The 7016 SIGNAL SOURCE incorporates high-performance DMM functions into a handy signal generator to provide a convenient, multi-function calibrator at a low price. In addition to generating constant voltage and constant current, it generates pulse signals such as the voltage pulses used for calibrating flow meters and similar devices. Along with its many signal generator functions, the substantial stand-alone DMM measurement functions of Model 7016 include AC and DC voltage and current, resistance, frequency and temperature, and continuity checking. Moreover, with the optional 3856 Communication Package, measured values can be sent to a PC, which can also control functions such as source voltage settings and measurement range selection. The 7016 gives you multiple functions, high precision and high performance at low cost in an instrument that is suitable for use in the laboratory as well as in the field.
A handy signal generator that can simultaneously measure and generate pulse for calibration of industrial instruments

As a signal generator
- DCCV [±1.5000 V to ±15.000 V range]
- DCCA [±25.000mA range]
- PULSE [0.5 Hz to 4800 Hz, 5 V/12 V/±5 V/±12 V]
- Other Standard Features
  - Bipolar sink/source generation, pulse generation with variable duty ratio, pulse width, and amplitude, memory generation, scan generation, and ramp generation function

- Convenient pulse source for calibrating flow meters, as well generation of constant current and constant voltage
  Meters that use pulse output as sensor signals, such as flow meters, can easily be calibrated in the field by using the 7016 as a pulse generator to supply reference signal input. Its ability to generate constant voltage and constant current in the range from 1-5 V and 4-20 mA makes it ideally suited to a variety of maintenance needs, such as calibration of equipment instrumentation in the 1-5 V/4-20 mA range.

- Bipolar output expands test utility
  Ability to function both as source and sink makes the 7016 well suited for signal loop testing in instrumentation systems or testing charge/discharge of secondary batteries.

- Up to 16 steps of memory scan output
  Memory scan output allows the 7016 to quickly accommodate calibration requirements that involve repetitive checks.

- Signal generator and measurement functions can be used simultaneously to measure input/output insulation
  When measuring insulation between inputs and outputs, the 7016 can be simultaneously used as both a signal generator and DMM without compromising the functionality of either. A dual display makes it easy to simultaneously check inspection results for both inputs and outputs.

- A wide variety of accessories
  A wide variety of accessories, such as an AC adapter, Ni-MH battery and three types of test leads are provided with the 7016 as standard features. The 7016 is also equipped with a carrying case for transporting the unit together with all of its accessories.

As a DMM
- DC/ACV [50 mV to 250 V range]
- DC/ACA [50 mA to 500 mA range]
- OHM [500 Ω to 50 MΩ range]
- FREQ [measurement range 1 Hz to 200 kHz]
- Continuity check
- Diode check
- Temperature [-40°C to 1372°C] [-40°F to 2502°F]
- AC+DC RMS measurement of voltage and current, 1 ms peak hold function

- High resolution, high accuracy and advanced measurement functions
  The 7016 achieves unparalleled performance for a handy DMM, providing DC voltage measurement accuracy of ±0.03% rdg. ±5 dgt. (excluding 50 mV range), with display switchable to 51000 count. Also, in addition to the basic measurements of DC voltage, DC current, AC voltage, resistance, diode, and ground, this multi-function instrument also supports frequency and temperature measurement.

- AC+DC measurement function provides RMS measurement of full- and half-wave rectified waveforms
  The 7016 can measure RMS values of full-wave and half-wave rectified waveforms used in household electrical equipment.

- 1ms Peak Hold Function maintains maximum/minimum peak values
  The waveform peak values can be acquired and the crest factors calculated from measurement of the instantaneous peak value and calculated true RMS value.

- Temperature measurement function
  Measuring temperature by connecting the 7016 to the optional 9180-9183 or 9472-9476 temperature probes.
Control and data import by PC

- Full data transfer compatibility included as a standard feature
  (Dedicated cable and communication software sold separately)

The optional 3856 COMMUNICATION PACKAGE consists of a dedicated cable and software for transferring measurement data and control signals to and from a PC. Imported data can be stored in text format on the PC, enabling efficient data management using commercial spreadsheet software. Both RS-232C and USB connections are available.

- Generation Range and Accuracy

  Accuracy is guaranteed at 23±5°C and at 80% rh or less after 5 minutes warm-up. In other conditions, add ±(50 ppm setting + 0.5 dgt.)/°C.

- DC constant voltage generation (CV)

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>±15.000 V</td>
<td>0.1 mV</td>
<td>±(0.03% setting +3 dgt.)</td>
<td>sink/source output max. output: ±25 mA</td>
</tr>
<tr>
<td>±30.000 V</td>
<td>0.2 mV</td>
<td>±(0.03% setting +3 dgt.)</td>
<td>sink/source output max. output: ±50 mA</td>
</tr>
</tbody>
</table>

- DC constant current generation (CC)

<table>
<thead>
<tr>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>±5.000 mA</td>
<td>1 µA</td>
<td>±(0.03% setting +5 dgt.)</td>
<td>sink/source output max. output: ±12 V</td>
</tr>
<tr>
<td>±10.000 mA</td>
<td>2 µA</td>
<td>±(0.03% setting +5 dgt.)</td>
<td>sink/source output max. output: ±24 V</td>
</tr>
</tbody>
</table>

- General Specifications

  - Generator functions: DC constant voltage, DC constant current, pulse generation
  - Measurement functions: AC voltage, DC voltage, AC+DC voltage, AC current, DC current, AC+DC current, resistance, diode, continuity, temperature, frequency, duty ratio, pulse width measurement
  - Output method: Bipolar sink/source output
  - AC measurement method: True RMS
  - Additional functions: Settable duty ratio, pulse width and amplitude pulse generation, memory generation (16 memory data settings per range), scan generation (single/continuous); ramp generation, AC+DC RMS voltage/current measurement, 1-ms peak hold (for voltage/current measurement), recording, data hold/refresh hold, relative display, 4-20 mA current-loop percentage display, 0-20 mA percentage display, RS-232C data communications, power-on option.
  - Range selection: Full auto or manual
  - Display device: LCD with backlight
  - Display contents: Two 5-digit numeric digital displays (for generation and measurement functions, one large main display and one small sub display)
  - Max. measurement count: 51,000 counts
  - Auto power off: Settable 0 to 99 minutes in 1-minute intervals
  - Battery charge state: Warning on LCD when battery voltage falls below 9V
  - Sampling rate: 3/s (except AC+DC and frequency measurement)
  - Noise susceptibility: NMRR DCV: -60dB or more (50/60 Hz) CMRR DCV: -90dB or more (50/60 Hz)

- Pulse generation (PULSE)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Output range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>0.5, 1, 2, 2.5, 5, 10, 15, 20, 25, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 240, 300, 450, 600, 800, 1200, 1600, 2400, 4800 Hz</td>
<td>±(0.005% setting + 0.01 Hz)</td>
<td></td>
</tr>
<tr>
<td>Duty ratio</td>
<td>0.39% to 99.60%</td>
<td>0.390625%</td>
<td>±(0.01% setting + 0.2%) *1</td>
</tr>
<tr>
<td>Pulse width</td>
<td>1/f (0.39% to 99.60%)</td>
<td>1/256 × f*</td>
<td>±(0.01% setting + 0.3 ms)</td>
</tr>
<tr>
<td>Output voltage</td>
<td>5 V, 12 V</td>
<td>±25 V, ±12 V</td>
<td>±(25% setting + 0.2 V)</td>
</tr>
<tr>
<td></td>
<td>±5 V, ±12 V</td>
<td>±25 V, ±12 V</td>
<td>±(25% setting + 0.4 V)</td>
</tr>
</tbody>
</table>

- Withstand voltage: [Case]-[Combined power supply terminals]
- Operating temp. & humidity: 0 to 40°C, 0 to 80% rh (non-condensing)
- Storage temp. & humidity: -20 to 60°C, 0 to 80% rh (non-condensing, w/o batteries)
- Operating location: Indoors, below 2,000m altitude
- Power supply: 1.5V AA-size alkaline batteries (LR6) × 8 1.2V Ni-MH batteries × 8 (supplied) AC Adapter (Model SA-1410F-11 supplied, for 100 to 250 VAC, 47 to 63 Hz)
- Maximum rated power: ±5 VA
- Continuous operation: 20 h or more (measurement only), 4 h or more (generation and measurement) (with supplied Ni-MH batteries, new and after full charge)
- Charging time: 8 h or more
- Dimensions and mass: Approx. 90W × 129×54 mm, 735 g (instrument only)

- Related Product

The 7011 DC SIGNAL SOURCE: a DC signal generator for calibrating thermocouples.

In addition to measuring and generating ± 25 V, ±25 mA, the 7011 is capable of generating seven types of thermoelectromotive force by temperature settings.
### Measurement Range and Accuracy

Accuracy is guaranteed at 23±5°C and at 80% rh or less after 5 minutes warm-up.
In other conditions, add ±(measurement accuracy 0.15)°C.

#### DC Voltage (DCV) / AC Voltage (ACV) / AC+DC Voltage (ACDCV) / 1-ms peak-hold Voltage (V)

<table>
<thead>
<tr>
<th>Range</th>
<th>Measurement range</th>
<th>DC V Accuracy</th>
<th>AC V Accuracy&lt;sup&gt;2&lt;/sup&gt;</th>
<th>ACDC V Accuracy&lt;sup&gt;2&lt;/sup&gt;</th>
<th>V Accuracy&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Input impedance</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mV</td>
<td>0 to ±5.000 mV</td>
<td>±0.05% rdg + 3.5 dgt&lt;sup&gt;4&lt;/sup&gt;</td>
<td>±(0.7% rdg + 40 dgt)</td>
<td>(±1.5% rdg + 40 dgt)</td>
<td>±(0.8% rdg + 70 dgt)</td>
<td>250 MΩ</td>
</tr>
<tr>
<td>9474</td>
<td>±5 to ±10.000 V</td>
<td>±(0.7% rdg + 20 dgt)</td>
<td>±(1.5% rdg + 20 dgt)</td>
<td>±(0.8% rdg + 25 dgt)</td>
<td>±(1.6% rdg + 25 dgt)</td>
<td>250 MΩ</td>
</tr>
<tr>
<td>9472</td>
<td>±5 to ±10.000 V</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>100 MΩ</td>
</tr>
<tr>
<td>9475</td>
<td>±5 to ±10.000 V</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>100 MΩ</td>
</tr>
</tbody>
</table>

<sup>1</sup> When measuring REL after shorting input terminals before measurement. Accuracy when not measuring REL is ±(0.05% rdg + 50 dgt).
<sup>2</sup> Specified for 5% or more from the low end of range. Crest factor: 3 or less.
<sup>3</sup> Specified for signals with at least 1μs pulse width. Overvoltage protection: 250 Vms AC. Upper limit frequency product: 10 VHz.

#### DC Current (DCA) / AC Current (ACA) / AC+DC Current (ACDCDA) / 1-ms peak-hold Current (A)

<table>
<thead>
<tr>
<th>Range</th>
<th>Measurement range</th>
<th>DC A Accuracy&lt;sup&gt;1&lt;/sup&gt;</th>
<th>AC A Accuracy&lt;sup&gt;2&lt;/sup&gt;</th>
<th>A Accuracy&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Maximum voltage</th>
<th>Shunt resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mA</td>
<td>0 to ±5.000 mA</td>
<td>±(0.03% rdg + 3 dgt)</td>
<td>±(0.6% rdg + 20 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(0.3% rdg + 6 °F)</td>
<td>0.6V/1 Ω</td>
</tr>
<tr>
<td>9472</td>
<td>±5 to ±10.000 mA</td>
<td>±(0.05% rdg + 5 dgt)</td>
<td>±(0.7% rdg + 40 dgt)</td>
<td>±(2% rdg + 40 dgt)</td>
<td>±(0.3% rdg + 6 °F)</td>
<td>0.6V/1 Ω</td>
</tr>
</tbody>
</table>

<sup>1</sup> When measuring REL after opening input terminals before measurement, or for “0 mA” input. Accuracy when not measuring REL is ±(0.05% rdg + 25 dgt).
<sup>2</sup> Specified for 5% or more from the low end of range. Crest factor: 0.5 or less.
<sup>3</sup> Specified for signals with at least 1μs pulse width. Overvoltage protection: fast-blow fuse (630 mA /250 V).

#### Resistance (OHM)

<table>
<thead>
<tr>
<th>Range</th>
<th>Measurement range</th>
<th>Resistance</th>
<th>Accuracy</th>
<th>Measurement current</th>
<th>Open terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 Ω&lt;sup&gt;1&lt;/sup&gt;</td>
<td>0 to 5.000 Ohm</td>
<td>0.01 Ω</td>
<td>±(0.15% rdg + 4.4 dgt)</td>
<td>45.0 mA</td>
<td>&gt; +4.8 VDC</td>
</tr>
<tr>
<td>5 kΩ&lt;sup&gt;1&lt;/sup&gt;</td>
<td>0 to 5.000 kΩ</td>
<td>0.1 Ω</td>
<td>±(0.15% rdg + 4.4 dgt)</td>
<td>4.5 Ω</td>
<td>&lt; +4.8 VDC</td>
</tr>
<tr>
<td>50 kΩ</td>
<td>0 to 1.000 kΩ</td>
<td>1 kΩ</td>
<td>±(0.15% rdg + 4.4 dgt)</td>
<td>450 Ω</td>
<td>&lt; +4.8 VDC</td>
</tr>
<tr>
<td>5 MΩ</td>
<td>0 to 5.000 MΩ</td>
<td>1 MΩ</td>
<td>±(0.15% rdg + 4.4 dgt)</td>
<td>4.5 MΩ</td>
<td>&lt; +4.8 VDC</td>
</tr>
</tbody>
</table>

<sup>1</sup> When measuring REL. Overvoltage protection: 250 Vrms AC. Beeps when measured value is 1000 dgt or less can be set on or off. Accuracy of 50-MΩ range is specified for humidity up to 90%. Overvoltage protection: 250 Vrms AC.

#### Frequency (FREQ)

<table>
<thead>
<tr>
<th>Range</th>
<th>Measurement range</th>
<th>Resolution</th>
<th>Accuracy</th>
<th>Measurement current</th>
<th>Open terminal voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Hz</td>
<td>0.500 Hz to 999.99 Hz</td>
<td>0.001 Hz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
<td>450.0 kHz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
</tr>
<tr>
<td>1 kHz</td>
<td>0.500 Hz to 999.99 Hz</td>
<td>0.1 Hz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
<td>45.0 kHz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
</tr>
<tr>
<td>10 kHz</td>
<td>0.500 Hz to 9999.9 Hz</td>
<td>1 Hz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
<td>4.5 kHz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
</tr>
<tr>
<td>100 kHz</td>
<td>1 Hz to 99999.9 Hz</td>
<td>1 Hz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
<td>450 Hz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
</tr>
<tr>
<td>200 kHz</td>
<td>10 Hz to 199999.9 Hz</td>
<td>10 Hz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
<td>45 kHz</td>
<td>±(0.3%/kHz + 0.3% f.s.)</td>
</tr>
</tbody>
</table>

<sup>1</sup> Minimum input frequency: 0.5 Hz (set by power-on option). Overvoltage protection: 250 Vrms AC.

#### Voltage measurement sensitivity

<table>
<thead>
<tr>
<th>Input range</th>
<th>Minimum input level (rms sine wave)</th>
<th>Trigger level (DC coupling)</th>
<th>(Current measurement sensitivity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 mV</td>
<td>±(0.05% rdg + 3 dgt)</td>
<td>±(2% rdg + 25 dgt)</td>
<td>(±0.05% rdg + 3 dgt)</td>
</tr>
<tr>
<td>5 kΩ</td>
<td>±(0.05% rdg + 3 dgt)</td>
<td>±(2% rdg + 25 dgt)</td>
<td>(±0.05% rdg + 3 dgt)</td>
</tr>
<tr>
<td>50 kΩ</td>
<td>±(0.05% rdg + 3 dgt)</td>
<td>±(2% rdg + 25 dgt)</td>
<td>(±0.05% rdg + 3 dgt)</td>
</tr>
<tr>
<td>5 MΩ</td>
<td>±(0.05% rdg + 3 dgt)</td>
<td>±(2% rdg + 25 dgt)</td>
<td>(±0.05% rdg + 3 dgt)</td>
</tr>
</tbody>
</table>

<sup>1</sup> When measuring REL after opening input terminals before measurement, or for “0 mA” input. Accuracy when not measuring REL is ±(0.05% rdg + 25 dgt).

#### Duty ratio, Pulse width

<table>
<thead>
<tr>
<th>Duty ratio</th>
<th>Pulse width</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 to 99.9% (DC coupling)</td>
<td>±(0.2% rdg + 3 dgt)</td>
</tr>
<tr>
<td>9 to 95% (AC coupling)</td>
<td>±(0.3% kHz + 0.3% fs)</td>
</tr>
</tbody>
</table>

#### Temperature (TEMP)(K) type thermocouple

<table>
<thead>
<tr>
<th>Range</th>
<th>Measurement range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 °C to 1372 °C</td>
<td>0.1 °C</td>
<td>±(0.3% rdg + 3 °C)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> The above accuracy does not include accuracy of thermocouple. Overvoltage protection: 250 Vrms AC.

#### Probes

- 9180, 9183 SHEATH TYPE TEMPERATURE PROBE
- 9181 SHEATH TYPE TEMPERATURE PROBE
- 9182 SHEATH TYPE TEMPERATURE PROBE
- 9184 SHEATH TYPE TEMPERATURE PROBE
- 9185 SHEATH TYPE TEMPERATURE PROBE
- 9186 SHEATH TYPE TEMPERATURE PROBE
- 9187 SHEATH TYPE TEMPERATURE PROBE
- 9188 SHEATH TYPE TEMPERATURE PROBE
- 9189 SHEATH TYPE TEMPERATURE PROBE
- 9190 SHEATH TYPE TEMPERATURE PROBE

#### 7016 SIGNAL SOURCE

- Accessories: Carrying case 1, AC adapter 1, Ni-MH battery 8, 3851-10 Test lead 1 set for measurement, Test lead 1 set for generation, Test lead 1(yellow), Alligator clip 1 set

### OPTION

- 3856-01 COMMUNICATION PACKAGE (RS-232C)
- 3856-02 COMMUNICATION PACKAGE (USB)
- 9180 SHEATH TYPE TEMPERATURE PROBE
- 9181 SHEATH TYPE TEMPERATURE PROBE
- 9182 SHEATH TYPE TEMPERATURE PROBE
- 9183 SHEATH TYPE TEMPERATURE PROBE
- 9184 SHEATH TYPE TEMPERATURE PROBE
- 9185 SHEATH TYPE TEMPERATURE PROBE
- 9186 SHEATH TYPE TEMPERATURE PROBE
- 9187 SHEATH TYPE TEMPERATURE PROBE
- 9188 SHEATH TYPE TEMPERATURE PROBE
- 9189 SHEATH TYPE TEMPERATURE PROBE
- 9190 SHEATH TYPE TEMPERATURE PROBE
- 3851-10 TEST LEAD (Lead length: Approx. 1 m / standard accessories)

* Non-CE mark products