E2” models ...... 4-20 mA models ............. 0-500 kΩ

**ACCURACY**

25°C, 60 Hz .......................... ± 0.5% F.S.
All conditions .......................... ± 0.7% F.S.
Output Ripple .......................... < 0.5% F.S.

**TEMPERATURE & PHYSICAL**

Temperature Range .......................... -20°C to 60°C
Net Weight ........................................ 1.0 lb

**CASE DIMENSIONS**

Dimensions in inches [mm]

**CONNECTION DIAGRAMS**

- 0-1 mA AND 0-5 Vdc MODELS
- 4-20 mA LOOP POWERED MODEL
**Current Measurement (AVG)**

2011/65/EU ● RoHS C  O MPLIA

**SINGLE-PHASE AC CURRENT TRANSUDER**  **MODEL DCT-**

**DIN-RAIL-MOUNTED AC CURRENT TRANSUDER**

**FEATURES**

- Accurate, reliable measurement.
- Both 1 and 5A ranges are available.
- Compact DIN Rail packaging.

**APPLICATIONS**

- Designed for use in OEM applications which require inexpensive current measurement.
- Designed for installations that require both CE and CSA approvals.
- Perfect for applications that require DIN-Rail mounting.

Transducer output is derived from the arithmetic mean value of the input and calibrated in terms of the RMS value of the sine wave input.

**MODEL SELECTION**

<table>
<thead>
<tr>
<th>INPUT AC AMPS</th>
<th>STANDARD OUTPUTS MODEL DCT-</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1mAdc*</td>
<td>001A 01E 01E2 001C 001CX5</td>
</tr>
<tr>
<td>0-5</td>
<td>005A 05E 05E2 005C 005CX5</td>
</tr>
</tbody>
</table>

*A models are self-powered from measured line.

**SPECIFICATIONS**

**INPUT**

- Current: 0-1A or 0-5A
- Frequency Range: 50/60Hz
- Burden: <1.5VA F.S.
- Continuous Overload: 120% of F.S. Input
- Transient: 20 X F.S. Rating

**OUTPUT**

- Output Loading
  - "A" models: (0-1mA output) 0-15kΩ
  - "C", "CX5" models: (5V & 10V) 2.5kΩ Min.
  - "E" models: (4-20mA) 0-750Ω
  - "E2" models: (loop powered) 0-600Ω@24V
- Response Time: 300ms

**DI ELECTRIC TEST**

- Input to Instrument Power/Output/Case: 3700Vac
- Instrument Power to Output/Case: 3700Vac
- Output to Case: 490Vac

**INSTRUMENT POWER**

- "A" models: none required
- "E", "C", "CX5" models: 100-135Vac, 50/60Hz, 3.0VA
- "E2" models: 12-32Vdc, loop-powered
- "-22" Option: 230Vac, 50/60Hz, ±15%

**ACCU RACY**

- Accurac y: ±0.5% F.S. @ 60Hz
- Includes effects of linearity and setpoint.
- Output Ripple: < 1.0% p.p.

**TEMPERATURE & PHYSICAL**

- Operating Range: -10ºC to 55ºC
- Termination: wire size up to 10AWG
- Net Weight: 0.65 lb

**FEATURES**

- Accurate, reliable measurement.
- Both 1 and 5A ranges are available.
- Compact DIN Rail packaging.

**APPLICATIONS**

- Designed for use in OEM applications which require inexpensive current measurement.
- Designed for installations that require both CE and CSA approvals.
- Perfect for applications that require DIN-Rail mounting.

**ORDERING INFORMATION**

Example: 5Ac Input with 4-20mA Output.

**DCT - 005E**

<table>
<thead>
<tr>
<th>MODELS</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>100-135Vac instr. power. For optional 220Vac instrument power - Add suffix &quot;-22&quot;.</td>
</tr>
<tr>
<td>C &amp; CX5</td>
<td>Instrument Power: 12-32Vdc, loop-powered</td>
</tr>
<tr>
<td>CX5</td>
<td>230Vac, 50/60Hz, ±15%</td>
</tr>
</tbody>
</table>

**CASE DIMENSIONS AND CONNECTIONS**
PROGRAMMABLE SETPOINT RELAY
MODEL CRD-005

FEATURES

- Programmable settings for either current or voltage input, threshold levels, and over- or under-relay alarms.
- Internal DIP-switches may be set for either 0-1mA or 0-10Vdc, and may be set for under-alarm or over-alarm relay operation.
- Factory setting “0-1mA and over-range alarm mode”
- Lid-mounted two-digit numerical push-button switch calibrated as percent of full scale with a threshold range of 1-99%.
- Red LED lamp lights to indicate when threshold level has been obtained.

INPUT RANGES

<table>
<thead>
<tr>
<th>Internal Switch Positions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNDER RANGE</strong>*</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>0-1mA dc</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>0-10V dc</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

**OVER RANGE***

<table>
<thead>
<tr>
<th>Internal Switch Positions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNDER RANGE</strong>*</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>0-1mA dc</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>0-10V dc</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

Highlighted area indicates Factory Setting. Unit is set at factory for the 0-1mA input and in the over-range alarm mode.

*The output relay will energize when instrument power is applied and the current is above the set point threshold. It will remain in a “Fail Safe” mode until either the input current drops below the set point threshold or instrument power is removed.

OUTPUT TERMINAL CONNECTIONS & LED OPERATION

<table>
<thead>
<tr>
<th>Mode of Operation</th>
<th>Under Range***</th>
<th>Over Range***</th>
</tr>
</thead>
<tbody>
<tr>
<td>INST. POWER</td>
<td>N/C Com N/O Off</td>
<td>N/C Com N/O Off</td>
</tr>
<tr>
<td>INST. PWR. ON</td>
<td>N/C Com N/O Off</td>
<td>N/O Com N/C OFF</td>
</tr>
<tr>
<td>INST. PWR. ON</td>
<td>N/O Com N/C OFF</td>
<td>N/C Com N/O ON</td>
</tr>
</tbody>
</table>

** The output relay will energize when instrument power is applied and will remain in a “Fail Safe” mode until either the instrument power is removed or the input exceeds the set point threshold level.

CONNECTION DIAGRAM

CASE DIMENSIONS

All dimensions in inches

DIA 0.38 (2 PLCS)
DIA 0.19 (4 PLCS)

PROGRAMMABLE AS A PERCENT OF RANGE

INPUT

- Current ........................................1mA dc
- Current Burden ................................1kΩ
- Voltage ..................................0-10Vdc
- Voltage Burden .........................10kΩ
- Set Point (Digital) .....................1-99%, 1% minimum

DIELECTRIC TEST

Input to Output and Case ...............1500Vac

INSTRUMENT POWER .................85-135Vac, 50-400Hz, 2.5VA

OUTPUT

- Relay ........................................Form C, SPDT
- Rating ..................................120Vac, 3A
- Response Time .........................10ms

ACCURACY

- Accuracy ................................Setpoint ±2 digits
- Resolution ................................±1 Digit
- Hysteresis ................................±1 Digit
- Temperature Effect (-10°C to +60°C) ......±0.1%/°C

MECHANICAL

- Mechanical Operations .................1 Million

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Page 27
PROGRAMMABLE SETPOINT RELAY

MODEL CRD-020

RANGES UP TO 20Aac CURRENT INPUT

FEATURES

• Programmable set-point relay setting for input current, threshold levels, over- and under-current operation.
• Internal DIP-switches may be set for current ranges of either 0-5, 0-10, 0-15, or 0-20 Amperes, and the relay mode for under- or over-current operation.
• Lid-mounted two-digit numerical push-button switch calibrated as percent of full scale with a threshold range of 1-99%.

• Red LED lamp lights to indicate when the threshold level has been obtained.

** The output relay will energize when instrument power is applied and will remain in a “Fail Safe” mode until either the input current drops below the set point threshold or instrument power is removed.

** The output relay will energize when instrument power is applied and the current is above the set point threshold. It will remain in a “Fail Safe” mode until either the input current drops below the set point threshold or instrument power is removed.

INPUT RANGES (AMPS)   INTERNAL SWITCH POSITIONS

1 2 3 4 5 6 7 8

UNDER CURRENT*  

<table>
<thead>
<tr>
<th>INPUT RANGE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ON</td>
</tr>
<tr>
<td>10</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

OVER CURRENT**

<table>
<thead>
<tr>
<th>INPUT RANGE</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ON</td>
</tr>
<tr>
<td>10</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

Highlighted area indicates Factory Setting. Unit is shipped from the factory with a 0-5 Amp input and in an over-current relay mode. The set point relay can be set to provide any one of the four current ranges and modes of operation.

* The output relay will energize when instrument power is applied and the current is above the set point threshold. It will remain in a “Fail Safe” mode until either the input current drops below the set point threshold or instrument power is removed.

SPECIFICATIONS

INPUT

Current Ranges........................................ (Selectable)
Operation........................................ 5A Range........ 80mA to 5A
                                             10A Range....... 160mA to 10A
                                             15A Range....... 200mA to 15A
                                             20A Range....... 220mA to 20A

Burden (Any Range).................................. 0.5VA, max.
Over-current (Any Range)
Continuous ........................................... 25Aac
Transient ........................................... 50Aac (10s/Hr)
Transient ........................................... 250Aac (1s/Hr)

Frequency............................................ 50-425Hz, 60Hz Nom.

DIELECTRIC TEST

Input/Output/Instrument Power/Case.................. 1500Vac

INSTRUMENT POWER .................. 85-135Vac, 50-400Hz, 2.5VA

OUTPUT

Relay....................................................... Form C, SPDT
Rating..................................................... 120Vac, 3A
Mechanical Operations..................................... 1 Million
Response Time to 90%........ 5A Range........ 200ms
                                           10A Range..... 250ms
                                           15A Range..... 350ms
                                           20A Range..... 550ms

ACCURACY

Setpoint.............................................. ±2 digits
Resolution.............................................. ±1 digit
Hysteresis............................................ ±1 digit

TEMPERATURE

Effect (-10°C to +60°C).............................. ±0.1%/°C, ±0.1% F.S.

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Page 28
CURRENT PRESENT DETECTOR
MODEL CPD-4715

DESCRIPTION
The model CPD-4715 is a current present detector (current switch) with a solid-state relay output that indicates a measured current level of 0.5Aac or greater.

To operate, simply pass the current conductor through the window of the unit and activate the monitored circuit - no instrument power or additional setup is required.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>INPUT</th>
<th>Trip Point (non-adjustable)</th>
<th>≤0.5Aac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over-range</td>
<td>Continuous</td>
<td>100Aac</td>
</tr>
<tr>
<td>Frequency</td>
<td>Calibrated</td>
<td>60Hz</td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td>50-400Hz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTPUT</th>
<th>Form A, Normally Open, 30Vac/40Vdc, 0.5Aac/dc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay Rate</td>
<td>Contact current = 0.075A, Contact voltage drop = typical 1.5V, maximum 3.0V</td>
</tr>
<tr>
<td>Trip Point</td>
<td>Form (non-adjustable) ≤0.5Aac</td>
</tr>
<tr>
<td>Relay Action</td>
<td>Current under trip point = Open, Current above trip point = Closed</td>
</tr>
<tr>
<td>Turn-On Time</td>
<td>at 100% of trip point approx. 100ms</td>
</tr>
<tr>
<td>Turn-Off Time</td>
<td>approx. 300ms</td>
</tr>
</tbody>
</table>

| DIELECTRIC TEST | 2250Vac |
| TEMPERATURE | Operating Range | -25°C to +60°C |

| PHYSICAL | LCP, UL94V-0, Black |
| Enclosure Material | |
| Weight | 0.15lb. |
| Leads | 36in., 18AWG |
| Termination | 0.25in. male and female quick-disconnects, Molex 19001-0002 and 19002-0002 or equivalent. |

CASE DIMENSIONS (inches)

For installation on up to 600Vac lines.
AC CURRENT SWITCH

MODEL DSO-102

DESCRIPTION
The Model DSO-102 monitors load currents of devices such as fans, pumps and other critical items in HVAC systems. The solid state relay output provides a run status indication for these devices to compatible DDC/PLC control systems. The relay output of this model is completely isolated from the input current.

Units with the VF option are suitable for use in Variable Frequency Drive (VFD) systems with a frequency range of 12 to 60Hz (order Model DSO-102-VF).

Note: DSO-102 was previously DSO-102-N.O.

SPECIFICATIONS

INPUT
Current Range (Jumper-selectable)...1-6A, 6-40A, 40-200A
Frequency
Standard..............................................................................60Hz
With VF option........................................................................12-60Hz

OUTPUT
Solid State Relay ..........Form A, Normally Open, 30Vdc, 0.150Adc maximum
Response Time
Standard..............................................................................25ms
With VF option........................................................................2s
Threshold Setting............................................................Adjustable
Relay Action...............Load current Under threshold = Open
Load current Over threshold = Closed

INSTRUMENT POWER
All models ..............................................................................Self Powered

TEMPERATURE
Operating Range................................................................10º-135ºF

PHYSICAL
Enclosure.........................ABS, Cycolac®, UL94V-0, Black
Net Weight ...............................................................0.25lb

CONNECTIONS
Input.......................Current-carrying cable is inserted through circular window opening.
Maximum cable size #3/0 (dia. <0.62")

Output...............Wire-retaining screw terminals No. 6/32
Maximum wire size #14 AWG

DIMENSIONS

0.18" DIA (TYP 2 PLCS)

0.62" DIA

0.91

2.20

3.20

2.56

3.00

3.00

ALL DIMENSIONS IN INCHES

OHIO SEMITRONICS, INC.

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DESCRIPTION
The CTCR series of transducers provides a non-contact, loop-powered, method of current measurement. The dc output is directly proportional to the true RMS value of ac window current. Measurement ranges of 1A to 100A are available.

FEATURES
• ±0.25% accuracy (±0.5% on 1A model)
• True RMS measurement
• Non-contact
• Loop-powered
• Ease of Installation

SPECIFICATIONS

INPUT
Current Range.................................................. See Table
Over-range w/o damage .. Continuous ........... 1.3X Rating
Frequency Range ............................................. 50-400Hz

OUTPUT
Type ............... 2-Wire ............... 4-20mAdc, loop-powered
Scaling ............... 0-F.S. Input = 4-20mAdc Output
Loading ...... 24Vdc loop power..................... 0-500Ω
15Vdc loop power..................... 0-400Ω
Response ...... to 90% .................... 250ms, Typical
Ripple ............................................. ≤1.0% F.S. pk-pk

DIELECTRIC TEST
Conductor Through Window to Output......... 2200Vac

INSTRUMENT POWER
Loop-Powered..... Nominal......................... 24Vdc
Range..................... 15-35Vdc

ACCURACY (setpoint, linearity, repeatability)
1A model
50/60Hz.......... 10-100% F.S....................... ±0.5% F.S.
all other ........................................ ±2% F.S., Typical
5A-100A models
50/60Hz.......... 10-100% F.S....................... ±0.25% F.S.
all other ........................................ ±1% F.S., Typical

TEMPERATURE
Operating Range............... -20°C to 60°C
Effect ............................... ±1.0% F.S.

PHYSICAL
Termination............... No. 6-32 Screw Terminals
Enclosure ....................... ABS, Black, UL94V-0
Weight ............................................. 0.2 lb

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT Aac</th>
<th>STANDARD OUTPUTS MODEL CTCR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>001E2</td>
</tr>
<tr>
<td>0-5</td>
<td>005E2</td>
</tr>
<tr>
<td>0-10</td>
<td>010E2</td>
</tr>
<tr>
<td>0-15</td>
<td>015E2</td>
</tr>
<tr>
<td>0-20</td>
<td>020E2</td>
</tr>
<tr>
<td>0-25</td>
<td>025E2</td>
</tr>
<tr>
<td>0-30</td>
<td>030E2</td>
</tr>
<tr>
<td>0-35</td>
<td>035E2</td>
</tr>
<tr>
<td>0-40</td>
<td>040E2</td>
</tr>
<tr>
<td>0-50</td>
<td>050E2</td>
</tr>
<tr>
<td>0-100</td>
<td>100E2</td>
</tr>
</tbody>
</table>

CONNECTION DIAGRAM

CASE DIMENSIONS

All dimensions in inches. (Tolerance: ±0.03in.)
SINGLE-PHASE AC RMS CURRENT TRANSDUCER

**MODEL ACTR-**

**FEATURES**
- Accurate measurement of the true RMS value of input signals over a wide frequency range.
- Input/output isolation.

**APPLICATIONS**
- For use in applications where measurement of non-sinusoidal waveforms is required.
- Designed to withstand motor start-up transients.

**INPUT Amps AC**

<table>
<thead>
<tr>
<th>Input</th>
<th>Standard Outputs</th>
<th>Model ACTR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1m</td>
<td>001B</td>
<td>001E</td>
</tr>
<tr>
<td>0-5m</td>
<td>005B</td>
<td>005E</td>
</tr>
<tr>
<td>0-10m</td>
<td>010B</td>
<td>010E</td>
</tr>
<tr>
<td>0-15m</td>
<td>015B</td>
<td>015E</td>
</tr>
<tr>
<td>0-20m</td>
<td>020B</td>
<td>020E</td>
</tr>
</tbody>
</table>

All standard units require 115Vac instrument power.
Optional 230Vac instrument power - Add suffix “-22”.

**SPECIFICATIONS**

**INPUT**
- Current: See Table
- Frequency Range: 48-420Hz
- Burden: 0.28VA F.S.
- Overload: 2X Rating (continuous) for 10 X Rating one-second transient 10s/hr

**DIELECTRIC TEST**
- Input/Output/Case: 2200Vac

**INSTRUMENT POWER**
- Standard: 115V, ±15%, 50/60Hz, 3.5VA
- “-22” Option: 230V, ±15%, 50/60Hz, 3.5VA

**OUTPUT**
- Type: See Table
- Loading: B models, 0-10kΩ
- D & X5 models, 2kΩ, min.
- E models, 0-500Ω
- Response Time: 100ms
- Field-adjustable Calibration: ±10%

**ACCURACY** (Includes Effects of Linearity and Set Point)
- At 60Hz: ±0.25% F.S.
- (±0.5% typical over frequency range)
- Output Ripple: <1.0% F.S.

**TEMPERATURE & PHYSICAL**
- Operating Range: -20 to 60°C
- Effect: ±1.0% Rdg.
- Net Weight: 1.5 Lbs.

**ORDERING INFORMATION**
- Example: 15Ac Input with 0-10Vdc Output. ACTR-015D

**CONNECTION DIAGRAM**

**OHIO SEMITRONICS, INC.**

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THREE-PHASE AC RMS CURRENT TRANSDUCER MODEL 3CTR-

3-IN-1 AC RMS CURRENT TRANSDUCER 0.25% ACCURACY

FEATURES
- Accurate measurement of the true RMS value of input current over a wide frequency range.
- Input/output dielectric test 2500V.
- 0.25% ACCURACY

APPLICATIONS
- For use in applications where measurement of non-sinusoidal waveforms is required.
- Designed for use on three-phase systems, but may also be used to monitor three single-phase circuits where panel space is a premium.
- Designed to withstand motor start-up transients.

<table>
<thead>
<tr>
<th>INPUT CURRENT</th>
<th>STANDARD OUTPUTS MODEL 3CTR-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mAdc</td>
</tr>
<tr>
<td>0-1</td>
<td>001B</td>
</tr>
<tr>
<td>0-5</td>
<td>005B</td>
</tr>
<tr>
<td>0-10</td>
<td>010B</td>
</tr>
<tr>
<td>0-15</td>
<td>015B</td>
</tr>
<tr>
<td>0-20</td>
<td>020B</td>
</tr>
</tbody>
</table>

5 YEAR WARRANTY

All units have universal power supply 85-265Vac, 48-420Hz, or 110-370Vdc.

ORDERING INFORMATION
Example: 15 Amp AC Input with 0-10Vdc Output.
3CTR-015D

SPECIFICATIONS

INPUT
Current ........................................See Table
Frequency Range ...................................48-420Hz
Burden .............................................0.40VA @ F.S.
Overload
1-10A Range .....................................2 X F.S. (cont.)
15 & 20A Range ...............................1.25 X F.S. rating (cont.)
1A Range ........................................10A (10s transient)
All other ranges ...............................50A (10s transient)
250A (1s transient)

DIELECTRIC TEST
Input/Output/Case ..................................2500Vac, RMS

INSTRUMENT POWER
Standard ..................................85-265Vac, 48-420Hz, 5VA
or 110-370Vdc, 5VA

DEAD BATTERY TEST
Input with 2kΩ min. for 20s or 110-370Vac, 5VA

RESPONSE TIME (TO 90%) ...............100ms

LOADING
“B” models ..............................0-10kΩ
“D”, “X5” models ................................2kΩ min.
“E” models ............................0-500Ω
Field Adjustable Cal. ........................±10%

ACCUACY
Linearity & Setpoint .........................±0.25% F.S. @ 60Hz
(±0.5% typical over frequency range.)
Output Ripple ..................................<1.0% F.S.

TEMPERATURE & PHYSICAL
Temperature Effect ......(-20ºC to 60ºC) .......±1.0% Rdg.
Net Weight ..................................2.5 Lbs.

CASE DIMENSIONS

All dimensions in inches

OHIO SEMITRONICS, INC.

Dw# 0902-00471-B Rev D
4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
PHONE: (614) 777-1005 * FAX: (614) 777-4511
WWW.OHIOSEMITRONICS.COM * 1-800-537-6732
FEATURES
- Accurate measurement of the true RMS value of input signals.
- Split-core current sensors for easy installation.
- Current transformers contain open-circuit protection.
- Signal conditioners and current sensors are calibrated as sets and provide a choice of analog outputs. (0-5Vdc, 0-10Vdc, 0-1mAdc or 4-20mAcdc)
- Current measurement ranges up to 40kAac.
- **Flexible Rogowski coils (air-core CTs)** are used for current measurement ranges of 1kAac and larger.
- Rogowski coil models use CE-compliant sensors.

### APPLICATIONS
- For use in existing applications requiring installation with split-core sensors.
- Designed to withstand motor start-up currents.
- Easy installation in tight areas.

### SPECIFICATIONS

#### INPUT
- Current Range ........................................... See Table
- Over range ........................................... 0-15% (w/o damage) ....... 2 X F.S. (cont.)
- Frequency Range ............................. Non-"R" models ....... 50-60Hz
- "R" models ............................... (see Accuracy)
- **DIELECTRIC TEST**
  - Input/Output/Case/Instrument Power .................... 1500Vac
- **INSTRUMENT POWER**
  - Standard ............................... 115Vac, ±15%, 50/60Hz, 3.5VA
  - Option "-22" ........................... 230Vac, ±15%, 50/60Hz, 3.5VA
- **OUTPUT**
  - Response Time (to 90%) ......... Non-"R" models ........ 100ms
  - "R" models ............................. 300ms
- **Loading**
  - "B" models ............................... 0-1mAac ...................... 0-10kΩ
  - "D", "X5" models .......................... 0-10Vdc, 0-5Vdc ............. 2kΩ min.
  - "E" models ............................... 4-20mAadc .................... 0-500Ω
  - Field-adjustable Calibration Range ........ ±10%, approx.
- **ACCURACY** (linearity and set point)
  - Current Transformer (Non-"R") Models
    - 5A to 10A models ....................... ±0.5% F.S. @ 60Hz
    - 15A to 1000A models .................. ±0.25% F.S. @ 60Hz
  - Rogowski Coil ("R") Models
    - With conductor centered in window ... ±1.0% F.S. @ 60Hz
    - Linearity .................................. ±0.25% F.S.
    - Set point variation with frequency
      - 10Hz to 20Hz ............................. ±2.0% F.S.
      - 20Hz to 2kHz .......................... ±1.0% F.S.
      - 2kHz to 5kHz .......................... ±3.0% F.S.
      - 5kHz to 7kHz .......................... ±7.0% F.S.
      - 7kHz to 20kHz .......................... ±30.0% F.S.
    - Position Sensitivity .................... ±2.0% F.S.
    - Output Ripple (all models) ................ <1.0% F.S.
- **PHYSICAL & ENVIRONMENTAL**
  - Temperature Effect (-20°C to 60°C) ........ ±1.0% Rdg., ±0.1% F.S.
  - Weight (not including sensor) ..................... 1.5 lbs

### MODEL SELECTION

#### SPLIT-CORE

<table>
<thead>
<tr>
<th>SENSOR</th>
<th>INPUTS AC AMPS</th>
<th>STANDARD MODELS CTRS-</th>
<th>0-1mAac</th>
<th>4-20mAac</th>
<th>0-10Vdc</th>
<th>0-5Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 5</td>
<td>005B</td>
<td>005E</td>
<td>005D</td>
<td>005X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 10</td>
<td>010B</td>
<td>010E</td>
<td>010D</td>
<td>010X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 15</td>
<td>015B</td>
<td>015E</td>
<td>015D</td>
<td>015X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 20</td>
<td>020B</td>
<td>020E</td>
<td>020D</td>
<td>020X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 25</td>
<td>025B</td>
<td>025E</td>
<td>025D</td>
<td>025X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 50</td>
<td>050B</td>
<td>050E</td>
<td>050D</td>
<td>050X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 100</td>
<td>101B</td>
<td>101E</td>
<td>101D</td>
<td>101X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 200</td>
<td>201B</td>
<td>201E</td>
<td>201D</td>
<td>201X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 300</td>
<td>301B</td>
<td>301E</td>
<td>301D</td>
<td>301X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 400</td>
<td>401B</td>
<td>401E</td>
<td>401D</td>
<td>401X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 500</td>
<td>501B</td>
<td>501E</td>
<td>501D</td>
<td>501X5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 1000</td>
<td>102B</td>
<td>102E</td>
<td>102D</td>
<td>102X5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5A to 1000A models use current transformers. 1kA to 40kA models use Rogowski coils.

### AVAILABLE OPTIONS (add in order shown):

230Vac instrument Power - Add suffix "-22"

Rogowski coil size:

<table>
<thead>
<tr>
<th>COIL INSIDE DIAMETER</th>
<th>COIL LENGTH (inch)</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5in. (16.5cm)</td>
<td>23.6in. (60cm)</td>
<td>(standard)</td>
</tr>
<tr>
<td>10.5in. (26.7cm)</td>
<td>35.4in. (90cm)</td>
<td>Add suffix &quot;-1&quot;</td>
</tr>
<tr>
<td>14.0in. (35.4cm)</td>
<td>47.2in. (120cm)</td>
<td>Add suffix &quot;-2&quot;</td>
</tr>
<tr>
<td>21.5in. (54.6cm)</td>
<td>70.9in. (180cm)</td>
<td>Add suffix &quot;-3&quot;</td>
</tr>
</tbody>
</table>

Additional current ranges, sensor sizes and RoHS-compliant models are available - Consult factory.

### ORDERING INFORMATION

Example: 10kAac Input with 0-10Vdc Output, 230Vac instrument power & 10.5-inch diameter Rogowski coil

**CTRS-103RD-22-1**

OHIO SEMITRONICS, INC. 4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264 PHONE: (614) 777-1005 * FAX: (614) 777-4511 WWW.OHIOSEMITRONICS.COM * 1-800-537-6732
CONNECTIONS & CASE DIMENSIONS

**CASE DIMENSIONS**

**CONNECTION DIAGRAM**

**SENSOR DIMENSIONS**

---

**5A to 1000A**

TO SEPARATE, OPEN VELCRO STRAP AND PULL APART.

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>SENSOR SIZE</th>
<th>DIMENSIONS (in inches)</th>
<th>WT. LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC AMPS</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>5 - 100</td>
<td>2.80</td>
<td>2.00</td>
<td>1.12</td>
</tr>
<tr>
<td>200 - 500</td>
<td>3.85</td>
<td>3.80</td>
<td>1.30</td>
</tr>
<tr>
<td>1000</td>
<td>5.50</td>
<td>4.90</td>
<td>1.60</td>
</tr>
</tbody>
</table>

Lead Length............... 72",16 gauge, White (X1) & Black

(Refer to **CTY spec sheet** for additional details.)

---

**1kA to 40kA**

TO SEPARATE COIL, TWIST AND PULL APART

<table>
<thead>
<tr>
<th>COIL INSIDE DIAMETER</th>
<th>COIL LENGTH</th>
<th>MODEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.5in. (16.5cm)</td>
<td>23.6in. (60cm)</td>
<td>(standard)</td>
</tr>
<tr>
<td>10.5in. (26.7cm)</td>
<td>35.4in. (90cm)</td>
<td>Add suffix &quot;-1&quot;</td>
</tr>
<tr>
<td>14.0in. (35.6cm)</td>
<td>47.2in. (120cm)</td>
<td>Add suffix &quot;-2&quot;</td>
</tr>
<tr>
<td>21.5in. (54.6cm)</td>
<td>70.9in. (180cm)</td>
<td>Add suffix &quot;-3&quot;</td>
</tr>
</tbody>
</table>

Lead Length..................approx. 6.6ft (2m) standard
Coil Diameter..............0.33 in. ±0.008 in. (8.4 ±0.2mm)

(Refer to **MFC150 spec sheet** for additional details.)

---

Consult factory for special current ranges, sensor sizes and RoHS-compliant models.
2-WIRE LOOP POWERED, TRUE RMS

FEATURES
- Accurate measurement of the true RMS value of input signals
- UL94V-0 Polyamide DIN-mount case
- Split-core CT option for easy installation
- Base unit and current sensor are calibrated as a set to provide a 4-20mA analog output.
- Current measurement ranges up to 1000A
- Slim profile allows maximum use of available space.
- Recessed terminals provide increased safety.
- Designed to withstand motor start-up currents

APPLICATIONS
- Use direct-input models with any CT with 0.1A, 1A, 5A or 0.333V secondary.
- Ideal for non-sinusoidal applications, such as VFDs and SCR-controlled loads.
- Retro-fit of existing applications requiring installation with split-core sensors (order with suffix "S")

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUTS AC AMPS</th>
<th>STANDARD OUTPUT MODEL MCTR-</th>
<th>SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-20mA dc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to 0.333V</td>
<td>0.333E2 (direct input)</td>
<td></td>
</tr>
<tr>
<td>0 to 0.1</td>
<td>0.100E2 (direct input)</td>
<td></td>
</tr>
<tr>
<td>0 to 1</td>
<td>001E2 (direct input)</td>
<td></td>
</tr>
<tr>
<td>0 to 5</td>
<td>005E2 (direct input)</td>
<td></td>
</tr>
<tr>
<td>0 to 10</td>
<td>010E2S 1</td>
<td></td>
</tr>
<tr>
<td>0 to 15</td>
<td>015E2S 1</td>
<td></td>
</tr>
<tr>
<td>0 to 20</td>
<td>020E2S 1</td>
<td></td>
</tr>
<tr>
<td>0 to 25</td>
<td>025E2S 1</td>
<td></td>
</tr>
<tr>
<td>0 to 50</td>
<td>050E2S 1</td>
<td></td>
</tr>
<tr>
<td>0 to 100</td>
<td>101E2S 1</td>
<td></td>
</tr>
<tr>
<td>0 to 200</td>
<td>201E2S 2</td>
<td></td>
</tr>
<tr>
<td>0 to 300</td>
<td>301E2S 2</td>
<td></td>
</tr>
<tr>
<td>0 to 400</td>
<td>401E2S 2</td>
<td></td>
</tr>
<tr>
<td>0 to 500</td>
<td>501E2S 2</td>
<td></td>
</tr>
<tr>
<td>0 to 1000</td>
<td>202E2S 3</td>
<td></td>
</tr>
</tbody>
</table>

*Note: The 0.333V model requires isolation through a separately-supplied external CT.

ORDERING INFORMATION
Example: 0-50A input, with an external, split-core sensor and 4-20mA loop-powered output.

MCTR-050E2S

SPECIFICATIONS

INPUT
- Type: See Table
- Over-range (without damage): Continuous 1.5 X F.S. Rating
- Frequency Range: 50-60Hz
- Burden: 0.1A & 1A models: 0.05VA, 5A models: 0.18VA, 0.333V models: 0.004VA

OUTPUT
- Scaling: 0-F.S. Input = 4-20mA dc Output
- Response: (to 90%) 300ms
- Loading: (@ 24Vdc loop-power) 0-500Ω
- Setpoint Adjustment: ±5%, minimum

DIELECTRIC TEST
- Input/Output: 2200Vac
- *NOTE: 0.333V model requires isolation through external CT.

INSTRUMENT POWER
- Loop-Powered: Nominal 24Vdc Range: 15-35Vdc

ACCURACY (Includes effects of linearity and setpoint)
- Direct input models: 10-100% F.S. ±0.25% F.S.
- “S” suffix (5-20A Input): 10-100% F.S. ±1.0% F.S.
- “S” suffix (25-1000A input): 10-100% F.S. ±0.5% F.S.
- Output Ripple: <1.0% pk-pk

TEMPERATURE
- Operating Range: -20°C to 60°C
- Effect: ±1.0% F.S.

PHYSICAL (Base unit)
- Net Weight: 0.4 lb
- Unit can be mounted on: RAIL EN50035 (DIN 1) or RAIL EN50022 (DIN 2)

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4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
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Page 36
**RMS CURRENT TRANSDUCER**

**MODEL MCTR-**

**CONNECTION DIAGRAMS**

**DIRECT CURRENT INPUT**

```
1 2 3 4
OUTPUT R_L 15-35Vdc
+ LINE LOAD
- + +
```

**VOLTAGE INPUT**

```
1 2 3 4
OUTPUT R_L 15-35Vdc
0-0.333Vac
+ INPUT
- + +
```

**BASE UNIT (All Models)**

```
1 2 3
OUTPUT ZERO
+ SPAN
- MODEL
```

**USING EXTERNAL CTs - “S” OPTION**

```
1 2 3 4
OUTPUT R_L 15-35Vdc
+ LINE LOAD
- + +
```

**DIMENSIONS**

**BASE UNIT (All Models)**

- Width: 3.10 in
- Height: 3.56 in
- Depth: 3.37 in

**CURRENT SENSORS - “S” OPTION**

- **INPUT SENSOR SIZE**: 5 to 100A - 1; 200 to 500A - 2; 1000A - 3
- **SENSOR DIMENSIONS** (in inches, Tolerance ±0.03 in.)
  - **A**
  - **B**
  - **C**
  - **D**
  - **E**
  - **G**
  - **J**
  - **M**

<table>
<thead>
<tr>
<th>INPUT SIZE</th>
<th>SENSOR SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>J</th>
<th>M</th>
<th>WT. LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 100A</td>
<td>1</td>
<td>2.80</td>
<td>2.00</td>
<td>1.12</td>
<td>1.09</td>
<td>1.09</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.4</td>
</tr>
<tr>
<td>200 to 500A</td>
<td>2</td>
<td>3.85</td>
<td>3.80</td>
<td>1.30</td>
<td>2.40</td>
<td>1.25</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.8</td>
</tr>
<tr>
<td>1000A</td>
<td>3</td>
<td>5.50</td>
<td>4.90</td>
<td>1.60</td>
<td>3.15</td>
<td>3.20</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>1.5</td>
</tr>
</tbody>
</table>

**Lead Type**......................... 5Aac models......................... 24", 14AWG, White (X1) & Black, Flying leads
All other models.................... 72", 16AWG, White (X1) & Black, Flying leads

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Page 37
SINGLE-PHASE AC RMS CURRENT TRANSUDER  MODEL DCTR-

DIN-RAIL-MOUNTED AC RMS CURRENT TRANSUDER

FEATURES
• Accurate measurement of the true RMS value of the input signal.
• Universal ac/dc instrument power.
• One model for either 1A or 5A input.

APPLICATIONS
• For use in applications where measurement of non-sinusoidal or distorted waveforms is required.
• Applications that require CE or CSA approvals.
• Perfect for installations that require compact packaging.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC AMPS</th>
<th>STANDARD OUTPUTS MODEL DCTR-</th>
<th>0-1mA dc</th>
<th>4-20mA dc</th>
<th>0-10Vdc</th>
<th>0-5Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 or 5</td>
<td>005B 005E 005D 005X5</td>
<td>005</td>
<td>005</td>
<td>005</td>
<td>005</td>
</tr>
</tbody>
</table>

All standard units require 85-230Vac/dc instrument power.

ORDERING INFORMATION

Example: 1 Amp AC Input with 0 to 10Vdc Output.
DCTR-005D

SPECIFICATIONS

INPUT
Current ............................................0-1Aac or 0-5Aac
Frequency Range...............................50/60Hz
Burden ..............................................<1VA
Current Overload.... Continuous ...........120% F.S.
For 1 second .................. 20 X F.S.

DIELECTRIC TEST
Input to Instrument Power/Output/Case........3700Vac
Instrument Power to Output/Case ...........3700Vac
Output to Case ....................................490Vac

INSTRUMENT POWER
Standard..........................85-230Vac/dc, 50/60Hz, 3.0VA

OUTPUT
Loading
“B” model .................... (0-1mA output) ............ 0-15kΩ
“D”, “X5” models ...... (0-10, 0-5Vdc) .......... 2.5kΩ min.
“E” model .................... (4-20mA).................. 0-750Ω
Response Time .. (to 90%) ................. 300ms

ACCURACY ...................... ±0.5% F.S. @ 60Hz
Output Ripple ...................... <0.5% p.p.

TEMPERATURE & PHYSICAL
Operating Range .................. -10ºC to 55ºC
Termination ...................... Wire size up to 10AWG
Net Weight ..................... 0.7 lbs

INSTRUMENT POWER
85-230Vac/dc, 50/60Hz, 3.0VA

NOTE:
1. DIMENSIONS ARE IN INCHES [MM].
2. MOUNTED ON 35MM TOP-HAT DIN-RAIL.
DC & RMS CURRENT TRANSUDCERS
MODELS CT7- & CT8-

DC TO 500Hz 0.1A TO 20A INPUTS

DESCRIPTION
The Model CT7- Series (DC) current transducer produces an output which is directly proportional to the input signal from dc to 500Hz. It functions as a dc isolator or low-frequency ac transducer with dc response. The output is proportional to the input. (ac input/ac output, dc input/dc output)

The Model CT8- Series (RMS) current transducer provides an output directly proportional to the RMS value of the input over the dc to 500Hz range. The dc output is proportional to the RMS input including dc. Full-scale current ranges of 0.1 to 20 Amperes, and 2500Vac input/output dielectric test make them suitable for many instrumentation needs.

<table>
<thead>
<tr>
<th>INPUT AMPS</th>
<th>STANDARD OUTPUTS MODEL CT7- &amp; CT8-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1mA</td>
</tr>
<tr>
<td>0-0.1</td>
<td>002B</td>
</tr>
<tr>
<td>0-0.5</td>
<td>004B</td>
</tr>
<tr>
<td>0-1</td>
<td>006B</td>
</tr>
<tr>
<td>0-1.5</td>
<td>007B</td>
</tr>
<tr>
<td>0-2</td>
<td>008B</td>
</tr>
<tr>
<td>0-5</td>
<td>014B</td>
</tr>
<tr>
<td>0-10</td>
<td>015B</td>
</tr>
<tr>
<td>0-15</td>
<td>016B</td>
</tr>
<tr>
<td>0-20</td>
<td>017B</td>
</tr>
</tbody>
</table>

Bidirectional (±) output on CT7.
Other current & frequency ranges available, consult factory.

SAVE $ “-11” & “-22” models utilize a low-cost linear power supply.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>INPUT</th>
<th>Current ..................................................See Table</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency Range ...........................................dc-500Hz</td>
</tr>
<tr>
<td></td>
<td>Burden .................................................VA (0.050V X F.S. current)</td>
</tr>
<tr>
<td></td>
<td>Overload ..................................................1.25 X F.S. rating</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTPUT</th>
<th>Response Time (to 90%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT7 Models</td>
<td>.................................1ms</td>
</tr>
<tr>
<td>CT8 Models</td>
<td>.................................100ms</td>
</tr>
<tr>
<td>Loading</td>
<td>0-1mA .............................0-10kΩ</td>
</tr>
<tr>
<td>5V &amp; 10V</td>
<td>.................................&gt;2kΩ</td>
</tr>
<tr>
<td>20mA</td>
<td>.................................0-500Ω</td>
</tr>
<tr>
<td>Field Adjustable Cal.</td>
<td>±10%</td>
</tr>
</tbody>
</table>

DIELECTRIC TEST

Input/Output/Case..............................................2500Vac

INSTRUMENT POWER

Standard........................................85-265Vac, 48-420Hz, 5VA, or 110-370Vdc

ACCURACY ..................................includes effects of linearity and repeatability.

CT7 Models ........................................±0.25% F.S. @ DC
CT8 Models ........................................±0.25% F.S. @ 48-420Hz

Ripple ........................................<1.0% F.S.

TEMPERATURE & PHYSICAL

Operating Range ..................-10ºC to 60ºC

Temperature Effect ..................±1% Rdg.

Net Weight ........................................1.5 lbs

ORDERING INFORMATION

Example: 0-5Adc Input, with 4-20mA Output & 125Vdc Inst. Pwr.

CT7-014E

Instrument Power Options

Option “-11” ............95-135Vac, 50/60Hz, 5VA
Option “-22” ............230Vac, 50/60Hz, 5VA
Options “-12”, “-15”, “-24”, “-37”, “-48”......
12Vdc thru 48Vdc, ±10%, 150mA max.

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CIRCULAR WINDOW MODELS

<table>
<thead>
<tr>
<th>CURRENT RANGE</th>
<th>MODEL NUMBER</th>
<th>NOMINAL OUTPUT</th>
<th>SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 35A</td>
<td>CTL-51/35</td>
<td>35mV</td>
<td>A</td>
</tr>
<tr>
<td>0 to 50A</td>
<td>CTL-51/50</td>
<td>50mV</td>
<td>A</td>
</tr>
<tr>
<td>0 to 50A</td>
<td>CTL-101/50 *</td>
<td>50mV</td>
<td>C</td>
</tr>
<tr>
<td>0 to 75A</td>
<td>CTL-101/75 *</td>
<td>75mV</td>
<td>C</td>
</tr>
<tr>
<td>0 to 100A</td>
<td>CTL-101/100 *</td>
<td>100mV</td>
<td>D</td>
</tr>
<tr>
<td>0 to 150A</td>
<td>CTL-201/150 *</td>
<td>75mV</td>
<td>D</td>
</tr>
<tr>
<td>0 to 200A</td>
<td>CTL-201/200 *</td>
<td>100mV</td>
<td>D</td>
</tr>
<tr>
<td>0 to 300A</td>
<td>CTL-401/300 *</td>
<td>75mV</td>
<td>D</td>
</tr>
<tr>
<td>0 to 400A</td>
<td>CTL-401/400 *</td>
<td>100mV</td>
<td>D</td>
</tr>
<tr>
<td>0 to 500A</td>
<td>CTL-601/500</td>
<td>40mV</td>
<td>D</td>
</tr>
<tr>
<td>0 to 600A</td>
<td>CTL-601/600</td>
<td>50mV</td>
<td>E</td>
</tr>
<tr>
<td>0 to 800A</td>
<td>CTL-202/800</td>
<td>40mV</td>
<td>E</td>
</tr>
<tr>
<td>0 to 1000A</td>
<td>CTL-202/1000</td>
<td>50mV</td>
<td>E</td>
</tr>
<tr>
<td>0 to 1500A</td>
<td>CTL-202/1500</td>
<td>75mV</td>
<td>E</td>
</tr>
<tr>
<td>0 to 2000A</td>
<td>CTL-202/2000</td>
<td>100mV</td>
<td>E</td>
</tr>
</tbody>
</table>

* Split-core option is not included in UL listing. Sensor size A is supplied as solid core only.

ORDERING INFORMATION
Example: 300 Amp Split-Core Current Sensor with Extended Temperature Range.

CTL-401TS/300
(Order in combination with appropriate CTA Signal Conditioner)

SPECIFICATIONS

INPUT
Current Range See Table....................... dc/RMS
Over-current (without damage)...................... 50X rating
Resistance
0-400A models .................................. 6Ω ±3Ω
600A+ models ................................... 23Ω ±5Ω
Excitation Current................................ 200mA

OUTPUT
With 200mA excitation current .................... Nominal ±30%
Response Time (to 90% F.S.) ..................... 50µ, typical
Resistance ........................................ 25Ω ±15Ω
Initial Offset .................................... <±2mV

DIELECTRIC TEST (Conductor through window to output).
Standard Models ................................ 2200Vac
Suitable for installation on 600Vac or 850Vdc uninsulated bus
Option "S" with sensor size C and D.............. 1000Vdc
To be used with insulated conductors only.

ACCURACY & LINEARITY
When Calibrated with CTAxxxx.................... ±0.5% F.S.
(With current conductor centered in window)

TEMPERATURE
Operating Range
Standard ....................................... -10ºC to 40ºC
Extended .... Add suffix "T" ......................... -40ºC to 65ºC
Effect ............................................. ±1% F.S.

OPTIONS
Split-core (Sensor sizes C, D and E) ............ Add suffix "S"

PHYSICAL
Cable Length ... A(all), C(solid), D(solid) ... 18in. non-detachable
C (split) ........................................ 8ft. non-detachable
D (split), E(all) ................................ 8ft. detachable

Other cable lengths available - Consult factory.

NOTES:
CTL specifications are for unidirectional operation. For bidirectional, add suffix "Y122".
(use with direct model CTA)
CTA signal conditioners provide the excitation current (instrument power) that the CTL sensor requires, as well as amplifying the low-level (mV) signal into a more typical signal. See CTA spec sheet for details.

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HALL-EFFECT CURRENT SENSORS

CIRCULAR WINDOW MODELS

<table>
<thead>
<tr>
<th>CURRENT RANGE</th>
<th>MODEL NUMBER</th>
<th>TYPICAL OUTPUT</th>
<th>SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 500A</td>
<td>CTL-601FS/500</td>
<td>40mV</td>
<td>F</td>
</tr>
<tr>
<td>0 to 600A</td>
<td>CTL-601FS/600</td>
<td>50mV</td>
<td>F</td>
</tr>
<tr>
<td>0 to 800A</td>
<td>CTL-202FS/800</td>
<td>40mV</td>
<td>F</td>
</tr>
<tr>
<td>0 to 1000A</td>
<td>CTL-202FS/1000</td>
<td>50mV</td>
<td>F</td>
</tr>
<tr>
<td>0 to 1500A</td>
<td>CTL-202EES/1000</td>
<td>100mV</td>
<td>EE</td>
</tr>
<tr>
<td>0 to 1500A</td>
<td>CTL-202EES/1500</td>
<td>75mV</td>
<td>F</td>
</tr>
<tr>
<td>0 to 2000A</td>
<td>CTL-202FS/2000</td>
<td>150mV</td>
<td>EE</td>
</tr>
<tr>
<td>0 to 2000A</td>
<td>CTL-202EES/2000</td>
<td>100mV</td>
<td>F</td>
</tr>
<tr>
<td>0 to 2500A</td>
<td>CTL-302EES/2500</td>
<td>200mV</td>
<td>EE</td>
</tr>
<tr>
<td>0 to 3000A</td>
<td>CTL-302EES/3000</td>
<td>85mV</td>
<td>EE</td>
</tr>
</tbody>
</table>

Split core standard on all models.

SPECIFICATIONS

INPUT
Current Range ........up to 2000A models........... dc/RMS
2500A & above .............dc/peak ac
Over-current (without damage) ............50 X rating
Resistance .............................................. 23Ω ± 5Ω
Excitation Current ............. 200mA

OUTPUT
Typical Output (@ 200mA excitation) ........ Nominal ±30%
Response Time (to 90% F.S.) .............. 50µs, typical
Resistance .................................................. 25Ω ± 15Ω
Initial Offset ............................................. <±2mV

DIELECTRIC TEST
Conductor Through Window to Output ..................2200v ac
Suitable for installation on 600vac or 850vdc uninsulated bus.

ACCURACY & LINEARITY
When Calibrated with CTA ............................................ ±0.5% F.S.

TEMPERATURE
Operating Range
Standard.................................. -10ºC to +40ºC
Extended ..............Add Suffix "T" .................. -40ºC to +65ºC
Effect.......................................... ±1% F.S.

CABLE LENGTHS
All models are supplied with detachable 8-foot cable.
Longer cables are available - Consult factory.

NOTES:
CTL specifications are for unidirectional operation.
For bidirectional, add suffix “Y122”. (use with direct model CTA)
CTAsignal conditioners provide the excitation current (instrument power) that the CTL sensor requires, as well as amplifying the low-level (mV) signal into a more typical signal.
See CTA spec sheet for details.

Example: 2000Amp split-core current sensor with extended temperature range and 4 1/4” window.
CTL-202EETS/2000
(Order in combination with appropriate CTA Signal Conditioner)

ORDERING INFORMATION

CASE DIMENSIONS EE & F

<table>
<thead>
<tr>
<th>SENS. SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>M</th>
<th>P</th>
<th>WT LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>5 5/8</td>
<td>5 1/4</td>
<td>1 5/8</td>
<td>2 1/4</td>
<td>2 5/8</td>
<td>2 1/16</td>
<td>1 1/16</td>
<td>3 1/4</td>
<td>4 1/8</td>
<td>9/16</td>
<td>5/8</td>
<td>1/4</td>
<td>2.8</td>
</tr>
<tr>
<td>EE</td>
<td>7 3/4</td>
<td>7 1/4</td>
<td>1 5/8</td>
<td>4 1/4</td>
<td>3 5/8</td>
<td>3 7/8</td>
<td>1 1/8</td>
<td>5 1/2</td>
<td>6 1/4</td>
<td>3/8</td>
<td>5/16</td>
<td>1/4</td>
<td>4.5</td>
</tr>
</tbody>
</table>

5 YEAR WARRANTY

UL LISTED

Measuring Equipment 7N93

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**HALL-EFFECT CURRENT SENSORS**

**MODEL CTL-**

### RECTANGULAR WINDOW (BUS BAR) MODELS

<table>
<thead>
<tr>
<th>CURRENT RANGE</th>
<th>MODEL NUMBER</th>
<th>TYPICAL OUTPUT</th>
<th>SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 500A</td>
<td>CTL-202HS/500</td>
<td>50mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 1000A</td>
<td>CTL-202HS/1000</td>
<td>100mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 1000A</td>
<td>CTL-202ZZS/1000</td>
<td>100mV</td>
<td>ZZ</td>
</tr>
<tr>
<td>0 to 1500A</td>
<td>CTL-202HS/1500</td>
<td>150mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 1500A</td>
<td>CTL-202ZZS/1500</td>
<td>150mV</td>
<td>ZZ</td>
</tr>
<tr>
<td>0 to 2000A</td>
<td>CTL-202HS/2000</td>
<td>200mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 2000A</td>
<td>CTL-202ZZS/2000</td>
<td>200mV</td>
<td>ZZ</td>
</tr>
<tr>
<td>0 to 2000A</td>
<td>CTL-202HS/2000</td>
<td>60mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 2500A</td>
<td>CTL-2502HS/2500</td>
<td>75mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 2500A</td>
<td>CTL-2502ZZS/2500</td>
<td>125mV</td>
<td>ZZ</td>
</tr>
<tr>
<td>0 to 3000A</td>
<td>CTL-3002HS/3000</td>
<td>150mV</td>
<td>ZZ</td>
</tr>
<tr>
<td>0 to 3000A</td>
<td>CTL-3002ZZS/3000</td>
<td>150mV</td>
<td>ZZ</td>
</tr>
<tr>
<td>0 to 4000A</td>
<td>CTL-4002HS/4000</td>
<td>120mV</td>
<td>Z</td>
</tr>
<tr>
<td>0 to 5000A</td>
<td>CTL-5002HS/5000</td>
<td>150mV</td>
<td>Z</td>
</tr>
</tbody>
</table>

All standard models are configured with a split core. Solid-core option is available - Consult factory.

### CASE DIMENSIONS Z & ZZ

**Window Size**
- ZZ .......... 2\(\frac{3}{16}\) X 4\(\frac{1}{2}\)"

<table>
<thead>
<tr>
<th>SENSOR DIMENSIONS (inches)</th>
<th>WT LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>7(\frac{3}{16}) 3(\frac{15}{16}) 1(\frac{5}{16}) 1(\frac{1}{4}) X 4(\frac{1}{2}) 2(\frac{1}{2})\space 3(\frac{1}{2}) 1 5 1(\frac{7}{8}) 3(\frac{1}{16}) 3(\frac{1}{2}) 2(\frac{1}{2}) N/A N/A N/A N/A 2.8</td>
<td></td>
</tr>
<tr>
<td>ZZ</td>
<td></td>
</tr>
<tr>
<td>7(\frac{3}{16}) 5(\frac{1}{2}) 1(\frac{1}{8}) 2(\frac{1}{16}) X 4(\frac{1}{2}) 2(\frac{1}{2}) 3(\frac{1}{2}) N/A N/A N/A N/A 3(\frac{1}{2}) 3(\frac{1}{16}) 3(\frac{1}{2}) N/A 3.5</td>
<td></td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**


**CTL-202HTS/2000**
(Order in combination with appropriate CTA Signal Conditioner)

**SPECIFICATIONS**

**INPUT**
- Current Range .......See Table...............dc/peak ac
- Over-current (without damage)..............50 X rating
- Resistance ..............................................230 ±50
- Excitation Current ....................................200mA

**OUTPUT**
- Typical Output (@ 200mA excitation) ........Nominal ±30%
- Response Time (to 90% F.S.) ..................50µ, typical
- Resistance ...............................................250 ±150
- Initial Offset .........................................<±2mV

**DIELECTRIC TEST**
- Conductor Through Window to Output .................2200Vac
- Suitable for installation on 600Vac or 850Vdc uninsulated bus

**ACCURACY & LINEARITY**
- When Calibrated with CTA .........................±1% F.S.

**TEMPERATURE**
- Operating Range
  - Standard ....................................-10ºC to +40ºC
  - Extended .... Add suffix "T" ..............-40ºC to +65ºC
- Effect.............................................±1% F.S.

**CABLE LENGTH**
- All models are supplied with detachable 8-foot cable.
- Longer cables are available - Consult factory.

**NOTES:**
- CTL specifications are for unidirectional operation.
- For bidirectional, add suffix “Y122”. (use with direct model CTA)
- CTA signal conditioners provide the excitation current (instrument power) that the CTL sensor requires, as well as amplifying the low-level (mV) signal into a more typical signal. See CTA spec sheet for details.
**HALL-EFFECT CURRENT SENSORS**

**MODEL CTL-**

**RECTANGULAR WINDOW (BUS BAR) MODELS**

<table>
<thead>
<tr>
<th>CURRENT RANGE</th>
<th>MODEL NUMBER</th>
<th>TYPICAL OUTPUT</th>
<th>SENSOR SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 2500A</td>
<td>CTL-502S/2500</td>
<td>75mV</td>
<td>G</td>
</tr>
<tr>
<td>0 to 3000A</td>
<td>CTL-502S/3000</td>
<td>90mV</td>
<td>G</td>
</tr>
<tr>
<td>0 to 4000A</td>
<td>CTL-502S/4000</td>
<td>120mV</td>
<td>G</td>
</tr>
<tr>
<td>0 to 5000A</td>
<td>CTL-502S/5000</td>
<td>150mV</td>
<td>G</td>
</tr>
<tr>
<td>0 to 5000A</td>
<td>CTL-103S/5000</td>
<td>50mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 6000A</td>
<td>CTL-103S/6000</td>
<td>60mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 7000A</td>
<td>CTL-103S/7000</td>
<td>70mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 8000A</td>
<td>CTL-103S/8000</td>
<td>80mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 9000A</td>
<td>CTL-103S/9000</td>
<td>90mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 10000A</td>
<td>CTL-103S/10000</td>
<td>100mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 12000A</td>
<td>CTL-203S/12000</td>
<td>60mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 15000A</td>
<td>CTL-203S/15000</td>
<td>75mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 18000A</td>
<td>CTL-203S/18000</td>
<td>90mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 20000A</td>
<td>CTL-203S/20000</td>
<td>100mV</td>
<td>H</td>
</tr>
<tr>
<td>0 to 25000A</td>
<td>CTL-303S/25000</td>
<td>85mV</td>
<td>HH*</td>
</tr>
<tr>
<td>0 to 30000A</td>
<td>CTL-303S/30000</td>
<td>100mV</td>
<td>HH*</td>
</tr>
<tr>
<td>0 to 35000A</td>
<td>CTL-403S/35000</td>
<td>90mV</td>
<td>HH*</td>
</tr>
<tr>
<td>0 to 40000A</td>
<td>CTL-403S/40000</td>
<td>100mV</td>
<td>HH*</td>
</tr>
</tbody>
</table>

*Sensor size HH is supplied as split-core only. Sensor sizes G & H are supplied as either solid- or split-core. Remove “S” from model number to indicate solid-core.

**ORDERING INFORMATION**

Example: 2500 Amp, Split-Core Current Sensor with Extended Temperature Range.

**CTL-502TS/2500**

(Order in combination w/ appropriate CTA Signal Conditioner)

**SPECIFICATIONS**

**INPUT**
- Current Range: See Table. dc/peak ac
- Over-current (without damage): 50 X rating
- Excitation Current: 200mA
- Resistance
  - 500-5000A models: 230 ±5Ω
  - 6000A + models: 120 ±5Ω

**OUTPUT**
- Typical Output (@ 200mA excitation): Nominal ±30%
- Response Time (for 90% F.S.): 50μ, typical
- Resistance
  - 500-5000A models: 25Ω ±15Ω
  - 6000A + models: 32Ω ±10Ω
- Initial Offset: <±2mV

**DIELECTRIC TEST**
- Conductor Through Window to Output: 2200Vac
- Suitable for installation on 600Vac or 850Vac uninsulated bus.

**ACCU RACY & LINEARITY**
- (When calibrated with CTA)
  - 502 and 103 models: ±1% F.S.
  - 203, 303, and 403 models: ±2% F.S.

**TEMPERATURE**
- Operating Range
  - Standard: -10ºC to +40ºC
  - Extended: Add suffix “T”: -40ºC to +65ºC
- Effect: ±1% F.S.
- 20,000A models & up, Extended Range: ±2% F.S.

**CABLE LENGTH**
- All models are supplied with detachable 8-foot cable.
- Longer cables are available - Consult factory.

**NOTES**
- For HH case, remove red screws before unlatching head halves.
- CTA specifications are for unidirectional operation.
- For bidirectional, add suffix “Y122”. (Use with direct model CTA)
- CTA signal conditioners provide the excitation current (instrument power) that the CTA sensor requires, as well as amplifying the low-level (mV) signal into a more typical signal. See CTA spec sheet for details.

**SENSORS**

<table>
<thead>
<tr>
<th>SENSORS</th>
<th>SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>10</td>
<td>13 3/4</td>
<td>1 3/4</td>
<td>5 1/2 x 8</td>
<td>6 1/2</td>
<td>5</td>
<td>9/8</td>
<td>8 3/4</td>
<td>11 1/2</td>
<td>1 1/2</td>
<td>3/4</td>
<td>5/8</td>
<td>5/16</td>
<td>5/16</td>
<td>13</td>
</tr>
<tr>
<td>HH*</td>
<td>21</td>
<td>21</td>
<td>2</td>
<td>13 x 13</td>
<td>10 1/2</td>
<td>10 1/2</td>
<td>1 1/2</td>
<td>18</td>
<td>18</td>
<td>11 1/2</td>
<td>1 1/2</td>
<td>3/8</td>
<td>5/8</td>
<td>11 1/16</td>
<td>3/8</td>
</tr>
</tbody>
</table>

**WARRANTY**
- 5 YEAR WARRANTY
DESCRIPTION
The CTA Signal Conditioner provides the excitation current (instrument power) that the CTL Hall-effect sensor requires, as well as amplifying the low-level (mV) signal into a more typical signal. The CTA is calibrated to the output of the specific CTL selected for the application. Each CTA model has a specific input range (mV) which corresponds to the output of the CTL.

The CTA family has two different types: Direct and RMS. Direct models provide an isolated output that is directly proportional to the amplitude and frequency of the input signal. If the input signal is ac, then the output signal is ac. If the input signal is dc, then the output signal is dc.

The RMS output models provide an output which is directly proportional to the RMS of the input signal. The output is dc regardless of whether the input is ac or dc. Each type has four output options: 1mAdc, 4-20mA dc, 10Vdc or 5Vdc. DC instrument power options are available from 12 to 48Vdc.

The table on the following page shows appropriate CTA/CTL combinations with available CTA output options.

NOTE: For bidirectional calibration, use direct model CTA and CTL with “Y12” suffix.

INPUT (to CTA)
Standard (no option letter in model).........................0-50mV
Option “R”................. 0-35mV  Option “W”................. 0-90mV
Option “F”................. 0-40mV  Option “P”................. 0-100mV
Option “G”................. 0-60mV  Option “N”................. 0-120mV
Option “H”................. 0-75mV  Option “K”................. 0-150mV
Option “J”................. 0-80mV  Option “L”................. 0-200mV
Frequency Range (of CTA Signal Conditioner only) ... dc-5000Hz

OUTPUT
Field-adjustable Gain........................................... 25% Loading
Models with 1mA output ...................................... 0-10kΩ
Models with 10V or 5V output .............................. 2kΩ min.
Models with 4-20mA output ................................ 0-500Ω
Response time (to 90%) ................................. 40µs
Direct models ................................................... 200ms
RMS models ...................................................... 200ms

INSTRUMENT POWER
Standard ...................................................... 115Vac, 50-400Hz, 2VA
Option “-22” ............................................. 230Vac ±15%, 50/60Hz
Option “-24” ............................................. 9-18Vdc
Option “-48” ............................................. 18-36Vdc

ACCURACY
Linearity ...................................................... ± 0.1% F.S.
Output Ripple ................................................... Less than 0.25% F.S.

TEMPERATURE
Operating Range ........................................... 0°C to +70°C
Effect ......................................................... ±0.005%/°C

CTA CASE DIMENSIONS

CTA SIGNAL CONDITIONERS  MODEL CTA

ORDERING INFORMATION
Example: 0-2000Ωdc CTL Input through 2” Window, Split-Core, ±0.5% Accuracy and Linearity, and 4-20mActl dc Output (direct, not RMS)

CTA-202S/2000 and CTA212P

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### CTA MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT CURRENT (THROUGH CTL WINDOW)</th>
<th>MODEL CTL CURRENT TRANSUDER</th>
<th>ACC (% OF F.S.)</th>
<th>DIRECT MODELS - AC/DC OUTPUT PROPORTIONAL TO AC/DC INPUT</th>
<th>STANDARD OUTPUT MODEL CTA</th>
<th>STANDARD OUTPUT MODEL CTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-35A</td>
<td>CTL-51(T)/35</td>
<td>±0.5</td>
<td>201RX5</td>
<td>213RX5</td>
<td>213R</td>
</tr>
<tr>
<td>0-50A</td>
<td>CTL-51(T)/50</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-50A</td>
<td>CTL-101(T)/50</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-75A</td>
<td>CTL-101(T)/75</td>
<td>±0.5</td>
<td>201H5X</td>
<td>213H5X</td>
<td>213H</td>
</tr>
<tr>
<td>0-100A</td>
<td>CTL-101(T)/100</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-150A</td>
<td>CTL-201(T)/150</td>
<td>±0.5</td>
<td>201H5X</td>
<td>213H5X</td>
<td>213H</td>
</tr>
<tr>
<td>0-200A</td>
<td>CTL-301(T)/200</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-300A</td>
<td>CTL-401(T)/300</td>
<td>±0.5</td>
<td>201H5X</td>
<td>213H5X</td>
<td>213H</td>
</tr>
<tr>
<td>0-400A</td>
<td>CTL-601(T)/400</td>
<td>±0.5</td>
<td>201H5X</td>
<td>213H5X</td>
<td>213H</td>
</tr>
<tr>
<td>0-500A</td>
<td>CTL-601(F)/500</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-500A</td>
<td>CTL-601(F)/500</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-600A</td>
<td>CTL-101(F)/600</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-800A</td>
<td>CTL-201(F)/800</td>
<td>±0.5</td>
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<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-1000A</td>
<td>CTL-201(E)/1000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-1500A</td>
<td>CTL-202(E)/1500</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-2000A</td>
<td>CTL-202(E)/2000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-2500A</td>
<td>CTL-202(E)/2500</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-3000A</td>
<td>CTL-202(E)/3000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-4000A</td>
<td>CTL-202(E)/4000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-5000A</td>
<td>CTL-202(E)/5000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-6000A</td>
<td>CTL-202(E)/6000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-7500A</td>
<td>CTL-202(E)/7500</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-10000A</td>
<td>CTL-202(E)/10000</td>
<td>±0.5</td>
<td>201F5X</td>
<td>213F5X</td>
<td>213F</td>
</tr>
<tr>
<td>0-12500A</td>
<td>CTL-203(T)/12500</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-15000A</td>
<td>CTL-203(T)/15000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-18000A</td>
<td>CTL-203(T)/18000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-20000A</td>
<td>CTL-203(T)/20000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-25000A</td>
<td>CTL-203(T)/25000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-30000A</td>
<td>CTL-203(T)/30000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-35000A</td>
<td>CTL-203(T)/35000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
<tr>
<td>0-40000A</td>
<td>CTL-203(T)/40000</td>
<td>±0.5</td>
<td>201X5</td>
<td>213X5</td>
<td>213</td>
</tr>
</tbody>
</table>

When ordered together, CTL/CTA combinations are factory-calibrated as a set. To select the proper CTA model, locate the preferred CTL model and move to the right, selecting either direct or RMS style and the desired output signal.

*For bidirectional calibration, use direct model CTA and CTL with “Y122” suffix.

OSI CT & CTA COMBINATIONS

**MODELS CTL-/CTA**

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q
**HALL-EFFECT CURRENT TRANSUDER**

**MODEL CTG-**

**CURRENT SENSOR WITH OUTPUT AMPLIFIER**

**5Vdc OR 10Vdc OUTPUTS**

**DESCRIPTION**

The CTG Current Transducer is a Hall-effect sensor integrated with an output amplifier. The CTG series offers a number of current ranges, outputs and sensor dimensions. Hall-effect current measurement is a non-contact technique that measures the magnetizing effects of current flowing in a conductor. This measurement type offers a number of benefits not afforded by conventional direct or contact (in-line) measurement. Some of these benefits are high electrical isolation between conductor and sensor output, high overload capability, fast response to input changes and no power consumption on measured circuit.

**FEATURES**

- **Accuracy of ±1% F.S.**
- **2200Vac line-to-output dielectric test.**
- **DC to 400Hertz response.**
- **Sensor and amplifier in one package.**
- **Available in split-core configurations.**
- **Output is proportional in direction and magnitude to the current flow through the window. (ac input yields ac output, dc input yields dc output)**
- **Overload capability to 10 times rating (at 60Hz).**
- **Stability maintained during severe vibration.**
- **Models available to 5,000A.**
- **Response time less than 500µs.**
- **8-foot cable length.**

**APPLICATIONS**

- **Replaces shunts. No insertion loss.**
- **Ideal for use on ac systems with dc components and/or chopped waveforms.**

**MODEL SELECTION**

<table>
<thead>
<tr>
<th>Current Range</th>
<th>±10Vdc Output</th>
<th>±5Vdc Output</th>
<th>Sensor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 100A</td>
<td>CTG-101</td>
<td>CTG-101X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 200A</td>
<td>CTG-201</td>
<td>CTG-201X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 300A</td>
<td>CTG-301</td>
<td>CTG-301X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 400A</td>
<td>CTG-401</td>
<td>CTG-401X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 500A</td>
<td>CTG-501</td>
<td>CTG-501X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 600A</td>
<td>CTG-601</td>
<td>CTG-601X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 800A</td>
<td>CTG-801</td>
<td>CTG-801X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 1000A</td>
<td>CTG-102</td>
<td>CTG-102X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 1500A</td>
<td>CTG-152</td>
<td>CTG-152X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 2000A</td>
<td>CTG-202</td>
<td>CTG-202X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 2500A</td>
<td>CTG-252</td>
<td>CTG-252X5</td>
<td>D</td>
</tr>
<tr>
<td>0 - 3000A</td>
<td>CTG-302</td>
<td>CTG-302X5</td>
<td>D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Range</th>
<th>±10Vdc Output</th>
<th>±5Vdc Output</th>
<th>Sensor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 500A</td>
<td>CTG-501HS</td>
<td>CTG-501HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 600A</td>
<td>CTG-601HS</td>
<td>CTG-601HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 800A</td>
<td>CTG-801HS</td>
<td>CTG-801HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 1000A</td>
<td>CTG-102HS</td>
<td>CTG-102HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 1500A</td>
<td>CTG-152HS</td>
<td>CTG-152HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 2000A</td>
<td>CTG-202HS</td>
<td>CTG-202HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 2500A</td>
<td>CTG-252HS</td>
<td>CTG-252HX5S</td>
<td>Z</td>
</tr>
<tr>
<td>0 - 3000A</td>
<td>CTG-302HS</td>
<td>CTG-302HX5S</td>
<td>Z</td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**

Example: 300Amp Split-Core Current Sensor with ±5V Output and Extended Temperature Range.

**CTG-301X5ST**

For optional CTG power supply, see **PS-4753 spec sheet.**

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SPECIFICATIONS

INPUT
Current........................................See Table..................dc/Peak ac
Over-current (without damage)..............10 X rating

INSTRUMENT POWER ........Nominal ...............±15Vdc
Range...........................................±13Vdc to ±18Vdc
Current.........................................<±20mA dc

DIELECTRIC TEST (Conductor Through Window to Output)
Sensor size “D” (split-core)..................1000Vdc
All others........................................2200Vac

OUTPUT
Load on output ..............................≥25kΩ
Response Time ............................(typical)...........500μs
Saturation.....................................Approx. ..........13.5V @±15Vdc

ACCURACY AND LINEARITY ......................±1.0% F.S.

TEMPERATURE
Temperature Range .............Standard ...........0ºC to +40ºC
Extended Temp. Range ....add “T” suffix ....-20ºC to +60ºC
Temperature Effects .............±0.05%/ºC

PHYSICAL
Insulation...........................................600Vac
Option “S” .................................. split-core
Dimensions .............................. Refer to CTG and CTG spec sheets
NOTE: For sensor size “G”, connector height is 0.422in.

Sensor size “D” split-core models are not UL listed.
Sensor size “F”, “EE” & “Z” are available in split-core only.

CONNECTIONS

TABLE 1: SENSOR SIZES D & Z
Plastic Connector, 8ft. Rubber Cable

<table>
<thead>
<tr>
<th>PINS</th>
<th>LEADS</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WHITE</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>GREEN</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>BLACK</td>
<td>-15V</td>
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<tr>
<td>8</td>
<td>RED</td>
<td>+15V</td>
</tr>
<tr>
<td>1</td>
<td>WHITE</td>
<td>COM</td>
</tr>
</tbody>
</table>

“Red dot” side of CTG must face positive supply.

TABLE 2: SENSOR SIZES E, EE, F & G
Metal Connector, 8ft. Rubber Cable

<table>
<thead>
<tr>
<th>PINS</th>
<th>LEADS</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>WHITE</td>
<td>-</td>
</tr>
<tr>
<td>B</td>
<td>GREEN</td>
<td>+</td>
</tr>
<tr>
<td>C</td>
<td>BLACK</td>
<td>-15V</td>
</tr>
<tr>
<td>D</td>
<td>RED</td>
<td>+15V</td>
</tr>
<tr>
<td>A</td>
<td>WHITE</td>
<td>COM</td>
</tr>
</tbody>
</table>

INSTALLATION AND OPERATING INSTRUCTIONS

INSTALLATION INSTRUCTIONS
1. Installation should be performed by qualified electricians only!
2. Make sure electrical service is disconnected before making any electrical connections.
3. Branch circuit protection is required to be provided in accordance with the National and Local codes of the inspection authority.
4. Route wires as required and secure to terminals per connection diagram on this sheet and on the unit.
5. Transducers are suitable for installation on 600Vac lines.

OPERATING INSTRUCTIONS
1. This unit is intended for indoor use at altitudes up to 2000 meters.
2. Transient overvoltages according to Installation Category (overvoltage category) II, pollution Degree 2.
3. The output signal is intended to be “Not accessible to the user.” To prevent contact with live circuits, the transducer is required to be mounted in an enclosure that requires the use of a tool for access.
4. If cleaning of the exterior surface is necessary, de-energize all services of supply (both measuring and instrument power circuits) and brush with a soft brush or blow off with low-pressure air. Use appropriate eye protection. Not suitable for hose-down cleaning.
5. Maximum relative humidity is 80 percent for temperatures up to 31ºC decreasing linearly to 50 percent relative humidity at 40ºC.
6. Maximum operating temperature range is -20ºC to 60ºC (refer to specifications for accuracy).

UL approved for USA and Canada

WARRANTY STATEMENT
Ohio Semitronics Inc. warrants this unit to be free of defects in material and workmanship for a period of five years from date of shipment. This unit must not be used in any manner other than as specified in this document.
DESCRIPTION
The CTH Series Current Transducer is a Hall-effect sensor integrated with an output amplifier. The CTH Series Current Transducer offers a 4-20mA, 4-12-20mA, 5V, or 10V output and can be operated from either a 24Vdc source or a low-cost 24Vac control transformer. Available options are split-core, extended temperature range, ruggedized design and 12Vdc or 15Vdc instrument power.

FEATURES
• ACCURACY 0.5%
• Sensor & Amplifier in one package
• Output is proportional in direction and magnitude to the current flow through the window. (ac input yields ac output, dc input yields dc output)
• Available in split-core configurations
• Replaces shunts. No insertion loss.

ORDERING INFORMATION
Example: 0-300mA Input, 4-20mA Output, Split-Core Option and Extended Temperature Range, with 15Vdc Instrument Power.

CTH-301LSST-15

Power supply available by using the PS-4753-5 or -6.

SPECIFICATIONS

INPUT
Current: See Tables ... dc or Peak ac
Over-current: ... 10 x rating

INSTRUMENT POWER
Standard: 24Vdc or ac ±10% Instrument Current: 25mA + load current

DIELECTRIC TEST
Bare Bus to Output: 3750Vac
Split-Core Sensor Size D: 1000Vdc

OUTPUT
Load: 4-20mA models: 0-500Ω
5 & 10V models: >2kΩ
Response Time (to 90%): 500μs, typical

TEMPERATURE
Temperature Effects: (0°C to +40°C) ±0.025%/°C
Temperature Range: 0°C to +40°C
Extended Temp. Range: -40°C to +60°C

ACCURACY AND LINEARITY
CTH-050, CTH-050M, CTH-050X5, CTH-050D ... ±1.0% F.S.
CTH-025, CTH-025M, CTH-025X5, CTH-025D ... ±2.0% F.S.
All Other Models: ±0.5% F.S.

AVAILABLE OPTIONS
Add Suffix in order shown:
Split-Core ... ... Add suffix “S”
Extended Temperature Range ... Add Suffix “T”
Ruggedized (potted) ... Add Suffix “R”
NOTE: Sensor size D split-Core models are potted, so “R” is not required in model number.
Instrument Power: 12Vdc, ±10% ... Add Suffix “-12”
15Vdc, ±10% ... Add Suffix “-15”

OHIODESCRIPTION WITH OUTPUT AMPLIFIER
4-20mA, 5Vdc OR 10Vdc OUTPUT

MODEL SELECTION
Circular Window Models

<table>
<thead>
<tr>
<th>Input DC</th>
<th>4-20mA Output</th>
<th>4-12-20mA Output</th>
<th>±5Vdc Output</th>
<th>±10Vdc Output</th>
<th>Sensor Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>025</td>
<td>025M</td>
<td>025X5</td>
<td>025D</td>
<td>B</td>
</tr>
<tr>
<td>0-50</td>
<td>050</td>
<td>050M</td>
<td>050X5</td>
<td>050D</td>
<td>B</td>
</tr>
<tr>
<td>0-100</td>
<td>101</td>
<td>101M</td>
<td>101X5</td>
<td>101D</td>
<td>B</td>
</tr>
<tr>
<td>0-200</td>
<td>201</td>
<td>201M</td>
<td>201X5</td>
<td>201D</td>
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Split-Core option “S” is available except for sensor size B.
All sensor size F, EE, and Z are standard split-core.
Consult factory if solid core is desired in these models.

Rectangular Window Models

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<tr>
<th>Input DC</th>
<th>4-20mA Output</th>
<th>4-12-20mA Output</th>
<th>±5Vdc Output</th>
<th>±10Vdc Output</th>
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PHONE: (614) 777-1005 * FAX: (614) 777-4511
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Page 48
**CURRENT MEASUREMENT**

**MODEL CTH-**

### CONNECTIONS & CASE DIMENSIONS

#### CASE DIMENSIONS B

![Diagram of Case Dimensions B]

Use Sensor Size D Cable Assembly for connections.

Use Sensor Size D Cable Assembly for connections.

#### CASE DIMENSIONS D & E

![Diagram of Case Dimensions D & E]

#### CASE DIMENSIONS F & EE

![Diagram of Case Dimensions F & EE]

#### CASE DIMENSIONS Z

![Diagram of Case Dimensions Z]

**SENS. SIZE** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **J** | **K** | **L** | **M** | **N** | **P** |
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**SENSOR DIMENSIONS** (inches)

**WT. LBS.**

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<th>C</th>
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<th>E</th>
<th>F</th>
<th>G</th>
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**CABLE ASSEMBLY**

**SENS. SIZE D, Z**

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<td>6</td>
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<td>INST. PWR. +24V</td>
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**SENS. SIZE E, EE, F**

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<tr>
<td>B</td>
<td>GREEN</td>
<td>COM</td>
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<td>C</td>
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<td>INST. PWR.</td>
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<tr>
<td>D</td>
<td>RED</td>
<td>PWR. +24V</td>
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*For positive output, insert positive current cable through “red dot” side of sensor.

Power supply available by using the PS-4753-5 or -6.

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DESCRIPTION

The CTLC series current transducers are Hall-effect current sensors with signal conditioning and an output amplifier in a single compact package. All models are supplied in a split-core configuration for ease of installation.

Hall-effect current measurement is a non-contact technique that measures the magnetizing effects of current flowing in a conductor.

Advantages of this technique include high electrical isolation between the measured conductor and transducer output, high over-range capability and fast response to input changes.

FEATURES

- **Accuracy** = ±0.5% F.S.
- Sensor, signal conditioning and amplifier in one package
- Output is proportional in direction and magnitude to current flow through the window. (4-20mA output is unidirectional)
- Split-core configuration
- Replaces shunts. No insertion loss.

ORDERING INFORMATION

Example: Split-core current transducer with 0-400A dc Input, 4-20mA dc Output, D size, 24Vdc/ac instrument power and extended temperature range

CTLC-401LS

Power supply available by using the PS-4753-5 or -6.

MODEL SELECTION

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<th>DC Current Input</th>
<th>MODEL CTLC-</th>
<th>4-20mA dc Output</th>
<th>±5Vdc Output</th>
<th>±10Vdc Output</th>
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<td>302SD</td>
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SPECIFICATIONS

**INPUT**

Current .................................................. See Table
Over-current without damage .................10 X rating

**OUTPUT**

Load .................. 4-20mA models.................. 0-500Ω
5 and 10V models.................. ≥2kΩ
Response Time (to 90%) ...................... 500μs, typical

**INSTRUMENT POWER**

Voltage ..................................................24Vdc/ac ±10%
Current ........................................... 25mA + output current

**DIELECTRIC TEST**

Bare Conductor thru Window to Output ...... 3750Vac

**ACCURACY and LINEARITY** ............... ±0.5% F.S.

**TEMPERATURE and ENVIRONMENTAL**

Operating Range...................................... 0 to +40°C
Extended Range (add suffix “T”) .......... -40°C to +60°C
Temperature Effect ................................ ±0.025%/°C
Humidity ............................................ 0-95%, non-condensing

**PHYSICAL**

Weight ....................... D size ≤0.75lb., EE size ≤4.5lb.
Connections .................. 6-32 screw terminals
CASE DIMENSIONS AND CONNECTIONS

MODEL CTLC-

ALL DIMENSIONS ARE IN INCHES. TOLERANCE IS ±0.030” UNLESS OTHERWISE NOTED.

CASE DIMENSIONS D

CASE DIMENSIONS EE

HOLE INFORMATION:
A. 0.221 DIA (TYP 4 PLCS)

0.50
0.50
1.50
3.50
1.50
1.50
1.00
1.63
0.50
0.63
0.50

CASE DIMENSIONS G

Dwg.# 0902-09055-B Rev D

Dwg.# 0902-09048-B Rev A

Dwg.# 0902-09048-B Rev A

MOUNTING INSTRUCTIONS

Unit must be installed in a vertical position as shown. The conductors through the window and the wires attached to the terminal strips must not apply any stress to the latches in any direction.

CONNECTIONS

OUTPUT

POWER

24Vac/dc

INSTRUMENT

TERMINAL IDENTIFICATION

Terminal 1 (−) Output
Terminal 2 (+) Instrument Power
Terminal 3 (−) Instrument Power
Terminal 4 (+) Instrument Power

“Red dot” side of CTL must face positive supply.

Power supply available by using the PS-4753-5 or -6.

Dwg.# 0902-00438-B Rev A (mod.) & Dwg.# 0902-00600-B Rev A (mod.)

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**DESCRIPTION**

The ISC current transducer provides a Hall-Effect sensor with an integrated signal conditioner. All units are packaged in a split-core configuration for ease of installation. Application flexibility is provided by a wide variety of input current ranges and output signal types.

Units meet the requirements of ATEX Directive 94/9/EC and UL/CUL Intrinsically Safe regulations (see standards listing). These standards are specifically related to the requirements for hazardous location installations in North America and the European Union (EU) but are widely accepted throughout the world. When used with appropriate safety barriers these units are recommended for installation in hazardous locations such as offshore platforms and petrochemical plants.

**FEATURES**

- Hall-Effect Current Sensor with Output Amplifier
- Split Core
- UL/CUL Intrinsically Safe Certification.
- Meets Requirements of ATEX Directive 94/9/EC

**APPLICATIONS**

- Current Sensing
- Torque Measurements
- Hazardous Locations Such as Offshore Platforms and Petrochemical Plants

**SPECIFICATIONS**

**INPUT**

Current: Linear
Over-current: Without Damage
Frequency Range: DC to 1kHz

**DIELECTRIC TEST**

Bus through Window to Output: 5kVac

**INSTRUMENT POWER**

Nominal: 24Vdc
Range: 14-30Vdc
Max Current Draw: 36mA

**OUTPUT**

Signal: See Table
Loading: Voltage Models: ≥100kΩ
Current Models: ≤250Ω
Response Time: <1ms
Offset: ≤1% F.S.

**ACCURACY & LINEARITY**

±2% F.S.

**TEMPERATURE**

Operating Range: -10 to 60°C
Effect: (-10°C ≤ Tamb ≤ 60°C) ±1% F.S.

**PHYSICAL**

Weight: 2 lbs.
Enclosure: Noryl SE1X, Black

**ORDERING INFORMATION**

Example: Input 0-1000Adc
Output 0-2.9 Vdc
ISC-102

**INPUT DC AMPS**

<table>
<thead>
<tr>
<th>Input DC Amps</th>
<th>Standard Outputs</th>
<th>Model ISC-</th>
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<tbody>
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<td>0-10Vdc</td>
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<td>401X5</td>
<td>401D</td>
</tr>
<tr>
<td>0-500</td>
<td>501</td>
<td>501X5</td>
<td>501D</td>
</tr>
<tr>
<td>0-600</td>
<td>601</td>
<td>601X5</td>
<td>601D</td>
</tr>
<tr>
<td>0-800</td>
<td>801</td>
<td>801X5</td>
<td>801D</td>
</tr>
<tr>
<td>0-1000</td>
<td>102</td>
<td>102X5</td>
<td>102D</td>
</tr>
<tr>
<td>0-1500</td>
<td>152</td>
<td>152X5</td>
<td>152D</td>
</tr>
<tr>
<td>0-2000</td>
<td>202</td>
<td>202X5</td>
<td>202D</td>
</tr>
<tr>
<td>0-2500</td>
<td>252</td>
<td>252X5</td>
<td>252D</td>
</tr>
</tbody>
</table>

* Requires two turns through window.
**Warning:**
1. Do not use in environments where ethers are present.
2. Clean only with a damp cloth to prevent the possibility of electric discharge.

Reference also Control Drawing 0901-00226-B Rev C

**Entity Parameters**

<table>
<thead>
<tr>
<th>Supply</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ui, Vmax</strong></td>
<td>30Vdc</td>
</tr>
<tr>
<td><strong>li, Imax</strong></td>
<td>110mA</td>
</tr>
<tr>
<td><strong>Pi, Pmax</strong></td>
<td>1.1W</td>
</tr>
<tr>
<td><strong>Ci</strong></td>
<td>0µF</td>
</tr>
<tr>
<td><strong>Li</strong></td>
<td>0mH</td>
</tr>
</tbody>
</table>

**CURRENT MEASUREMENT (HALL-EFFECT, OPEN LOOP)**

**OHIO SEMITRONICS, INC.**

Page 53
HALL-EFFECT CURRENT TRANSDUCER

MODEL CTLP-

DESCRIPTION
The model CTLP is a Hall-effect current sensor with signal conditioning in a single compact package. Hall-effect current measurement is a non-contact technique that measures the magnetizing effects of current flowing in a conductor. Advantages of this technique include high electrical isolation between the measured conductor and transducer output, high over-range capability and fast response to input changes.

This loop-powered design simplifies installation by reducing instrument power and output signal connections to a simple 2-wire interface.

SPECIFICATIONS

INSTRUMENT POWER
Loop-powered ........ Voltage ........... 24Vdc, ±15%

TEMPERATURE
Operating Range .... standard ........... 0 to +40°C

 Type ........ T option .......... 40°C to +60°C

Effect .... A case ........ standard ........... ±2.0% F.S.

 Type ........ T option .......... ±3.0% F.S.

Z case ........ standard ........... ±1.0% F.S.

 Type ........ T option .......... ±2.5% F.S.

PHYSICAL
Termination ............. 6-32 Screw Terminals
Enclosure ............. A case .......... Noryl SE1X, Gray

 Z case .......... Noryl SE1X, Black

Weight ............. A case .......... 0.2 lb.

 Z case .......... 1.4 lb.

INPUT
Current Range .................. See Table
Over-range w/o damage .... Continuous ...... 10X Rated
Frequency Range .................. dc

OUTPUT
Type ............ Loop-powered .......... 4-20mAdc
Scaling .................. 0-F.S. Input = 4-20mAdc Output
Loading ........ 24Vdc loop-power, ±15% ....... 0-500Ω
Response .... to 90% ...................... 500µs, Typical

DIELECTRIC TEST
Conductor through Window to Output .............. 2200Vac

ACCURACY (Setpoint, Linearity, Repeatability)
CTLP-025 .................. ±2.0% F.S.
CTLP-050, CTLP-100 .......... ±1.0% F.S.
All Others .................. ±0.5% F.S.

CASE DIMENSIONS

A CASE MODELS

Z CASE MODELS

ALL MODELS

OHIO SEMITRONICS, INC.
**HALL-EFFECT CURRENT SENSOR**  
**MODEL CTF & CTFB**

### DESCRIPTION

The CTF and CTFB current sensors are closed-loop, highly-precise electronic sensors designed for ac, dc, pulse and variable-frequency drives. The output is directly proportional to the input and the output waveform is identical to the “through-window” current. 

The CTF and CTFB provide 0.1% linearity. Rugged construction and reduced temperature sensitivity ensure reliable measurements over a wide range of temperatures. 

Models are provided in enclosures or circuit board arrangement. 

Use [CTA800-](#) for instrument power source and output signal conditioning.

### MODEL SELECTION

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>INPUT CURRENT (AMPS)</th>
<th>TEMPERATURE RANGE</th>
<th>OFFSET OVER RANGE</th>
<th>TURNS RATIO</th>
<th>OUTPUT</th>
<th>ACCURACY F.S. @ 25°C</th>
<th>LINEARITY F.S.</th>
<th>SENSOR CASE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTFB-100TT</td>
<td>100 150</td>
<td>-25° to +70°C</td>
<td>+0.75mA</td>
<td>1000:1</td>
<td>100mA</td>
<td>0-50Ω</td>
<td>±0.4%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>CTFB-100T</td>
<td>100 150</td>
<td>-40° to +80°C</td>
<td>+1.0mA</td>
<td>1000:1</td>
<td>100mA</td>
<td>0-50Ω</td>
<td>±0.4%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>CTFB-300TT</td>
<td>300 750</td>
<td>-25° to +70°C</td>
<td>+0.8mA</td>
<td>2000:1</td>
<td>150mA</td>
<td>0-40Ω</td>
<td>±0.4%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>CTFB-300T</td>
<td>300 750</td>
<td>-40° to +80°C</td>
<td>+0.75mA</td>
<td>2000:1</td>
<td>150mA</td>
<td>0-40Ω</td>
<td>±0.4%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>CTF-500TT</td>
<td>500 750</td>
<td>-0° to +70°C</td>
<td>+0.25 mA</td>
<td>5000:1</td>
<td>100mA</td>
<td>0-50Ω</td>
<td>±0.3%</td>
<td>±0.1%</td>
</tr>
<tr>
<td>CTF-500T</td>
<td>500 750</td>
<td>-40° to +80°C</td>
<td>+0.5mA</td>
<td>5000:1</td>
<td>100mA</td>
<td>0-50Ω</td>
<td>±0.3%</td>
<td>±0.1%</td>
</tr>
</tbody>
</table>

### SPECIFICATIONS

- Current: See Table
- Response Time: (to 90%) 1µs
- di/dt: 50A/1µs
- Bandwidth (-1dB): dc to 100kHz
- Instrument Power: ±15Vdc to ±18Vdc
- Dielectric Test: (input/output) 3kV
- Weight: CTFB 0.4 lb  
  CTF 2.2 lb

### CASE DIMENSIONS (in inches)

**CASE 1 (CTFB)**

- 0.17 DIA (4 PLCS)
- 1.00 DIA
- 0.20
- 2.16
- 2.56
- 3.15
- 3.55
- 1.25
- 0.20
- 1.14

**CASE 2 (CTF)**

- 0.25 X 0.59 (4 PLACES)
- 0.4
- 1.6 DIA
- 4.0
- 1.7
- 1.9
- 3.9
- 3.3
- 3.3

### CTFB CONNECTIONS

- +15V
- COM
- -15V
- OUTPUT

### CTF CONNECTIONS

- +V
- -V
- OUTPUT
- RL
- COM

---

**Ohio Semitronics, Inc.**

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4242 Reynolds Drive * Hilliard, Ohio * 43026-1264

Phone: (614) 777-1005 * Fax: (614) 777-4511

www.OhioSemitronics.com * 1-800-537-6732
DESCRIPTION

The CTFG-series current sensors are closed-loop Hall-Effect current sensors designed to measure ac or dc currents, or a combination of both. With allowable input current from 100A through 500A, the series provides pulse current measurement up to 100A/µs.

FEATURES

• Rugged construction
• Reduced temperature sensitivity
• High galvanic isolation

APPLICATIONS

• Suitable for safe and reliable operation in a wide range of environmental conditions.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT CURRENT*</th>
<th>MODEL NUMBER</th>
<th>TURNS RATIO</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 100A</td>
<td>CTFG-101</td>
<td>1000:1</td>
<td>100mA</td>
</tr>
<tr>
<td>0 - 200A</td>
<td>CTFG-201</td>
<td>2000:1</td>
<td>100mA</td>
</tr>
<tr>
<td>0 - 300A</td>
<td>CTFG-301</td>
<td>3000:1</td>
<td>100mA</td>
</tr>
<tr>
<td>0 - 400A</td>
<td>CTFG-401</td>
<td>4000:1</td>
<td>100mA</td>
</tr>
<tr>
<td>0 - 500A</td>
<td>CTFG-501</td>
<td>5000:1</td>
<td>100mA</td>
</tr>
</tbody>
</table>

* AC input current ratings based on 10Ω load or less.

ORDERING INFORMATION

Example: 0-300A Input and 0-100mA Output

CTFG-301

SPECIFICATIONS

INPUT

Current (ac RMS or dc) ....................... See Table
Over-range (w/o damage)
Continuous ........................................ 110% F.S.
Transient ...................................... 10 X F.S. for 50ms/Hz
Bandwidth (-3dB) ................................... dc to 35kHz
Response (di/dt correctly followed) ........... 100A/µs

OUTPUT

Scaling/Turns Ratio ............................... See Table
Loading (@15Vdc Instrument Power)
100-300A Models ........ Max ........ 50Ω** Min ........ 0Ω
400-500A Models ...... Max ........ 40Ω** Min ........ 0Ω
** Values shown are for dc/pkac. Max 10Ω for ac RMS.
Response Delay ...................................... ≤1µs

DIELECTRIC TEST (Cable through Window to Output)
60Hz, 1min. ........................................... 2.2kV

INSTRUMENT POWER

Voltage .............................................. ±15Vdc, ±5%
Current ...... Quiescent ................. ±25mAdc
Maximum ...... Quiescent + Output Current

ACCURACY

With F.S. Input @ 25°C .......................... ±0.5% F.S.
Linearity ........................................... ±0.1% F.S.
Offset @ 25°C .................................... ±0.25mA

TEMPERATURE & ENVIRONMENTAL

Operating Range ................................. -20 to 70°C
Effect ...... -20°C to 0°C ..................... ±20µA/°C
0°C to 70°C ............................... ±6µA/°C
Storage Range ................................. -25 to 85°C
Operating Humidity ...................... 0-95% non-condensing

PHYSICAL

Weight ............................................. 11.3oz.
Enclosure .... Material ...................... Noryl SE1X
Flammability ......................... UL 94 V-1
Color ........................................... Black
Connections
Instrument Power & Output .............. M4 Stud
Primary Conductor ...... 1.25 in.(32mm) dia. window

NOTE: CTA800 signal conditioners provide the instrument power that the CTFG requires, as well as amplifying the low-level (mA) signal into a more typical signal. See CTA800 spec sheet for details.

OHIO SEMITRONICS, INC.
4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
PHONE: (614) 777-1005 * FAX: (614) 777-4511
WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

Page 56
DESCRIPTION
The UFG series solid-core current transducers provide ultra-high accuracy in a convenient compact enclosure. Units operate bidirectionally and provide an output that is a scaled replica of the input.

FEATURES
- Ultra-high accuracy of ±0.01% error, max.
- Nearly half the size of competitors’ units
- Rugged construction

APPLICATIONS
- Precision measurements
- Medical devices
- Electric vehicle battery packs

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT</th>
<th>MODEL</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Adc/pkac)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 to ±200</td>
<td>UFG-201</td>
<td>0 to ±100mA</td>
</tr>
<tr>
<td>0 to ±600</td>
<td>UFG-601</td>
<td>0 to ±300mA</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION
Example: 0 to ±600A Input with 0 to ±300mA Output

UFG-601

SPECIFICATIONS

INPUT
Current .......................................................... See Table
Bandwidth .................................................. dc to 10kHz

OUTPUT
Current .......................................................... See Table
Voltage .......................................................... ±5V max.
Response .......................................................... 1µs
Load Resistor (Rb) UFG-201 ................................ 50Ω, 0.01% acc., >2W
UFG-601 ................................ 16.666Ω, 0.01% acc., >2W

NOTE: Resistors similar to the Vishay VPR221 series are recommended.

ACCURACY
Setpoint, repeatability ........................................ ±0.01% F.S.
Linearity .......................................................... ±0.01% F.S.
Offset .......................................................... UFG-201 ±10µA
.......................................................... UFG-601 ±30µA
Hysteresis .......................................................... 1ppm

INSTRUMENT POWER
Voltage .......................................................... ±15Vdc, ±5%
Current ........................................................ 35mAdc plus output current

TEMPERATURE & ENVIRONMENTAL
Operating Range .............................................. -30 to 80°C
Effect .......................................................... Operating Humidity ................. 0-95% non-condensing

PHYSICAL
Size .......................................................... UFG-201 1.38in. X 1.38in. X 0.79in., 0.59in. dia.
 .......................................................... UFG-601 2.36in. X 2.36in. X 1.61in., 1.18in. dia.
Weight .......................................................... UFG-201 1.1oz (30g)
 .......................................................... UFG-601 0.6lb (0.3kg)
Termination UFG-201 .................................... 4-pin, male..EHR-4* (JST Mfg. Co., Ltd.)
 .......................................................... UFG-601 .................................. 4-pin, male..XHP-4* (JST Mfg. Co., Ltd.)
 (*Mating connectors not supplied.)
**SIGNAL CONDITIONER**

**MODEL CTA800-**

**DESCRIPTION**

The model CTA800/801 series of signal conditioners is designed to interface with the CTF(B) and CTFG series of closed-loop Hall-effect current sensors. All models provide a ±15Vdc power supply to power the current sensor.

Two types of signal conditioning are available:

- **Direct** - this type is recommended for dc applications, but may also be used in ac applications to provide an output which is a scaled replica of the input.
- **RMS** - this type is recommended for ac and ac/dc applications, and provides a dc output proportional to the true RMS value of the input.

The model **CTA800-P** provides a ±15Vdc power supply only.

### MODEL SELECTION

<table>
<thead>
<tr>
<th>TYPE</th>
<th>OUTPUT(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Direct (output is a scaled replica of the input)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>RMS (output is proportional to the RMS value of the input)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SPECIFICATIONS

**INPUT** (From external current sensor)

- Type .................................................. nominal ........................................... 100mA
- Frequency .................................................. dc to 50kHz

**OUTPUT** (Signal Conditioning)

- Type .................................................. See Table
- Loading .................................................. "B" Models .................................................. 0-10kΩ
- "D" or "X5" Models .................................................. 2kΩ, min.
- "E" or "EA" Models .................................................. 0-500Ω
- Field Adjustment .......... Gain .................................................. ±10%
- Ripple (RMS models @ dc & >50Hz) .......... <0.5% F.S.
- Response Time .................................................. (to 90% F.S.)
- Direct Models (X5 or D) .................................................. 1μs
- Direct Models (B, E, EA) .................................................. 30μs
- RMS Models .................................................. 100ms

**OUTPUT** (Power supply for external sensor)

- Standard .................................................. ±15Vdc
- (Consult factory for additional options.)

**INSTRUMENT POWER**

- Standard .................................................. 115Vac ±10%, 50/60Hz
- Option "-22" .................................................. 230Vac ±10%, 50/60Hz

**ACCURACY**

- Linearity .................................................. ±0.1% F.S.

**TEMPERATURE**

- Operating Range .................................................. 0-70°C
- Effect .................................................. ±0.01%/°C
DESCRIPTION
The Model PS-4753 universal power supply is designed to interface with the CTLC, CTG, CTH and CTU series current transducers to provide the excitation current (instrument power) that the open-loop Hall-effect sensor requires.

Instrument power to the PS-4753 is rated at 110Vdc-370Vdc or 85Vac-265Vac, or with option 3 or 4, 15Vdc to 60Vdc.

A single or dual ±12Vdc or ±15Vdc output is available to power the sensor(s).

MODEL SELECTION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>INSTRUMENT POWER</th>
<th>OUTPUT (to Sensor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS-4753</td>
<td>110-370Vdc or 85-265Vac</td>
<td>±15Vdc (30Vdc)</td>
</tr>
<tr>
<td>PS-4753-2</td>
<td>110-370Vdc or 85-265Vac</td>
<td>Dual ±15Vdc (30Vdc)</td>
</tr>
<tr>
<td>PS-4753-3</td>
<td>15-60Vdc</td>
<td>±15Vdc (30Vdc)</td>
</tr>
<tr>
<td>PS-4753-4</td>
<td>15-60Vdc</td>
<td>Dual ±15Vdc (30Vdc)</td>
</tr>
<tr>
<td>PS-4753-5</td>
<td>110-370Vdc or 85-265Vac</td>
<td>±12Vdc (24Vdc)</td>
</tr>
<tr>
<td>PS-4753-6</td>
<td>110-370Vdc or 85-265Vac</td>
<td>Dual ±12Vdc (24Vdc)</td>
</tr>
</tbody>
</table>

DIELECTRIC TEST..... Input/Output/Case.......2500Vac

CASE DIMENSIONS

CASE HEIGHT 4.38" 1.44 LBS
ALL DIMENSIONS IN INCHES

CONNECTION DIAGRAM

CONNECTION EXAMPLES

CONNECTIONS TO ±12Vdc (24Vdc) CURRENT SENSORS

CONNECTIONS TO ±15Vdc (30Vdc) CURRENT SENSORS

NOTE: Refer to the CTLC or CTH spec sheet for additional connection details.

NOTE: Refer to the CTG or CTU spec sheet for additional connection details.

5 YEAR WARRANTY
DESCRIPTION

MFC150 Series flexible current transducers operate based on the Rogowski principle. These coils are available in four standard sizes and can also be supplied according to customer’s design by special order. Due to their design-specific features, Rogowski coils are an extremely flexible solution for current measurement and can be used in a number of cases where a traditional current transducer is not an option.

The MFC150 coil is provided with a shield that negates the influence of external magnetic fields allowing for ideal accuracy from low currents to hundreds of kiloamps.

FEATURES

• High linearity
• Wide dynamic range
• Very useful with large wire bundles or awkwardly-shaped conductors, or in places with limited access.
• Cannot be damaged by large overloads.
• Light weight - can be suspended on the conductor being measured.

Rogowski coils have been used for the detection and measurement of electric currents for several decades. They are based on a simple principle: an “air-cored” coil is placed around the conductor in a toroidal fashion and the magnetic field produced by the current induces a voltage in the coil. The voltage output is proportional to the rate of change of current. This voltage is integrated, thus producing an output proportional to the current.

By using precision winding techniques specially developed for the purpose, the coils are manufactured so that their output is not influenced by the position of the conductor within the toroid.

Rogowski coil current transducers are used for AC measurement applications.

They can be used similarly to current transformers but for many applications they have considerable advantages:

The transducer does not measure DC, but unlike a current transformer it can carry out accurate measurement of AC components even if there is a large superimposed DC component. This feature is particularly useful for measuring ripple currents in battery charging circuits.

A Rogowski coil current measuring system consists of the combination of a coil and conditioning electronics.

Rogowski coils must be connected to an electronic integrator for 90° phase shift compensation and frequency equalization.

APPLICATIONS

• Measuring devices, lab instrumentation
• Power monitoring & control systems
• DC ripple measurement
• Harmonics and transients monitoring
• Very high current monitoring, including pulse current

BENEFITS

• By design, flexible Rogowski coils allow for installation over various conductor sizes or grouped cables.
• The coil output gives a low voltage signal; therefore there is no danger from an open-circuited secondary. This feature makes Rogowski transducers extremely suitable for temporary measurements.
• Unlike traditional current transformers with magnetic cores, the Rogowski coil is a non-intrusive transducer. Since it has no magnetic core, it draws no power from the main circuit carrying the current to be measured.
• The absence of a magnetic core allows for a wide frequency response up to hundreds of kHz. This makes the MFC150 Series particularly suitable for measurement of harmonic content and transients.

ORDERING INFORMATION

Example: 35” coil with 100mV/1kA output for use with an RPS50.

17645

Electronic Integrator
(such as the RPS50, FCA3000, etc.)

DAS
(such as PLC or data logger)

OHIO SEMITRONICS, INC. 4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264 PHONE: (614) 777-1005 * FAX: (614) 777-4511 WWW.OHIOSEMITRONICS.COM * 1-800-537-6732
## FLEXIBLE ROGOWSKI COILS

### MFC150 SERIES

#### MODEL SELECTION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Rogowski Coil Length* in inches (cm)</th>
<th>Approx. ID in inches (cm)</th>
<th>Output (@50Hz)</th>
<th>Accuracy (typical)</th>
<th>Coil Resistance</th>
<th>Frequency Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>17644</td>
<td>23.6 (60)</td>
<td>6.5 (16.5)</td>
<td>100mV/1kA</td>
<td>&lt; ±1%</td>
<td>20-140Ω</td>
<td>40Hz-20kHz</td>
</tr>
<tr>
<td>17645</td>
<td>35.4 (90)</td>
<td>10.5 (26.7)</td>
<td>100mV/1kA</td>
<td>&lt; ±1%</td>
<td>20-140Ω</td>
<td>40Hz-20kHz</td>
</tr>
<tr>
<td>17646</td>
<td>47.2 (120)</td>
<td>14.0 (35.6)</td>
<td>100mV/1kA</td>
<td>&lt; ±1%</td>
<td>20-140Ω</td>
<td>40Hz-20kHz</td>
</tr>
<tr>
<td>17647</td>
<td>70.9 (180)</td>
<td>21.5 (54.6)</td>
<td>100mV/1kA</td>
<td>&lt; ±1%</td>
<td>20-140Ω</td>
<td>40Hz-20kHz</td>
</tr>
</tbody>
</table>

*Custom coil lengths from 10 to 118 inches (25 to 300cm) available - Consult factory.

#### SPECIFICATIONS

**ELECTRICAL CHARACTERISTICS**
- Output Level (RMS) (1) std. .......... 100mV/1kA@50Hz
- Output Permissible Load ........... >15kΩ for best accuracy
- Coil Resistance .......................... 70-900Ω
- Accuracy (2) ................................................... <±1% Rdg., typical
- Frequency Range (3) ..................... approx. 40Hz to 20kHz
  (range depends upon coil length)
- Working Voltage .............................. 1000VRMS, CAT III,
  600VRMS, CAT IV, Pollution Deg. 2
- Test Voltage ........................................ 7400VRMS/1min

**STANDARDS COMPLIANCE**
- Safety: EN61010-1, EN61010-031, EN61010-2-031, and EN61010-2-032 Standards

**TRANSDUCER**
- Length ........................................ 10 in. to 118 in. (25 to 300cm)
- Coil Diameter .............................. 0.33 in. ±0.008 in. (8.4 ±0.2mm)
- Fastener Type ..........................Bayonet holder
- Net Weight ................................... approx. 0.33 to 1.1 lb (150 to 500g)
- Material ...................................... Thermoplastic rubber UL94-V0

**CONNECTION LEAD**
- Lead Wires..2-conductor, 34-35AWG (0.15mm), plus shield
- Length ........................................ approx. 6.6ft (2m) standard
- Material ...................................... UL approved, 80°C, 1000V

**ENVIRONMENTAL CONDITIONS**
- Operating Temperature Range .......... -30°C to 80°C
- Storage Temperature Range .............. -40°C to 80°C
- Relative Humidity .......................... 95% max., non-condensing
- Protection Degree .......................... IP67

**NOTES:**
1. The Rogowski coil output is proportional to the rate of change of current. The calculation formula is: Amperes(RMS) x Hertz x K x 10^-6, where K depends on manufacturing. The K value is 2 for 100mV models
2. All accuracies are specified at 23°C (±2°C) with the conductor carrying the current centered in the coil.
3. The low limit is approximate and is determined by noise effect on very low signals.

#### DIMENSIONS & CONNECTION DIAGRAM

- 6.6 FT [200] STANDARD
- LEAD
- 0.33 [8.4] COIL DIAMETER
- TWIST
- PULL
- TO SEPARATE COIL, TWIST AND PULL APART

**NOTES:**
1. ALL DIMENSIONS ARE IN INCHES [cm].
2. TOLERANCE: ±0.03 INCHES [0.08cm] UNLESS OTHERWISE NOTED.

---

OHIO SEMITRONICS, INC.
4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
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Page 61
DESCRIPTION
The RPS50 is a multi-scale signal conditioner designed to operate with the MFC150 series of Rogowski coils. Frequency equalization and 90° phase shift correction allow the use of Rogowski coils over a wide frequency range as well as with power and energy meters. Each unit provides a 0-3Vac output signal proportional to the instantaneous measured current. An optional dc output signal proportional to the RMS value of measured current is also available. Three DIP-switch-selectable ranges allow measurement of a wide range of current values with a single Rogowski coil.

FEATURES
- 90° phase shift correction allows Rogowski coils to be used with power and energy meters.
- Frequency equalization allows Rogowski coils to be used over a wide range of frequencies.
- DIP-switch-selectable ranges allow the same Rogowski coil to measure a wide range of current values.
- Compact and convenient DIN-Rail enclosure.
- Powered by any std. power mains Voltage from 85-250Vac or 110-250Vdc.

APPLICATIONS
- Measuring devices, lab instrumentation
- Power monitoring and control systems
- Harmonic and transient monitoring
- DC ripple measurement
- Welding machine control
- High current measurement

SPECIFICATIONS
INPUT (From MFC150 series Rogowski coil)
Standard ........................................... 100mV/1kA@50Hz
Other values available upon request.
DIP-Switch-Selectable Ranges:
  F.S. = 10kA ........................................... 0.5kA, 2.5kA, 10kA
  F.S. = 50kA ........................................... 2.5kA, 10kA, 50kA
  F.S. = 250kA ....................................... 10kA, 50kA, 250kA
Frequency Range (See Note 1) .............. 8Hz-100kHz@-3dB
OUTPUT 1 (Proportional to the instantaneous measured current)
Scaling ........................................... 0-F.S. Range = 0-3Vac Output
Other values available upon request.
  Loading ...................................................... >10kΩ
OUTPUT 2 (Optional) (Proportional to RMS measured current)
Scaling
  Option D ........................................... 0-F.S. Range = 0-10Vac Output
  Option E ........................................... 0-F.S. Range = 4-20mA dc Output
  Option N ........................................... 0-F.S. Range = 0-20mA dc Output
  Option P ........................................... 0-F.S. Range = 0-1Vac dc Output
  Loading ...................................................... >10kΩ
  Option D ........................................... >100kΩ
  Option E ........................................... <300Ω
  Option N ........................................... <300Ω
  Option P ........................................... >100kΩ
ACCURACY (See Note 2)
Accuracy ............................................. ±1.0% of F.S.
INSTRUMENT POWER
Rated Voltage (std.) ... 85-250Vac, 50/60Hz or 110-250Vdc
Consumption ........................................ 1.5VA max.

ENVIRONMENTAL
Operating Temperature Range .......... -10°C to +50°C
Storage Temperature Range ............. -25°C to +70°C
Relative Humidity ....................... 80% non-condensing

MECHANICAL
Material ........................................... Plastic enclosure
Protection ............................................. IP20
Size (approximate) ...................... 4.5in. x 3.9in. x 0.9in.
Net Weight (approximate) .............. 4.1oz
DIN-Rail Format ......................... EN50022

NOTES:
1. The low limit is approximate and is determined by signal-to-noise ratio.
2. The RPS50 is delivered with the specified accuracy. The calibration of each scale is adjustable by the user to achieve the maximum accuracy in conjunction with the coil being used.

STANDARDS COMPLIANCE
SAFETY ............................. 73/23/EEC and 93/68/EEC directives, EN61010-1 safety standard
EMC ............................ 89/366/EEC directive with following modifications:
  93/31/EEC and 93/68/EEC, EN50081-2,
  EN50082-2, EN61326/A1

CONNECTIONS
Refer to User’s Manual for installation instructions.

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DESCRIPTION
The FCA3000 is a multi-channel current converter designed to operate with the MFC150 series of Rogowski coils. Three independent input channels allow for measurement of a single three-phase system or multiple single-phase systems. Three dc output signals indicate the true RMS value of the individual input channels. A fourth output signal represents the sum of the three inputs - system current for three-phase systems.

Application flexibility is provided by jumper-selectable output response time values and frequency equalization to allow Rogowski coils to be used over a wide range of frequencies.

FEATURES
- Three independent input/output channels
- Fourth output for sum of three input channels
- True RMS measurements
- Jumper-selectable output response time
- Compact and convenient DIN-Rail enclosure
- Powered by any standard power mains from 80 to 260Vac
- Optional 19 to 60Vdc instrument power

APPLICATIONS
- True RMS current measurement
- High-current measurement
- PLC interface
- SCADA systems

5 YEAR WARRANTY

MODEL SELECTION

FCA3000 -

<table>
<thead>
<tr>
<th>FULL-SCALE INPUT</th>
<th>OUTPUT</th>
<th>INSTRUMENT POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0300 300A</td>
<td>D</td>
<td>0-10Vdc (blank) 80-260Vac (std)</td>
</tr>
<tr>
<td>3K 3kA</td>
<td>N</td>
<td>0-20mAdc DC 19-60Vdc</td>
</tr>
<tr>
<td>K050 50kA</td>
<td>E</td>
<td>4-20mAdc</td>
</tr>
<tr>
<td>K300 300kA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: All models are designed for use with any separately-supplied 100mV/1kA, MFC150 series Rogowski coil.

ORDERING INFORMATION
Example: 3000A F.S. input, 0-10Vdc output, standard instrument power
FCA3000-3K-D

SPECIFICATIONS

INPUTS (3) From MFC150 series Rogowski coils
Standard........................................100mV/1kA@50Hz
Other values available - Consult factory

OUTPUTS (4)
Scaling
Option D..............0-F.S. Input = 0-10Vdc Output
Option E..............0-F.S. Input = 4-20mAdc Output
Option N..............0-F.S. Input = 0-20mAdc Output
Loading
Option D..................>100kΩ
Option E..................<300Ω
Option N..................<300Ω
Response Time (default value)..................150ms
(jumper-selectable from 50 to approx. 150ms)

MECHANICAL
Enclosure Material .......................Noryl UL94-V0
Size (approximate) .....................3.7in. x 6.2in. x 2.3in.
Weight (approximate) ....................9oz.
DIN-Rail Format .......................EN50022
Protection Degree ..............front panel .............IP51
terminals ......................IP20

ENVIRONMENTAL
Operating Temperature Range ..........-10 to 50°C
Storage......................................-25 to 60°C
Operating Humidity ..............0-75% non-condensing

STANDARDS COMPLIANCE
SAFETY .......73/23/EEC and 93/68/EEC directives, EN61010.1 safety standard

EMC ......89/366/EEC directive with following modifications:
93/31/EEC and 93/68/EEC, EN50081-2,
EN50082-2, EN61326/A1

connections
Refer to User’s Manual for installation instructions.
DESCRIPTION
The AVT model transducers are designed for applications where UL, CUL, or CE listing is required. The AVT provides isolated outputs which are proportional to the applied voltage. Transducer output is derived from the average absolute value of the input and calibrated as the RMS value of a sine wave input. The AVT takes one voltage input and provides one isolated output.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC VOLTS</th>
<th>STANDARD OUTPUTS MODEL</th>
<th>UL, CUL &amp; CE</th>
<th>UL &amp; CUL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mAdc*</td>
<td>4-20mAAdc**</td>
<td>0-10Vdc*</td>
</tr>
<tr>
<td>0 - 90</td>
<td>090A</td>
<td>090E2</td>
<td>090C</td>
</tr>
<tr>
<td>0 - 150</td>
<td>150A</td>
<td>150E2</td>
<td>150C</td>
</tr>
<tr>
<td>0 - 300</td>
<td>300A</td>
<td>300E2</td>
<td>300C</td>
</tr>
<tr>
<td>0 - 600</td>
<td>600A</td>
<td>600E2</td>
<td>600C</td>
</tr>
</tbody>
</table>

* “A”, “C”, and “CX5” models are self-powered from measured line.
** “E2” models are 4-20mA loop-powered, and require 15-24Vdc instrument power.

Standard “E” models require 115Vac instrument power. For optional 230Vac instrument power - add suffix “-22”.

400Hz models are available - consult factory for VT series, which is not UL-, CUL- or CE-approved.

ORDERING INFORMATION
Example: 120Vac Input, single-phase with 4-20mA Output
AVT-150E

SPECIFICATIONS

INPUT
Frequency Range..............................50/60Hz
Burden........90V & 150V models .................1VA
300V models ........................................2VA
600V models ........................................3VA
Overload....90V, 150V & 300V models ....F.S. rating
600V models ........................................575V

DIELECTRIC TEST
Input/Output/Case........................................2200Vac

INSTRUMENT POWER
“A”, “C” and “CX5” models ..............Self-powered
“E2” models................................15-24Vdc
“E” models ...............115Vac, 50/60Hz, ±15%, 10VA
“-22” Option..........230Vac, 50/60Hz, ±15%, 10VA

OUTPUT
Response .................................................400ms
Loading
“A” models ....(0-1mA Adc output) ............0-10kΩ
“E” models ....(4-20mA output) ..................0-1kΩ
“E2” models ...(4-20mA output @ 24Vdc)...0-600Ω
“C” & “CX5” models (5V & 10V output)......≥10MΩ
Field Adjustable Cal. .............................±5%

ACCURACY........................................±0.25% F.S.@60Hz
Includes effects of linearity (10-100%) and setpoint.
Output Ripple .........................Less than 1.0% F.S.

TEMPERATURE
Range...........................................-20°C to 60°C
Effect................................................±1.0% Rdg.
CASE DIMENSIONS & CONNECTION DIAGRAMS

"A", "C", "CX5" OR "E2" MODELS

CASE HEIGHT 4.5" 0.8 LBS

DIA 0.38 (2 PLCS)

PROTECTIVE GROUND POINT

ALL DIMENSIONS ARE IN INCHES. TOLERANCE: ±0.03 INCHES

"E" MODELS

CASE HEIGHT 4.5" 1.4 LBS

DIA 0.38 (2 PLCS)

PROTECTIVE GROUND POINT

ALL DIMENSIONS ARE IN INCHES. TOLERANCE: ±0.03 INCHES

CONNECTION DIAGRAMS

"A", "C" & "CX5" MODELS

OUTPUT

LINE

LOAD

+E

"E" MODELS

OUTPUT

INST POWER

LINE

LOAD

+E

"E2" MODELS

OUTPUT

RL 15-24Vdc

LINE

LOAD

+E

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Page 65
THREE-PHASE AC VOLTAGE TRANSDUCER  

MODEL 3AVT-

DESCRIPTION
The 3AVT model transducers are designed for applications where UL, CUL, or CE listing is required. The 3AVT provides isolated outputs which are proportional to the applied voltage. Transducer output is derived from the average absolute value of the input and calibrated as the RMS value of a sine wave input. The 3AVT takes three voltage inputs and provides three separate isolated outputs.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC VOLTS</th>
<th>STANDARD OUTPUTS MODEL 3AVT-</th>
<th>UL, CUL &amp; CE</th>
<th>UL &amp; CUL</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 90</td>
<td>0.1mAdc*</td>
<td>0.05mAdc</td>
<td>0.1mAdc</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0.5mAdc*</td>
<td>0.25mAdc</td>
<td>0.5mAdc</td>
</tr>
<tr>
<td>0 - 300</td>
<td>1.0mAdc*</td>
<td>0.5mAdc</td>
<td>1.0mAdc</td>
</tr>
<tr>
<td>0 - 600</td>
<td>2.0mAdc*</td>
<td>1.0mAdc</td>
<td>2.0mAdc</td>
</tr>
</tbody>
</table>

* “A”, “C”, and “CX5” models are self-powered from measured line.
** “E” models are 4-20mA loop-powered, and require 15-24Vdc instrument power.
Standard “E” models require 115Vac instrument power.
For optional 230Vac instrument power - add suffix “-22”.
400Hz models are available - consult factory for 3VT series, which is not UL-, CUL- or CE-approved.

SPECIFICATIONS

INPUT
Frequency Range .................................................. 50/60Hz
Burden .............................................................. 0.1VA
300V models ...................................................... 1VA
600V models ...................................................... 3VA

Overload ............... 90, 150, 300V models ............... F.S. rating
600V models ............... 575V

DIELECTRIC TEST
Input/Output/Case ............................................. 2200Vac

INSTRUMENT POWER
“A”, “C”, and “CX5” models ................................... Self-powered
“E” models ........................................................... 15-24Vdc
“-22” Option .................................................. 230Vac, 50/60Hz, ±15%, 10VA

“E” models .................................................. 115Vac, 50/60Hz, ±15%, 10VA
“-22” Option .................................................. 230Vac, 50/60Hz, ±15%, 10VA

“E” models .................................................. 115Vac, 50/60Hz, ±15%, 10VA

OUTPUT
Response .......................................................... 400ms
Loading
“A” models .................................................. 0-10kΩ
“E” models .................................................. 0-1kΩ
“E” models .................................................. 0-600Ω
“C”, “CX5” models ........................................ 10Ω

Field Adjustable Cal. ............................................ ±5%

ACCURACY ................................................ 0.25% F.S. @60Hz

Includes effects of linearity (10-100%) and setpoint.

TEMPERATURE
Temperature Range ........................................... -20°C to 60°C

Temperature Effect ............................................. ±1.0% Rdg.

ORDERING INFORMATION
Example: Three 120Vac Inputs, with three 4-20mA Outputs
3AVT-150E

CASE DIMENSIONS

“E” MODELS

“E” MODELS

“A”, “C”, “CX5”, OR “E2” MODELS

All dimensions in inches

Dwg# 0902-00880-B Rev --

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Page 66
CONNECTION DIAGRAMS

"A", "C" & "CX5" MODELS

THREE-PHASE, THREE-WIRE

THREE-PHASE, FOUR-WIRE

"E" MODELS

THREE-PHASE, THREE-WIRE

THREE-PHASE, FOUR-WIRE

TERMINALS 1, 3, AND 5 ARE INTERNALLY COMMON

"E2" MODELS

THREE-PHASE, THREE-WIRE

THREE-PHASE, FOUR-WIRE
DIN-RAIL-MOUNTED AC VOLTAGE TRANSDUCER

0.25% ACCURACY

FEATURES
- Ruggedized Polyamide DIN-mount case.
- Slim profile allows maximum use of available space.
- Field-selectable analog outputs.
- Recessed terminals provide increased safety.

APPLICATIONS
- Ideal for use in enclosures with dimensional constraints.
- Designed for industrial environments.
- OEM measurement systems.
- Designed for use with potential transformers.
- Easily integrated into control systems.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>INPUT AC VOLTAGE</th>
<th>STANDARD OUTPUTS MODEL MVT-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mA dc*</td>
</tr>
<tr>
<td>0-150</td>
<td>150A</td>
</tr>
<tr>
<td>0-300</td>
<td>300A</td>
</tr>
<tr>
<td>10-600</td>
<td>1600A</td>
</tr>
</tbody>
</table>

† 600V Models and MVT-300E are not included in UL Listing.
* Models are self-powered from measured AC input line with DIP-switch-selectable 0-5Vdc or 0-10Vdc output.
** Denotes 4-20mA loop-powered unit, requires 15-40Vdc instrument power.
“E” models require 85-135Vac instrument power.

Note: 600Vac models supplied with potential transformer (PT)

DIN-rail lengths available: Consult Factory

OUTPUT
- Response Time (to 99% F.S.) 400ms
- Field-Adjustable Span ±5%
- Loading
  - “A” models set for 0-1mA output 0-10kΩ
  - “A” models set for 0-5Vdc output >5MΩ
  - “A” models set for 0-10Vdc output >10MΩ
  - “E” models (4-20mA dc output) 0-500Ω
  - “E2” models (4-20mA dc Loop Powered) 0-600Ω

ACCURACY (@ 60Hz) ±0.25% F.S.
Includes effects of linearity and setpoint (10% to 100% F.S.)
- Output Ripple <1.0% F.S.

TEMPERATURE EFFECT
- “A” and “E2” models (-20°C to +65°C) ±1.0%
- “E” models (-20°C to +40°C) ±1.0%
CONNECTIONS & CASE DIMENSIONS

**MODEL MVT-**

**SELF-POWERED “A” MODELS**

150 & 300Vac MODELS

PTs: CONNECT AS SHOWN IN 600V DIAGRAM.

600Vac MODELS

(P/T SUPPLIED WITH UNIT)

**LOOP-POWERED “E2” MODELS**

150 & 300Vac MODELS

PTs: CONNECT AS SHOWN IN 600V DIAGRAM.

600Vac MODELS

(P/T SUPPLIED WITH UNIT)

**“E” MODELS**

150 & 300Vac MODELS

* AC INSTRUMENT POWER, TERMINALS 5, 6

600Vac MODELS

(P/T SUPPLIED WITH UNIT)

* AC INSTRUMENT POWER, TERMINALS 5, 6

**Mounting Dimensions**

UNIT CAN BE MOUNTED ON:

STANDARD 35MM TOP-HAT DIN-RAIL (DIN3) PER EN 50022 OR STANDARD 32MM "G" DIN-RAIL (DIN1) PER EN 50035.

**Output Selections, “A” Models**

<table>
<thead>
<tr>
<th>OUTPUT</th>
<th>SWITCH POS. 1</th>
<th>SWITCH POS. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1mA</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>0-5V</td>
<td>ON</td>
<td>ON</td>
</tr>
<tr>
<td>0-10V</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

**PT Dimensions**

Dwg# 0902-00862-B Rev A
**SINGLE-PHASE AC VOLTAGE TRANSDUCER MODEL DVT-**

**DESCRIPTION**

The DVT model transducers provide an electrically-isolated output which is proportional to the applied voltage. Transducer output is derived from the arithmetic mean value of the input and calibrated as the RMS value of a sine wave input.

The transducer fulfills requirements and regulations regarding EMC and safety (IEC 1010) and was designed, manufactured and tested in accordance with ISO 9001.

**FEATURES**

- Voltage ranges up to 600V.
- Current and voltage outputs available.
- Compact DIN-rail packaging.

**APPLICATIONS**

- Where voltage measurements are required.
- Where CE or CSA approvals are required.
- SCADA, process control or OEM applications.

### MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC VOLTS</th>
<th>STANDARD OUTPUTS MODEL DVT-</th>
<th>ORDERING INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mA dc*</td>
<td>4-20mA dc*</td>
</tr>
<tr>
<td>0-90</td>
<td>090A</td>
<td>090E</td>
</tr>
<tr>
<td>0-150</td>
<td>120A</td>
<td>120E</td>
</tr>
<tr>
<td>0-300</td>
<td>240A</td>
<td>240E</td>
</tr>
<tr>
<td>0-600</td>
<td>600A</td>
<td>600E</td>
</tr>
</tbody>
</table>

* "A" models are self-powered from measured voltage line.
** "E2" loop-powered models require 12-32Vdc instr. power.

**ORDERING INFORMATION**

Example: 120Vac Input with 4-20mA Output.

DVT-120E

DIN Rail lengths available - Consult factory

**SPECIFICATIONS**

**INPUT**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>See Table</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>Burden</td>
<td>&lt;2VA</td>
</tr>
<tr>
<td>Overload</td>
<td>120% of F.S.</td>
</tr>
</tbody>
</table>

**DIELECTRIC TEST**

- Input to Instrument Power/Output/Case: 3700Vac
- Instrument Power to Output/Case: 3700Vac
- Output to Case: 490Vac

**INSTRUMENT POWER**

- "A" models: Self-powered
- "E", "C" & "CX5" models: 100-135Vac, 50/60Hz, 3VA
- "E2" loop-powered models: 12-32Vdc
- "-22" Option: 230Vac, 50/60Hz, ±15%

**OUTPUT**

- Response Time (to 90% F.S.): 300ms
- Loading:
  - "A" models: 0-15kΩ
  - "C" & "CX5" models: 2.5kΩ minimum
  - "E" models: 0-750Ω
  - "E2" models: 0-600Ω @ 24V

**ACCURACY**

±0.5% F.S. @ 60Hz
Includes effects of linearity (20%-100%) and setpoint.
Output Ripple: <1.0% p.p.

**TEMPERATURE & PHYSICAL**

- Temperature Range: -10°C to +55°C
- Termination: #10 AWG max.
- Net Weight: 0.6 lb

**CASE DIMENSIONS**

Dwg# 0902-00866-B Rev --

**CONNECTION DIAGRAMS**

**VOLTAGE MEASUREMENT (AVG)**

OHIO SEMITRONICS, INC.

Page 70
**FEATURES**
- Accurate measurement of the **true RMS** value of input signals over a wide frequency range.

**APPLICATIONS**
- For use in applications where measurement of nonsinusoidal waveforms is required.

### SPECIFICATIONS

**INPUT**
- Voltage: See Table
- Frequency Range: 48 to 420 Hz
- Burden: 150 Vac Range < 0.15VA
- 300 Vac Range < 0.30VA
- 600 Vac Range < 0.60VA
- Overload: 150 Vac & 300 Vac Models F.S. Rating
- 600 Vac Models: 575V

**DIELECTRIC TEST**
- Input/Output/Case: 2200 Vac

**INSTRUMENT POWER**
- Standard: 115 Vac, ±15%, 50/60Hz, 3.5VA
- Option “-22”: 230 Vac, ±15%, 50/60Hz, 3.5VA

**OUTPUT**
- Response Time (90%): 100ms
- Loading: 
  - “B” models: (0-1mAdc output) 0-10kΩ
  - “X5” & “D” models: (0-5, 0-10 Vdc output) 2kΩ min.
  - “E” models: (4-20mAdc output) 0-500Ω
- Field Adjustable Cal.: ±10%
- ACCURACY: ±0.25% F.S. @ 60Hz
  - Includes effects of linearity and setpoint
  - Typical ±0.5% over frequency range
- Output Ripple: <1.0% F.S.

**TEMPERATURE & PHYSICAL**
- Temperature Effect: (-20°C to +60°C) ±1.0% Rdg.
- Net Weight: 1.5 Lbs

### MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC VOLTS</th>
<th>STANDARD OUTPUTS MODEL AVTR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-150</td>
<td>001B 001D 001E 001X5</td>
</tr>
<tr>
<td>0-300</td>
<td>002B 002D 002E 002X5</td>
</tr>
<tr>
<td>0-600</td>
<td>004B 004D 004E 004X5</td>
</tr>
</tbody>
</table>

All standard units require 115Vac instrument power.
Optional 230Vac instrument power - Add suffix “-22”.

### ORDERING INFORMATION
Example: Single-phase 120Vac Input with 0-10Vdc Output.
AVTR-001D

### CONNECTION DIAGRAM

[Diagram showing connection points 1 to 6 with inst power and output]
THREE-PHASE AC RMS VOLTAGE TRANSDUCTOR MODEL 3VTR-

3-IN-1 AC RMS VOLTAGE TRANSDUCTOR 0.25% ACCURACY

FEATURES
• Accurate measurement of the true RMS value of input voltage over a wide frequency range.
• Input/Output dielectric test of 2500V.

APPLICATIONS
• For use in applications where measurement of nonsinusoidal waveforms is required.
• Designed for use in three-phase systems, but may also be used to monitor three single-phase circuits where panel space is at a premium.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC VOLTS</th>
<th>STANDARD OUTPUTS MODEL 3VTR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-150</td>
<td>001B 001D 001E 001X5</td>
</tr>
<tr>
<td>0-300</td>
<td>002B 002D 002E 002X5</td>
</tr>
<tr>
<td>0-600</td>
<td>004B 004D 004E 004X5</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION
Example: 120Vac Input with a 0-10Vdc Output. 3VTR-001D

SPECIFICATIONS

INSTRUMENT POWER
All units require 85-265Vac, 48-420Hz, 5VA or 110-370Vdc, 5VA.

DIELECTRIC TEST
Input/Output/Case ........................................ 2500Vac RMS

ACCURACY ................................................ ±0.25% F.S. @60Hz
(Includes effects of linearity and setpoint from 10-100% of range. ±0.5% F.S. typical over frequency range.)

Output Ripple .............................................. <1.0% F.S.

TEMPERATURE & PHYSICAL
Temperature Effect (-20ºC to +60ºC) ............... ±1.0% Rdg.
Net Weight ................................................. 2.5 lbs

5 YEAR WARRANTY

CONNECTION DIAGRAMS AND CASE DIMENSIONS

OHIO SEMITRONICS, INC.
Page 72
2-WIRE LOOP POWERED, TRUE RMS

FEATURES
- Provides a fully-isolated 4-20mA output proportional to the measured voltage even in non-sinusoidal waveforms.
- Slim profile allows maximum use of control enclosure space.
- Recessed terminals provide increased safety.
- UL94V-0 polyamide DIN-mount case style.

APPLICATIONS
- True RMS transducer for accurately sensing voltage in single- and 3-phase installations.
- Ideal for non-sinusoidal applications, such as VFDs and SCR-controlled loads.
- Designed for industrial environments.

MODEL SELECTION

<table>
<thead>
<tr>
<th>AC VOLTAGE</th>
<th>STANDARD OUTPUTS MODEL MVTR-</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-150</td>
<td>4-20mA dc</td>
</tr>
<tr>
<td>0-300</td>
<td>150E2</td>
</tr>
<tr>
<td>0-600</td>
<td>300E2</td>
</tr>
<tr>
<td>0-600*</td>
<td>600E2</td>
</tr>
</tbody>
</table>

*Note: 600Vac models supplied with potential transformer (PT)

SPECIFICATIONS

INPUT
- Voltage........................................See Table
- Frequency Range ....Standard ........50-400Hz
- Burden ...............150Vac models .........1.0VA
- 300Vac, 600Vac models ......2.0VA
- Voltage Overload .......................................F.S. Rating

OUTPUT
- Scaling ..............0-F.S. Input = 4-20mA dc Output
- Response (to 90%) ....150 & 300Vac models 200ms
- 600Vac models ..............500ms
- Loading ..................(@ 24Vdc Inst. Pwr.) ...........0-500Ω
- Setpoint Adjustment ......................±5%, minimum

DIELECTRIC TEST
- Input/Output ........................................2200Vac

INSTRUMENT POWER
- Loop-Powered..........Nominal ......................24Vdc
- Range ......................15-35Vdc

ACCURACY (Includes effects of linearity and setpoint)
- 60Hz ..................10-100% F.S. ...........±0.25% F.S.
- all others ......................±1.0% F.S.
- Output Ripple ......................<1.0% pk-pk

TEMPERATURE
- Operating Range ..............-20°C to 60°C
- Effect ......................±1.0% F.S.

PHYSICAL
- Termination Wire Size ..............22 to 12AWG
- Net Weight ..........150Vac, 300Vac models .........0.25 lb
- 600Vac models with PT ..........0.90 lb
- Unit can be mounted on ............RAIL EN50035 (DIN 1), or RAIL EN50022 (DIN 2)

CONNECTIONS & DIMENSIONS

Dwgf# 0902-00863-B Rev B

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OHIO SEMITRONICS, INC. Page 73
FEATURES

- Accurate measurement of the true RMS value of the input signal.
- Universal ac/dc instrument power.
- Models up to 600Vac input.

APPLICATIONS

- For use in applications where measurement of nonsinusoidal or distorted waveforms is required.
- Applications that require CE or CSA approval.
- Perfect for installations that require compact packaging.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT AC VOLTS</th>
<th>STANDARD OUTPUTS MODEL DVTR-</th>
<th>0-1mAdc</th>
<th>0-10Vdc</th>
<th>4-20mAdc</th>
<th>0-5Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-90</td>
<td>090B</td>
<td>090D</td>
<td>090E</td>
<td>090X5</td>
<td></td>
</tr>
<tr>
<td>0-150</td>
<td>150B</td>
<td>150D</td>
<td>150E</td>
<td>150X5</td>
<td></td>
</tr>
<tr>
<td>0-300</td>
<td>300B</td>
<td>300D</td>
<td>300E</td>
<td>300X5</td>
<td></td>
</tr>
<tr>
<td>0-600</td>
<td>600B</td>
<td>600D</td>
<td>600E</td>
<td>600X5</td>
<td></td>
</tr>
</tbody>
</table>

All standard units require 85-230Vac/dc instrument power (dc or 50/60Hz.)
DIN-rail lengths available: Consult Factory

ORDERING INFORMATION

Example: 120Vac Input with a 0-10Vdc Output.

DVTR-150D

SPECIFICATIONS

INPUT
Voltage .......................................................... See Table
Frequency Range ........................................50/60Hz
Burden ..........................................................<1V F.S.
Overload ......................................................120% F.S. Rating

DIELECTRIC TEST
Input to Instrument Power/Output/Case ............... 3700Vac
Instrument Power to Output/Case ....................... 3700Vac
Output to Case ............................................. 490Vac

INSTRUMENT POWER
Standard ...................................................... 85-230Vac/dc, 50/60Hz, 3.0VA

TEMPERATURE
Operating Range ........................................... -10ºC to +55ºC

OUTPUT
Response Time (to 90%) ...................................... 0ms
Loading
“B” models........... (0-1mAdc output) .................. 0-15kΩ
“D” & “X5” models .. (0-5, 0-10Vdc) ..................... 5kΩ min.
“E” models........... (4-20mAdc) .......................... 0-750Ω

ACCURACY .............. ±0.5% F.S.@60Hz
Output Ripple .................. <0.5% pk-pk

PHYSICAL
Termination .................................................. #10 AWG max.
Net Weight .................................................. 0.7 lb

CASE DIMENSIONS

NOTES
1. DIMENSIONS ARE IN INCHES [MM].
2. MOUNTED ON 35MM TOP-HAT DIN-RAIL.
RMS VOLTAGE TRANSDUCER

MODEL VT8-

DC TO 10KHZ FREQUENCY RANGE

DESCRIPTION
The model VT8 RMS voltage transducer provides an output directly proportional to the true RMS value of the input. Input voltages may be dc, ac, non-sinusoidal or complex combinations of these waveforms.

A wide variety of standard input ranges and output types are available. Consult factory for special ranges.

FEATURES
• True RMS measurement
• 2500Vac dielectric test
• Wide frequency range

APPLICATIONS
• Accurate measurement of dc, ac and non-sinusoidal waveforms.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT (mV)</th>
<th>STANDARD OUTPUTS MODEL VT8-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mA dc</td>
</tr>
<tr>
<td>0 - 50</td>
<td>015B</td>
</tr>
<tr>
<td>0 - 100</td>
<td>016B</td>
</tr>
<tr>
<td>0 - 200</td>
<td>017B</td>
</tr>
<tr>
<td>0 - 250</td>
<td>018B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT (Volts)</th>
<th>STANDARD OUTPUTS MODEL VT8-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mA dc</td>
</tr>
<tr>
<td>0 - 10</td>
<td>001B</td>
</tr>
<tr>
<td>0 - 25</td>
<td>002B</td>
</tr>
<tr>
<td>0 - 50</td>
<td>003B</td>
</tr>
<tr>
<td>0 - 100</td>
<td>004B</td>
</tr>
<tr>
<td>0 - 150</td>
<td>005B</td>
</tr>
<tr>
<td>0 - 250</td>
<td>006B</td>
</tr>
<tr>
<td>0 - 300</td>
<td>007B</td>
</tr>
<tr>
<td>0 - 400</td>
<td>008B</td>
</tr>
<tr>
<td>0 - 500</td>
<td>009B</td>
</tr>
<tr>
<td>0 - 600</td>
<td>010B</td>
</tr>
<tr>
<td>*0 - 700</td>
<td>011B</td>
</tr>
<tr>
<td>*0 - 800</td>
<td>012B</td>
</tr>
<tr>
<td>*0 - 900</td>
<td>013B</td>
</tr>
<tr>
<td>*0 - 1000</td>
<td>014B</td>
</tr>
</tbody>
</table>

Instrument Power Options
Option “-11” ................. 115Vac ±15%, 50/60Hz, 5VA
Option “-22” ................. 230Vac ±15%, 50/60Hz, 5VA
Options “-12”, “-15”, “-24”, “-28”, “-37”, “-48” ................. 12Vdc thru 48Vdc, ±10%, 150mA max.

Standard models contain a universal switching power supply. “-11” & “-22” models utilize a lower-cost linear power supply.

ORDERING INFORMATION
Example: 0-100Vac Input with 0-10Vdc Output and 115Vac Instr. Pwr.
VT8-004D-11

SPECIFICATIONS

INPUT
Voltage .................................................. See Table
Frequency Range .................................. dc-10kHz
Overload
0.05-600Vac models ........ 2XF.S. or 600Vac/850Vdc max.
700V-1000Vac models (w/external divider box) ........ 1.25XF.S.
Burden ............................................. >100kΩ

DIELECTRIC TEST
Input/Output/Case ................................... 2500Vac

INSTRUMENT POWER
Standard ... 85-265Vac, 48-420Hz, 5VA or 110-370Vdc, 5VA
“-11” option .................. 115Vac ±15%, 50/60Hz, 5VA
“-22” option .................. 230Vac ±15%, 50/60Hz, 5VA
“-12”, “-15”, “-24” options ... 12, 15, or 24Vac ±10%, 150mA max.
“-28”, “-37”, “-48” options ... 28, 37, or 48Vdc ±10%, 150mA max.

OUTPUT
Type .................................................. See Table
Response ................... (to 90%) ............... 100ms
Loading
“B” models .............. (0-1mA dc) ............... 0-10kΩ
“D”, “X5” models .... (0-10, 0-5Vdc) .......... >2kΩ
“E” models .............. (4-20mA dc) .......... 0-500Ω
Field Adjustable Cal. ................................ ±10%

ACCURACY
Includes effects of linearity, setpoint and repeatability.
All Models ............... ±0.25% F.S. @ 48-420Hz

TEMPERATURE
Operating Range .............. -10°C to 60°C
Effect .................. ±1.0% Rdg., ±0.1% F.S.
**CONNECTION DIAGRAMS**

**MODEL VT8**

**SHUNT ISOLATOR**
50mV - 250mV MODELS

- **CONNECTIONS & CASE DIMENSIONS**

**10V - 600V MODELS**

**700V - 1000V MODELS**

**CASE DIMENSIONS**

**MODEL VT7 & VT8**

**DIVIDER BOX**

Note: All models above 600V input require a divider box in series with the input terminal #2. Do not connect the input voltage directly! Damage to the VT8 will result if not properly connected.

All dimensions in inches

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Page 76
DC TO 10KHZ FREQUENCY RANGE

DESCRIPTION
The model VT7 dc voltage transducer provides an output directly proportional to the input. It functions as a milliVolt shunt or high-voltage isolator.
This unit is primarily intended to measure and isolate dc voltages, but may also be used to monitor ac and non-sinusoidal waveforms. The output signal is a scaled replica of the input (ac input = ac output, etc.). For ac or bidirectional dc applications, a model with bidirectional output type must be used.
A wide variety of standard input ranges and output types are available. Consult factory for special ranges.

FEATURES
• dc voltage measurement
• 2500Vac dielectric test
• Wide frequency range

APPLICATIONS
• Accurate measurement and isolation of dc voltages.
• Shunt isolator

5 YEAR
WARRANTY

MODEL SELECTION

<table>
<thead>
<tr>
<th>*INPUT (mV)</th>
<th>STANDARD OUTPUTS MODEL VT7-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0±0.5mA</td>
</tr>
<tr>
<td>0 - 50</td>
<td>015B</td>
</tr>
<tr>
<td>0 - 100</td>
<td>016B</td>
</tr>
<tr>
<td>0 - 200</td>
<td>017B</td>
</tr>
<tr>
<td>0 - 250</td>
<td>018B</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INPUT (Volts)</th>
<th>STANDARD OUTPUTS MODEL VT7-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0±0.5mA</td>
</tr>
<tr>
<td>0 - 10</td>
<td>001B</td>
</tr>
<tr>
<td>0 - 25</td>
<td>002B</td>
</tr>
<tr>
<td>0 - 50</td>
<td>003B</td>
</tr>
<tr>
<td>0 - 100</td>
<td>004B</td>
</tr>
<tr>
<td>0 - 150</td>
<td>005B</td>
</tr>
<tr>
<td>0 - 250</td>
<td>006B</td>
</tr>
<tr>
<td>0 - 300</td>
<td>007B</td>
</tr>
<tr>
<td>0 - 400</td>
<td>008B</td>
</tr>
<tr>
<td>0 - 500</td>
<td>009B</td>
</tr>
<tr>
<td>0 - 600</td>
<td>010B</td>
</tr>
<tr>
<td><strong>0 - 700</strong></td>
<td>011B</td>
</tr>
<tr>
<td><strong>0 - 800</strong></td>
<td>012B</td>
</tr>
<tr>
<td><strong>0 - 900</strong></td>
<td>013B</td>
</tr>
<tr>
<td><strong>0 - 1000</strong></td>
<td>014B</td>
</tr>
</tbody>
</table>

* Shunt inputs
** Supplied with external divider box.

DETAILS

<table>
<thead>
<tr>
<th>Instrument Power Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option “-11”</strong> ..........</td>
</tr>
<tr>
<td><strong>Option “-22”</strong> ..........</td>
</tr>
<tr>
<td><strong>Options “-12”, “-15”, “-24”, “-28”, “-37”, “-48”</strong> ..........</td>
</tr>
</tbody>
</table>
Standard models contain a universal switching power supply. “-11” & “-22” models utilize a lower-cost linear power supply.

ORDERING INFORMATION

Example: 0-50mVdc Input with 4-20mA Output and 125Vdc Instrument Power

VT7-015E

SPECIFICATIONS

INPUT
Voltage .............................................. See Table
Frequency Range ...................................... dc-10kHz
Overload
0.05-600V models .......... 2XF.S. or 600Vac/850Vdc max.
700V-1000V models (w/external divider box) .......... 1.25XF.S.
Burden ............................................. >100kΩ

DIELECTRIC TEST
Input/Output/Case ...................................... 2500Vac

INSTRUMENT POWER
Standard ...85-265Vac, 48-420Hz, 5VA or 110-370Vdc, 5VA
“-11” option ............................................ 115Vac ±15%, 50/60Hz, 5VA
“-22” option ............................................ 230Vac ±15%, 50/60Hz, 5VA
“-12”, “-15”, “-24” options ...12, 15, or 24Vac ±10%, 150mA max.
“-28”, “-37”, “-48” options ...28, 37, or 48Vac ±10%, 150mA max.

OUTPUT
Type .............................................. See Table
Response .............................................. (to 90%) .......... 50µs
Loading
“B” models .............. (0-1mA) .............. 0-10kΩ
“D”, “X5” models ............ (0-10, 0-5V) .......... >2kΩ
“E” models .............. (4-20mA) .............. 0-500Ω
Field Adjustable Cal. .......... ±10%

ACCURACY
Includes effects of linearity, setpoint and repeatability.
All Models .............................................. ±0.25% F.S.@ DC

TEMPERATURE
Operating Range .............. -10ºC to 60ºC
Effect .............................................. ±1.0% Rdg., ±0.1%F.S.
CONNECTIONS & CASE DIMENSIONS

MODEL VT7-

CONNECTION DIAGRAMS

SHUNT ISOLATOR
50mV - 250mV MODELS

10V - 600V MODELS

1 2 3 4 5 6

INSTR OUTPUT
POWER

LOAD

LINE

SHUNT

INST OUTPUT
POWER

LOAD

LINE

DIA 0.38
2 PLCS

CASE HEIGHT 4.38"
1.5 LBS

DIA 0.19
4 PLCS

DIA 0.19 (2 PLCS)

15" LEAD

2.51

1.56

2.87

15" LEAD

1.00

2.07

Note: All models above 600V input require a divider box in series with the input terminal #2. Do not connect the input voltage directly! Damage to the VT7 will result if not properly connected.

CASE DIMENSIONS

MODEL VT7 & VT8

DIVIDER BOX

Dwg# 0902-00847-B Rev A

All dimensions in inches
DESCRIPTION
The DVT7E is a single-model dc voltage transducer with user-selectable input ranges. DIP switch-selectable ranges extend from 50mV to 600V. An output of 4-20mA is proportional to a zero-to-F.S. input for the selected range. Packaging is in a compact, easy-to-install, DIN rail-mount enclosure.

FEATURES
- DC voltage measurement
- 4-20mA sensor-powered output
- Input, output and instrument power are electrically isolated
- DIN rail-mount enclosure

APPLICATIONS
- Shunt isolation
- Solar string voltage monitoring
- Monitoring of battery ground problems
- Monitoring of over-voltage or under-voltage conditions to avoid DC motor drive problems.

SPECIFICATIONS

INPUT
(3 separate inputs, each with DIP switch-selectable ranges)
Millivolt Input:
  Selectable Ranges: 50, 100, 150, 250 & 500mVdc
Low-Voltage Input:
  Selectable Ranges: 5, 10, 15, 25 & 50Vdc
High-Voltage Input:
  Selectable Ranges: 50, 100, 150, 250, 500 & 600Vdc
  (*1000V option is available - Consult factory for details)
Over-range (without damage)
  500V and 600V Ranges........................................ 850Vpk
  All Other Ranges............................................ 2 X F.S. Rating
Frequency (all ranges)...............................Unidirectional dc Impedance:
  Millivolt Input........................................... ≥1kΩ
  Low-Voltage Input....................................... ≥100kΩ
  High-Voltage Input..................................... ≥1MΩ

OUTPUT
Type .............................................. 4-20mA
Scaling ........................................... 0-F.S. Input = 4-20mA Output
Response (to 90%)............................ 100µs, Typical
Loading .................................................. 0-500Ω

INSTRUMENT POWER
Standard ........................................ 24V, ±20%, dc/50-400Hz, ≤2W

ACCURACY (Includes effects of setpoint, linearity and offset)
At Any Range Setting.............................. ±0.5% F.S.

DIELECTRIC TEST
Input to Output/Instrument Power.................... 2500Vac
Instrument Power to Output.......................... 500Vac

TEMPERATURE & ENVIRONMENTAL
Operating Range..................................... -30°C to +60°C
Temperature Effect............................... ±1% Rdg., ±0.1% F.S.
Relative Humidity................................. 0-95%, non-condensing

PHYSICAL
Mounts on standard 35mm "Top Hat" rail, per EN50052/EN60715.
Termination Wire Size................................. 12-30AWG
IP Rating................................................. IP20

SWITCH POSITIONS
To select the desired input range, set the switches “ON” as indicated in the chart below.

<table>
<thead>
<tr>
<th>INPUT RANGE</th>
<th>SWITCH POSITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SW1</td>
<td>SW2</td>
</tr>
<tr>
<td>1000*</td>
<td>ON</td>
</tr>
<tr>
<td>600</td>
<td>off</td>
</tr>
<tr>
<td>500</td>
<td>off</td>
</tr>
<tr>
<td>250</td>
<td>ON</td>
</tr>
<tr>
<td>150</td>
<td>ON</td>
</tr>
<tr>
<td>100</td>
<td>ON</td>
</tr>
<tr>
<td>50</td>
<td>ON</td>
</tr>
<tr>
<td>50</td>
<td>off</td>
</tr>
<tr>
<td>25</td>
<td>ON</td>
</tr>
<tr>
<td>15</td>
<td>ON</td>
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<td>10</td>
<td>ON</td>
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<td>ON</td>
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<td>250</td>
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<td>100</td>
<td>ON</td>
</tr>
<tr>
<td>50</td>
<td>ON</td>
</tr>
</tbody>
</table>

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CONNECTIONS & CASE DIMENSIONS

MODEL DVT7E-

DIMENSIONS

1) DIN Rail 35mm x 7.5mm x 2 meter, slotted (OSI P/N 18066)
ALL DIMENSIONS IN INCHES (mm)
TOLERANCE: ±0.03 IN. (0.76mm)

Dwg# 0902-00740-B Rev -- (mod.)

DC VOLTAGE ISOLATORS

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Page 80
**UNIDIRECTIONAL DC VOLTAGE ISOLATOR**  
**MODEL VTU-**

**LOW COST**

**APPLICATIONS**
- Monitoring of substation or electric circuit performance.
- Isolation and amplification of shunt output.
- Electric generator or solar field monitoring.

---

**FEATURES**
- Output is electrically isolated from the input and is directly proportional to the input.
- Unidirectional signals only.
- Provides 1500V dielectric protection.

---

**INPUT**

<table>
<thead>
<tr>
<th>DC VOLTS</th>
<th>0-1mAdc</th>
<th>4-20mAdc</th>
<th>0-5Vdc</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 0.05</td>
<td>015B</td>
<td>015E</td>
<td>015X5</td>
</tr>
<tr>
<td>0 - 0.10</td>
<td>016B</td>
<td>016E</td>
<td>016X5</td>
</tr>
<tr>
<td>0 - 1</td>
<td>001B</td>
<td>001E</td>
<td>001X5</td>
</tr>
<tr>
<td>0 - 25</td>
<td>002B</td>
<td>002E</td>
<td>002X5</td>
</tr>
<tr>
<td>0 - 50</td>
<td>003B</td>
<td>003E</td>
<td>003X5</td>
</tr>
<tr>
<td>0 - 100</td>
<td>004B</td>
<td>004E</td>
<td>004X5</td>
</tr>
<tr>
<td>0 - 150</td>
<td>005B</td>
<td>005E</td>
<td>005X5</td>
</tr>
<tr>
<td>0 - 250</td>
<td>006B</td>
<td>006E</td>
<td>006X5</td>
</tr>
<tr>
<td>0 - 300</td>
<td>007B</td>
<td>007E</td>
<td>007X5</td>
</tr>
<tr>
<td>0 - 400</td>
<td>008B</td>
<td>008E</td>
<td>008X5</td>
</tr>
<tr>
<td>0 - 500</td>
<td>009B</td>
<td>009E</td>
<td>009X5</td>
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<tr>
<td>0 - 600</td>
<td>010B</td>
<td>010E</td>
<td>010X5</td>
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<tr>
<td>0 - 700</td>
<td>011B</td>
<td>011E</td>
<td>011X5</td>
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<tr>
<td>0 - 800</td>
<td>012B</td>
<td>012E</td>
<td>012X5</td>
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<tr>
<td>0 - 900</td>
<td>013B</td>
<td>013E</td>
<td>013X5</td>
</tr>
<tr>
<td>0 - 1000</td>
<td>014B</td>
<td>014E</td>
<td>014X5</td>
</tr>
</tbody>
</table>

700-1000V models are supplied with an external divider box. 50mV and 100mV models can be used for shunt isolation.

---

**ORDERING INFORMATION**
Example: 150Vdc Input with 4-20mAdc Output.

**VTU-005E**

---

**CASE DIMENSIONS**

**DIELECTRIC TEST** (direct input/output/case) ..........1500Vac

**INSTRUMENT POWER**
Standard ...........................................115Vac ±15%, 50/60Hz, 4VA
"-22" option .....................................230Vac ±15%, 50/60Hz, 4VA

**OUTPUT**
Response Time ...........(to 90%) ..................500µs
Loading
- "B" models ..............(0-1mAdc output) ...........0-5kΩ
- "E" models ..............(4-20mAdc output) ...........0-300Ω
- "X5" models ..........(0-5Vdc output) ..............≥2kΩ
Field Adjustable Cal. ..........±10%

**ACCURACY** ..................±0.25% Rdg., ±0.1% F.S.@dc includes effects of linearity and repeatability

**TEMPERATURE**
Effect ..............(-5°C to +40°C) ..........±1.0% Rdg., ±0.1% F.S.

---

**OHIO SEMITRONICS, INC.**

Page 81
FEATURES
- Output is electrically isolated from the input and is directly proportional to the input amplitude.
- Input/output dielectric test of 10kV.

APPLICATIONS
- Monitoring of substation or electric circuit performance.
- Isolation and amplification of shunt output.

### SPECIFICATIONS

**INPUT**
- Voltage Range: See Table
- Over-range w/o damage: 120% of Rating
- Burden: ≤1mA

**DIELECTRIC TEST**
- Input to Output/Instrument Power: 10kVac
- Instrument Power to Output: 2200Vac

**INSTRUMENT POWER**
- Standard: 115Vac, 50/60Hz, 3VA

**ACCURACY**
- ±0.5% F.S.

**OUTPUT**
- Response: (to 90%) 100ms
- Loading:
  - "B" models: 0-1mAdc output ≤10kΩ
  - "X5", "D" models: (5V, 10Vdc output) ≥2kΩ
  - "E" models: (4-20mAdc output) ≤500Ω

**TEMPERATURE & PHYSICAL**
- Temperature Effect (-10°C to +60°C): ±1.0% Rdg., ±0.1% F.S.
- Net Weight: 3.0 lb
- Input Leads:
  - Wire Size: 22AWG
  - Length: Standard 3ft, with option "L" 15ft

**DIMENSIONS & CONNECTIONS**
- MOUNTING FLANGE THICKNESS: 0.13" (4 PLACES)
- MOUNTING HOLES: 0.20" DIAMETER (4 PLACES)
- ALL DIMENSIONS IN INCHES
- TOLERANCE: ±0.03"

---

**ORDERING INFORMATION**
Example: 1000Vdc Input with a 4-20mA Output. VTH-014E

**5 YEAR WARRANTY**
AC WATT TRANSDUCER

MODEL PC5-/PC4-

INCLUDES PHASE-FIRED & ZERO-CROSSING MEASUREMENTS

DESCRIPTION

The PC5 Series Watt transducers utilize Hall-effect multipliers to provide continuous multiplication of voltage and current to accurately measure real power delivered to a load. Full-scale current ranges up to 1000A and full-scale voltage ranges up to 600V are available in one-, two-, 2½- or three-element transducers.

These highly-reliable units have been used for many years in industrial monitoring and control applications by thousands of customers. They are widely used in applications with chopped or distorted waveforms where they have advantages over pulse-width modulated units.

FEATURES

- Accurate regardless of variations in voltage, current, power factor, or load.
- Output is proportional to true power delivered to a load; P = Ei(Cos Φ).
- Accuracy maintained when supplied with internal or external current sensors. Factory calibrated.

APPLICATIONS

- Equipment power consumption.
- For use with SCR controls, chopped waveforms, or where harmonic components exist.
- Optional 230VAC instrument power.

ORDERING INFORMATION

Example: Three-Phase, Three-Wire, Self-Powered, 120V, 5A input with 0-1000 Watts = 0-10VDC Output.

PC5-004C

Split-core external CT option is available - consult factory.

400Hz Models: To order for use on 400Hz applications, substitute “PC4-” for “PC5-” in model number.

MODEL SELECTION

SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT) MODELS WITH INTERNAL CURRENT SENSOR

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. (WATTS)</th>
<th>STANDARD DC OUTPUT MODEL PC5- OR PC4-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>0-±1mA</td>
</tr>
<tr>
<td>0-150</td>
<td>0 - 1</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>0 - 2.5</td>
<td>250</td>
</tr>
<tr>
<td></td>
<td>0 - 5</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>0 - 10</td>
<td>1k</td>
</tr>
<tr>
<td></td>
<td>0 - 15</td>
<td>1.5k</td>
</tr>
<tr>
<td></td>
<td>0 - 20</td>
<td>2k</td>
</tr>
<tr>
<td></td>
<td>0 - 25</td>
<td>2.5k</td>
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<tr>
<td>0-300</td>
<td>0 - 1</td>
<td>200</td>
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<tr>
<td></td>
<td>0 - 2.5</td>
<td>500</td>
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<td></td>
<td>0 - 5</td>
<td>1k</td>
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<tr>
<td></td>
<td>0 - 10</td>
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<td>0 - 15</td>
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<td>0 - 20</td>
<td>4k</td>
</tr>
<tr>
<td></td>
<td>0 - 25</td>
<td>5k</td>
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<tr>
<td>0-600</td>
<td>0 - 1</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>0 - 5</td>
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<td>0 - 15</td>
<td>6k</td>
</tr>
<tr>
<td></td>
<td>0 - 20</td>
<td>8k</td>
</tr>
</tbody>
</table>

* “A”, “C” and “CX5” models are self-powered. Input voltage range is limited to:
85-135V for 150V models
200-280V for 300V models
380-550V for 600V models

** “E2” models require only 15-40VDC loop power.
“B”, “D” and “X5” models require 85-135Vac instrument power.
“E” and “EM” models require 105-135Vac instrument power.
Add suffix “-22” for optional 230Vac instrument power.

NOTE: “A”, “B”, “C”, “CX5”, “D”, “X5” and “EM” models operate bi-directionally. Positive (+) output at terminal 2 (greater than 12mA for “EM” models) indicates forward/consumed power. Negative (-) output at terminal 2 (less than 12mA for “EM” models) indicates reverse/generated power.

“E” and “E2” models are unidirectional only. Reverse power conditions may cause the output to drop below 4mA but not below 0mA.

Add suffix “Y25” for use on zero-crossing SCR controllers. NOTE: This option is not available for self-powered models.

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OHIO SEMITRONICS, INC.
### SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSOR

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. (WATTS)</th>
<th>SENSOR SIZE</th>
<th>0-±1mA*</th>
<th>0-±1mA</th>
<th>0-±10V*</th>
<th>0-±10V</th>
<th>4-20mA</th>
<th>4-12-20mA</th>
<th>4-20mA**</th>
<th>0-±5V*</th>
<th>0-±5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 100</td>
<td>10k</td>
<td>W</td>
<td>058A</td>
<td>058B</td>
<td>058C</td>
<td>058D</td>
<td>058E</td>
<td>058EM</td>
<td>058E2</td>
<td>058E2</td>
<td>058E2</td>
</tr>
<tr>
<td>0 - 200</td>
<td>20k</td>
<td>W</td>
<td>067A</td>
<td>067B</td>
<td>067C</td>
<td>067D</td>
<td>067E</td>
<td>067EM</td>
<td>067E2</td>
<td>067E2</td>
<td>067E2</td>
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<td>0 - 400</td>
<td>40k</td>
<td>X</td>
<td>076A</td>
<td>076B</td>
<td>076C</td>
<td>076D</td>
<td>076E</td>
<td>076EM</td>
<td>076E2</td>
<td>076E2</td>
<td>076E2</td>
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<td>0 - 600</td>
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<td>085D</td>
<td>085E</td>
<td>085EM</td>
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<td>Y</td>
<td>094A</td>
<td>094B</td>
<td>094C</td>
<td>094D</td>
<td>094E</td>
<td>094EM</td>
<td>094E2</td>
<td>094E2</td>
<td>094E2</td>
</tr>
</tbody>
</table>

#### Note:
Current Transformer is supplied as part of the model. Refer also to notes below table on first page.

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT) MODELS WITH INTERNAL CURRENT SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. (WATTS)</th>
<th>SENSOR SIZE</th>
<th>0-±1mA*</th>
<th>0-±1mA</th>
<th>0-±10V*</th>
<th>0-±10V</th>
<th>4-20mA</th>
<th>4-12-20mA</th>
<th>4-20mA**</th>
<th>0-±5V*</th>
<th>0-±5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>0 - 1</td>
<td>200</td>
<td>W</td>
<td>120A</td>
<td>120B</td>
<td>120C</td>
<td>120D</td>
<td>120E</td>
<td>120EM</td>
<td>120E2</td>
<td>120E2</td>
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<tr>
<td>0 - 2.5</td>
<td>500</td>
<td>W</td>
<td>129A</td>
<td>129B</td>
<td>129C</td>
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<td>129E</td>
<td>129EM</td>
<td>129E2</td>
<td>129E2</td>
<td>129E2</td>
</tr>
<tr>
<td>0 - 10</td>
<td>1k</td>
<td>004A</td>
<td>004B</td>
<td>004C</td>
<td>004D</td>
<td>004E</td>
<td>004EM</td>
<td>004E2</td>
<td>004E2</td>
<td>004E2</td>
<td></td>
</tr>
<tr>
<td>0 - 15</td>
<td>3k</td>
<td>022A</td>
<td>022B</td>
<td>022C</td>
<td>022D</td>
<td>022E</td>
<td>022EM</td>
<td>022E2</td>
<td>022E2</td>
<td>022E2</td>
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<tr>
<td>0 - 20</td>
<td>4k</td>
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<td>112B</td>
<td>112C</td>
<td>112D</td>
<td>112E</td>
<td>112EM</td>
<td>112E2</td>
<td>112E2</td>
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<tr>
<td>0 - 25</td>
<td>5k</td>
<td>123A</td>
<td>123B</td>
<td>123C</td>
<td>123D</td>
<td>123E</td>
<td>123EM</td>
<td>123E2</td>
<td>123E2</td>
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<td></td>
</tr>
</tbody>
</table>

#### Note:
Refer also to notes below table on first page.

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. (WATTS)</th>
<th>SENSOR SIZE</th>
<th>0-±1mA*</th>
<th>0-±1mA</th>
<th>0-±10V*</th>
<th>0-±10V</th>
<th>4-20mA</th>
<th>4-12-20mA</th>
<th>4-20mA**</th>
<th>0-±5V*</th>
<th>0-±5V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 100</td>
<td>20k</td>
<td>W</td>
<td>061A</td>
<td>061B</td>
<td>061C</td>
<td>061D</td>
<td>061E</td>
<td>061EM</td>
<td>061E2</td>
<td>061E2</td>
<td>061E2</td>
</tr>
<tr>
<td>0 - 200</td>
<td>40k</td>
<td>X</td>
<td>070A</td>
<td>070B</td>
<td>070C</td>
<td>070D</td>
<td>070E</td>
<td>070EM</td>
<td>070E2</td>
<td>070E2</td>
<td>070E2</td>
</tr>
<tr>
<td>0 - 400</td>
<td>80k</td>
<td>X</td>
<td>079A</td>
<td>079B</td>
<td>079C</td>
<td>079D</td>
<td>079E</td>
<td>079EM</td>
<td>079E2</td>
<td>079E2</td>
<td>079E2</td>
</tr>
<tr>
<td>0 - 600</td>
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<td>088D</td>
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<tr>
<td>0 - 1000</td>
<td>200k</td>
<td>Y</td>
<td>097A</td>
<td>097B</td>
<td>097C</td>
<td>097D</td>
<td>097E</td>
<td>097EM</td>
<td>097E2</td>
<td>097E2</td>
<td>097E2</td>
</tr>
</tbody>
</table>

#### Note:
Current Transformer is supplied as part of the model. Refer also to notes below table on first page.

---

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THREE-PHASE, FOUR-WIRE (THREE-ELEMENT) MODELS WITH INTERNAL CURRENT SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>AC VOLTS</th>
<th>AC AMPS</th>
<th>F.S. (WATTS)</th>
<th>STANDARD DC OUTPUT MODEL PC5- OR PC4-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0-±1mA*</td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
<td></td>
<td>0-±1mA</td>
</tr>
<tr>
<td>0-25</td>
<td>300</td>
<td>0-1</td>
<td>125A</td>
<td>124D</td>
</tr>
<tr>
<td>0-25</td>
<td>750</td>
<td>0-2.5</td>
<td>132A</td>
<td>132D</td>
</tr>
<tr>
<td>0-1</td>
<td>0.75A</td>
<td>0-5</td>
<td>007A</td>
<td>075D</td>
</tr>
<tr>
<td>0-1</td>
<td>1.5K</td>
<td>0-10</td>
<td>016A</td>
<td>016C</td>
</tr>
<tr>
<td>0-15</td>
<td>7.5K</td>
<td>0-25</td>
<td>052A</td>
<td>025C</td>
</tr>
<tr>
<td>0-20</td>
<td>6K</td>
<td></td>
<td>115A</td>
<td>115C</td>
</tr>
<tr>
<td>0-25</td>
<td>7.5K</td>
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<td>127A</td>
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<td>0-300</td>
<td>0-1</td>
<td>600</td>
<td>126A</td>
<td>126C</td>
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<tr>
<td>0-300</td>
<td>1.5K</td>
<td>0-2.5</td>
<td>133A</td>
<td>133C</td>
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<tr>
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<td>1K</td>
<td>0-10</td>
<td>017A</td>
<td>017C</td>
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<td>026C</td>
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<td>15K</td>
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<td>128A</td>
<td>128C</td>
</tr>
</tbody>
</table>

Note: Part Numbers 7.5 and 8.5 denote 2½-element units. Refer also to notes below table on first page.

THREE-PHASE, FOUR-WIRE (THREE-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>AC VOLTS</th>
<th>AC AMPS</th>
<th>SENSOR SIZE</th>
<th>STANDARD DC OUTPUT MODEL PC5- OR PC4-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0-±1mA*</td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
<td>W</td>
<td>064A</td>
</tr>
<tr>
<td>0-200</td>
<td>30K</td>
<td>0-100</td>
<td>W</td>
<td>064B</td>
</tr>
<tr>
<td>0-400</td>
<td>60K</td>
<td>0-200</td>
<td>W</td>
<td>073A</td>
</tr>
<tr>
<td>0-600</td>
<td>120K</td>
<td>0-400</td>
<td>X</td>
<td>082A</td>
</tr>
<tr>
<td>0-1000</td>
<td>180K</td>
<td>0-600</td>
<td>Y</td>
<td>091A</td>
</tr>
<tr>
<td>0-150</td>
<td>60K</td>
<td>0-100</td>
<td>W</td>
<td>065A</td>
</tr>
<tr>
<td>0-200</td>
<td>120K</td>
<td>0-200</td>
<td>W</td>
<td>074A</td>
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<td>0-300</td>
<td>120K</td>
<td>0-300</td>
<td>W</td>
<td>083A</td>
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<tr>
<td>0-1000</td>
<td>360K</td>
<td>0-600</td>
<td>Y</td>
<td>101A</td>
</tr>
</tbody>
</table>

Note: Current Transformers are supplied as part of the model. Refer also to notes below table on first page.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>INPUT</th>
<th>Voltage, Current</th>
<th>See Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency Range</td>
<td>PC5- models</td>
</tr>
<tr>
<td></td>
<td>Power Factor</td>
<td>Any</td>
</tr>
<tr>
<td></td>
<td>Response (Transient, to 90% F.S.)</td>
<td>Any</td>
</tr>
<tr>
<td></td>
<td>With Internal Sensors</td>
<td>&lt;100μs</td>
</tr>
<tr>
<td></td>
<td>With Current Transformers</td>
<td>1ms</td>
</tr>
<tr>
<td></td>
<td>Burden</td>
<td>1.25VA/phase</td>
</tr>
<tr>
<td></td>
<td>Output Amplifier</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Current Overload (Continuous)</td>
<td>1-10A models</td>
</tr>
<tr>
<td></td>
<td>Transient (all models)</td>
<td>6 X F.S. (10 seconds)</td>
</tr>
</tbody>
</table>

DEELECTRIC TEST

| Input/Output/Case | 1500Vac (RMS) | Withstands IEEE SWC test |

INSTRUMENT POWER

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>85-135Vac, 50-400Hz, 5VA</td>
<td>not required</td>
<td>85-135Vac, 50-400Hz, 5VA</td>
<td>105-135Vac, 50-400Hz, 5VA</td>
<td>15-40vdc loop power only</td>
<td>230Vac, ±10%, 50/60Hz, 5VA</td>
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<td></td>
<td></td>
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</tbody>
</table>

OUTPUT

<table>
<thead>
<tr>
<th>Type</th>
<th>See Tables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watt Output, Loading</td>
<td>“A” &amp; “B” models</td>
</tr>
<tr>
<td>“C” &amp; “D” models</td>
<td>(0-±10vdc)</td>
</tr>
<tr>
<td>“CX5” &amp; “X5” models</td>
<td>(0-±5Vdc)</td>
</tr>
<tr>
<td>“E”, “EM” models</td>
<td>(4-20mA)</td>
</tr>
<tr>
<td>“E2” models</td>
<td>(loop powered)</td>
</tr>
<tr>
<td>Response Time (90% F.S.)</td>
<td>250ms</td>
</tr>
<tr>
<td>Suffix “Y2S” (for use on zero-crossing SCR controllers)</td>
<td>5s</td>
</tr>
</tbody>
</table>

NOTE: This option is not available for self-powered models.

Field Adjustable Calibration | ±10% |

ACCURACY | ±0.5% F.S.

Includes combined effects of power factor, repeatability, linearity, and current sensor.

Output Ripple | <1% F.S.

TEMPERATURE

| Operating Range | -10°C to +60°C |
| Effect | ±1.0% of Rdg, ±0.1% F.S. output |

Split-core external CT option is available - consult factory.

OHIO SEMITRONICS, INC.

4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
PHONE: (614) 777-1005 * FAX: (614) 777-4511
WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

Page 85
**DIMENSIONS & CONNECTIONS**

**MODEL PC5-/PC4-**

### CASE DIMENSIONS

**SINGLE-PHASE & THREE-PHASE, THREE-WIRE**
*(EXCEPT THREE-PHASE, THREE-WIRE "E" MODELS)*

<table>
<thead>
<tr>
<th>1PH</th>
<th>2.2 LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PH</td>
<td>3.7 LBS</td>
</tr>
</tbody>
</table>

**THREE-PHASE, FOUR-WIRE**
*(ALSO USED ON THREE-PHASE, THREE-WIRE "E" MODELS)*

<table>
<thead>
<tr>
<th>3PH 3W</th>
<th>3.7 LBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PH 4W</td>
<td>4.2 LBS</td>
</tr>
</tbody>
</table>

ALL DIMENSIONS IN INCHES.

### OUTPUT CONNECTIONS

**"E2" MODELS**

```
1  +  +
  -  OUT
    PUT

RL  15-40 Vdc
```

4-20 mA loop powered

**ALL OTHER MODELS**

```
1  +
  -
```

0-5 Vdc, 0-10 Vdc, 0-1 mA dc, 4-20 mA dc

### SENSOR DIMENSIONS

<table>
<thead>
<tr>
<th>SENS. SIZE</th>
<th>SENSOR DIMENSIONS (in inches)</th>
<th>WT. LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td></td>
<td>0.27 x 0.44</td>
</tr>
<tr>
<td>X</td>
<td></td>
<td>0.28</td>
</tr>
<tr>
<td>Y</td>
<td></td>
<td>0.28</td>
</tr>
</tbody>
</table>

Split-core external CT option is available - consult factory.
**DESCRIPTION**

Model W transducers are available in many models covering 0-600 Volts and 0-1000 Amperes. One-, two- & three-element transducers are available for all single-phase and three-phase power systems. All models provide an isolated analog output signal related to the average power consumed in the load and/or relay closure (or pulse output) related to the Watthours of energy consumed in the load.

Computers or auxiliary equipment can be used to calculate demand, monitor or control processes, and to accumulate energy consumption for billing purposes.

**FEATURES**

- Analog output for instantaneous Watts and relay closure or pulse output for Watthour consumption.
- Maintains accuracy with chopped or distorted waveforms through use of real-time multiplier.
- Accuracy maintained when factory-calibrated with external current sensors.
- Rugged metal enclosures for harsh environments.

**APPLICATIONS**

- Building energy management systems
- Manufacturing process control
- Pump motor power consumption.
- Welding and soldering process monitoring.
- Battery charger monitoring.

**ORDERING INFORMATION**

Example: Self-Powered, Three-Phase, Four-Wire, 120V, 5A Input with 0-5Vdc Output Proportional to 0-1500 Watts, TTL Pulse Output for Watthours, each Pulse Proportional to 1.0 Watthour

**MODEL SELECTION**

**SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT) MODELS WITH INTERNAL CURRENT SENSOR**

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. WATTS</th>
<th>F.S. COUNTS PER HOUR</th>
<th>WH PER COUNT</th>
<th>STANDARD OUTPUT MODEL W- OR W4-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>0±1mA*</td>
<td>0±1mA</td>
<td>0±10V*</td>
</tr>
<tr>
<td>0-150</td>
<td>0 - 1</td>
<td>100</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>0 - 2.5</td>
<td>250</td>
<td>250</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>0 - 5</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>0 - 10</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>0 - 15</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>0 - 25</td>
<td>2500</td>
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<tr>
<td>0-300</td>
<td>0 - 1</td>
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</tr>
<tr>
<td>0 - 2.5</td>
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<td>0 - 5</td>
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<tr>
<td>0 - 15</td>
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<td>0 - 25</td>
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</tr>
<tr>
<td>0 - 20</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
<td>8000</td>
</tr>
</tbody>
</table>

* “A”, “C” and “CX5” models are self-powered. Input voltage range is limited to:
  - 103-135V for 150V models
  - 215-280V for 300V models
  - 395-550V for 600V models

Add suffix “-22” for optional 230Vac instrument power.

For custom Wh count rates, order desired model with added suffix “/xxx”, where “xxx” = F.S. counts/hr.

Example: 0-300V, 0-100A input, 0-10Vdc output (for Watts) and TTL output (for Wh) with 5000 counts/hr at F.S.:

order model: W-059D-T/5000

Add suffix “Y27” for use on zero-crossing SCR controllers.

**NOTE:** This option is not available for self-powered models.

**NOTE:** Watt outputs for “A”, “B”, “C”, “CX5”, “D” and “X5” models operate bi-directionally. Positive (+) output at terminal 2a indicates forward/consumed power; negative (-) output indicates reverse/generated power. “E” models and all Wh relay outputs are unidirectional and operate in the forward/consumed direction only. For “E” models, reverse power conditions may cause the Watt output to drop below 4mA but not below 0mA.
### SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSOR

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. VOLTS</th>
<th>F.S. Amps</th>
<th>F.S. CTS PER HR</th>
<th>WH PER COUNT</th>
<th>SENSOR SIZE</th>
<th>STANDARD OUTPUT MODEL W- OR W4-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-100</td>
<td>10k</td>
<td>10000</td>
<td>1 W</td>
<td>058A</td>
<td>058B 058C 058D 058 CX 058X5 058X 058E</td>
</tr>
<tr>
<td></td>
<td>0-200</td>
<td>20k</td>
<td>2000</td>
<td>10 W</td>
<td>067A</td>
<td>067B 067C 067D 067 CX 067X5 067X 067E</td>
</tr>
<tr>
<td></td>
<td>0-400</td>
<td>40k</td>
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<td>10 X</td>
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<td>076B 076C 076D 076 CX 076X5 076X 076E</td>
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<tr>
<td></td>
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<td>10 X</td>
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<td>085B 085C 085D 085 CX 085X5 085X 085E</td>
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<td>086B 086C 086D 086 CX 086X5 086X 086E</td>
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<td>400000</td>
<td>10000 X</td>
<td>080A</td>
<td>080B 080C 080D 080 CX 080X5 080X 080E</td>
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<td>6000k</td>
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<td>070B 070C 070D 070 CX 070X5 070X 070E</td>
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<td>1000000 X</td>
<td>064A</td>
<td>064B 064C 064D 064 CX 064X5 064X 064E</td>
</tr>
</tbody>
</table>

**Note:** Current Transformer is supplied as part of the model. Refer also to notes below table on page first page.

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT) MODELS SUPPLIED WITH INTERNAL CURRENT SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. VOLTS</th>
<th>F.S. Amps</th>
<th>F.S. CTS PER HOUR</th>
<th>WH PER COUNT</th>
<th>SENSOR SIZE</th>
<th>STANDARD OUTPUT MODEL W- OR W4-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1</td>
<td>200</td>
<td>200</td>
<td>1</td>
<td>120A</td>
<td>120B 120C 120D 120 CX 120X5 120X</td>
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<td>0-2.5</td>
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<td>129B 129C 129D 129 CX 129X5 129X</td>
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<td>0-5</td>
<td>1k</td>
<td>1000</td>
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<td>013B 013C 013D 013 CX 013X5 013X</td>
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<td>0-20</td>
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<td>032B 032C 032D 032 CX 032X5 032X</td>
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<td>1</td>
<td>092A</td>
<td>092B 092C 092D 092 CX 092X5 092X</td>
</tr>
</tbody>
</table>

**Note:** Refer to notes below table on page first page.

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. VOLTS</th>
<th>F.S. Amps</th>
<th>F.S. CTS PER HOUR</th>
<th>WH PER COUNT</th>
<th>SENSOR SIZE</th>
<th>STANDARD OUTPUT MODEL W- OR W4-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-100</td>
<td>20k</td>
<td>2000</td>
<td>10 W</td>
<td>061A</td>
<td>061B 061C 061D 061 CX 061X5 061X</td>
</tr>
<tr>
<td></td>
<td>0-200</td>
<td>40k</td>
<td>4000</td>
<td>10 W</td>
<td>070A</td>
<td>070B 070C 070D 070 CX 070X5 070X</td>
</tr>
<tr>
<td></td>
<td>0-400</td>
<td>80k</td>
<td>8000</td>
<td>10 X</td>
<td>079A</td>
<td>079B 079C 079D 079 CX 079X5 079X</td>
</tr>
<tr>
<td></td>
<td>0-600</td>
<td>120k</td>
<td>12000</td>
<td>10 X</td>
<td>088A</td>
<td>088B 088C 088D 088 CX 088X5 088X</td>
</tr>
<tr>
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<td>0-1000</td>
<td>200k</td>
<td>20000</td>
<td>100 Y</td>
<td>097A</td>
<td>097B 097C 097D 097 CX 097X5 097X</td>
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<td>0-150</td>
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<td>062B 062C 062D 062 CX 062X5 062X</td>
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<td></td>
<td>0-300</td>
<td>800</td>
<td>8000</td>
<td>10 X</td>
<td>071A</td>
<td>071B 071C 071D 071 CX 071X5 071X</td>
</tr>
<tr>
<td></td>
<td>0-600</td>
<td>1600</td>
<td>16000</td>
<td>100 X</td>
<td>080A</td>
<td>080B 080C 080D 080 CX 080X5 080X</td>
</tr>
<tr>
<td></td>
<td>0-1000</td>
<td>3200</td>
<td>32000</td>
<td>100 X</td>
<td>091A</td>
<td>091B 091C 091D 091 CX 091X5 091X</td>
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<tr>
<td></td>
<td>0-150</td>
<td>6400</td>
<td>64000</td>
<td>100 Y</td>
<td>099A</td>
<td>099B 099C 099D 099 CX 099X5 099X</td>
</tr>
</tbody>
</table>

**Note:** Current Transformers are supplied as part of the model. Refer also to notes below table on first page.
### THREE-PHASE, FOUR-WIRE (THREE-ELEMENT) MODELS WITH INTERNAL CURRENT SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>AC VOLTS</th>
<th>AC AMPS</th>
<th>F.S. WATTS</th>
<th>F.S. COUNTS PER HOUR</th>
<th>WH PER COUNT</th>
<th>0±1mA*</th>
<th>0±1mA</th>
<th>0±10V*</th>
<th>0±10V</th>
<th>0±5V*</th>
<th>0±5V</th>
<th>4-20mA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100 L-N</td>
<td>0-2.5</td>
<td>1.5k</td>
<td>1500</td>
<td>1</td>
<td>7.5A</td>
<td>7.5B</td>
<td>7.5C</td>
<td>7.5D</td>
<td>7.5CX5</td>
<td>7.5DX5</td>
<td>7.5E</td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td>5k</td>
<td>1500</td>
<td>1</td>
<td>7.5A</td>
<td>7.5B</td>
<td>7.5C</td>
<td>7.5D</td>
<td>7.5CX5</td>
<td>7.5DX5</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
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<td>0</td>
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<td></td>
</tr>
<tr>
<td>0-5</td>
<td>5k</td>
<td>1500</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>0-0</td>
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<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<td></td>
</tr>
</tbody>
</table>

Note: Part Numbers 7.5 and 8.5 denote 2½-element units. Refer also to notes below table on first page.

### THREE-PHASE, FOUR-WIRE (THREE-ELEMENT) MODELS SUPPLIED WITH EXTERNAL SENSORS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>AC VOLTS</th>
<th>AC AMPS</th>
<th>F.S. WATTS</th>
<th>F.S.CTS PER HOUR</th>
<th>WH PER COUNT</th>
<th>SENSOR SIZE</th>
<th>0±1mA*</th>
<th>0±1mA</th>
<th>0±10V*</th>
<th>0±10V</th>
<th>0±5V*</th>
<th>0±5V</th>
<th>4-20mA</th>
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<tr>
<td>0-150 L-N</td>
<td>0-100</td>
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<td>10</td>
<td>W</td>
<td>064A</td>
<td>064B</td>
<td>064C</td>
<td>064D</td>
<td>064CX5</td>
<td>064DX5</td>
<td>064E</td>
<td></td>
</tr>
<tr>
<td>0-200</td>
<td>60k</td>
<td>6000</td>
<td>10</td>
<td>W</td>
<td>073A</td>
<td>073B</td>
<td>073C</td>
<td>073D</td>
<td>073CX5</td>
<td>073DX5</td>
<td>073E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-400</td>
<td>120k</td>
<td>1200</td>
<td>10</td>
<td>X</td>
<td>082A</td>
<td>082B</td>
<td>082C</td>
<td>082D</td>
<td>082CX5</td>
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<tr>
<td>0-600</td>
<td>180k</td>
<td>1800</td>
<td>10</td>
<td>X</td>
<td>091A</td>
<td>091B</td>
<td>091C</td>
<td>091D</td>
<td>091CX5</td>
<td>091DX5</td>
<td>091E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1000</td>
<td>300k</td>
<td>3000</td>
<td>10</td>
<td>X</td>
<td>100A</td>
<td>100B</td>
<td>100C</td>
<td>100D</td>
<td>100CX5</td>
<td>100DX5</td>
<td>100E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-300 L-N</td>
<td>0-100</td>
<td>60k</td>
<td>6000</td>
<td>10</td>
<td>W</td>
<td>065A</td>
<td>065B</td>
<td>065C</td>
<td>065D</td>
<td>065CX5</td>
<td>065DX5</td>
<td>065E</td>
<td></td>
</tr>
<tr>
<td>0-200</td>
<td>120k</td>
<td>1200</td>
<td>10</td>
<td>W</td>
<td>074A</td>
<td>074B</td>
<td>074C</td>
<td>074D</td>
<td>074CX5</td>
<td>074DX5</td>
<td>074E</td>
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<td></td>
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<td>0-400</td>
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<td>2400</td>
<td>10</td>
<td>X</td>
<td>083A</td>
<td>083B</td>
<td>083C</td>
<td>083D</td>
<td>083CX5</td>
<td>083DX5</td>
<td>083E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-600</td>
<td>360k</td>
<td>3600</td>
<td>10</td>
<td>X</td>
<td>092A</td>
<td>092B</td>
<td>092C</td>
<td>092D</td>
<td>092CX5</td>
<td>092DX5</td>
<td>092E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1000</td>
<td>600k</td>
<td>6000</td>
<td>10</td>
<td>Y</td>
<td>101A</td>
<td>101B</td>
<td>101C</td>
<td>101D</td>
<td>101CX5</td>
<td>101DX5</td>
<td>101E</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Current Transformers are supplied as part of the model. Refer also to notes under table on first page.

### SPECIFICATIONS

**INPUT**
- Voltage: See Tables
- Current: See Tables
- Frequency Range: W- models 48-70Hz
- W4- models 400Hz

**Power Factor** Any

**Response (Transient, to 90% F.S.)**
- With Internal Sensors: <100µs
- With Current Transformers: 1ms

**Burden**
- Voltage and Current: 1.25VA/phase
- Output Amplifier: 2W
- Current Overload (Continuous): 1-10A models 2 X F.S.
- 15A, 20A, 25A models 3 X F.S.
- Transient (all models): 6 X F.S. (10 seconds)

**DIELECTRIC TEST**
- Input/Output/Case: 1500Vac (RMS)
- Surge: Withstands IEEE SWC test

**INSTRUMENT POWER**
- "A", "C", "CX5" models: not required
- "B", "D", "XS" & "E" models: 103-135Vac, 50-400Hz, 5VA
- "-22" Option: 230Vac ±10%, 50/60Hz ±10%

**OUTPUT**
- Wh Relay (Wh output is forward/consumed direction only)
- Standard...N/O SPST relay contact; 150Vac, 0.5A Rated
- Contact Closure Period: 200ms
- "T" Option: TTL output for Wattmeters, 5Vdc pulse
- Watt Output, Loading
- "A" & "B" models: (0±1mA)...
- "C" & "D" models: (0±10mA)...
- "CX5" & "X5" models: (0±5Vdc)...
- "E" models: (4-20mA)...
- ±1mA, ±5V and ±10V unit Watt outputs are bidirectional
- Response Time (90% F.S.): standard 250ms
- Suffix "Y27" (for use on zero-crossing SCR controllers)...
- Note: This option is not available for self-powered models

**ACCUARITY** ±0.5% F.S.

**TEMPERATURE**
- Operating Range: -10°C to +60°C
- Effect: ±1.0% of Rdg., ±0.1% F.S. Output
**CONNECTION DIAGRAMS**

**MODEL W/W4-**

### SINGLE-PHASE CONNECTIONS

- **Using Internal Sensor**
- **Using External Sensors**

### SINGLE-PHASE, THREE-WIRE CONNECTIONS

- **Edison System Using Internal Sensor**
- **Edison System Using External Sensors**

### THREE-PHASE, THREE-WIRE CONNECTIONS

- **Using Internal Sensor**
- **Using External Sensors**

* 115Vac on models with B, D, E or X5 suffix.
* 230Vac on models with -22 suffix.
* Not required on models with A, C or CX5 suffix.
**CONNECTIONS & DIMENSIONS**

**MODEL W-/W4-**

**THREE-PHASE, FOUR-WIRE CONNECTIONS**

![Diagram of three-phase, four-wire connections]

**USING INTERNAL SENSORS**

![Diagram of using internal sensors]

**USING EXTERNAL SENSORS**

- *115Vac on models with B, D, E or X5 suffix.
- *230Vac on models with -22 suffix.
- *Not required on models with A, C or CX5 suffix.

**CASE DIMENSIONS**

![Case dimensions diagram]

**SENSOR DIMENSIONS**

![Sensor dimensions diagram]

**CASE HEIGHT 5.50"**
- 1PH 2W: 3.0 LBS
- 3PH 3W: 3.7 LBS
- 3PH 4W: 4.5 LBS

**ALL DIMENSIONS IN INCHES.**

**LEAD LENGTH IS 24 INCHES.**
- WHITE LEAD IS X1.

**SENSOR DIMENSIONS (inches)**

<table>
<thead>
<tr>
<th>SENSOR SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>J</th>
<th>M</th>
<th>WT. (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>4.50</td>
<td>3.70</td>
<td>1.25</td>
<td>1.25</td>
<td>1.94</td>
<td>3.88</td>
<td>0.34</td>
<td>0.27 X 0.44</td>
<td>1.43</td>
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<tr>
<td>X</td>
<td>6.50</td>
<td>4.70</td>
<td>1.25</td>
<td>2.50</td>
<td>2.46</td>
<td>5.75</td>
<td>0.39</td>
<td>0.28</td>
<td>1.61</td>
</tr>
<tr>
<td>Y</td>
<td>6.50</td>
<td>4.70</td>
<td>1.25</td>
<td>3.00</td>
<td>2.46</td>
<td>5.75</td>
<td>0.39</td>
<td>0.28</td>
<td>1.10</td>
</tr>
</tbody>
</table>

**Lead Length: 24 inches**
- White Lead is X1.
FEATURES
- Accurate regardless of variations in voltage, current, power factor, or load.
- Available with 1-, 2-, 2½-, or 3-element configurations.
- Provides bidirectional operation.
- Accuracy maintained over wide temperature range, calibration traceable to NIST.

APPLICATIONS
- Equipment monitoring for process control.
- Integration into energy management systems, or a variety of sub-metering applications.
- Measurement using direct-connection, current and/or potential transformers.

### SPECIFICATIONS

**INPUT**
- Voltage: See Table
- Current: 0-5 Aac
- Frequency Range: 58-62 Hz
- Power Factor: Any
- Burden:
  - Voltage: <0.1 VA
  - Current: <0.25VA
- Overload Voltage (continuous): 150 Vac
- Overload Current (continuous): 2X F.S.
- 50 Aac transient: 10s/hr
- 250 Aac transient: 1s/hr

**OUTPUT**
- Loading:
  - "B" models: (0-±1mAdc output) 0-10kΩ
  - "D" models: (0-±10Vdc output) 2kΩ min.
  - "E" models: (4-20mA dc output) 0-500Ω
- Response Time: (99%) <400ms
- Field Adjustable Cal.: ±2% min.
- Accuracy: ±0.2% Rdg./PF, ±0.04% F.S.
- Ripple: Less than 0.5% F.S.

**TEMPERATURE & PHYSICAL**
- Temperature Effect: -20ºC to 60ºC: ±0.005%/ºC
- Operating Humidity: 0-95% non-condensing
- Net Weight: 3.3 lbs.

**DIELECTRIC TEST**
- Input/Output/Case (150V & 300V): 1800 Vac
- (600V): 2200 Vac
- Surge: Withstands IEEE SWC test

**WARRANTY**
5 YEAR

**INPUTS**

<table>
<thead>
<tr>
<th>AC VOLTS</th>
<th>AC AMPS</th>
<th>F.S. WATTS</th>
<th>PHASE</th>
<th>NO. OF ELEMENTS</th>
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</thead>
<tbody>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>500</td>
<td>1Ph - 2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>1000</td>
<td>1Ph - 2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>2000</td>
<td>1Ph - 2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>1000</td>
<td>3Ph - 3W</td>
<td>2</td>
</tr>
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</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>4000</td>
<td>3Ph - 3W</td>
<td>2</td>
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<tr>
<td>0 - 150 L-N</td>
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<td>1500</td>
<td>3Ph - 4W</td>
<td>3</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3Ph - 4W</td>
<td>3</td>
</tr>
<tr>
<td>0 - 150 L-N</td>
<td>0 - 5</td>
<td>1500</td>
<td>3Ph - 4W</td>
<td>2½</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3Ph - 4W</td>
<td>2½</td>
</tr>
</tbody>
</table>

To calculate full-scale Watts when using potential and/or current transformers:

\[
a = \text{initial transducer calibration (from table above in F.Watts column)}
\]

\[
b = \text{current transformer ratio (e.g. 100:5, or 20)}
\]

\[
c = \text{potential transformer ratio (e.g. 600:120, or 5)}
\]

\[
\text{F.S. WATTS} = a \times b \times c
\]

NOTE: UL-recognized current transformers available from factory.
DESCRIPTION

The model GW5 Watt transducer provides power measurements to within ±0.2% of reading accuracy in single- or polyphase systems. The Model GV5 VAR transducer provides reactive power measurements to within ±0.2% of reading accuracy in single- or polyphase systems. The electrically-isolated dc output is proportional to the instantaneous power averaged over several cycles.

Currents up to 20A and voltages up to 600 Vac can be directly connected to the GW5 and GV5, thus eliminating the additional cost and additive errors of current and voltage transformers for these ranges. The GW5 and GV5 can be used with OSI metering class current transformers for measurements up to 10 kiloamperes.

FEATURES

- Accurate regardless of variations in voltage, current, power factor, or load.
- Available in 1-, 1½-, 2-, 2½-, or 3-element configurations.
- Provides Leading/Lagging VAR indication.
- Accuracy maintained over wide temperature range, calibration traceable to NIST.
- For UL Listed precision Watt transducers, see AGW Series.

APPLICATIONS

- Equipment monitoring for process control.
- Integration into energy management systems, or a variety of sub-metering applications.
- Measurement using direct-connection, current transformers and/or potential transformers.

AC INPUTS WATT OR VAR TRANSCLUDER MODELS GW5- & GV5-

<table>
<thead>
<tr>
<th>VOLTS</th>
<th>AMPS</th>
<th>F.S. WATTS</th>
<th>VOLTS</th>
<th>AMPS</th>
<th>F.S. VARS</th>
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<td>0-150</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>0-5</td>
<td>1</td>
<td>103A</td>
<td>0-1</td>
<td>1</td>
<td>103B</td>
</tr>
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<td>0-2.5</td>
<td>100</td>
<td>103B</td>
<td>0-5</td>
<td>500</td>
<td>01A</td>
</tr>
<tr>
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<td>1</td>
<td>010A</td>
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<td>2</td>
<td>02B</td>
</tr>
<tr>
<td>0-2</td>
<td>500</td>
<td>01B</td>
<td>0-10</td>
<td>1</td>
<td>010B</td>
</tr>
<tr>
<td>0-1</td>
<td>0</td>
<td>01C</td>
<td>0-20</td>
<td>2</td>
<td>01B</td>
</tr>
<tr>
<td>0-4</td>
<td>4</td>
<td>01D</td>
<td>0-10</td>
<td>1</td>
<td>01C</td>
</tr>
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<td>01E</td>
<td>0-20</td>
<td>2</td>
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<td>0</td>
<td>01G</td>
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AC OUTPUTS MODEL GW5- OR GV5-

<table>
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<th>AMPS</th>
<th>F.S. WATTS</th>
<th>VOLTS</th>
<th>AMPS</th>
<th>F.S. VARS</th>
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<td>103A</td>
<td>0-1</td>
<td>1</td>
<td>103B</td>
</tr>
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<td>0-2.5</td>
<td>100</td>
<td>103B</td>
<td>0-5</td>
<td>500</td>
<td>01A</td>
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<tr>
<td>0-10</td>
<td>1</td>
<td>010A</td>
<td>0-20</td>
<td>2</td>
<td>01B</td>
</tr>
<tr>
<td>0-2</td>
<td>500</td>
<td>01B</td>
<td>0-10</td>
<td>1</td>
<td>01B</td>
</tr>
<tr>
<td>0-1</td>
<td>0</td>
<td>01C</td>
<td>0-20</td>
<td>2</td>
<td>01D</td>
</tr>
<tr>
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<td>4</td>
<td>01D</td>
<td>0-10</td>
<td>1</td>
<td>01D</td>
</tr>
<tr>
<td>0-1</td>
<td>0</td>
<td>01E</td>
<td>0-20</td>
<td>2</td>
<td>01E</td>
</tr>
<tr>
<td>0-2</td>
<td>4</td>
<td>01E</td>
<td>0-10</td>
<td>1</td>
<td>01E</td>
</tr>
</tbody>
</table>

FEATURES

- Provides leading/lagging VAR indication.
- Accuracy maintained over wide temperature range, calibration traceable to NIST.
- For UL Listed precision Watt transducers, see AGW Series.

APPLICATIONS

- Equipment monitoring for process control.
- Integration into energy management systems, or a variety of sub-metering applications.
- Measurement using direct-connection, current transformers and/or potential transformers.
**Voltage specifications are line-to-neutral voltage.**  
*Denotes self-powered unit, limiting input voltage ranges to:  
85-135 for 150Vac models  
200-280 for 300Vac models  
380-550 for 600Vac models  
All others require 85-135Vac instrument power, 60Hz.  

Optional 50ms output response to 90% - Add suffix "W"  
Optional 230Vac instrument power - Add suffix "-22"  
For UL Listed precision Watt transducers, [see AGW Series](https://www.ohiosemitronics.com)  

**50 Hertz Models:**  
Add suffix "-50" to part number.

### THREE-PHASE, FOUR-WIRE MODELS, INTERNAL SENSOR (THREE-ELEMENT)  

<table>
<thead>
<tr>
<th>AC Inputs</th>
<th>F.S. Watts or vars</th>
<th>Standard Outputs Model GW5 or GV5-</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VOLTS</strong></td>
<td><strong>AMPS</strong></td>
<td><strong>0-1mAdc</strong></td>
</tr>
<tr>
<td>0-150 L-N**</td>
<td>0-1</td>
<td>0.5</td>
</tr>
<tr>
<td>0-20</td>
<td>0.5</td>
<td>1.5k</td>
</tr>
<tr>
<td>0-300 L-N**</td>
<td>0-1</td>
<td>0.5</td>
</tr>
<tr>
<td>0-20</td>
<td>0.5</td>
<td>1.5k</td>
</tr>
</tbody>
</table>

**NOTE:** PART NUMBERS 7.5 & 8.5 DENOTE 2½-ELEMENT UNITS.

### ORDERING INFORMATION  
Example: Self-Powered, Three-Phase, Four-Wire, 120V, 5A Input with 0-±5Vdc Output. Proportional to 0-±1500Watts.  
**GW5-007CX5**

Example: Self-Powered, Three-Phase, Four-Wire, 120V, 5A Input with 0-1mAAdc Output. Proportional to 0-±1500VAR.  
**GV5-007A**

### SPECIFICATIONS  
**INPUT**  
- Voltage: See Tables  
- Current: See Tables  
- Frequency Range:  
  - GW5: 58-62Hz  
  - GV5: 48-52Hz  
- Power Factor: Any  
- Burden: Voltage ≤0.1VA/element  
- Current ≤0.28VA/element  
- Overload: Voltage continuous 0-150Vac Range 175Vac  
  - 0-300Vac Range 350Vac  
  - 0-600Vac Range 600Vac  
- Current: continuous 0-1, 2.5, 5, 10Aac Ranges 2 X F.S.  
  - 0-20Aac Range 20A  
  - Transient: 0-1, 2.5Aac Ranges 20A  
    - 5-10, 20A Ranges 50A  
    - 0-1, 2.5Aac Ranges 100A  
    - 0-5-10, 20A Ranges 250A  

**DIELECTRIC TEST**  
Input/Output/Case: 1800Vac (RMS)  
Surge: Withstands IEEE SWC test  

**TEMPERATURE & PHYSICAL**  
- Operating Range: -20°C to 65°C  
- Temperature Effect: -20°C to 65°C: ±0.005%/°C  
- Storage Range: -40°C to 70°C  
- Operating Humidity: 0-95% non-condensing

**ACCURACY**  
Includes combined effects of voltage, current, load and power factor.  
- GW5: ±0.2% Rdg./PF, ±0.04% F.S.  
- GV5: ±0.2% Rdg./sinθ, ±0.04% F.S.  
- Output Ripple: <0.5% F.S.
SINGLE-PHASE CONNECTIONS
(1 ELEMENT)

DIRECT CONNECTION

USING POTENTIAL AND CURRENT TRANSFORMERS

THREE-PHASE, THREE-WIRE CONNECTIONS
(1-1/2 ELEMENT)

DIRECT CONNECTION

USING POTENTIAL AND CURRENT TRANSFORMERS

THREE-PHASE, THREE-WIRE CONNECTIONS
(2 ELEMENT)

DIRECT CONNECTION

USING POTENTIAL AND CURRENT TRANSFORMERS

* 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
* 230Vac ON MODELS WITH -22 SUFFIX.
* NOT REQUIRED ON MODELS WITH A, C, CX5, EG OR EMG SUFFIX.

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THREE-PHASE, FOUR-WIRE CONNECTIONS
(2-1/2 ELEMENT)

1 2 3 4 5 6 6a 7 8 9 10 11 12 12a

OUTPUT

L1
LINE
L2
L3
N
DIRECT CONNECTION

LOAD
LINE
LOAD

USING POTENTIAL AND CURRENT TRANSFORMERS

● 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
● 230Vac ON MODELS WITH -22 SUFFIX.
● NOT REQUIRED ON MODELS WITH A, C, CX5, EG OR EMG SUFFIX.

THREE-PHASE, FOUR-WIRE CONNECTIONS
(3 ELEMENT)

1 2 3 4 5 6 6a 7 8 9 10 11 12 12a

OUTPUT

L1
LINE
L2
L3
N
DIRECT CONNECTION

LOAD
LINE
LOAD

USING POTENTIAL AND CURRENT TRANSFORMERS

CASE DIMENSIONS

GW5/GV5 MODELS WITH 1mA, 5V, OR 10V OUTPUTS

GW5/GV5 MODELS WITH 4-20mA OUTPUTS AND ALL AGW MODELS

CASE HEIGHT 5.38"
1PH 2W 2.3 LBS
3PH 3W 2.7 LBS
3PH 4W 3.1 LBS

CASE HEIGHT 5.88"
1PH 2W 2.4 LBS
3PH 3W 3.3 LBS
3PH 4W 4.4 LBS

ALL DIMENSIONS IN INCHES.

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**FEATURES**
- Available in 1-, 2-, or 3-element configurations.
- Some models provide bidirectional outputs.
- 0.2% of reading accuracy.
- Accuracy maintained over wide temperature range, calibration traceable to NIST.

**APPLICATIONS**
- Integration into energy management systems and sub-metering applications.
- Measurement using direct connection, current transformers, and/or potential transformers.
- Sinusoidal waveforms.

### SINGLE- AND THREE-PHASE MODELS WITH INTERNAL SENSOR

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S.</th>
<th>PHASE</th>
<th>NO. OF ELE.</th>
<th>STANDARD OUTPUTS MODEL: GWV5-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>WATT/ VAR</td>
<td>0-±1mAdc</td>
<td>0-±10Vdc</td>
</tr>
<tr>
<td>0-150</td>
<td>0-5</td>
<td>50</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0-300</td>
<td>0-5</td>
<td>100</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0-600</td>
<td>0-5</td>
<td>200</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0-150</td>
<td>0-5</td>
<td>50</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0-300</td>
<td>0-5</td>
<td>100</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0-600</td>
<td>0-5</td>
<td>200</td>
<td>3P-3W</td>
<td>2</td>
</tr>
</tbody>
</table>

* Denotes self-powered unit, voltage range limited to:
  - 85-135V For 150V Models
  - 200-280V For 300V Models
  - 380-550V For 600V Models

All units other than self-powered require 85-135Vac inst. power.
Optional 230Vac Instrument Power - Add suffix “-22”

**50 HERTZ MODELS** - Add suffix “-50” to part number.

50ms output response to 90% - Add suffix “W”

### ORDERING INFORMATION
Example: Three-Phase, Three-Wire 120Vac,
5A Input with 0-±mA Output
Equals 1000W & VARs.

GWV5-004B

### SPECIFICATIONS

**INPUT**
- Voltage: See Table
- Frequency: 60Hz standard; 50Hz optional
- Power Factor: Any
- Burden: <0.1VA/phase
- Overload: <0.28VA/phase

**DIODE TEST**
- Input/Output/Case: 1800Vac
- Surge: Withstands IEEE SWC test

**INSTRUMENT POWER**
- Standard: 85-135Vac, 60Hz, 7.5VA
- “-22” option: 230Vac, 50/60Hz, ±15%
- “A”, “C”, “CX5” and “EG” models: not required

**OUTPUT**
- VARs: ±0.2% Rdg./PF, ±0.05% F.S.
- Watts: ±0.009%/ºC

**TEMPERATURE & PHYSICAL**
- Temperature Effect: (-20ºC to 60ºC)
- Humidity: ±0.95% non-condensing
CONNECTIONS AND DIMENSIONS

MODEL GWV5-

CONNECTION DIAGRAMS

SINGLE-PHASE, TWO-WIRE CONNECTIONS

THREE-PHASE, THREE-WIRE CONNECTIONS

THREE-PHASE, FOUR-WIRE CONNECTIONS

CASE DIMENSIONS

* 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX
* 230Vac ON MODELS WITH -22 SUFFIX
* NOT REQUIRED ON MODELS WITH A, C, CX5 OR EG SUFFIX.

ALL DIMENSIONS ARE IN INCHES.

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**DESCRIPTION**

The Model DW5 provides power measurement to within ±0.5% of full-scale accuracy in single- or polyphase systems. The electrically-isolated dc output is proportional to the instantaneous power averaged over several cycles. The DW5 is packaged in a DIN-Rail case for easy installation.

Currents up to 5 Amperes and voltages up to 600 Vac can be directly connected to the DW5. The DW5 can be used with OSI metering class current transformers for measurements up to 10 kiloamperes.

Specific outputs can be selected to interface with any data acquisition system from a simple recorder to computer-, SCADA-, or PLC-based system.

The DW5 is widely used in a variety of applications, including hydroelectric generator output measurement, end-of-line appliance testing for energy consumption, building automation, energy management, and cogeneration systems. It comes with CE and CSA approvals and is manufactured and tested in accordance with ISO-9001.

**FEATURES**

- Accurate regardless of variations in voltage, current, power factor, or load.
- Available with 1-, 2-, or 3-element configurations.
- Some models provide bidirectional operation.
- Accuracy maintained over wide temperature range.

**APPLICATIONS**

- Equipment monitoring for process control.
- Integration into energy management systems or a variety of sub-metering applications.
- Measurement using direct-connection, current transformers, and/or potential transformers.
- Best applied to sinusoidal waveforms.

**MODEL SELECTION**

**SINGLE- AND THREE-PHASE MODELS WITH INTERNAL SENSOR**

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S.</th>
<th>NO. OF ELEMENTS</th>
<th>STANDARD OUTPUTS MODEL DW5-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLS</td>
<td>AC AMPS</td>
<td>PHASE</td>
<td>0-±1mAAdc</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>500</td>
<td>1P-2W</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>1000</td>
<td>1P-2W</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>1000</td>
<td>3P-3W</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>2000</td>
<td>3P-3W</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>4000</td>
<td>3P-3W</td>
</tr>
<tr>
<td>0 - 150 L-N</td>
<td>0 - 5</td>
<td>1500</td>
<td>3P-4W</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3P-4W</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS**

**INPUT**

- Voltage: See Table
- Current: See Table
- Frequency: Nominal: 60Hz (Option "-50") 50Hz
- Power Factor: Any
- Burden: Voltage: 400kΩ/phase
- Current: 0.01Ω/phase
- Overload: Voltage: 120% continuous
- Current: 120% continuous

**DIELECTRIC TEST**

- Input to Instrument Power/Output/Case: 5550 Vac
- Input to Input: 3250 Vac
- Instrument Power to Output/Case: 3700 Vac
- Output to Case: 490 V Vac

**INSTRUMENT POWER**

- Standard: 85-230 Vac/dc, 50/60 Hz, 4.5VA

**OUTPUT**

- Loading: "B" models: (0-1mAAdc output) 0-15kΩ
- "X5" & "D" models: (0-5, 0-10Vdc) 2.5kΩ min.
- "E" models: (4-20mAAdc) 0-750Ω
- Response Time (to 99%): 300 ms
- Open Circuit Voltage: <40 Vdc

**ACCURACY**

- ±0.5% F.S.
- Output Ripple: <1% pk-pk

**TEMPERATURE**

- Temperature Range: -10°C to 55°C

**PHYSICAL**

- Mean Annual Humidity: <75%
- Net Weight: 0.9 lbs.
- Termination: 10 AWG max.
CONNECTIONS AND CASE DIMENSIONS

MODEL DW5-

SINGLE-PHASE CONNECTIONS (ONE-ELEMENT)

THREE-PHASE, THREE-WIRE CONNECTIONS (TWO-ELEMENT)

THREE-PHASE, FOUR-WIRE CONNECTIONS (THREE-ELEMENT)

CASE DIMENSIONS

SINGLE-PHASE MODELS

THREE-PHASE MODELS

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WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

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**AC WATT/VAR TRANSDUCER**

**MODEL DWV-**

**DIN-RAIL-MOUNTED AC WATT/VAR TRANSDUCER**

**FEATURES**
- Available with 1-, 2-, or 3-element configurations.
- Some models provide bidirectional outputs.
- Compact DIN-Rail package, CE and CSA approvals.

**APPLICATIONS**
- Integration into energy management systems or a variety of sub-metering applications.
- Measurement using direct-connection, current transformers, and/or potential transformers.
- Sinusoidal Waveforms.

---

**SINGLE- AND THREE-PHASE MODELS WITH INTERNAL SENSOR**

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S.</th>
<th>PHASE</th>
<th>NO. OF ELEMENTS</th>
<th>STANDARD OUTPUTS MODEL DWV-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>WATT/VAR</td>
<td>PHASE</td>
<td>0-±1mAdc</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>500</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>1000</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>2000</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>1000</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>2000</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>4000</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0 - 150 L-N</td>
<td>0 - 5</td>
<td>1500</td>
<td>3P-4W</td>
<td>3</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3P-4W</td>
<td>3</td>
</tr>
</tbody>
</table>

**INPUT**
- Voltage: See Table
- Current: 0-5Aac
- Frequency: Standard 60Hz, Option "-50" 50Hz
- Power Factor: any
- Burden: Voltage: 400kΩ/phase, Current: 0.01Ω/phase
- Overload: Voltage (continuous): 120% of F.S. Voltage, Current (continuous): 120% of F.S. Current

**DIELECTRIC TEST**
- Input/Instrument Power to Output/Case: 3700Vac
- Input to Input: 2200Vac
- Output to Case: 490Vac

**OUTPUT**
- Loading: "B" models: 0-1mAdc, "E" models: 0-20mAdc, "X5", "D" models: 0-5, 0-10Vdc
- Response Time: <300ms

**ACCURACY**
±0.5% F.S.

**INSTRUMENT POWER**
- Standard: 85-230Vac/dc, 50/60Hz, 7.0VA

**TEMPERATURE & PHYSICAL**
- Temperature Range: -10°C to 55°C
- Annual Mean Humidity: <75%
- Net Weight: 1 lb
- Termination: 10 AWG max.

---

**FEATURES**

- Available with 1-, 2-, or 3-element configurations.
- Some models provide bidirectional outputs.
- Compact DIN-Rail package, CE and CSA approvals.

---

**APPLICATIONS**

- Integration into energy management systems or a variety of sub-metering applications.
- Measurement using direct-connection, current transformers, and/or potential transformers.
- Sinusoidal Waveforms.

---

**INPUT**

- Voltage: See Table
- Current: 0-5Aac
- Frequency: Standard 60Hz, Option "-50" 50Hz
- Power Factor: any
- Burden: Voltage: 400kΩ/phase, Current: 0.01Ω/phase
- Overload: Voltage (continuous): 120% of F.S. Voltage, Current (continuous): 120% of F.S. Current

---

**DIELECTRIC TEST**

- Input/Instrument Power to Output/Case: 3700Vac
- Input to Input: 2200Vac
- Output to Case: 490Vac

---

**OUTPUT**

- Loading: "B" models: 0-1mAdc, "E" models: 0-20mAdc, "X5", "D" models: 0-5, 0-10Vdc
- Response Time: <300ms

---

**ACCURACY**

±0.5% F.S.

---

**INSTRUMENT POWER**

- Standard: 85-230Vac/dc, 50/60Hz, 7.0VA

---

**TEMPERATURE & PHYSICAL**

- Temperature Range: -10°C to 55°C
- Annual Mean Humidity: <75%
- Net Weight: 1 lb
- Termination: 10 AWG max.

---

**AC WATT/VAR TRANSDUCER**

**MODEL DWV-**

**SINGLE- AND THREE-PHASE MODELS WITH INTERNAL SENSOR**

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S.</th>
<th>PHASE</th>
<th>NO. OF ELEMENTS</th>
<th>STANDARD OUTPUTS MODEL DWV-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>WATT/VAR</td>
<td>PHASE</td>
<td>0-±1mAdc</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>500</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>1000</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>2000</td>
<td>1P-2W</td>
<td>1</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>1000</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>2000</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>4000</td>
<td>3P-3W</td>
<td>2</td>
</tr>
<tr>
<td>0 - 150 L-N</td>
<td>0 - 5</td>
<td>1500</td>
<td>3P-4W</td>
<td>3</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3P-4W</td>
<td>3</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

1. DIMENSIONS ARE IN INCHES (MM).
2. MOUNTED ON 35MM TOP-HAT DIN-RAIL.

**CONNECTIONS**

**ANALOG OUTPUTS**

- Watts (+), (-)
- Vars (+), (-)

---

**OHIO SEMITRONICS, INC.**

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PRECISION AC WATT/WATTHOUR TRANSDUCER

MODEL AGH-

ACCURATE TO 0.2% OF READING

FEATURES
- Accurate regardless of variations in voltage, current, power factor, or load.
- Dual outputs, analog signal proportional to instantaneous watts. Relay closure proportional to Whatthours.
- Calibrated with standards traceable to NIST.

APPLICATIONS
- Designed for applications which require UL-listed devices.
- Integration into energy management systems or a variety of sub-metering applications.
- Measurement using direct-connection, current transformers and/or potential transformers.

SINGLE- AND THREE-PHASE MODELS WITH INTERNAL SENSOR

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. OUTPUTS</th>
<th>NO. OF</th>
<th>STANDARD OUTPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLS</td>
<td>WATTS</td>
<td>PHASE</td>
<td>MODEL AGH-2</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>500</td>
<td>1P - 2W</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>1000</td>
<td>1P - 2W</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>2000</td>
<td>1P - 2W</td>
</tr>
<tr>
<td>0 - 150</td>
<td>0 - 5</td>
<td>1000</td>
<td>3P - 3W</td>
</tr>
<tr>
<td>0 - 300</td>
<td>0 - 5</td>
<td>2000</td>
<td>3P - 3W</td>
</tr>
<tr>
<td>0 - 600</td>
<td>0 - 5</td>
<td>4000</td>
<td>3P - 3W</td>
</tr>
<tr>
<td>0 - 150 L-N</td>
<td>0 - 5</td>
<td>1500</td>
<td>3P - 4W</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3P - 4W</td>
</tr>
<tr>
<td>0 - 150 L-N</td>
<td>0 - 5</td>
<td>1500</td>
<td>3P - 4W</td>
</tr>
<tr>
<td>0 - 300 L-N</td>
<td>0 - 5</td>
<td>3000</td>
<td>3P - 4W</td>
</tr>
</tbody>
</table>

5 YEAR WARRANTY

NOTE: UL-listed current transformers available from factory

SPECIFICATIONS

To calculate full-scale Watts when using potential and/or current transformers:

a = initial transducer calibration (F.S. Watts from table above)
b = current transformer ratio (e.g. 100:5, or 20)
c = potential transformer ratio (e.g. 600:120, or 5)
F.S. Watts = a x b x c

WH Relay ............... N/O SPST; 120Vac, 0.5A Rated contact closure duration .................. 200ms
Closure Calibration (Std.) .................. 1 Watthour/closure
Analog Output Loading
"B" models ... (0-1mAdc output) .................. 0-10kΩ
"D" models ... (0-10Vdc output) .................. 2kΩ min.
"E" models ... (4-20mAAdc output) .................. 0 to 500Ω
Response Time (to 99%) .................. <400ms

ACCURACY .................. ±0.2% Rdg. ±0.05% F.S. Includes combined effects of voltage, current, load and power factor.
Analog Output Ripple .................. <0.5% F.S.

TEMPERATURE & PHYSICAL

Temperature Effect (-20° to 60°C) .................. ±0.005%/°C
Net Weight ... .................. 3 lbs.

CONNECTION DIAGRAMS AND DIMENSIONS SHOWN ON PAGES 106-107

OHIO SEMITRONICS, INC.

4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
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Page 103
**DESCRIPTION**

The GH Watt/Watthour Transducer provides an analog output proportional to time-averaged instantaneous true power and a relay closure or TTL pulse output calibrated in terms of Watthours of energy consumption by the load. Accuracy is ±0.2% of reading.

A Model VGH VAR/VARhour transducer provides an analog output proportional to time-averaged instantaneous reactive power and a relay closure or TTL pulse output calibrated in terms of VARhours for reactive energy. Accuracy is ±0.2% of reading.

In addition, they are used extensively for sub-metering, generation control and appliance testing to verify compliance with federal standards.

Models are available in 1-, 2-, 2½-, or 3-element configuration. Bidirectional Watt and Watthour or VAR and VARhour outputs are available.

**FEATURES**

- Accurate regardless of variations in voltage, current, power factor, or load.
- Available with 1-, 2-, 2½- or 3-element configurations.
- Bidirectional Watt/Watthours available.
- Leading/Lagging VARs/VARhours available.
- Accuracy maintained over wide temperature range.
- Calibration traceable to NIST.

**APPLICATIONS**

- Equipment monitoring for process control.
- Integration into energy management systems or a variety of sub-metering applications.
- Measurement using direct connections, current and/or potential transformers.

50Hz models available: Add suffix “-50” to part number.

---

**SINGLE-PHASE, TWO-WIRE MODELS WITH INTERNAL SENSOR (ONE-ELEMENT)**

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. WATTS or VARS</th>
<th>STANDARD GH- OR VGH-</th>
<th>RELAY OPTIONS (ADD SUFFIX) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>0±1mAdc</td>
<td>10-5mAdc</td>
</tr>
<tr>
<td>0 to 150</td>
<td>0 to 1</td>
<td>100</td>
<td>103B</td>
</tr>
<tr>
<td>0 to 2.5</td>
<td>250</td>
<td>106B</td>
<td>106D</td>
</tr>
<tr>
<td>0 to 5</td>
<td>500</td>
<td>001B</td>
<td>001D</td>
</tr>
<tr>
<td>0 to 10</td>
<td>1000</td>
<td>010B</td>
<td>010D</td>
</tr>
<tr>
<td>0 to 20</td>
<td>2000</td>
<td>019B</td>
<td>019D</td>
</tr>
<tr>
<td>0 to 50</td>
<td>5000</td>
<td>020B</td>
<td>020D</td>
</tr>
<tr>
<td>0 to 100</td>
<td>10000</td>
<td>021B</td>
<td>021D</td>
</tr>
<tr>
<td>0 to 200</td>
<td>20000</td>
<td>022B</td>
<td>022D</td>
</tr>
<tr>
<td>0 to 500</td>
<td>50000</td>
<td>023B</td>
<td>023D</td>
</tr>
<tr>
<td>0 to 1000</td>
<td>100000</td>
<td>024B</td>
<td>024D</td>
</tr>
</tbody>
</table>

- Wh relay is replaced with a 5Vdc, TTL-compatible pulse.
- A second Wh relay or pulse is provided to allow bidirectional (Forward/Reverse) energy measurement relay.
- Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in “KYZ” format (50% duty cycle).

**5 YEAR WARRANTY**

All standard units require 115Vac instrument power.

Optional 230Vac instrument power - Add suffix “-22”

Optional self-powered models - Add suffix “G”

To calculate unit scaling when using Current and/or Potential Transformers (CTs or PTs), multiply the base unit scaling by the CT and/or PT ratio.

Example: GH-001D used with 100:5 CTs

CT ratio = 100/5 = 20, so F.S. Watt input = 500W x 20 = 10,000W

Wh Relay scaling = 1Wh/Cnt x 20 = 20Wh/Cnt

**ORDERING INFORMATION**

Example: Single-Phase, 120V, 5A Input with ±0-10Vdc Output proportional to ±0-500 Watts, TTL Pulse Output for Watthours, Each Pulse Proportional to 1.0 Watthour.

**GH-001D-T**

For self-powered models, input voltage ranges are limited to: 95-135V for 150V models 200-280V for 300V models 380-550V for 600V models

---

**ORDERING INFORMATION**

Example: Single-Phase, 120V, 5A Input with ±0-10Vdc Output proportional to ±0-500 VARs, Self-Powered, 1.0 VARhour per Relay Count.

**VGH-001DG**
## THREE-PHASE, THREE-WIRE MODELS WITH INTERNAL SENSOR (TWO-ELEMENT)

| INPUTS | STANDARD GH- OR VGH- | RELAY OPTIONS (ADD SUFFIX) *
|--------|----------------------|-----------------------------
| AC VOLTS | AC AMPS | 0-1±mAdc | 0-10Vdc | 4-20mAdc | 4-12-20mAdc | 0±5Vdc | Wh RELAY | “-T” | “-R” | “-H” | “-K” |
| 0 to 150 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 |
| 0 to 600 | 0 to 1 | 120B | 120D | 12DE | 12E5 | 125E | 125X5 | 1Wh/Cnt | Wh relay is replaced with a 5Vdc TTL-compatible pulse. | A second Wh relay or pulse is provided to allow bidirectional energy measurement. | Wh relay is replaced with a solid-state, Form C (SPDT) relay. | Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in “KYZ” format (50% duty cycle) |
| 0 to 600 | 0 to 1 | 122B | 122D | 12DE | 12E5 | 125E | 125X5 | 1Wh/Cnt | Wh relay is replaced with a 5Vdc TTL-compatible pulse. | A second Wh relay or pulse is provided to allow bidirectional energy measurement. | Wh relay is replaced with a solid-state, Form C (SPDT) relay. | Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in “KYZ” format (50% duty cycle) |

## THREE-PHASE, FOUR-WIRE MODELS WITH INTERNAL SENSOR (THREE-ELEMENT)

| INPUTS | STANDARD GH- OR VGH- | RELAY OPTIONS (ADD SUFFIX) *
|--------|----------------------|-----------------------------
| AC VOLTS | AC AMPS | 0-1±mAdc | 0-10Vdc | 4-20mAdc | 4-12-20mAdc | 0±5Vdc | Wh RELAY | “-T” | “-R” | “-H” | “-K” |
| 0 to 150 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 | 0 to 1 | 0 to 2.5 | 0 to 5 | 0 to 10 | 0 to 20 |
| 0 to 600 | 0 to 1 | 125B | 125D | 12DE | 12E5 | 125E | 125X5 | 1Wh/Cnt | Wh relay is replaced with a 5Vdc TTL-compatible pulse. | A second Wh relay or pulse is provided to allow bidirectional energy measurement. | Wh relay is replaced with a solid-state, Form C (SPDT) relay. | Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in “KYZ” format (50% duty cycle) |
| 0 to 600 | 0 to 1 | 123B | 123E | 12E5 | 125E | 125X5 | 1Wh/Cnt | Wh relay is replaced with a 5Vdc TTL-compatible pulse. | A second Wh relay or pulse is provided to allow bidirectional energy measurement. | Wh relay is replaced with a solid-state, Form C (SPDT) relay. | Wh relay is replaced with a solid-state, Form C (SPDT) relay operating in “KYZ” format (50% duty cycle) |

### PART NUMBERS

7.5 and 8.5 denote 3/4-ELEMENT UNITS.

*Custom Watthour or VArhour count rate available - See previous page*

### SPECIFICATIONS

#### INPUT
- Voltage: See Tables
  - See Tables
- Current: See Tables
- Frequency Range: GH (standard) 58-62Hz
- VGH (standard) 60Hz
- Option “-50” GH 48-52Hz
- VGH 50Hz
- Power Factor: Any
- Burden: 0.1VA/phase
- Current: 0.28VA/phase
- Overload: 175V
- 300V Range: 0.28VA/phase
- 600V Range: 0.28VA/phase
- Current: 2F.S.
- 5A Range: 2F.S.
- 10A Range: 2F.S.
- 20A Range: F.S.
- transit: All Ranges, 50A | 10s/hr
- All Ranges, 250A | 1s/hr

#### DIELECTRIC TEST
- Input/Output/Case: 1800Vac (RMS)
- Surge: Withstands IEEE SWC test

#### INSTRUMENT POWER
- Standard: 115Vac ±15%, 50/60Hz, 7.5VA
- Option “-22”: 230Vac ±15%, 50/60Hz, 7.5VA

### OUTPUT
- VGH: + = Lagging/ - = Leading
- Wh Relay: Form A (SPST, N.O.) 0.5A
- Contact closure duration: 200ms
- Option “-T” Pulse: 5V, TTL-compatible pulse
- Pulse duration: 200ms
- Option “-H” Solid-state, Form C (SPDT): 0.1A
- Contact closure duration: 200ms
- Option “-K” Solid-state, Form C (KYZ): 0.1A
- Contact closure duration: 50% duty cycle
- Field Adjustable Cal.: ±2% min.

#### ACCURACY
- (Includes effects of voltage, current, load & PF)
- GH: ±0.2% Rdg./sinθ, ±0.05% F.S.
- VGH: ±0.2% Rdg./sinθ, ±0.05% F.S.
- Analog Output Ripple: <0.5% F.S.

#### TEMPERATURE & PHYSICAL
- Temperature Effect: -20°C to 60°C
- Operating Humidity: 0-95% non-condensing

---

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Page 105
CONNECTION DIAGRAMS

MODEL AGH, GH & VGH-

SINGLE-PHASE CONNECTIONS (ONE-ELEMENT)

DIRECT CONNECTION

USING POTENTIAL AND CURRENT TRANSFORMERS

THREE-PHASE, THREE-WIRE CONNECTIONS (TWO-ELEMENT)

DIRECT CONNECTION

USING POTENTIAL AND CURRENT TRANSFORMERS

THREE-PHASE, FOUR-WIRE CONNECTIONS (2-1/2 ELEMENT)

DIRECT CONNECTION

USING POTENTIAL AND CURRENT TRANSFORMERS

★ 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
★ 230Vac ON MODELS WITH -22 SUFFIX.
★ NOT REQUIRED ON MODELS WITH G SUFFIX.

OHIO SEMITRONICS, INC.

Page 106
THREE-PHASE, FOUR-WIRE CONNECTIONS (THREE-ELEMENT)

DIRECT CONNECTION
* 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
* 230Vac ON MODELS WITH -22 SUFFIX.
* NOT REQUIRED ON MODELS WITH G SUFFIX.

USING POTENTIAL AND CURRENT TRANSFORMERS

WATTHOUR OR VARHOUR OUTPUT CONNECTIONS

OPTION "-T" TTL OUTPUT

STANDARD OUTPUT SPST RELAY (VGH = LAGGING)

OPTION "R" BIDIRECTIONAL SPST RELAY

OPTION "H" OR "K" SPDT RELAY (VGH = LAGGING)

OPTION "RH" OR "RK"

CASE DIMENSIONS

CASE HEIGHT 5.88"
1PH 2W  2.9 LBS
3PH 3W  3.3 LBS
3PH 4W  3.8 LBS

Dwg# 0902-00877-B Rev --
**VARIABLE-FREQUENCY AC WATT TRANSDUCER MODEL P-**

**FEATURES**
- Accurate from 5 to 500 Hz, factory-calibrated.
- Available in both single-phase and three-phase configurations. Bidirectional output.
- Available with split-core current sensors.

**APPLICATIONS**
- Accurate monitoring of power that contains dc and non-sinusoidal ac components.
- Variable-frequency drives.
- Ideal for use in phase-angle-firing circuits or frequency synthesizers.

### SINGLE-PHASE (ONE-ELEMENT)

<table>
<thead>
<tr>
<th>Inputs</th>
<th>F.S. (Watts)</th>
<th>Sensor Size</th>
<th>Standard Outputs Model P-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Volts</td>
<td>AC Amps</td>
<td></td>
<td>0-±1mA &amp;c</td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-100</td>
<td>10k</td>
<td>C</td>
<td>121B</td>
</tr>
<tr>
<td>0-200</td>
<td>20k</td>
<td>D</td>
<td>124B</td>
</tr>
<tr>
<td>0-400</td>
<td>40k</td>
<td>E</td>
<td>130B</td>
</tr>
<tr>
<td>0-600</td>
<td>60k</td>
<td>F</td>
<td>133B</td>
</tr>
<tr>
<td>0-1000</td>
<td>100k</td>
<td>G</td>
<td>136B</td>
</tr>
<tr>
<td>0-2000</td>
<td>200k</td>
<td>H</td>
<td>139B</td>
</tr>
</tbody>
</table>

### THREE-PHASE, THREE-WIRE (TWO-ELEMENT)

<table>
<thead>
<tr>
<th>Inputs</th>
<th>F.S. (Watts)</th>
<th>Sensor Size</th>
<th>Standard Outputs Model P-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Volts</td>
<td>AC Amps</td>
<td></td>
<td>0-±1mA &amp;c</td>
</tr>
<tr>
<td>0-150</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-100</td>
<td>20k</td>
<td>C</td>
<td>142B</td>
</tr>
<tr>
<td>0-200</td>
<td>40k</td>
<td>D</td>
<td>145B</td>
</tr>
<tr>
<td>0-400</td>
<td>80k</td>
<td>E</td>
<td>151B</td>
</tr>
<tr>
<td>0-600</td>
<td>120k</td>
<td>F</td>
<td>154B</td>
</tr>
<tr>
<td>0-1000</td>
<td>200k</td>
<td>G</td>
<td>157B</td>
</tr>
<tr>
<td>0-2000</td>
<td>400k</td>
<td>H</td>
<td>160B</td>
</tr>
</tbody>
</table>

All units require 115Vac instrument power, 50/60Hz. Optional 230Vac instrument power - add suffix “-22”

**ORDERING INFORMATION**
Example: Three-Phase, Three-Wire, 120V, 100A Input, Split-Core Sensor, with 0-±5Vdc Output, Proportional to 0-±20kW.

P-142X5S

**CONTRIBUTION INFORMATION**
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WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

OHIO SEMITRONICS, INC.
THREE-PHASE, FOUR-WIRE (THREE ELEMENTS)

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. (WATTS)</th>
<th>SENSOR SIZE</th>
<th>STANDARD OUTPUTS MODEL P-</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUTS</td>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>0-±1mAAdc</td>
</tr>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>0-±1mAAdc</td>
<td>0-±10Vdc</td>
</tr>
<tr>
<td>0-150 L-N</td>
<td>0-100</td>
<td>30k</td>
<td>C</td>
</tr>
<tr>
<td>0-200</td>
<td>60k</td>
<td>D</td>
<td>162B</td>
</tr>
<tr>
<td>0-400</td>
<td>120k</td>
<td>D</td>
<td>164B</td>
</tr>
<tr>
<td>0-600</td>
<td>180k</td>
<td>E</td>
<td>166B</td>
</tr>
<tr>
<td>0-1000</td>
<td>300k</td>
<td>E</td>
<td>168B</td>
</tr>
<tr>
<td>0-2000</td>
<td>600k</td>
<td>E</td>
<td>170B</td>
</tr>
<tr>
<td>0-150 L-N</td>
<td>0-100</td>
<td>60k</td>
<td>C</td>
</tr>
<tr>
<td>0-200</td>
<td>120k</td>
<td>D</td>
<td>163B</td>
</tr>
<tr>
<td>0-400</td>
<td>240k</td>
<td>D</td>
<td>165B</td>
</tr>
<tr>
<td>0-600</td>
<td>360k</td>
<td>E</td>
<td>167B</td>
</tr>
<tr>
<td>0-1000</td>
<td>600k</td>
<td>E</td>
<td>169B</td>
</tr>
<tr>
<td>0-2000</td>
<td>1200k</td>
<td>E</td>
<td>171B</td>
</tr>
</tbody>
</table>

SPECIFICATIONS

INPUT

Voltage: See Tables
Current: See Tables
Frequency Range: 5-500Hz
Power Factor: Any
Response (Transient 90%): 50µs
Burden
Voltage: <0.1VA/phase
Current: <0.1VA/phase
Overload
Voltage: 600Vac max.
Current: 50 X F.S.

OUTPUT

Loading
"B" models: 0-±1mAAdc output...0-10kΩ
"D" models: 0-±10Vdc output...2kΩ min.
"E", "EM", "EA" models: 0-500Ω
"X5" models: 0-±5Vdc output...2kΩ min.
Response Time (to 90%): 500ms
Field Adjustable Cal. ±10%

ACCURACY

±1.0% F.S.
Includes combined effects of linearity, repeatability and frequency.
Output Ripple: Less than 1.0% F.S. @ 60Hz

TEMPERATURE

Temperature Range: 0°C to +40°C
Temperature Effect: ±1.0% of Rdg., ±0.1% F.S. Output
Optional split-core current sensor available - Add suffix "S"

SENSOR DIMENSIONS & CONNECTION DIAGRAMS

<table>
<thead>
<tr>
<th>SIGNAL</th>
<th>PIN 1-CABLE</th>
<th>PIN 2-CABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUTPUT (-)</td>
<td>A WHITE</td>
<td>1 GRAY &quot;B&quot;</td>
</tr>
<tr>
<td>OUTPUT (+)</td>
<td>B GREEN</td>
<td>2 GRAY &quot;R&quot;</td>
</tr>
<tr>
<td>EXCITATION (-)</td>
<td>C BLACK</td>
<td>6 BLACK &quot;B&quot;</td>
</tr>
<tr>
<td>EXCITATION (+)</td>
<td>D RED</td>
<td>8 BLACK &quot;R&quot;</td>
</tr>
</tbody>
</table>

Ohio Semitronics, Inc.

Page 109
WARNING! SHOCK HAZARD!
Current Sensor Terminals are at Line Potential.

ONE-CABLE CURRENT SENSORS

TWO-CABLE CURRENT SENSORS

CASE DIMENSIONS

CASE HEIGHT 5.88"
1PH 2W TYP 3.0 LBS
3PH 3W TYP 3.5 LBS
3PH 4W TYP 4.0 LBS

ALL DIMENSIONS IN INCHES.
DESCRIPTION

The PC8 units are designed to provide accurate power measurements on sinusoidal or highly-distorted waveforms. Basic four-quadrant multiplier response of dc to 20 kilohertz provides operation up to at least the fifth harmonic for dc to 400-hertz applications.

Full-scale accuracy of 1% results for dc, sinusoidal ac, chopped or pulsed waveforms. Time-varying waveforms with a dc component are accurately measured. Most units provide bidirectional output so that power consumption or generation can be measured. All units have input/output/case isolation.

Standard units with input current ranges up to 2000 Amperes and voltage ranges to 600 Volts are available with outputs to interface with most data calibration or control equipment.

FEATURES

• Accurate from dc to 400 Hz.
• Factory calibration traceable to NIST.
• Input/output/case isolation.
• Real-time indication of power with transient response of less than 50 microseconds.

APPLICATIONS

• Accurate monitoring of power that contains dc and/or harmonics.
• Ideal for use in SCR and other ac or dc switching circuitry.
• Bidirectional output.

MODEL SELECTION

PC8 [ ] [ ] [ ] (NO DASH) [ ] (S) 5 YEAR WARRANTY

<table>
<thead>
<tr>
<th>INPUT VOLTAGE</th>
<th>INPUT CURRENT</th>
<th>SENSOR SIZE</th>
<th>OUTPUT OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>001 0 - 25V</td>
<td>08 0 - 5A</td>
<td>(internal) B</td>
<td>0 - ±1mAdc</td>
</tr>
<tr>
<td>002 0 - 50V</td>
<td>01 0 - 100A</td>
<td>C</td>
<td>0 - ±10Vdc</td>
</tr>
<tr>
<td>003 0 - 150V</td>
<td>02 0 - 200A</td>
<td>D</td>
<td>4 - 20mAdc</td>
</tr>
<tr>
<td>004 0 - 300V</td>
<td>03 0 - 300A</td>
<td>D</td>
<td>4/12/20mA dc</td>
</tr>
<tr>
<td>005 0 - 400V</td>
<td>04 0 - 400A</td>
<td>D</td>
<td>X5 0 - ±5Vdc</td>
</tr>
<tr>
<td>006 0 - 500V</td>
<td>05 0 - 600A</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>007 0 - 600V</td>
<td>06 0 - 1000A</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>008 0 - 2000A</td>
<td>07 0 - 2000A</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

All units require 85-135Vac instrument power, 50-400Hz. Optional 230Vac instrument power - add suffix “-22”

Full-scale power (Watts) can be determined by the product of full-scale input voltage and full-scale input current.

OPTIONAL SPLIT-CORE CURRENT SENSOR AVAILABLE WITH UNITS OF 100 AMPS OR GREATER - ADD SUFFIX “S”.

ADDITIONAL CURRENT RANGES AVAILABLE - CONSULT FACTORY.

SPECIFICATIONS

INPUT

Voltage.......................................................... See Table
Current.......................................................... See Table
Frequency Range .............................................. dc to 400Hz
Power Factor..................................................Any
Response (Transient 90%)................................. 50µs
Burden
Voltage ................................ Models under 50V ............ >100kΩ
Models over 50V............................................. >1MΩ
Overload
Voltage ....................................................... 2 X F.S. or 600Vac/850Vdc max.
Current .......... Using internal sensor ................. 2 X F.S.
Using sensors C, D, E ...................................... 50 X F.S.

DIELECTRIC TEST

Input/Output/Case.............................................. 1000Vdc
Surge ............................................................ Withstands IEEE SWC test

OUTPUT

Loading
“B” models ................................ (0-±1mAdc output) ... 0-10kΩ
“E”, “EM” models ............................ (4-20, 4-12-20mA dc output) ... 0-500Ω
“X5”, “D” models ...................... (0-±5, 0-±10Vdc output) ... ±2kΩ

Response Time ................................... (to 90%) ............. <500ms

Field Adjustable Cal. ......................................... ±10%

ACCURACY ............................................. ±1.0% F.S.

Includes combined effects of voltage, current, load and power factor

INSTRUMENT POWER

Standard ........................................ 85-135Vac, 50-400Hz, 10VA
“-22” Option ........................................ 230Vac, 50/60Hz, ±15%

TEMPERATURE

Temperature Range ........................................... 0ºC to 40ºC
Temperature Effect ...................................... ±1.0% of Rdg, ±0.1% F.S. Output
CONNECTION DIAGRAMS

SINGLE-PHASE, VARIABLE-FREQUENCY (ONE-ELEMENT)

DIRECT-CONNECTION USING INTERNAL SENSOR

CONNECTION USING EXTERNAL SENSOR WITH TWO CABLES.

CONNECTION USING EXTERNAL SENSOR WITH ONE CABLE.

Warning! Shock Hazard!
Current Sensor Terminals are at Line Potential.

CASE DIMENSIONS

SENSOR DIMENSIONS

Solid-core models are supplied with 18-inch cables on sensor sizes C & D. All other solid-core models supplied with detachable 8-foot cable. Sensor size C split-core models are supplied with 8-foot attached cable. All other split-core models are supplied with detachable 8-foot cable. Longer cables are available.
AC WATT/POWER FACTOR/VA TRANSUDER MODEL PC20-

DESCRIPTION
The Model PC20 transducer provides three separate outputs proportional to true power, VA, and power factor in single- or polyphase power systems. These are the most significant parameters in the efficient utilization of electrical energy in manufacturing or building management.

True power (Watts) is accurately measured by a continuous multiplication of instantaneous voltage and current by a four-quadrant multiplier. Average true power is then provided as the output.

The apparent power (VA) is determined by taking the product of RMS voltage and RMS current.

Power factor is derived from the ratio of true power to apparent power. This measurement does not rely on phase-angle measurement and is accurate for sinusoidal or distorted waveforms in the 50-400Hz frequency range.

FEATURES
- True power and VA measurement for sinusoidal and distorted waveforms.
- Power factor is derived from the ratio of true power to apparent power and remains accurate for SCR-controlled or otherwise-distorted waveforms.
- Three separate output signals – one each for Watts, power factor, and VA.

APPLICATIONS
- Equipment monitoring to determine and/or maintain efficiency.
- Process monitoring and/or controlling to maintain consistent product quality.
- For use with SCR-controlled, chopped, or otherwise-distorted waveforms.

MODEL SELECTION

SINGLE-PHASE, TWO-WIRE (ONE-ELEMENT)

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>F.S. (W, VA)</th>
<th>STANDARD OUTPUTS (W, PF, VA)</th>
<th>MODEL PC20-</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC VOLTS</td>
<td>AC AMPS</td>
<td>0-1mA dc*</td>
<td>0-1mA dc</td>
</tr>
<tr>
<td>0-150 Nominal 115</td>
<td>0-1</td>
<td>100</td>
<td>103A</td>
</tr>
<tr>
<td></td>
<td>0-5</td>
<td>500</td>
<td>001A</td>
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<tr>
<td></td>
<td>0-10</td>
<td>1000</td>
<td>010A</td>
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<tr>
<td></td>
<td>0-20</td>
<td>2000</td>
<td>117A</td>
</tr>
<tr>
<td>0-300 Nominal 230</td>
<td>0-1</td>
<td>200</td>
<td>104A</td>
</tr>
<tr>
<td></td>
<td>0-5</td>
<td>1000</td>
<td>002A</td>
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<td></td>
<td>0-10</td>
<td>2000</td>
<td>011A</td>
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<td>0-20</td>
<td>4000</td>
<td>110A</td>
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<tr>
<td>0-600 Nominal 480</td>
<td>0-1</td>
<td>400</td>
<td>105A</td>
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<td>0-5</td>
<td>2000</td>
<td>003A</td>
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<td>0-10</td>
<td>4000</td>
<td>012A</td>
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<tr>
<td></td>
<td>0-20</td>
<td>8000</td>
<td>111A</td>
</tr>
</tbody>
</table>

* Denotes self-powered units. Input voltage ranges limited to:
  85-135V for 150Vac models
  200-280V for 300Vac models
  380-550V for 600Vac models
All others require a separate 120Vac (85-135V) instrument power.

For optional 230Vac instrument power - Add suffix “-22”

ORDERING INFORMATION
Example: Three-Phase, Three-Wire, 230V, 5A, 0-10Vdc Output, Proportional to 0-2000W (VA), with Separate 120Vac Instrument Power.
PC20-005D

NOTE: Phase-Angle Transducer Model PF5 provides a DC output which is linearly-proportional to the phase-angle difference between voltage and current on AC power systems. For more details, see model PF5 on page 121.
### Three-Phase, Three-Wire Models (Two-Element)

<table>
<thead>
<tr>
<th>Inputs</th>
<th>F.S. (W, VA)</th>
<th>Standard Outputs (W, PF, VA) Model PC20-</th>
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</thead>
<tbody>
<tr>
<td>AC Volts</td>
<td>AC Amps</td>
<td>0-1mA</td>
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<tr>
<td>0-150 Nominal 115</td>
<td>0-1</td>
<td>200</td>
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<tr>
<td>0-150 Nominal 115</td>
<td>0-5</td>
<td>1000</td>
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<td>0-150 Nominal 115</td>
<td>0-10</td>
<td>2000</td>
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<tr>
<td>0-150 Nominal 115</td>
<td>0-20</td>
<td>4000</td>
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</table>

### Three-Phase, Four-Wire Models (Three-Element)

<table>
<thead>
<tr>
<th>Inputs</th>
<th>F.S. (W, VA)</th>
<th>Standard Outputs (W, PF, VA) Model PC20-</th>
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</thead>
<tbody>
<tr>
<td>AC Volts</td>
<td>AC Amps</td>
<td>0-1mA</td>
</tr>
<tr>
<td>0-150 L-N Nominal 115</td>
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<td>300</td>
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<tr>
<td>0-150 L-N Nominal 115</td>
<td>0-5</td>
<td>1500</td>
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<td>0-150 L-N Nominal 115</td>
<td>0-10</td>
<td>3000</td>
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<td>0-150 L-N Nominal 115</td>
<td>0-20</td>
<td>6000</td>
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<tr>
<td>0-300 L-N Nominal 277</td>
<td>0-1</td>
<td>600</td>
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<td>0-300 L-N Nominal 277</td>
<td>0-5</td>
<td>3000</td>
</tr>
<tr>
<td>0-300 L-N Nominal 277</td>
<td>0-10</td>
<td>6000</td>
</tr>
<tr>
<td>0-300 L-N Nominal 277</td>
<td>0-20</td>
<td>12000</td>
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</tbody>
</table>

### Specifications

**Input**
- Voltage: See Tables
- Current: See Tables
- Frequency Range: 50 to 400 Hz
- Power Factor: Any
- Response (to 90%): 1 ms
- Burden
  - Voltage: 0.1 VA/phase
  - Current: 0.28 VA/phase
- Over-range (w/o damage)
  - Voltage: 150V Range
  - 300V Range
  - 600V Range
  - Current: 1A, 5A, 10A Range
- X-Ray: 20A Range

**Output**
- Power Factor: 0.5% F.S.
- Loading
  - "A", "B" models (0-1mA dc): 0-10kΩ
  - "E" models (4-20mA dc): 0-50kΩ
  - All other models (0-5, 0-10Vdc): 2 kΩ min
  - (Except "E" model outputs are bidirectional)
- Response Time: 250 ms

**Accuracy**
- Includes effects of linearity, setpoint, repeatability and power factor at nominal voltage input @ ±10%
- W/V...50-60 Hz ±0.25% F.S.
- Power Factor: 10-100%/VA, 50/60 Hz ±0.005 PF
- Power Factor: 50-400 Hz ±0.5% F.S.
- Power Factor: 10-100%/VA, 50-400 Hz ±0.01 PF
- Ripple: <1% F.S.
- Operating Range: -10°C to +60°C
- Effect: ±1.0% of Rdg., ≤0.1% F.S.
- Temperature: 20-AC Watt/Power Factor/VA Transducer

**Electrical Test**
- Input/Output/Case: 1500 Vac

**Instrument Power**
- "A", "C", "CX5" models: not required
- "B", "D", "X5", "E" models: 85-135 Vac, 50-400 Hz, 10 VA
- "-22" Option: 230 Vac ±15%, 50/60 Hz

**Contact Information**
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- 4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
- PHONE: (614) 777-1005 * FAX: (614) 777-4511
- WWW.OHIOSEMITRONICS.COM * 1-800-537-6732
SINGLE-PHASE CONNECTIONS (ONE-ELEMENT)

USING INTERNAL SENSORS

USING EXTERNAL SENSORS

THREE-PHASE, THREE-WIRE CONNECTIONS (TWO-ELEMENT)

USING INTERNAL SENSORS

USING EXTERNAL SENSORS

THREE-PHASE, FOUR-WIRE CONNECTIONS (THREE-ELEMENT)

USING INTERNAL SENSORS

USING EXTERNAL SENSORS

★ 115Vac ON MODELS WITH B, D, E, EM OR X5 SUFFIX.
★ 230Vac ON MODELS WITH -22 SUFFIX.
★ NOT REQUIRED ON MODELS WITH A, C, OR CX5 SUFFIX.

CASE DIMENSIONS

ALL DIMENSIONS IN INCHES.

CASE HEIGHT 5.88”
1PH 2W 3.0 LBS
CASE HEIGHT 5.88”
3PH 3W 3.7 LBS

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Page 115
DESCRIPTION

The MT Transducer provides an output signal which is directly proportional to the instantaneous product of two input signals. Each input and the output are isolated from one another up to 1000 Volts dc.

The MT series should be used where two process quantities must be multiplied to obtain a useful quantity. For example, a shunt output may be multiplied with the system voltage to obtain dc power delivered to a load. The multiplier provides full four-quadrant operation so signals that may change polarity during operation may be accurately multiplied.

CALIBRATION

All standard models are calibrated at the factory with the values listed below in the Model Selection Table. For instance, the model MT-1-06B would be calibrated with inputs of 50mV and 100 Volts for a full-scale output of 1mA. To compute the power when using a 50mV shunt, multiply the current value of the shunt times 100V. In the case where the shunt equals 1000A, multiply 1000 times 100 for an output of 1mA which equals 100 kilowatts. EXAMPLE: 50mV (Shunt Value) X 100V = 1mA Full-Scale Output

MODEL SELECTION

ORDERING INFORMATION

Example: Input 1 = 0-50mV, Input 2 = 0-100Vdc, with 0-10Vdc Output. MT-1-06D

SPECIFICATIONS

INPUT

Input One (Shunt) ............................................. See Table
Burden .......................................................... >100kΩ
Over-range ...................................................... 2 X Rated Input

Input Two (Voltage) ......................................... See Table
Burden .......................................................... 100kΩ
(150V to 300V) ............................................. 500kΩ
(400V to 750V) ............................................. 1MQ
Over-range ..................................................... 2 X F.S. or 600Vac/850Vdc max.
Frequency ........................................................ See Table
AC Option ..................................................... DC

INSTRUMENT POWER

Standard ................................................. 90-135Vac, 50-400Hz, 7VA
“G” Option .................................................. 180-270Vac, 50-400Hz

OUTPUT

Load on Output ............................................. 0-10kΩ
10V ............................................................. ≥2kΩ
20mA ........................................................... 0-500Ω
Response Time to 90% ................................. DC Models ................................. 10ms
AC Option ................................................... 200ms

ACCURACY & LINEARITY

±0.5% F.S.
Including Set-point, Repeatability, Voltage & Current Linearity

TEMPERATURE & PHYSICAL

Temperature Effect ................................... (-20°C to 65°C) ±0.02%°C
Net Weight ................................................... 2.2 lb

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Page 116
DESCRIPTION
The model SWH is a single-phase bidirectional Watthour transducer with current transformer. The model SWH has a Form A solid-state relay pulse output.

FEATURES
- Easy-to-install split-core design
- LED indications of proper installation/operation

APPLICATIONS
- Energy Allocations
- Sub Metering
- Revenue Metering
- Process Control

ORDERING INFORMATION
Example: 100Aac Input For Use On 230Vac L-N Voltage
SWH-2100

SPECIFICATIONS

INPUT
Voltage .......................................................... See Table
Current .......................................................... See Table
Frequency Range ........................................... 48-62Hz
Power Factor .................................................. Any
Burden Voltage .............................................. <0.2VA
Overload Voltage ........................................... 120% of Nominal
Current .......................................................... 125% of F.S.

DIELECTRIC TEST
Input/Output .................................................. 2250Vac

INSTRUMENT POWER
Standard ........................................................ Self-powered
Consult Factory for Custom Pulse Rates

OUTPUT
LED .................................................. Energy Rate and Direction Indicator
Green = Forward Power
Red = Reverse Power
Blinks at same rate as WH pulse
WH Pulse
Type.... Form A, Solid-State Relay, 30Vpk, 100mA max.
Scaling .................................................. 10WH per pulse
Consult Factory for Custom Pulse Rates
Pulse Duration ............................................ 200ms
Forward Power ...... Normally Open with contact closing
Reverse Power .. Normally Closed with contact opening

ACCURACY ..................................................... ±1.0% F.S.

TEMPERATURE & PHYSICAL
Temperature Effect (-20ºC to 65ºC) ................. ±1.0% F.S.
Weight .......................................................... 1.0 lb

CONNECTIONS

DIMENSIONS

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Page 117
DESCRIPTION
The model ESP3 Watthour meter is used to measure energy at the input to electrical load centers or branch circuits. The unit displays Volts, Amps, Watts and power factor, in addition to import and export energy.

The unit is DIN-rail mounted and has optional indoor and outdoor enclosures. Solid-core or split-core current transformers are available.

FEATURES
• Single model for all 1Φ and 3Φ applications over range of 120-240Vac
• Indoor or outdoor package options
• Optional split-core current transformers

APPLICATIONS
• Input to electrical load centers
• Branch circuits

ORDERING INFORMATION
Example: 3Φ/3W Watthour Meter with 208Vac and 200Aac Input, with Split-core CTs in Outdoor Surface-mount Enclosure
ESP3-354EDM-N with SCCT-013-200 (Qty 2) and ENC-OSM

LOW-COST

CONNECTION OPTIONS

<table>
<thead>
<tr>
<th>SYSTEM CONFIGURATION</th>
<th>VOLTAGE INPUT (Vac)</th>
<th>MODEL ESP3-</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Phase 2-Wire*</td>
<td>120</td>
<td>354EDM-N</td>
</tr>
<tr>
<td>1-Phase 2-Wire*</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td>1-Phase 3-Wire*</td>
<td>120/240</td>
<td></td>
</tr>
<tr>
<td>1-Phase 3-Wire Network*</td>
<td>120/208</td>
<td></td>
</tr>
<tr>
<td>3-Phase 3-Wire*</td>
<td>208</td>
<td></td>
</tr>
<tr>
<td>3-Phase 4-Wire*</td>
<td>120/208</td>
<td></td>
</tr>
</tbody>
</table>

*1Φ2W system requires 1 CT, 1Φ3W or 3Φ3W system requires 2 CTs. 3Φ4W system requires 3 CTs. Solid and Split-Core CTs are available separately. See SCCT and BCT on following pages.

INPUT
Current Range
   With appropriate CTs ($I_p$)...............0-200, 0-400, 0-600Aac
   Over-range without damage..................125% F.S.
   Voltage......Nominal...................120, 208, 240Vac
   Operating Range................................Nominal ±30%
   Power Factor......................any
   Frequency Range..........................47-63Hz
   Power Consumption..........................<1VA

OUTPUT
Pulse Value..................1.0kWh/Pulse, polarity sensitive
   (NOTE: Unit is factory-programmed for CT ratio.)
   Contact Closure (Low-impedance)......low<3Ω, high>1MΩ
   Duration.... 50% duty cycle or 80ms, whichever is greater
   Serial.....................................RS-485, 9600 baud (E,7,1)

DIELECTRIC TEST
Input/Output/Case..................2250Vac

ACCURACY
IEC 62052-11..................0.05($I_p$).................Class 0.5

SPECIFICATIONS
DISPLAYED VALUES
<table>
<thead>
<tr>
<th>Resolution</th>
<th>Energy (Import and Export)..................(kWh)....XXXXXX.X</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Volts (Per-Phase)..........................(Vac).....XXX.X</td>
</tr>
<tr>
<td></td>
<td>Amps (Per-Phase)...........................(Aac)........XXX.X</td>
</tr>
<tr>
<td></td>
<td>Power (Per-Phase and Total)................(W).........XXXXXXX</td>
</tr>
<tr>
<td></td>
<td>Power Factor (Per-Phase w/Direction).....(C or L).....X.XX</td>
</tr>
</tbody>
</table>

TIME OF USE (Parameters Available via RS-485 Port)
Real-Time Clock Calendar with Battery Back-up
4 Tariff Periods (T1, T2, T3, T4) Per Day. (Active Tariff Period is shown on display below decimal point in kWh reading.)
Max. Demand for 15-, 30-, or 60-Minute Intervals.
Resettable Demand via RS-485 Port

PHYSICAL & ENVIRONMENTAL
Operating Range.............................0º to 40ºC
Storage Range...............................-30º to 55ºC
Operating Humidity ......................0-85% non-condensing
Weight..................................10.0 oz
Termination (Screw Compression)..........20-16 AWG
Enclosure Material......................ABS

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Page 118
## DISPLAY, CONNECTIONS & DIMENSIONS

### MODEL ESP3-

#### DISPLAY REGISTERS

<table>
<thead>
<tr>
<th></th>
<th>01</th>
<th>02</th>
<th>03</th>
<th>04</th>
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<tbody>
<tr>
<td>Total kWh</td>
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<td>Volts L1</td>
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<td>Amps L1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Display scrolls through each register with Total kWh displayed for 2 min. followed by the remaining registers for 3 sec. each.

#### CASE DIMENSIONS

![Case Dimensions Diagram](image)

#### CONNECTION DIAGRAMS

**1-PHASE 2-WIRE SYSTEMS**

![Connection Diagram 1-phase 2-wire systems](image)

**1-PHASE 3-WIRE SYSTEMS**

![Connection Diagram 1-phase 3-wire systems](image)

**1-PHASE 3-WIRE NETWORK SYSTEMS**

![Connection Diagram 1-phase 3-wire network systems](image)

**3-PHASE 3-WIRE SYSTEMS**

![Connection Diagram 3-phase 3-wire systems](image)

**3-PHASE 4-WIRE SYSTEMS**

![Connection Diagram 3-phase 4-wire systems](image)
**Features**
- 0.5% Accuracy
- Split-core SCCT models
- Solid-core BCT models
- AC Output 26.6mA

**Applications**
- For use with ESP3 series Watt transducers
- Other metering applications

---

**Model Selection**

<table>
<thead>
<tr>
<th>Input AC Amps</th>
<th>Split-Core: Model BCT-0-26.6mAac Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 200</td>
<td>013-200</td>
</tr>
<tr>
<td>0 - 200</td>
<td>015-200</td>
</tr>
<tr>
<td>0 - 200</td>
<td>025-200</td>
</tr>
<tr>
<td>0 - 400</td>
<td>025-400</td>
</tr>
<tr>
<td>0 - 600</td>
<td>045-600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Input AC Amps</th>
<th>Solid-Core: Model SCCT-0-26.6mAac Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 200</td>
<td>013-200</td>
</tr>
<tr>
<td>0 - 400</td>
<td>032-400</td>
</tr>
</tbody>
</table>

Optional inputs and outputs are available for BCT & SCCT. Consult factory.

*Intended for use over insulated conductors only!*

---

**Specifications**

**Input**
- Current
  - See Model Selection Table
- Over-current: 1.2 X F.S.
- Frequency Range: 50-60Hz

**Output**
- Scaling: 0-F.S. Input = 0-26.6mAac Output
- Burden: 1VA

**Accuracy**
- ±0.5% F.S.

**Physical & Environmental**
- Weight
  - See Dimension Table
- Lead Length: 72"
- Lead Type: 22AWG stranded, White (X1) & Black
- Operating Temperature: 55°C Max.

---

**Sensor Dimensions**

<table>
<thead>
<tr>
<th>Model BCT-</th>
<th>Dimensions (inches)</th>
<th>WT. (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>ID</td>
<td>OD</td>
</tr>
<tr>
<td>013-200</td>
<td>0.8</td>
<td>0.51</td>
</tr>
<tr>
<td>015-200</td>
<td>0.8</td>
<td>0.59</td>
</tr>
<tr>
<td>025-200</td>
<td>0.79</td>
<td>0.98</td>
</tr>
<tr>
<td>025-400</td>
<td>0.79</td>
<td>0.98</td>
</tr>
<tr>
<td>045-600</td>
<td>0.95</td>
<td>1.77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model SCT-</th>
<th>Dimensions (inches)</th>
<th>WT. (lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>ID</td>
<td>OD</td>
</tr>
<tr>
<td>013-200</td>
<td>0.8</td>
<td>0.53</td>
</tr>
<tr>
<td>032-400</td>
<td>0.8</td>
<td>1.26</td>
</tr>
</tbody>
</table>

---

**Ohio Semitronics, Inc.**

Page 120
PHASE ANGLE TRANSUDER

MODEL PF5

DESCRIPTION
The model PF5 provides a dc output which is linearly proportional to the phase angle difference between voltage and current of an ac power system. The polarity of the bidirectional output indicates leading or lagging conditions.

Balanced load conditions are necessary in three-phase systems. Deviation from sine wave conditions leads to inaccuracies with all transducers since angle measurement is based on the time difference between zero crossings.

FEATURES
• The bidirectional output of the model PF5 is directly proportional to the 0° to 60° leading or lagging phase angle of the input signal.
• A leading phase angle results in a negative output signal.
• A lagging phase angle results in a positive output signal.

APPLICATIONS
• Provides an accurate means for calculating power factor, PF = COSΦ

1-PHASE, 2-WIRE MODELS

<table>
<thead>
<tr>
<th>VOLTAGE INPUT (VL-L)</th>
<th>CURRENT INPUT (Aac)</th>
<th>STANDARD OUTPUTS, MODEL PF5-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mAAdc*</td>
<td>0-10Vdc*</td>
</tr>
<tr>
<td>95 - 135</td>
<td>0.2 to 5.0</td>
<td>001A</td>
</tr>
<tr>
<td></td>
<td>0.3 to 10.0</td>
<td>010A</td>
</tr>
<tr>
<td></td>
<td>1.0 to 20.0</td>
<td>019A</td>
</tr>
<tr>
<td>200 - 300</td>
<td>0.2 to 5.0</td>
<td>002A</td>
</tr>
<tr>
<td></td>
<td>0.3 to 10.0</td>
<td>011A</td>
</tr>
<tr>
<td></td>
<td>1.0 to 20.0</td>
<td>020A</td>
</tr>
<tr>
<td>410 - 550</td>
<td>0.2 to 5.0</td>
<td>003A</td>
</tr>
<tr>
<td></td>
<td>0.3 to 10.0</td>
<td>012A</td>
</tr>
<tr>
<td></td>
<td>1.0 to 20.0</td>
<td>021A</td>
</tr>
</tbody>
</table>

3-PHASE, 3-WIRE OR 3-PHASE, 4-WIRE MODELS

<table>
<thead>
<tr>
<th>VOLTAGE INPUT (VL-L)</th>
<th>CURRENT INPUT (Aac)</th>
<th>STANDARD OUTPUTS, MODEL PF5-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mAAdc*</td>
<td>0-10Vdc*</td>
</tr>
<tr>
<td>95 - 135</td>
<td>0.2 to 5.0</td>
<td>004A</td>
</tr>
<tr>
<td></td>
<td>0.3 to 10.0</td>
<td>013A</td>
</tr>
<tr>
<td></td>
<td>1.0 to 20.0</td>
<td>022A</td>
</tr>
<tr>
<td>200 - 300</td>
<td>0.2 to 5.0</td>
<td>005A</td>
</tr>
<tr>
<td></td>
<td>0.3 to 10.0</td>
<td>014A</td>
</tr>
<tr>
<td></td>
<td>1.0 to 20.0</td>
<td>023A</td>
</tr>
<tr>
<td>410 - 550</td>
<td>0.2 to 5.0</td>
<td>006A</td>
</tr>
<tr>
<td></td>
<td>0.3 to 10.0</td>
<td>015A</td>
</tr>
<tr>
<td></td>
<td>1.0 to 20.0</td>
<td>024A</td>
</tr>
</tbody>
</table>

*Denotes self-powered unit. All other models require 85-135Vac instrument power.
**4-20mA models for use only on lagging power factor. (unidirectional output)
Higher current ranges available - consult factory.

SPECIFICATIONS

INPUT
Current.................................................. See Tables
Voltage.................................................. See Tables
Frequency Range.................................... 50-60Hz
Burden
Voltage.................................................. 2.0VA
Current.................................................. 0.4VA
Overload (Continuous)
Voltage .............................................. 135Vac Range .............. 175Vac
300Vac Range ........................................ 350Vac
550Vac Range ........................................ 600Vac
Current ................................................ 5Aac Range .................. 10Aac
10Aac Range .............................. 20Aac
20Aac Range .............................. 30Aac

INSTRUMENT POWER
“A” and “C” models ......................... Self-Powered
“E” and “EM” models ............... 85-135Vac, 50-400Hz, 3.5VA
“-22” Option........................................... 230Vac ±15%, 50/60Hz

DIELECTRIC TEST
Input/Output/Case................................. 1500Vac

OUTPUT
Type.................................................. See Tables
Span ............... (Current In. ref. Volts In.) ..........+60° to 0 to -60°
Current leads Voltage .......... Negative Output
Current lags Voltage .......... Positive Output
Loading .............. “A” models ................. 0-10kΩ
“C” models ......................... 2kΩ, min.
“E” & “EM” models .......... 0-500Ω
Response Time (to 90%) .................. 400ms
Field-adjustable Cal. ................+-10%

ACCURACY............................................. ±0.5% of Span (includes combined effects of voltage, current & frequency)

TEMPERATURE
Operating Range............................... -20°C to 60°C
Effect.................. ±0.5% F.S.

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INSTALLATION NOTE: Proper installation of the model PF5 Phase Angle Transducer is critical. The connection diagrams shown above must be followed precisely. If the application requires the use of current transformers, insure that polarity is correct. Any deviation from the connections shown will result in a locked full-scale output signal.
FREQUENCY TRANSDUCER

MODEL AFT-

0.05% ACCURACY

DESCRIPTION
The AFT Frequency Transducer combines wide frequency range capability with high-accuracy measurement in a UL & CUL listed package. The AFT can accurately measure frequencies up to 1000Hz with some models measuring from dc to full-scale.

For applications requiring better resolution, the AFT has standard models with narrower frequency ranges. A wide input range means that all standard models accept voltages from 3V to 575V. The AFT comes with standard outputs of 0-1mA, 4-20mA, 0-20mA as well as 0-5V and 0-10V.

FEATURES
- High accuracy over wide frequency ranges.
- Each model covers all input voltages from 3V to 575V.
- UL & CUL approvals.

APPLICATION
- Where instantaneous indication of frequency is required.

### ORDERING INFORMATION
Example: 55-65Hz Input with 0-5Vdc Output. AFT-060-10X5

### SPECIFICATIONS

#### INPUT
<table>
<thead>
<tr>
<th>FREQUENCY (Hz)</th>
<th>0-1mA (Vdc)</th>
<th>0-10mA (Vdc)</th>
<th>0-5Vdc</th>
<th>4-20mA (Vdc)</th>
<th>4-20mA (Vdc)*</th>
<th>0-20mA (Vdc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45-55</td>
<td>050-10B</td>
<td>050-10D</td>
<td>050-10X5</td>
<td>050-10E</td>
<td>050-10E2</td>
<td>050-10EA</td>
</tr>
<tr>
<td>55-65</td>
<td>060-10B</td>
<td>060-10D</td>
<td>060-10X5</td>
<td>060-10E</td>
<td>060-10E2</td>
<td>060-10EA</td>
</tr>
<tr>
<td>375-425</td>
<td>400-50B</td>
<td>400-50D</td>
<td>400-50X5</td>
<td>400-50E</td>
<td>400-50E2</td>
<td>400-50EA</td>
</tr>
<tr>
<td>0-10</td>
<td>010B</td>
<td>010D</td>
<td>010X5</td>
<td>010E</td>
<td>010E2</td>
<td>010EA</td>
</tr>
<tr>
<td>0-55</td>
<td>055B</td>
<td>055D</td>
<td>055X5</td>
<td>055E</td>
<td>055E2</td>
<td>055EA</td>
</tr>
<tr>
<td>0-65</td>
<td>065B</td>
<td>065D</td>
<td>065X5</td>
<td>065E</td>
<td>065E2</td>
<td>065EA</td>
</tr>
<tr>
<td>0-100</td>
<td>100B</td>
<td>100D</td>
<td>100X5</td>
<td>100E</td>
<td>100E2</td>
<td>100EA</td>
</tr>
<tr>
<td>0-425</td>
<td>425B</td>
<td>425D</td>
<td>425X5</td>
<td>425E</td>
<td>425E2</td>
<td>425EA</td>
</tr>
<tr>
<td>0-1000</td>
<td>1000B</td>
<td>1000D</td>
<td>1000X5</td>
<td>1000E</td>
<td>1000E2</td>
<td>1000EA</td>
</tr>
</tbody>
</table>

115Vac, 50/60Hz instrument power is required on all units.
Optional 230Vac Instrument Power - Add suffix “-22”
(Also requires instrument power)
Consult factory for special frequency ranges.

#### OUTPUT
- Loading
  - "B" models ................. (0-1mA (Vdc)) .......... 0-1kΩ
  - "D" & "X5" models .......... (0-10, 0-5Vdc) ......... 2kΩ min.
  - "E", "E2" & "EA" models .. (4-20 & 0-20mA) ......... 500Ω
- Response Time..................<200ms
- ACCURACY....................±0.05% Rdg. ±0.05% Span
- OUT PUT Ripple ...............±1.0% F.S.
- TEMPERATURE
  - Operating Range ............-20ºC to 60ºC
  - Effect .....................±0.005%/ºC

#### CONNECTION DIAGRAMS AND CASE DIMENSIONS

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Page 123
FREQUENCY TRANSDUCER

DIN-RAIL-MOUNTED FREQUENCY TRANSDUCER

FEATURES

• Frequency measurement of sinusoidal and distorted waveforms.
• Digital period measurement.
• Analog output.

APPLICATIONS

• For use on any application that requires indication of instantaneous frequency.
• Where CE or CSA is required.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT FREQUENCY (Hz)</th>
<th>STANDARD OUTPUTS MODEL DFT-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mAdc</td>
</tr>
<tr>
<td>45-55</td>
<td>050B</td>
</tr>
<tr>
<td>55-65</td>
<td>060B</td>
</tr>
<tr>
<td>375-425</td>
<td>400B</td>
</tr>
</tbody>
</table>

All standard models require instrument power.
Additional frequency and voltage ranges available - Consult factory
Wide-range Frequency Transducers also Available - Consult factory

ORDERING INFORMATION

Example: 55-65Hz Input with 0-5Vdc Output.
DFT-060X5

DIN Rail lengths available - Consult factory

SPECIFICATIONS

INPUT

Frequency Range ........................................... See Table
Voltage Range ........................................... 10-230Vac
Burden ..................................................... <1.0VA
Overload ........................................... 120% F.S. voltage continuous
                                                  200% F.S. voltage for 1 second

OUTPUT

Loading

“B” models ............ (0-1mAdc) ......................... 0-15kΩ
“D”, “X5” models ....... (0-10, 0-5Vdc) ............. 2.5kΩ min.
“E” & “EA” models ....... (4-20, 0-20mAdc) ........ 0-750Ω
Response Time .......... 4 Periods of Input Frequency

INSTRUMENT POWER

Standard ........................................... 85-230Vdc/ac, 50/60Hz, 3.5VA

DIELECTRIC TEST

Input to Instrument Power/Output/Case .................... 3700Vac
Instrument Power to Output/Case ......................... 3700Vac
Output to Case ........................................... 490Vac

ACCURACY

50Hz, 60Hz Models ........................................ ±0.02Hz
400Hz Model ........................................... ±0.1Hz
Output Ripple ........................................... <0.5% p.p.

TEMPERATURE & PHYSICAL

Temperature Range ...................................... -10ºC to 55ºC
Termination ........................................... #10 AWG max.
Net Weight ........................................... 0.7 Lbs.

CASE DIMENSIONS AND CONNECTION DIAGRAM

NOTES
1. DIMENSIONS ARE IN INCHES [MM].
2. MOUNTED ON 35MM TOP-HAT DIN-RAIL.

Dwgid 0902-00869-B Rev --

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FEATURES

• Provides analog output which is proportional to the input frequency over wide ranges.
• Digital period measurement delivers accurate frequency measurement.

APPLICATIONS

• For use on any application that requires measurement for generation or energy management.
• Applications that require compact DIN packaging or CE & CSA approvals.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT FREQUENCY (Hz)</th>
<th>STANDARD OUTPUTS MODEL DFTA-</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-1mAdc</td>
</tr>
<tr>
<td>10-55</td>
<td>005B</td>
</tr>
<tr>
<td>10-65</td>
<td>004B</td>
</tr>
<tr>
<td>10-100</td>
<td>002B</td>
</tr>
<tr>
<td>10-425</td>
<td>006B</td>
</tr>
<tr>
<td>10-1000</td>
<td>003B</td>
</tr>
</tbody>
</table>

All standard models require instrument power.
Additional frequency and voltage ranges available - Consult factory
Differential Frequency Transducers also Available - Consult Factory

ORDERING INFORMATION

Example: 10-100Hz, 10-100V Input, 0-5Vdc Output proportional to 10-100Hz.
DFTA-002X5

DIN Rail lengths available - Consult factory

SPECIFICATIONS

INPUT

Frequency Range ................................................... See Table
Voltage Range ....................................................... 0-230V
AC Waveforms ...................................................... Sine, square or triangle
Burden ..................................................................... <1.0VA
Overload ................................................................. 120% F.S. Voltage

OUTPUT

Loading
“B” models ................................................... (0-1mAcdc)......................... 0-15kΩ
“D” & “X5” models ........................................ (0-10Vdc, 0-5Vdc)........ 2.5kΩ min.
“E” & “EA” models ............................................ (4-20mAcdc, 0-20mAcdc)...... 0-750Ω
Response Time ............................................... 4 Periods of Input Frequency

INSTRUMENT POWER

Standard ......................................................... 85-230Vdc/ac, 50/60Hz, 3.0VA

DIELECTRIC TEST

Input to Instrument Power/Output/Case...................... 3700Vac
Instrument Power to Output/Case............................. 3700Vac
Output to Case .................................................. 4900Vac

ACCURACY ............................................................ ±0.2% of Span
Output Ripple ...................................................... <0.5% p.p.

TEMPERATURE & PHYSICAL

Temperature Range .............................................. -10°C to 55°C
Termination ......................................................... #10 AWG max.
Net Weight ......................................................... 0.7 lbs

CASE DIMENSIONS AND CONNECTION DIAGRAM

NOTES

1. DIMENSIONS ARE IN INCHES [MM].
2. MOUNTED ON 35MM TOP-HAT DIN-RAIL.

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### FEATURES
- Isolated linear output from a standard or non-standard input process signal.
- Factory calibrated for various input and output signals.

### APPLICATIONS
- Process control
- Signal isolation
- Signal conversion

---

#### MODEL SELECTION

<table>
<thead>
<tr>
<th>RATED INPUT</th>
<th>RATED OUTPUT</th>
<th>INSTRUMENT POWER</th>
<th>ADJUSTMENT OPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0-1mAdc</td>
<td>01 0-1mAdc</td>
<td>H 115Vac</td>
<td>(Blank)</td>
</tr>
<tr>
<td>2 0-10Vdc</td>
<td>02 0-10Vdc</td>
<td>G 230Vac</td>
<td>±10% Output Span Adj. ±1% Zero Adj.</td>
</tr>
<tr>
<td>3 0-5Vdc</td>
<td>03 0-5Vdc</td>
<td></td>
<td>50% Output Span Adj.</td>
</tr>
<tr>
<td>4 1-5Vdc</td>
<td>04 1-5Vdc</td>
<td></td>
<td>+10% Output Span Adj. 50% Zero Adj.</td>
</tr>
<tr>
<td>5 0-20mAdc</td>
<td>05 0-20mAdc</td>
<td></td>
<td>50% Output Span Adj. 50% Zero Adj.</td>
</tr>
<tr>
<td>6 4-20mAdc</td>
<td>06 4-20mAdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 20-4mAdc</td>
<td>07 0-5mAdc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 10-50mAdc</td>
<td>08 4-20mA loop powered</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### OUTPUT
- Loading:
  - 0-1mA models ................................................. 0-10kΩ
  - 0-5mA models ................................................. 0-2.4kΩ
  - 0-5V, 0-10V models ........................................ 2kΩ
  - 1-5V models ................................................ 2kΩ
  - 0-20mA, 4-20mA & 4-12-20mA models .................. 0-600Ω

#### ACCURACY
- Set Point .................................................. ±0.25% F.S.
- Linearity ................................................. ±0.1% F.S.
- Output Ripple ........................................... <±0.5% F.S.

#### TEMPERATURE & PHYSICAL
- Temperature Operating Range ...................... -20ºC to 65ºC
- Temperature Effect ..................................... ±0.01%/ºC
- Termination ............................................... #14 AWG max.

### SPECIFICATIONS

#### INPUT TYPE
- See Table

#### BURDEN
- 0-1mA models .............................................. 1kΩ
- 0-5V, 0-10V and 1-5V models ......................... min. 100kΩ
- 0-20mA, 4-20mA and 20-4mA models ............... 250Ω
- 10-50mA models ........................................... 100Ω
- Over-range ............................................. 2 X rated input.
- Response Time .......................................... 1ms

#### DIELECTRIC TEST
- Input to Output ......................................... 1000Vdc
- Input/Output to Instrument Power .................. 1500Vdc

#### INSTRUMENT POWER
- Standard (option H) ................................. 95-135Vac, 50-400Hz, 3.5VA
- Option G .................................................. 230Vac, 50-60Hz
- Optional DC instrument power ..................... Consult Factory

#### CASE DIMENSIONS AND CONNECTION DIAGRAMS

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Page 126
PROCESS SIGNAL CONDITIONERS

MODEL MSG-

FEATUES
• Isolated linear output from a standard or non-standard input process signal.
• Factory calibrated for various input and output signals.
• DIN-style case

APPLICATIONS
• Process control
• Signal isolation
• Signal conversion

MODEL SELECTION

<table>
<thead>
<tr>
<th>RATED INPUT</th>
<th>RATED OUTPUT</th>
<th>INSTRUMENT POWER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-1mAdc</td>
<td>H 115Vac</td>
</tr>
<tr>
<td>2</td>
<td>0-10Vdc</td>
<td>1 5 20-4m</td>
</tr>
<tr>
<td>3</td>
<td>0-5Vdc</td>
<td>0-5Vdc 12 12Vdc</td>
</tr>
<tr>
<td>4</td>
<td>1-5Vdc</td>
<td>1-5Vdc 15 15Vdc</td>
</tr>
<tr>
<td>5</td>
<td>0-20mA</td>
<td>0-20mA 24 24Vdc</td>
</tr>
<tr>
<td>6</td>
<td>4-20mA</td>
<td>4-20mA</td>
</tr>
<tr>
<td>7</td>
<td>20-4mA</td>
<td>0-5mA</td>
</tr>
<tr>
<td>8</td>
<td>10-50mA</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>0-50mVdc</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>0-100mVdc</td>
<td></td>
</tr>
</tbody>
</table>

ORDERING INFORMATION
Example:
4-20mAdc Input and 0-1mA
Output, 115Vac Instrument Power.
MSG-6-01-H

SPECIFICATIONS

INPUT
Current, Voltage ........................................ See Table
Burden
0-1mA models ............................................. 1kΩ
5V, 10V, 1-5V, 50mV and 100mV models ........ min. 100kΩ
0-20mA, 4-20mA and 20-4mA models ............... 100Ω
10-50mA models ....................................... 40Ω
Over-range .............................................. 2 X rated input.
Response Time ......................................... 1ms

DIELECTRIC TEST
Input to Output ........................................ 1000Vdc
Input/Output to Instrument Power .................. 1500Vdc

INSTRUMENT POWER
Standard ........................................ 95-135Vac, 50-400Hz, 3.5VA
Optional .............................................. See Table

OUTPUT
Current, Voltage ........................................ See Table
Loading
0-1mA models ............................................. 0-10kΩ
0-5mA models ............................................ 0-2kΩ
0-5V and 0-10V models .............................. >2kΩ
1-5V models ............................................. >1MΩ
0-20mA and 4-20mA models ...................... 0-500Ω
Response Time ......................................... 10ms
Field-Adjustable Cal ....................................
Zero ..................................................... ±1%
Span .................................................... ±10%
Ripple ................................................... <±0.5% F.S.

ACCURACY
Set Point .............................................. ±0.25% F.S.
Linearity .............................................. ±0.1% F.S.

TEMPERATURE & PHYSICAL
Operating Temperature Range ...................... -20ºC to 65ºC
Temperature Effect ................................... ±0.01% /ºC
Termination ........................................... #14 AWG max.
Net Weight ............................................ 0.24 lb

5 YEAR WARRANTY

WARRANTY

CASE DIMENSIONS AND CONNECTION DIAGRAMS

MOUNTS ON STANDARD 35MM TOP-HAT DIN-RAIL PER EN50022 OR 32MM "G" RAIL PER EN6035.

OHIO SEMITRONICS, INC.
4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
PHONE: (614) 777-1005 * FAX: (614) 777-4511
WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

Page 127
CONVERTS DC INPUT TO TIME-INTEGRATED PULSE

FEATURES
- Provides relay closure rate which is proportional to the time integral of the input signal.

APPLICATIONS
- Designed for use with DC, pulsating DC, or DC with AC components.

MODEL SELECTION

<table>
<thead>
<tr>
<th>INPUT RANGE</th>
<th>CLOSURE RATE (COUNTS/HR)</th>
<th>STANDARD MODELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50mVdc</td>
<td>0-10000</td>
<td>VFC-010</td>
</tr>
<tr>
<td>0-100mVdc</td>
<td>0-10000</td>
<td>VFC-020</td>
</tr>
<tr>
<td>0-150mVdc</td>
<td>0-10000</td>
<td>VFC-030</td>
</tr>
<tr>
<td>0-250mVdc</td>
<td>0-10000</td>
<td>VFC-040</td>
</tr>
<tr>
<td>0-1mA</td>
<td>0-10000</td>
<td>VFC-050</td>
</tr>
<tr>
<td>0-10mA</td>
<td>0-10000</td>
<td>VFC-060</td>
</tr>
<tr>
<td>0-20mA</td>
<td>0-10000</td>
<td>VFC-070</td>
</tr>
<tr>
<td>0-5V</td>
<td>0-10000</td>
<td>VFC-080</td>
</tr>
</tbody>
</table>

Case dimensions available - Consult factory
Optional 230Vac Instrument Power - Add suffix “-22”

ORDERING INFORMATION
Example: 0-150mV Input, 10,000Cts/hr at F.S., 230Vac Inst. Pwr.
VFC-030-22

SPECIFICATIONS

INPUT
- Type .......................................................... See Table
- Overload..................................................... 10Vdc max.
- Impedance
  - Voltage input models ........................................... >1MΩ
  - Current input models ......................................... <200Ω
- Frequency ..........dc with up to 100% ripple @ ≥120Hz

INSTRUMENT POWER
- Standard..........................85-135Vac, 50-400Hz, 3.5VA
- “-22” Option...................... 230Vac, 50/60Hz, ±15%

OUTPUT
- Relay .....................N/O SPST, 120V, 0.5A contact rating
- Relay closure period .................. 200ms

ACCURACY .................................................. ±0.25% F.S.
- Linearity.................................................. ±0.1% F.S.

TEMPERATURE
- Operating Range .................... -10°C to 60°C
- Effect .................................................. ±0.5%

CASE DIMENSIONS & CONNECTION DIAGRAM

Dwg# 0902-00889-B Rev A

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WWW.OHIOSEMITRONICS.COM * 1-800-537-6732
Page 128
DIGITAL AC POWER MONITOR

MODEL DSP-

DESCRIPTION
The DSP is a three-phase, three-element multifunction digital transducer with outputs for voltage, current, and power via serial communication. Applications include 4-wire and 3-wire circuits with external current transformers where needed. Voltage and current ratings are programmable to obtain primary scaling.

Measurements include: 3 line-to-line and 3 line-to-neutral voltages, 3 currents, 3 per-phase power, total power and frequency. All measurements are true RMS values. Data is available via a serial RS-422 port using a simple ASCII protocol. (See below for RS-232C option.)

A PC data system and LabVIEW™ driver are available for programming and reading the DSP. Consult factory for free application software.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>MODEL DSP-007</th>
<th>MODEL DSP-008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (Line-Line/Line-Neutral)</td>
<td>300/175Vac</td>
<td>600/345Vac</td>
</tr>
<tr>
<td>Current (secondary)</td>
<td>0-5 Amps</td>
<td>0-5 Amps</td>
</tr>
<tr>
<td>Power measurement range</td>
<td>1-1000 W/element</td>
<td>2-2000 W/element</td>
</tr>
<tr>
<td>Frequency</td>
<td>48-62Hz</td>
<td>48-62Hz</td>
</tr>
<tr>
<td>Power Factor</td>
<td>1.0-0.1 Lag and Lead</td>
<td>1.0-0.1 Lag and Lead</td>
</tr>
</tbody>
</table>

SERIAL COMMUNICATION
Hardware......................... RS-422, 9-Pin D connector
Parameters... 9600 Baud, 8 data bits, 1 stop bit, no parity

DIELECTRIC TEST
Input/Instrument Power to Output ................. 1000Vac
Input/Instrument Power/Output to Case .......... 1500Vac

INSTRUMENT POWER
Standard......................... 115Vac, ±10%, 50/60Hz, 5VA
“-22” Option ..................... 230Vac, 50/60Hz, ±10%

TEMPERATURE & PHYSICAL
Temperature Effect...(-10ºC to 60ºC)........±0.005%/ºC
Weight ........................................... 3.4 lbs.

FUNCTION | RESOLUTION | UNIT OF MEASURE
--- | ---- | ----
Line-to-neutral RMS Volts, 3 phases | 4 digits (XXX.X) | Volts
Line-to-line RMS Volts, 3 phases | 4 digits (XXX.X) | Volts
Per-Phase Current, 3 phases | 4 digits (XXXX) | mA or Amps *
Per-Phase Power | 6 digits (XXXX.XX) | Watts or kW *
Total Power | 6 digits (XXXX.XX) | Watts or kW *
Frequency (measured at L1-N) | 4 digits (XXX.X) | Hz
Power Factor | 3 digits (X.XX) | PF

ACCURACY
Volts, Amps ........................................ ±0.1% F.S.
Power (.10%-100%) ..............±0.1% Rdg., ±0.05% F.S.
Frequency ........................................ ±0.1%, ±0.1Hz
Power Factor ........................................ ±0.01 PF

*CT Rating is programmable by serial communication from 5 - 5000.
If current units are in Amps, then Watt reading is in kilowatts. If units are in milliamperes, Watt reading is in Watts

ANALOG OUTPUT OPTION
The model D/A-4653 is a 24Vdc-powered serial converter providing 8 channels of 4-20mA dc analog output. The converter connects to the serial port of a model DSP and converts the serial data to 4-20mA dc analog signals. Consult factory for details and pricing.

RS-232C DATA CONVERTER OPTION
The model IFC-4498 is a full-duplex RS-232C and RS-422 data converter. It connects to the serial RS-422 port of the DSP and provides a standard 9-pin D connector for attaching to a PC. Consult factory for details and pricing.
MULTIFUNCTION TRANSDUCERS AND TEST PANELS

OSI DIGITAL AC POWER MONITOR

MODEL DSP-

CASE DIMENSIONS

COMMUNICATIONS

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CONNECTION DIAGRAMS

THREE-PHASE, FOUR-WIRE SYSTEM

THREE-PHASE, THREE-WIRE SYSTEM
(THREE CURRENT TRANSFORMERS)

NOTE: Connection of device voltage neutral to system neutral is recommended but not required. In this configuration, all three phase currents are measured. Individual phase power is dependent on system voltage balance if neutral is not connected. Total power accuracy is not dependent on voltage balance.

THREE-PHASE, THREE-WIRE SYSTEM
(TWO CURRENT TRANSFORMERS)

NOTE: Connection of device voltage neutral to system neutral is recommended but not required. In this configuration, all three phase currents are measured. Individual phase power is dependent on system voltage balance if neutral is not connected. Total power accuracy is not dependent on voltage balance. L2 current is derived for this connection as L2 = -(L1+L3)

SIG  PIN
+5V  2
COM  1
TX+  4
TX-  5
RX+  8
RX-  9

Dwg # 0902-00883-B Rev --
MULTIFUNCTION POWER TEST BOARD  MODEL PTB-

VOLTS, AMPS, WATTS, WATTHOURS, POWER FACTOR & VA

DESCRIPTION
The PTB board-level system monitor is designed to measure and provide analog output signals for all parameters of voltage, current, and total power in an electrical system. Optional outputs are available for power factor, apparent power, and Watthours as plug-in “daughter” boards.

The PTB comes standard with seven analog outputs for voltage, current, and power. As options, 0-10Vdc, 0-1mAdc and 4-20mAdc outputs are available.

The 10.75” x 8.9” x 2.5” circuit board is provided with mounting holes to fit a 10” x 12” NEMA case (option C) or the circuit board can be mounted in the user’s cabinet with the stand-offs provided. Input and output terminals are located directly on the circuit board.

The electronic circuitry uses solid-state multipliers, RMS converters, and amplifiers. 115Vac or 230Vac instrument power options are available.

PTM Rack-mount models available - Consult factory

FEATURES
• Small Package
• Less Wiring
• High Accuracy
• Up to 9 Analog Outputs
• Circuit Board Design
• Direct Input to 600Vac
• Low Cost
• Calibrated with CTs

5 YEAR WARRANTY

MODEL SELECTION

PTM -

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>VOLTS</th>
<th>AMPS</th>
<th>SENSOR SIZE</th>
<th>OUTPUTS</th>
<th>INST. PWR.</th>
<th>OPTION P</th>
<th>OPTION W</th>
<th>OPTION C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1Φ2W</td>
<td>1</td>
<td>0 - 5 Aac</td>
<td>D</td>
<td>0 - 10Vdc</td>
<td>1</td>
<td>115Vac</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3Φ3W</td>
<td>2</td>
<td>0 - 100 Aac</td>
<td>W</td>
<td>0 - 1mAdc</td>
<td>2</td>
<td>230Vac</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>*3Φ4W</td>
<td>3</td>
<td>0 - 200 Aac</td>
<td>W</td>
<td>4 - 20mAdc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>*1Φ3W</td>
<td>4</td>
<td>0 - 400 Aac</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Specify L-N Voltage

NOTE: External current sensors are included with models having an input current range of 100A and above (PTB-xx2xxx, PTB-xx3xxx, and PTB-xx4xxx models). For details, see dimension and connection diagrams.

ORDERING INFORMATION
Example: 3Φ3W, 2-element system, 0-150Vac & 0-100Aac Inputs, 0-10Vdc & Watthour Outputs, 115Vac instrument power, in NEMA case

PTB-212D1WC
**SPECIFICATIONS**

**INPUT**
- Voltage
  - F.S. Linear Range: See Table
  - Over-voltage: 150Vac models: 175Vac
    - 300Vac models: 350Vac
    - 600Vac models: 610Vac
- Burden: <0.25VA/Phase
- Current
  - F.S. Linear Range: See Table
  - Over-current (continuous)
    - 0-5A models: 10Aac
    - All other models: 125% of F.S.
- Burden: <0.25VA/Phase
- Frequency Range: (Linear) 48-70Hz
- Power Factor: Any

**DIELECTRIC TEST**
- Input To Outputs: 1500Vac

**OPTIONS P, W or C**
- Apparent Power (VA): **Same Formula as Watts**
- Power Factor: 0-1 Lead or Lag
- Watthours
  - 0-5A Models: 1 Wh/Cnt
  - 0-100A Models: 20 Wh/Cnt
  - 0-200A Models: 40 Wh/Cnt
  - 0-400A Models: 80 Wh/Cnt
- Relay Rating: 120V, 0.5A
- Relay Closure Duration: 200ms

**OUTPUT**
- (Output range shown for D models. See table for other options.)
- Voltage (RMS) (3): 0-F.S. Volts Input = 0-10Vdc Output
  - Current (RMS) (3): 0-F.S. Amps Input = 0-10Vdc Output
- Watts (True Power): 0-F.S. Watts Input = 0-10Vdc Output
  - **F.S. Watts = F.S. Volts x F.S. Amps x No. of Elements x 0.8**
- Output Burden: 10V models: >2kΩ
  - 1mA models: 0-10kΩ
  - 20mA models: 0-500Ω
- Ripple: ±1% F.S.
- Response Time: 250ms

**ACCURACY**
- (Includes linearity, setpoint & power factor at 25°C)
  - 5A Models: Voltage: ±0.3% F.S.
  - Current: ±0.3% F.S.
  - Power: ±0.3% F.S.
  - 100A - 400A Models: Voltage: ±0.5% F.S.
  - Current: ±0.5% F.S.
  - Power: ±0.5% F.S.
- Watthours: (Option): ±0.5% F.S.
- Power Factor (10-100% Input): (Option): ±0.01 PF

**TEMPERATURE**
- Temperature Effects: (10º to 35ºC): ±0.5%

**INSTRUMENT POWER**
- Option 1: 115Vac, ±15%, 50-400Hz, 8.5VA
- Option 2: 230Vac, ±15%, 50/60Hz, 8.5VA

---

**CURRENT SENSOR DIMENSIONS**

**SENS. SIZE**

<table>
<thead>
<tr>
<th>SENS. SIZE</th>
<th>A (in inches)</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>J</th>
<th>M</th>
<th>WT. LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>4.50</td>
<td>3.7</td>
<td>1.25</td>
<td>1.25</td>
<td>1.94</td>
<td>3.88</td>
<td>0.34</td>
<td>0.27 x 0.44</td>
<td>1.43</td>
</tr>
<tr>
<td>X</td>
<td>6.50</td>
<td>4.7</td>
<td>1.25</td>
<td>2.50</td>
<td>2.46</td>
<td>5.75</td>
<td>0.39</td>
<td>0.28</td>
<td>1.61</td>
</tr>
</tbody>
</table>

LEAD LENGTH IS 24 INCHES. WHITE LEAD IS X1.
### Dimensions & Connections

**Model PTB-**

**Optional NEMA Case**
- **Dimensions:** 12” X 10” X 4”
- **Mounting:** 12.5” X 8.12”, 0.22” Dia. Holes
- **Weight:** 3.0 lbs.

### Output Connections

<table>
<thead>
<tr>
<th>1Φ2W System</th>
<th>3Φ3W System</th>
<th>3Φ4W System</th>
<th>1Φ3W System</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>2</td>
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</tr>
<tr>
<td>3</td>
<td>N/A</td>
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<td>4</td>
<td>N/A</td>
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<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Common</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Common</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>Common</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Power Factor</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Volt-Amperes</td>
<td>9</td>
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</tr>
<tr>
<td>10</td>
<td>Watts</td>
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<tr>
<td>11</td>
<td>Common</td>
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<td>N/A</td>
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<td>14</td>
<td>Current</td>
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<tr>
<td>15</td>
<td>Common</td>
<td>15</td>
<td>15</td>
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<td>16</td>
<td>N/A</td>
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<td>17</td>
<td>N/A</td>
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<td>17</td>
</tr>
<tr>
<td>18</td>
<td>Voltage</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

**Dwg# 0902-00890-B Rev --**
INPUT CONNECTION DIAGRAMS

MODEL PTB-

SINGLE-PHASE, TWO-WIRE CONNECTIONS

SINGLE-PHASE, THREE-WIRE CONNECTIONS

THREE-PHASE, THREE-WIRE CONNECTIONS

THREE-PHASE, FOUR-WIRE CONNECTIONS

OHIO SEMITRONICS, INC.

Page 134
DESCRIPTION

The Model PDM power display meter measures and displays voltage, current, power and energy parameters for single-phase or three-phase systems. Voltages up to 600Vac and currents up to 5Aac are directly connected to the unit. Current Transformers are available in both solid-core (best accuracy) and split-core (most flexible) types to extend the current measurement range.

Local display is provided by three LED displays. Displayable parameters are grouped into four sets of three parameters each with the groups selectable by front panel push-button. Remote display modules may be added as required to provide dedicated display of up to eighteen different parameters.

Analog outputs are provided by adding one or more D/A-4772 converters. Each of these converters provides up to eight output signals which may be assigned to any eight parameters.

Serial communications are provided through either an RS-232C, RS-422, RS-485 or USB interface, using a simple ASCII protocol. (USB is through an external RS-232C-to-USB adapter.)

FEATURES

• High accuracy over a wide range of measurement.
• Suitable for applications with PWM-generated waveforms such as variable-speed motor controls.
• Accommodates a wide variety of current sensors for many applications.
• Serial communication port options: RS-232C, RS-422, RS-485 or USB (through an external RS-232C-to-USB adapter)
• Simultaneous local display of three parameters on 5-digit, red, high-contrast LED displays.
• Measures true RMS voltage and current even with the presence of harmonics (distortion).
• Remote displays available.
• Analog output converters available.

MODEL SELECTION

PDM - [ ] - [ ] - [ ] - [ ] - [ ] - [ ]

VOLTAGE INPUT (Nominal)  CURRENT INPUT  SERIAL COMM.  FREQUENCY  INSTRUMENT POWER  OPTIONS

<table>
<thead>
<tr>
<th>VOLTAGE INPUT (Nominal)</th>
<th>CURRENT INPUT</th>
<th>SERIAL COMM.</th>
<th>FREQUENCY</th>
<th>INSTRUMENT POWER</th>
<th>OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Φ 4W</td>
<td>3Φ 3W</td>
<td>1 Φ 3W</td>
<td>1 Φ 2W</td>
<td></td>
<td></td>
</tr>
<tr>
<td>120V(N) 208V(L)</td>
<td>120V(L) 240V(L)</td>
<td>120V(N) 240V(L)</td>
<td>120V(N) 240V(L)</td>
<td>0 - 0.1A</td>
<td>1 RS-232C</td>
</tr>
<tr>
<td>277V(N) 480V(L)</td>
<td>N/A</td>
<td>240V(N)</td>
<td>2</td>
<td>0 - 5A</td>
<td>2 RS-422</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>240V(N)</td>
<td>3</td>
<td></td>
<td>3 RS-485</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>External RS-232C to USB adapter</td>
<td></td>
</tr>
</tbody>
</table>

* Available with 0.1A Current input only.
** Using more than 8 remote displays requires an external power supply.

NOTE: 0.1A Current Inputs may be used only with external CTs. 5A Current Inputs may be direct-connected or used with external CTs.

ORDERING INFORMATION

Example: 3Φ 3W, 0-120Vac Input, 0-5A Input, USB Serial Communications, 50/60Hz, 230Vac Instrument Power, with Streaming RS-485 analog output and internal power supply for remote displays.

PDM-1-2-4-1-2-BC

Measured parameters, local display arrangement, communication data strings, etc. may be customized by completing a PDM Configuration Worksheet at time of ordering. Consult factory for additional information.

OHIO SEMITRONICS, INC. 4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
PHONE: (614) 777-1005 * FAX: (614) 777-4511
WWW.OHIOSEMITRONICS.COM * 1-800-537-6732

Page 135
MULTIFUNCTION TRANSDUCERS AND TEST PANELS

OSI SPECIFICATIONS & DIMENSIONS

MODEL PDM-

INPUT
Voltage Range
Type 1 .................................................... 0-175V~/300V~
Type 2 .................................................... 0-346V~/600V~
Over-range (without damage) .................. 120% of Range
Burden (Nominal at maximum input) ........... 0.5mA
Current Range
Type 1 (for use with CTs only) ..................... 0-0.1Aac
Type 2 (direct or with CTs) ......................... 0-5Aac
Over-range (without damage) .................. 120% of Range
Burden (Nominal at maximum input)
Type 1 .................................................... 0.1VA
Type 2 .................................................... 0.5VA
Frequency Range
Type 1 .................................................... 50/60Hz ±10%
Type 2 .................................................... 400Hz ±10%
Type 3 ................................................... 25-130Hz, Variable
(Available Only with Current Type 1)
Power Factor .............................................. Any

INSTRUMENT POWER
Type 1 .................................................... 115Vac ±15%, 50/60Hz, 10VA
Type 2 .................................................... 230Vac ±15%, 50/60Hz, 10VA

SERIAL COMMUNICATIONS
Type 1 .................................................... RS-232C
Type 2 .................................................... RS-422
Type 3 .................................................... RS-485
Type 4 .................................................... USB
NOTE: USB comm. is through an RS-232C-to-USB adapter

OPTIONAL ACCESSORIES (consult factory)
1. Current transformers: solid or split-core
2. Remote display (P/N 21967): 5 digit, LED, up to 18 per unit.
3. Analog output converter (P/N D/A-4772): 8 channels each.

ACCURACY (typical setpoint, linearity and repeatability)
Voltage, Current, Volt-Amps and VARs (10% - 100% of range)
Frequency Type 1 or 2 ................................ ±0.1% F.S.
Frequency Type 3 ........................................ ±0.25% F.S.
Power and Energy (W)
Frequency Type 1 or 2 ................................ ±0.1% F.S.
Frequency Type 3 ........................................ ±0.25% F.S.
Power Factor
Frequency Type 1 or 2 ................................ ±0.01PF
Frequency Type 3 ........................................ ±0.02PF
Frequency
Frequency Type 1 or 2 ................................ ±0.1% Rdg., ±0.02% F.S.
Frequency Type 3 ........................................ ±0.1% Rdg., ±0.1% F.S.

DIELECTRIC TEST
Input/Output/Instrument Power ..................... 1800Vac

TEMPERATURE
Operating Range ..................................... 0ºC to 50ºC
Effect ..................................................... ±0.005%/ºC, ±0.05% F.S.

PHYSICAL
Operating Humidity .............................. 0-95% non-condensing
Weight ................................................... 2.75lb.

ENCLOSURE ................................ Noryl SE 1, UL94V-1, IP 40, Black

CONFIGURATION
Refer to the Configuration sheet supplied with each unit for specific information regarding the choice of measured parameters, local display arrangement, etc. (sheet is identified by serial number of unit).

Dwg# 0902-00756-B Rev C

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DESCRIPTION

The A210 Power Meter measures and displays voltage, current, power, and energy quantities in single-phase or three-phase power systems. The meter’s multifunction capability replaces a large number of analog measurement and display devices.

A high-contrast LED display in a compact, panel-mount package provides low-cost, high-visibility control panel monitoring. The basic instrument provides up to 83 measurements that can be displayed on three 4-digit LED displays.

Two solid-state relay/pulse outputs can be used as high/low limit alarms on selected measurements or as energy pulse outputs. Scaling of inputs for direct reading in primary values is provided.

An extension module is available to extend the A210’s function and flexibility. The MM/COM module provides RS-232/485 with MODBUS RTU communication protocol. The module also provides for load profile recording of active and/or reactive power quantities for up to 83 days at 15-minute intervals. Available software provides programming of the instrument, reading and retrieval of the recorded data. A pulse input can be used for synchronizing profile data timing or switching between high/low tariff energy metering with this option.

FEATURES

- Measurement of current, voltage, active, reactive and apparent power, active and reactive energy, power factor and line frequency
- Single-Phase, Three-Phase Three-Wire or Three-Phase Four-Wire Sinusoidal Measurements.
- Synchronous measurement of voltage, current, active and reactive power, and line frequency
- Installation size of 96mm x 96mm panel, 46mm depth behind panel (65mm with MM/COM module)
- Two pulserelay outputs can be used for limit alarms or energy pulse outputs
- MM/COM optional extension module can be added for communications and load profile memory

SPECIFICATIONS

DISPLAY

Character Height: 0.55in/14mm
Display Range: Max. 9999
Energy: Max 99999999

VOLTAGE

Nominal 500 V, 290 V, Nominal +20%
Over-range: Nominal +20%
Current: (A210-001/002) Nominal 5A
(A210-003/004) Nominal 1A
Over-range: Nominal +20%
Overload: 2X Nominal Continuous
Frequency: 45-65Hz

ACCURACY (% of Nominal)

Current: ±0.5%
Voltage: ±0.5%
Power: ±1.0%
Power Factor: ±1.0%
Frequency: ±0.02 Hz
Energy: ±1.0%
Response Time: 400ms

INSTRUMENT POWER

A210-001/003 85-253V, dc or 45-400Hz
A210-002/004 20-70V, dc or 45-400Hz
(3VA without MM/COM module, 4VA with MM/COM module)

OUTPUT

Pulse/Limit Alarm Outputs: (2ea)
Outputs: passive, opto-isolated common-collector transistors
Vce: 40V/dc maximum
Vsat: 1.2Vdc maximum
Imax: 150mA
Pulse Duration: 100ms

MM/COM MODULE (OPTION)

Interface: RS-232/485
Protocol: MODBUS RTU
Baud: 1200, 2400, 4800, 9600, 19200
Memory: 15936 values (records 2 quantities for 83 days at 15-min intervals)
Digital Input: Contact Closure Synchronizing Input or HI/LO rate (tariff) select.

ENVIRONMENTAL

Operating Temperature: -10°C to +55°C
Storage Temperature: -25°C to +70°C

MECHANICAL

Dimensions: 3.8” x 3.8” x 1.8” (2.6” depth behind panel with MM/COM module)
Panel Cutout: 3.6” x 3.6”
Net Weight: 8.8oz

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Page 137
MULTIFUNCTION POWER METER

**FEATURES**
- 134 measurements
- 12 energy meters
- Comprehensive average and min/max value functions
- Total Harmonic Distortion (THD) analysis
- Asymmetric voltage and zero-displacement voltage
- 2 pulse/relay outputs can be used for limit alarms or energy pulse outputs
- MM/COM Extension modules extend the functionality of the A230/230S including options for RS232/RS485 with Modbus and data memory, the addition of analog outputs (2), or Ethernet communication.

These measurements form the basis for the comprehensive analysis and assessment of the electrical system in all 4 quadrants.

**DESCRIPTION**
The A230 or A230S Power Meter measures and displays the voltage, current, power, and energy quantities in single-phase or three-phase power systems. The meter’s multifunction capability replaces a large number of analog measurement and display devices.

A high-contrast LED display in a compact, panel-mount package provides low-cost, high-visibility control panel monitoring. The basic instrument provides up to 266 measurements combinations that can be displayed on three 4-digit displays.

MM/COM modules for the A230 and A230S extend the instrument’s functionality by adding communication options, analog outputs, and data memory. Add the A200 plus PC application software for easy meter programming and remote data access at no additional cost.

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INPUT</strong></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>Nominal 500V_{LL} - 290V_{N}</td>
</tr>
<tr>
<td>Over-range</td>
<td>Nominal +20%</td>
</tr>
<tr>
<td>Current</td>
<td>A230/A230S-001 &amp; 002: Nominal 5A</td>
</tr>
<tr>
<td></td>
<td>A230/A230S-003 &amp; 004: Nominal 1A</td>
</tr>
<tr>
<td>Over-range</td>
<td>Nominal +20%</td>
</tr>
<tr>
<td>Overload</td>
<td>2X Nominal Continuous</td>
</tr>
<tr>
<td>Frequency</td>
<td>±0.2%</td>
</tr>
<tr>
<td>Energy</td>
<td>±0.2%</td>
</tr>
<tr>
<td>Response Time</td>
<td>0.02Hz</td>
</tr>
<tr>
<td>Accuracy (%) of Nominal</td>
<td>±0.2%</td>
</tr>
<tr>
<td>Current</td>
<td>±0.2%</td>
</tr>
<tr>
<td>Power</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Frequency</td>
<td>±0.02Hz</td>
</tr>
<tr>
<td>Energy</td>
<td>±0.5%</td>
</tr>
<tr>
<td>Response Time</td>
<td>400ms</td>
</tr>
</tbody>
</table>

**ACCURACY (%) of Nominal**
- Current: ±0.2%
- Voltage: ±0.2%
- Power: ±0.5%
- Frequency: ±0.02Hz
- Energy: ±0.5%
- Response Time: 400ms

**MM/COM MODULES (Options)**
- MM/COM201 Modbus RTU, Data Memory, RS-232/485
- MM/COM202 Two Analog Outputs
- MM/COM203 Ethernet, Real Time Clock, Data Memory

**INSTRUMENT POWER**
- A230/A230S-001 & 003: 85-253Vac/dc, 45-400Hz
- A230/A230S-002 & 004: 20-70Vac/dc, 45-400Hz

**MECHANICAL**
- Dimensions: A230 5.7” X 5.7” X 1.8”
- A230S 3.8” X 3.8” X 1.8”
- Panel Cutout: A230 5.4” X 5.4”
- A230S 3.6” X 3.6”
- Net Weight: A230 10.6oz
- A230S 7.0oz

**ENVIRONMENTAL**
- Operating Temperature: -10°C to +55°C
- Storage Temperature: -25°C to +70°C

**WARRANTY**
- 5 Year

**DIMENSIONS A230**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L:</td>
<td>2.56</td>
</tr>
<tr>
<td>W:</td>
<td>4.21</td>
</tr>
<tr>
<td>H:</td>
<td>1.61</td>
</tr>
</tbody>
</table>

**DIMENSIONS A230S**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>L:</td>
<td>3.78</td>
</tr>
<tr>
<td>W:</td>
<td>3.78</td>
</tr>
<tr>
<td>H:</td>
<td>1.61</td>
</tr>
</tbody>
</table>

**CONTENTS**
- OSI logo
- Model A230/A230S
- Features
- Description
- Specifications
- Dimensions
- Warranty
- Ohio Semitronics, Inc.

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### MM/COM201
- Modbus, data logger, RS232/485 interface, synchronizing input

### SPECIFICATIONS
- **Protocol:** Modbus RTU for SCADA Interface
- **Interface:** RS232/485, switchable
- **Synchronizing input:**
- synchronizing interval or tariff switching
- Baud rate...1200, 2400, 4800, 9600, 19200
- **Data logger with A210**
  - \(P_{\text{av}}\) ---- avg. active power values (incoming/outgoing)
  - \(Q_{\text{av}}\) ---- avg. active power values (IND/CAP)
- **Data logger with A230/A230s**
  - \(P_{\text{av}}\) ---- avg. active power values (incoming/outgoing)
  - \(Q_{\text{av}}\) ---- avg. reactive power values (incoming/outgoing)
  - \(S_{\text{av}}\) ---- avg. apparent power values and 9 additional free programming average values

- **Input values**
  - A210: \(U, I, P, Q, S, F, \cos \Phi\)
  - A230: \(U, I, P, Q, S, F, \cos \Phi\)
  - \(P_{\text{av}}\) (in addition to above)
  - zero-displacement voltage, asymmetric voltage,
  - THD U, THD I, Voltage, Current Avg. value
- **Output**
  - \(0-20\text{mA}, 4-20\text{mA}, \text{inverting}\)
  - Limitation: \(\min \ldots 0/3.7\text{mA}, \text{resp. max.} \ldots 21\text{mA}\)
- **Burden voltage**
  - \(8V\)
- **Accuracy**
  - \(0.1\%\) (without A2xx)
  - Number of channels...2, electrically-isolated

- **Amount of data**
  - 1 value: 166 days
  - 2 values: 83 days
  - 14 values: 12 days

For reading & selection of values, optional A200plus Software is available at no additional cost.
Consult factory.

### MM/COM202
- **2 Analog Outputs**

### MM/COM203
- Ethernet, real-time clock, comprehensive data logger.

### SPECIFICATIONS
- **Protocol:** Modbus over TCP/IP, HTTP
- **Real-Time Clock:** battery backup, synchronization via LAN or external
- **Data Logger:** up to 1 year with time stamp
- **Terminals:**
  - Ethernet RJ45-port, 10/100 Base-Tx
  - Tariff switching and synchronizing input via pluggable screw terminals
  - Synchronizing input \(5V-300V\text{ac}, 1-500Hz\)
  - Tariff Switching \(5V-300V\text{ac/dc}\)

### DIMENSIONS

**NOTES:**
1. All dimensions in inches [mm].
2. Panel cut-out: \(5.43 \pm 0.03/-0.00\) \([138 +0.8/-0.0] \times 5.43 +0.03/-0.00\) \([138 +0.8/-0.0]\)
3. Panel dimensions (thickness, min/max): \(0.08-1.00\) \([2-25.4]\)
4. Refer to Operating Instructions manual for details on attaching extension modules.

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Page 139
**DESCRIPTION**

The **APLUS** is a powerful platform for measuring, monitoring, and analyzing power systems. This universal measurement device can be easily integrated into the process environment on site by means of the communication interface, digital I/O ports, or analog outputs. The included PC software packages allow for remote configuration and control of multiple units, as well as analyzing acquired data.

**MODEL SELECTION**

<table>
<thead>
<tr>
<th>BASIC UNIT</th>
<th>FREQUENCY</th>
<th>INSTRUMENT POWER</th>
<th>COMMUNICATION INTERFACE</th>
<th>I/O EXTENSIONS</th>
<th>TEST CERTIFICATE</th>
<th>DATA LOGGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>50/60Hz</td>
<td>24-230Vac</td>
<td>1 RS-485 Modbus/RTU</td>
<td>0 (none)</td>
<td>0 (none)</td>
<td>0 (none)</td>
</tr>
<tr>
<td>1</td>
<td>50/60Hz</td>
<td>100-230Vac</td>
<td>2 Ethernet Modbus/TCP NTP</td>
<td>2 relay outputs, 4 analog outputs (±20mA), and 2 digital I/Os</td>
<td>E includes Cert.</td>
<td>with data logger</td>
</tr>
</tbody>
</table>

**SPECIFICATIONS**

**INPUT**

Current, Nominal: 1 to 5Aac, selectable
Maximum: 7.5Aac
Overload without damage: 10A, continuous
100A, 10 x 1s, at 10s intervals
Burden: ≤ 0.04 Ω x 0.01 Ω per phase
Voltage, Nominal: 57.7 to 400V~L-L, 100 to 693V~L-N
Maximum: 480V~L-N, 832V~L-L (sinusoidal)
Overload without damage: 480V~L-N, 832V~L-L continuous, 600V~L-N, 1040V~L-L, 10 x 10s, at 10s intervals
800V~L-N, 1386V~L-L, 10 x 1s, at 10s intervals
Burden: ≤ 500Ω
Frequency Range: 45...50/60...65Hz
True RMS measurement up to 63rd harmonic
System Configurations Accommodated:
Single-phase: 2-wire or 3-wire
Three-phase: 3-wire, balanced load (1 1/2 element)
3-wire, unbalanced load (2 ele., 3 ele.)
4wire, balanced load (1 ele.)
4-wire, unbalanced load (2 1/2 ele., 3 ele.)

**INSTRUMENT POWER**

Nominal: 100-230Vac ±15%, 50-400Hz or 24-230Vac ±15%
Burden: ≤ 7VA

**COMMUNICATION INTERFACE**

Modbus/RTU: RS-485 (max. 32 devices)
Physical: max. 4000 ft (1200m), via plug-in terminals
Baud Rate: 1.2 to 115.2kBaud
Profibus DP: RS-485, (max. 32 devices)
Physical: max. 4000 ft (1200m), via 9-pin D-Sub socket
Baud Rate: automatically detected (9.6k-12M Bit/s)
Ethernet: ISO11820, Ethernet 100Base TX
Physical: via RJ45 connector
Mode: 10/100 MBit/s, full/half duplex, auto negotiation
Protocol: Modbus/TCP, NTP (time synchronization)

**I/O INTERFACE**

Basic Device: 1 relay output, SPDT
1 digital output (fixed)
1 digital input (fixed)
I/O Extension 1: 2 relay outputs, SPDT
4 bidirectional analog outputs
2 digital inputs/outputs
I/O Extension 2: 2 relay outputs, SPDT
6 digital inputs/outputs

**DIGITAL INPUTS/OUTPUTS**

I/O extensions are individually configurable as inputs or outputs.
Connections: via plug-in terminals.
Inputs (according to EN 61 131-2, 24Vdc, Type 3):
Voltage, Nominal: 12 / 24Vdc (30V max.)
Logical Zero: 3 to +5V
Logical One: 8 to 30V
Outputs (partially according to EN 61 131-2):
Voltage, Nominal: 12 / 24Vdc (30V max.)
Current, Nominal: 50mA (60mA max.)
Load Capability: 400Ω-1MΩ

**RELAY OUTPUTS**

Connections: via plug-in terminals
Contacts: SPDT, latching
Load Capacity: 250Vac, 2A, 500Vac or 30Vdc, 2A, 60W

**ANALOG OUTPUTS**

Connections: plug-in terminals, galvanically isolated
Linearization: linear, quadratic or knee point
Range: ±20mA (24mA max.)
Uncertainty: ±0.2% F.S.
Burden: ≤ 500Ω
Burden Influence: ≤ 0.2%
Residual Ripple: ≤ 0.4%

**NOTE:** Refer to the Device Handbook (Operator’s Manual), Modbus (-TCP) Interface, System Booklet and Safety Instructions for additional information.

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MEASUREMENT UNCERTAINTY

Ref. Cond.: 15-30°C, sinusoidal, meas. over 8 cycles, PF=1, 50-60Hz
Voltage, Current .................................................. ± (0.08% Rdg. + 0.02% F.S.)**
Power ........................................................................ ± (0.16% Rdg. + 0.04% F.S.)**
Power Factor ................................................................. ± 0.1°**
**Additional uncertainty for voltage of 0.1% and for PF of 0.1° if neutral wire is not connected. F.S. Power based on F.S. Current x F.S. Voltage Frequency ................................................................. ± 0.01Hz
Voltage & Current Imbalance ........................................ ± 0.5%
Harmonics .................................................................... ± 0.5%
THD Voltage, TDD Current ........................................... ± 0.5%
Active Energy ............................................................... Class 0.5S, EN 62053-22
Reactive Energy ........................................................... Class 2, EN 62053-23

REAL-TIME CLOCK

Uncertainty: ±2 min./mo. (15-30°C), trimmable via software
Synchronization via sync pulse or NTP server
Battery Life ..................................................................... ≥ 10 years

PHYSICAL AND ENVIRONMENTAL

NOTE: Intended for indoor use only!
Enclosure Material ...................................................... Polycarbonate (Makrotron)
Weight ......................................................................... 1.1 lb (500g)
Flammability Class ...................................................... UL94V-0, halogen-free
Operating Temperature .............................................. −10 ... 15 ... 30 ... + 55°C
Storage Temperature .................................................... −25 to +70°C
Temperature Effect ..................................................... 0.5 x basic uncertainty per 10°C
Long-term Drift ........................................................... ± 0.2 x basic uncertainty per year
Others .......................................................................... Usage group II (EN 60688)
Relative Humidity .......................................................... < 95% non-condensing
Altitude ........................................................................ ≤ 2000m max.
Orientation ................................................................ Any

CASE DIMENSIONS & CONNECTIONS

DIN-RAIL MOUNT MODELS (NO DISPLAY)

Mounts on standard 35mm Top-Hat Din-Rail per EN50022.

PANEL-MOUNT MODELS

APPLIED STANDARDS, REGULATIONS & DIRECTIVES

IEC/EN 61010-1 Safety of electric measuring, control & laboratory equipment
IEC/EN 60688 Transducers for converting AC variables into analog or digital signals
DIN 40110 AC quantities
IEC/EN 60068-2-1/2/-3/-6/-27 ambient tests: -1 Cold, -2 Dry heat, -3 Damp heat, -6 Vibration, -27 Shock
IEC/EN 60529 Protection type by case
2002/95/EC (RoHS) EC directive on the restriction of the use of certain hazardous substances
IEC/EN 61000-6-2/6-4 Electromagnetic compatibility (EMC) standards for industrial environments
IEC/EN 61131-2 Programmable controllers - equipment, requirements and tests (digital I/O 12/24Vdc)
IEC/EN 61326 EMC requirements for electrical equipment for measurement, control & laboratory use
IEC/EN 62053-31 Pulse output devices for electronic and electromechanical meters (SO output)
UL94V-0 Test for flammability of plastic materials for parts in devices and appliances

SAFETY & ENVIRONMENTAL

Current inputs are galvanically isolated from each other.
Protection class .......... II (protective insulation, voltage inputs via protective impedance)
Pollution degree .......... II2
Protection Rating .......... IP64 (front), IP40 (housing), IP20 (terminals)
Measurement Category .......... CAT III, CAT II (relays)
## PANEL-MOUNT METERS

**MODELS OFC-, OFT-, & OFM-**

### MICROPROCESSOR-BASED AND LOW-COST OPTIONS

**DESCRIPTION & FEATURES**

The OFC series meters provide a 4-digit, microprocessor-based, delta-sigma A-to-D converter with 16-bit (65536 counts) resolution.

The OFT series meters are loop-powered, microprocessor-based, 6-digit process meters that convert a 4-20mA signal to a customer-scalable display value.

The OFM series meters offer a low-cost 3½-digit display with dual-slope integrating A-to-D conversion.

**FEATURES (OFC & OFT models)**

- OFC models offer 5 convenient front-panel buttons for setpoint, peak, valley, tare and set-up menu.
- The OFT control setup and calibration menus are accessed via two rear-panel switches.
- Both models fit 1/8 DIN cut-outs and offer optional set-point relay outputs (2).

### OFC MODEL SELECTION

<table>
<thead>
<tr>
<th>BASE METER</th>
<th>INSTRUMENT POWER</th>
<th>SIGNAL INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (no setpoint relays)</td>
<td>120Vac, 50/60Hz</td>
<td>100 4-20mAdc</td>
</tr>
<tr>
<td>1 2 setpoint relays</td>
<td>10-30Vdc, isolated*</td>
<td>120 0-10Vdc</td>
</tr>
</tbody>
</table>

* 750V isolation between power supply and signal input.

**ORDERING INFORMATION**

Example: 4-digit display with setpoint relays, 120Vac instrument power, and 5Aac input.

**OFM111-925**

NOTE: Optional NEMA 4X gasket available. Consult factory.

### OFT MODEL SELECTION

<table>
<thead>
<tr>
<th>BASE METER</th>
<th>INSTRUMENT POWER</th>
<th>SIGNAL INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 6-digit LCD (no relays)</td>
<td>self, from input loop</td>
<td>101 4-20mAdc</td>
</tr>
<tr>
<td>12 6-digit LCD with 2 relays</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ORDERING INFORMATION**

Example: 6-digit display with setpoint relays, 4-20mAdc input, self-powered from input loop.

**OFT120-101**

### OFM MODEL SELECTION

<table>
<thead>
<tr>
<th>INSTRUMENT POWER</th>
<th>SIGNAL INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 120Vac</td>
<td>221 0-10Vdc*</td>
</tr>
<tr>
<td>3 220Vac</td>
<td>305 0-20.00Vac</td>
</tr>
<tr>
<td>8 10-30Vdc</td>
<td>369 0-5.00Aac**</td>
</tr>
</tbody>
</table>

* -221 models also include an isolated 24Vdc power supply for powering external devices. (20mA max, 1kV isolation)

** -369 models include an external CT.

**ORDERING INFORMATION**

Example: 3½-digit display with 10-30Vdc Power Supply and 0-20.00Vac Input

**OFM818-305**

NOTE: Optional NEMA 4X gasket available. Order Q400-0109

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**OHIO SEMITRONICS, INC.**

4242 REYNOLDS DRIVE * HILLIARD, OHIO * 43026-1264
PHONE: (614) 777-1005 * FAX: (614) 777-4511
WWW.OHIOSEMITRONICS.COM * 1-800-537-6732
### PHYSICAL

**Display**
- **OFC**: Bright 0.6" tall, high-efficiency red LED
  - Range: 
    - 100 models: 0-10Vdc, 50mV max ripple allowed
    - 120 & -221 models: 0-1000V, ±2%, 500mV max ripple allowed
  - 305, 369 & -925 models: 0-10V, ±20%, 50mV max ripple allowed

**OFT**
- Bright 0.6" tall, high-efficiency LED
  - Range: 0 to +1999, 6 digits plus negative sign and decimal point

**OFM**
- Bright 0.6" tall, high-efficiency LED
  - Range: 0 to +1999, 6 digits plus negative sign and decimal point

**Bezel**
- Non-glare cast acrylic, ruby red filter
  - Bright 0.6" tall, high-efficiency LED

**Display Update**
- 7.5 per second

**Setpoint Relays (optional)**
- 221 models: 20-turn pot for scaling & calibration
- -305, -369 models: Fixed zero, 20-turn pot for span adjust

### INPUT

**Type**
- See individual model selection tables

**Frequency**
- -100, -120 & -221 models & all OFC: dc
- -305, -369 & -925 models: 50/60Hz

**Impedance**
- -100 models: 10Ω
- -120 & -221 models: 1MΩ
- -305 models: 2MΩ
- -369 & all OFF models: negligible

**Over/Under Range Indication**
- OFC: Displays "-ur-" or "-or-", when input exceeds min/max displayable range or min/max input range.
- OFT & OFM: Displays polarity, most significant digit and the decimal point when input exceeds min/max range.

**Connectors**
- Socketed screw terminal connectors

### INSTRUMENT POWER

**OFC**
- 101 & 111 models: 85-140Vac, 47-63Hz, 3VA max.
- 108 & 118 models: 10-30Vdc, 150mA max., 500mV max ripple allowed

**OFT**
- (all) self-powered, from 4-20mAdc input loop
  - Loop drop: 3.9V max., short-circuit protected

**OFM**
- 811 models: 120Vac, 50/60Hz, 25mA max., 3W
- 813 models: 220Vac, 50/60Hz, 14mA max., 3W
- 818 models: 10-30Vdc, 110mA max., 750Vdc isolation

### DISPLAY

**OFC**
- Modes: Track, Peak, Valley
- Update Rate: 1-16 per second (selectable)
- Scaling (Decimal Point Location): Programmable, for 0, 0.0, 0.00 or 0.000 precision.
- Response Time: 0.5s
- Setpoint Relays (optional): 200Vac/dc, 1A max., independently programmable as NO or NC

**OFT**
- Display Update Rate: 7.5 per second
- Display Scaling
  - Decimal Point Location: Programmable, for 0, 0.0, 0.00, 0.000, 0.0000 or 0.00000 precision
  - Setpoint Relays (optional): 300Vac/dc, 130mA max., solid-state, independently programmable NO or NC

**OFM**
- Display Update Rate: 2.5 per second
- Display Scaling
  - Decimal Point Location: Jumper-selectable, for 0, 0.0, 0.00 or 0.000 precision
  - -221 models: 20-turn pot for scaling & calibration
  - -305, -369 models: Fixed zero, 20-turn pot for span adjust

### ACCURACY & RESOLUTION

**OFC**
- Over Full Operating Temperature Range:
  - -100 & -221 models: ±0.05% F.S.
  - -925 models: ±0.2% F.S.
  - ±0.1% F.S.

**At Fixed Temperature:**
- -100 & -221 models: ±0.05% F.S.
- -925 models: ±0.05% F.S.

**A/D Converter**
- 16-bit: 65536 counts of resolution
- 4000 per second

**OFT**
- Accuracy: <±0.05%
- A/D Converter: 24-bit: 1,000,000 counts of resolution
- A/D Conversion rate: 7.5 per second

**OFM**
- (function of calibration and scaling)
  - Linearity: <±0.02%, typical

### TEMPERATURE & ENVIRONMENTAL

**OFC**
- Operating Range: -25°C to 80°C
- Storage Range: -55°C to 80°C
- Drift: <0.1% per 20°C change in ambient temperature

**OFT**
- Operating and Storage Range: -20°C to +80°C
- Operating Environment: Tested to NEMA 4X
  - NOTE: Meter will tolerate exposure to most dilute acids and cleaning agents when properly installed

**OFM**
- Operating Range: -25°C to 70°C
- Storage Range: -40°C to 85°C
- Drift: <0.1% per 20°C change in ambient temperature

### DIMENSIONS, CONNECTIONS, CALIBRATION & OPERATION

Refer to individual specification sheet for OFC, OFT or OFM
- Refer to Operation and Installation Guide for full connection details and menu functions.
- OFT & OFM: Refer to manuals for details on set-up and calibration.
VERSATILE DIGITAL PANEL METER

DESCRIPTIO

The 15660 is a streamlined, low-cost, utility, dc voltage measuring meter. The unit has a standard input range of ±2V. The easy-to-use screw terminals and provision to "Hold" the displayed reading indefinitely make this a cost-effective solution for display of most analog signals.

Ease-of-use and quick installation are facilitated by the unique pinout of the series. The standard meter is provided with screw terminal blocks and insulated quick disconnects.

SPECIFICATIONS

INPUT
Voltage Range........ Standard ..................... ±2Vdc
Selectable................ 20Vdc, ±200Vdc
Impedance................ 1MΩ, minimum

INSTRUMENT POWER
Standard.......................... 120/240V, 50/60Hz, 2.5VA

CASE DIMENSIONS in inches (mm)

MINIATURE ELECTRONIC COUNTER

FEATURES

• 8 Digits, 0.354" (9mm) LCD Display
• Reset Front and Remote
• 10-Year Battery
• Relay Contact/Open Collector/5V TTL or CMOS
• Pulse Input
• Up to 10kHz Count Rate
• NEMA 4X/IP65 RatingKit includes additional mounting adapters.

ACCURACY........................±0.05% of reading + 3 digits

TEMPERATURE
Operating Range...................... -10ºC to +50ºC

CONNECTION DIAGRAM

MINIATURE ELECTRONIC COUNTER

CASE DIMENSIONS (in inches)

Counter can be mounted as shown in drawing, or with included adaptor plate as shown in photo, or with adaptor frame - Consult factory for details.

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Page 144
PRECISION HALL-EFFECT PROBES

MODEL HR

HALLTRON MAGNETIC FIELD PROBE

FEATURES
With high accuracy and low noise, the HR series Hall-Effect Probes are designed into end-user applications where a reliable measurement of magnetic field strength is a requirement. When a specified control current is applied to the probe, the listed output reflects a field strength of 10kGauss.

APPLICATIONS
Our HR series probes have been manufactured for 50 years and are used as a key system component in a diverse array of industry projects. Applications include medical devices, cryogenics, and military aerospace, as well as many industry and university research projects with a requirement for measuring a fixed or changing magnetic field.

MODEL SELECTION

<table>
<thead>
<tr>
<th>MODEL NUMBER</th>
<th>OUTPUT B=10kG (mV, ±25%)</th>
<th>CONTROL CURRENT Ic (mA)</th>
<th>OHMIC RESIDUAL (mV)</th>
<th>TEMPERATURE COEFFICIENT (%/ºC, typical)</th>
<th>DIMENSIONS (INCHES)</th>
<th>LEAD WIRES (AWG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR36</td>
<td>1225</td>
<td>350</td>
<td>&lt;±0.15</td>
<td>-0.10</td>
<td>0.375 0.50 0.035</td>
<td>32</td>
</tr>
<tr>
<td>HR38</td>
<td>200</td>
<td>25</td>
<td>&lt;±0.15</td>
<td>-0.25</td>
<td>0.375 0.63 0.035</td>
<td>32</td>
</tr>
<tr>
<td>HR66</td>
<td>500</td>
<td>200</td>
<td>&lt;±0.50</td>
<td>-0.20</td>
<td>0.250 0.20 0.028</td>
<td>34</td>
</tr>
<tr>
<td>HR70</td>
<td>340</td>
<td>200</td>
<td>&lt;±0.50</td>
<td>-0.10</td>
<td>0.250 0.20 0.028</td>
<td>32</td>
</tr>
<tr>
<td>HR72</td>
<td>700</td>
<td>100, max</td>
<td>&lt;±2.0</td>
<td>-0.25</td>
<td>0.250 0.20 0.025</td>
<td>34</td>
</tr>
<tr>
<td>HR77</td>
<td>550</td>
<td>100</td>
<td>&lt;±0.20</td>
<td>-0.25</td>
<td>0.250 0.20 0.028</td>
<td>34</td>
</tr>
<tr>
<td>HR88</td>
<td>400</td>
<td>300</td>
<td>&lt;±1.4</td>
<td>-0.15</td>
<td>0.375 0.34 0.023</td>
<td>30</td>
</tr>
<tr>
<td>HR120</td>
<td>75</td>
<td>100</td>
<td>&lt;±0.50</td>
<td>-0.05</td>
<td>0.250 0.20 0.028</td>
<td>34</td>
</tr>
<tr>
<td>HR125A</td>
<td>100</td>
<td>100</td>
<td>&lt;±0.50</td>
<td>-0.05</td>
<td>0.250 0.20 0.028</td>
<td>34</td>
</tr>
<tr>
<td>HR170</td>
<td>20</td>
<td>200</td>
<td>&lt;±0.03</td>
<td>-0.005</td>
<td>0.250 0.20 0.028</td>
<td>34</td>
</tr>
</tbody>
</table>

B = magnetic field strength, in Gauss   Ic = control current (excitation current)

For full specifications on each model, visit our website at www.ohiosemitronics.com
Other sizes and configurations are available. Consult factory for details.

DIMENSIONS

+ INDICATES TAIL OF MAGNETIC FIELD VECTOR.

STRIP
BLACK (-)
YELLOW (+)
BLUE (±)
RED (±)

6.0 in. 0.25 in.

See model selection table for length, width, and thickness dimensions.

NOTE: For HR36 and HR38 probes, the wire color order is (top to bottom) Blue, Red, Yellow, Black. For HR88, both input leads are red and both output leads are green.

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Page 145
**VOLTAGE LIMITER**

**MODEL LDB-40**

**OPEN-SECONDARY PROTECTION FOR CURRENT TRANSFORMERS**

**DESCRIPTION**
The LDB-40 is an open-secondary protection device, intended to be used with industry-standard current transformers. When connected across an open secondary, the device will limit voltage to a safe level of approximately 40V.

**SPECIFICATIONS**

**INPUT**
- Current: 1A or 5A from CT secondary
- Frequency Range: 50 to 400Hz
- Leakage Current: Typical @ 25°C: 0.05mA

**PROTECTION**
- Breakover Voltage: 38Vpk, ±5V
- Clamping Voltage: Typical: 1V
- Clamping Duration: Continuous
- Response: 250µs

**TEMPERATURE**
- Operating Range: 25°C to 60°C

**PHYSICAL**
- Lead Length: 4.5 in. Typical, 16AWG
- Termination: #10 Ring Terminals
- Weight: Typical: 1 oz.

**DIMENSIONS & CONNECTIONS**

**CURRENT-TO-VOLTAGE CONVERTER**

**MODEL LRB-**

**DESCRIPTION**
The LRB series converters provide a precision resistor in a ruggedized enclosure. Standard resistor values from 500Ω to 10000Ω are available. Non-standard values from 200Ω to 10000Ω are also available. Consult factory for non-standard models.

**MODEL SELECTION**

<table>
<thead>
<tr>
<th>DC Output Required</th>
<th>Load Resistance (Ω)</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-500mV</td>
<td>500</td>
<td>LRB-500</td>
</tr>
<tr>
<td>0-1V</td>
<td>1000</td>
<td>LRB-1000</td>
</tr>
<tr>
<td>0-2V</td>
<td>2000</td>
<td>LRB-2000</td>
</tr>
<tr>
<td>0-5V</td>
<td>5000</td>
<td>LRB-5000</td>
</tr>
<tr>
<td>0-10V</td>
<td>10000</td>
<td>LRB-10000</td>
</tr>
</tbody>
</table>

Non-standard resistance values available for 200-10000Ω. Substitute desired load resistance in model number LRB-xxxx

**SPECIFICATIONS**

**INPUT**
- Current: 0-1mAdc

**OUTPUT**
- Voltage: See Table
- Load Resistance: See Table

**ACCURACY**
- 500-10000Ω models: ±0.1%
- 200-499Ω models: ±0.2%

**TEMPERATURE**
- Operating Range: -20°C to +70°C
- Effect: ±0.005%/°C

**ORDERING INFORMATION**

Example: 0-1mA Input, 0-2V Output

LRB-2000

**DIMENSIONS & CONNECTIONS**

**ACCESSORIES**

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Page 146
DESCRIPTION
This switch assembly is designed to provide a disconnecting means for your Watt transducer or meter. Not only can this switch assembly provide isolation from line voltages, it also will short out current transformer secondaries to prevent transformer damage which may occur when the circuit is opened under load.

FEATURES
• 3-Phase Switch Assembly
• 30 Amp Rated
• 600Vac
• UL Recognized

DIMENSIONS & CONNECTION DIAGRAM
SWITCH DIMENSIONS 9 1/2” X 3 1/2” X 2 3/4”
COVER DIMENSIONS 10 1/8” X 4 5/8” X 3 1/8”

NOTES
• The bottom side of the switch is connected to the circuits being measured.
• The top side of the switch is connected to the Watt transducer or meter.
• The switch handles are color-coded red for voltage and black for current.
• The black plastic cover is constructed so that all switches must be in the closed position before the cover can be sealed.

FUSE BLOCK & FUSES
MODEL FH-6-1/4-3

FEATURES
• 600V - 30A Base
• Fuses Included
• 3 each: 600V, ¼A, Fast Acting

CASE DIMENSIONS

SPECIFICATIONS
• Base of high-impact thermoplastic (125°C)
• Flammability Rating 94V-0
• Clip, Copper Alloy, Tin Plated
• Midget Fuses
• UL Recognized - CSA Certified
**ABS:** Acrylonitrile Butadiene Styrene - ABS is an easily-machined, tough, low-cost rigid thermoplastic material with high impact strength, ideal for turning, drilling, milling, sawing, die-cutting, and shearing.

**Accuracy:** The precision of a transducer or meter that is given as a percent of full scale (or of reading) at 25°C. This does not take temperature into consideration. The effect of temperature is a separate statement for OSI devices.

**Active Power (or Real Power) (P):** True electrical power; power that is actually doing work. It is measured in Watts.

**Apparent Power:** Power that is apparently available for use in an AC circuit containing a reactive element. It is the product of effective voltage times effective current expressed in Volt-Amperes (VA). It must be multiplied by the power factor to obtain true power available.

**Average Value of AC:** The average of instantaneous values for 1/2 cycle of alternating current, or the average of the absolute value of alternating current. (0.636 times the peak waveform for a full sine wave rectification)

**Burden (input):** The load in either Volt-Amperes (VA) or Ohms by a measuring device on the input circuit.

**Burden (output):** The maximum load in either Volt-Amperes (VA) or Ohms that a current or voltage transformer can maintain for the rated accuracy of the device.

**Cal Adjust:** All transducers manufactured by Ohio Semitronics, Inc. are calibrated against standards traceable to NIST. For Ohio Semitronics, Inc., the Cal Adjust refers to available calibration span over which the user may adjust the transducer or device.

**Compliance (Voltage):** Maximum output voltage that a transducer current output can maintain within the specified load resistance range.

**Current Transformer (CT or doughnut):** Transformer used to step the current up or down. For transducers and instrumentation, a current transformer steps a high value of current down to 5 or 1 Ampere, which the transducer or instrument can utilize. For any power-measuring device, the polarity markings must be observed. Primary current goes in H1 and out H2. In the secondary winding, usually a toroid, the X1 lead connects to the current "IN" terminal and the X2 lead connects to the current "OUT" terminal of the transducer or instrument.

**Delta Circuit:** 3-phase, 3-wire system in which the source is connected line-to-line (rather than line-to-neutral).

**DIAC (Diode for Alternating Current):** Used to protect current transformers against open-secondary conditions.

**Dielectric Test:** A test in which a voltage higher than the rated voltage is applied for one minute to determine the adequacy of the insulation under normal conditions.

**Direct Measurement:** Measurement of a waveform in which the output signal replicates the waveform of the input.

**Edison System:** Often used to describe typical USA home wiring that is a single-phase, three-wire system. This requires a two-element Watt transducer or meter for accurate measurement of active power.

**Elements:** The number of multipliers in an active or reactive power-measuring device where each multiplier is obtaining the instantaneous product of the measured voltage and current. The number of elements required equals the number of conductors used to connect the load minus one. For example, in the three-phase, three-wire connected load, a two-element device is required.

**Excitation Current:** This is the current required by OSI Hall-effect devices to produce the rated full-scale output. This applies to both open-loop Hall-effect current transducers and to Hall-effect probes.

**External Sensor:** This can be either a Hall-effect current transducer or transformer that is supplied and calibrated with a current or power measuring transducer or instrument.

**Full-Scale Counts per Hour:** The total number of contact closures or pulses generated by an active or reactive energy measuring device in one hour at the rated full-scale of the device.

**Grounded Delta:** Obsolete but still being used three-phase transformer system in which the secondaries are connected in a delta with one of the transformer windings center-tapped and grounded. This typically supplies a 3-phase, 3-wire system at 240V and a single-phase, three-wire 120/240V source. This system requires a three-element power transformer or meter.

**Hall-Effect Voltage:** A voltage that results in a conductor from the deflection of electrons perpendicular to a magnetic field and perpendicular to the direction of current flow.
Insertion Loss: For DC, it is the power lost due to the resistance of the measuring device (Zero for Hall-effect transducers). For AC, it is the power lost due to the impedance of the measuring device.

Instrument Power: The voltage supply required to power the transducer or device for operation.

Internal Sensor (Current): The primary current-sensing device is internal to the transducer or meter. Typically these transducers or meters may be connected directly in series with the load. 5A or 1A input models may also be used with 5A or 1A secondary current transformers.

Isolation: Voltage level the transducer or meter is expected to withstand without breakdown among the input circuit, output circuit, power supply input, and the case.

KYZ Output: Form C relay contact closure output in which each toggle (or change of state) represents some amount of integrated power or reactive power. (Energy or Reactive energy)

Linearity: The variation between a known standard across the low and high end of the span of a transducer or instrument.

Loop-Powered 4 to 20: Transducers with a loop-powered output require a voltage source in the external circuit. For OSI devices, this voltage may be between 15 and 40Vdc. The device will regulate the current output from 4 to 20mA proportional to the measured value.

Ohmic Residual: Hall Probes only. (Also referred to as the residual misalignment voltage) The offset voltage that results from the slight misalignment of the voltage pick-up points on the Hall element.

Output Loading: The total resistance of circuits and devices connected to the output of an OSI device.

Output Ripple: An oscillation of small amplitude imposed on top of the signal output of a transducer or instrument. This is expressed as a maximum permitted value as a percentage of the full scale.

Potential (or Voltage) Transformer: A precision shunt-connected transformer used to step voltage from one level to another for the purpose of measurement. These transformer ratios are typically stated as a ratio of the full-scale primary to the full-scale secondary voltage.

Examples are: 69.3:120, 240:120, 600:120, and 4200:120.

Phase Angle: The angular displacement in degrees between the voltage and current in a circuit. (Sinusoidal voltage and current only)

Power Factor: The ratio of active power to apparent power (Watts/VA). For the sine wave case, the power factor is also equal to the cosine of the phase angle displacement between the voltage and current.

Quiescent Current: (Closed-loop type Hall-effect sensors) Power supply current required with zero signal input.

Reactive Power (Q): The unused power which flows back and forth in an AC system due to electric and magnetic fields caused by inductive and capacitive loads. It is the vector difference between the Active (real) Power and the Apparent Power, and is measured in Volt-Amps Reactive (VAR).

Response Time: In the OSI catalog, this refers to the time required for the output signal to reach 90% (or as otherwise stated) of the full-scale output for a step change in the input from zero to full scale.

RMS (Root Mean Square): The equivalent heating value of an alternating current or voltage, as compared to a direct current or voltage. It is 0.707 times the peak value of the same sine wave.

RMS Measurement: Measurement of a waveform that provides the DC equivalent heating value — the RMS value of the current or voltage.

Self-Powered: A transducer that is parasitic for its instrument power. It takes the required power from the circuit being measured.

Split Core: Current transformer or Hall-effect current sensor that can be taken apart and put back together around a current-carrying conductor.

Surge (withstand) Test: Damped oscillatory wave in the megahertz (MHz) range applied to transducer or instrument input circuits to simulate a lightening strike down line. IEEE standards or agency approval standards apply.
GLOSSARY (Cont’d.), COMPLIANCE & CERTIFICATIONS

VA (Volt-Amperes): Unit of apparent power. (See Apparent Power)

VAR (Volt-Amperes-Reactive): Unit of reactive power. (See Reactive Power)

Watt: Unit of active power — measure of the rate at which work is being done. The unit power (Watt) equals 1 Joule per second; 1 Watt equals the power dissipated by a current of 1 Ampere flowing across a resistance of 1 Ohm.

Watthour: The unit of energy that is equal to the power of one Watt operating for one hour.

Wye: Three-phase, four-wire system in which the three phase lines reference a common neutral.

Zero: In the OSI catalog, “zero” refers to the adjustment potentiometer that allows one to adjust the output signal to the value representing zero or no input.

TEST CERTIFICATE OPTIONS

A-7003-01 Certificate of Compliance (C of C):
Includes Company name, P.O. #, Date, Model, and Serial number(s).

Document states: “It is hereby certified that the above stated models, in the quantities listed, are in full compliance with all applicable requirements and specifications. Configuration, operation and safety characteristics have been tested and inspected to verify compliance with published specifications and any additional requirements as specified by the referenced purchase order. Accuracy of factory test and measurement equipment is established through regular comparisons traceable to recognized national or international standards such as those maintained by the National Institute of Standards and Technology (NIST).”


A-7003-02 C of C with Documented Traceability:
Includes all the information and statements listed on above document, plus traceability to NIST provided via equipment and report identification numbers listed on the certificate.

Signature: Quality Assurance Manager.

A-7003-03 C of C with Traceability and Data Points:
Includes all the information and statements listed on above document, traceability to NIST provided via equipment and report identification numbers listed on the certificate, and 10-point calibration data. The format and price of the data points can vary with the type of equipment and/or customer requirements.

Signature: Quality Assurance Manager.

A-7003-04 C of C - ISO 17025
Includes all the information and statements listed on above document, plus information on the calibration services provider who is contracted to provide ISO/IEC 17025:2005 compliance certification for Ohio Semitronics, Inc. products.

Signature: Quality Assurance Manager.

A-7003-06 C of C - ANSI Z540
Includes: Includes all the information and statements listed on above document, plus information on the calibration services provider who is contracted to provide ISO/IEC 17025:2005 compliance certification for Ohio Semitronics, Inc. products.

Signature: Quality Assurance Manager.

To Order: Include the document number and price on your Ohio Semitronics, Inc. purchase order. Additional C of C options are available. Please consult Ohio Semitronics, Inc. for pricing.

T&C, REACH & WEEE COMPLIANCE & ISO 9000 CERTIFICATION

RoHS-Compliant Models Available! Consult Factory

For Terms and Conditions, refer to our website at: www.ohiosemitronics.com/Terms.pdf
For REACH compliance, refer to our website at: www.ohiosemitronics.com/REACH.pdf
For WEEE compliance, refer to our website at: www.ohiosemitronics.com/WEEE.pdf
For ISO 9000 certificate, refer to our website at: www.ohiosemitronics.com/ISO9001.pdf