



HIOKI

INSTRUCTION MANUAL

7011

DC SIGNAL SOURCE

HIOKI E. E. CORPORATION

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Introduction

Thank you for purchasing this HIOKI "7011 DC SIGNAL SOURCE." To get the maximum performance from the unit, please read this manual first, and keep this at hand.

For this unit, the batteries and AC adapter are not supplied. Use LR6 alkaline batteries, optional 9420 BATTERY PACK, or 9418-10 AC ADAPTER (PSA-30U-120, PHIHONG).

A Request

We have tried to bring this manual as close to perfection as we could achieve. If perchance you find any unclear portions, mistakes, omissions, or the like, we would be most obliged if you could please notify us of them via any HIOKI agent, or directly.

Shipping Check

When the unit is delivered, check and make sure that it has not been damaged in transit. In particular, check the accessories, panel switches, keys, and terminals.

If the unit is damaged, or fails to operate according to the specifications, contact your dealer or HIOKI representative.

Check the 7011 Unit and the Supplied Accessories

Main unit

7011 DC SIGNAL SOURCE

Supplied accessories

Instruction manual	1
9168 INPUT CORD	1 set
9170-10 TEST LEAD	1 set
Spare fuses 250VF50mAH	3


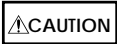

Safety






Incorrect measurement procedures could result in injury or death, as well as damage to the unit. (Please read this manual carefully and be sure that you understand its contents before using the unit. The manufacturer disclaims all responsibility for any accident or injury except that resulting due to defect in its product.)

This Instruction Manual provides information and warnings essential for operating this unit in a safe manner and for maintaining it in safe operating condition. Before using this unit, be sure to carefully read the following safety notes.

The following symbols are used in this Instruction Manual to indicate the relative importance of cautions and warnings.

	<p>Indicates that incorrect operation presents significant danger of accident resulting in death or serious injury to the user.</p>
	<p>Indicates that incorrect operation presents possibility of injury to the user or damage to the unit.</p>
	<p>Denotes items of advice related to performance of the unit or to its correct operation.</p>

Safety Symbols

	<p>This symbol is affixed to locations on the unit where the operator should consult corresponding topics in this manual (which are also marked with the  symbol) before using relevant functions of the unit.</p> <p>In the manual, this mark indicates explanations which it is particularly important that the user read before using the unit.</p>
	<p>Indicates DC (Direct Current)</p>



Points for Attention During Use

In order to ensure safe operation and to obtain maximum performance from the unit, observe the cautions listed below.

WARNING

- **When a power supply from AC adapter terminal on the unit, before turning on the power, make sure that the voltage of the power supply being used matches the supply voltage indicated on the part of the AC adapter terminal on the unit. If an attempt is made to use an improper supply voltage particularly in excess of 13.2 VDC, there is danger of damage to this unit and of life-threatening risk to the operator.**
- **The optional 9418-10 AC ADAPTER is constructed so as to be connected to a ground line via a grounded two cable power cord such as the power cord that is supplied with the unit. In order to avoid electric shock, connect the unit to a properly grounded power supply socket using the power cord provided. In addition, if using a ground adapter, be absolutely sure to connect the green ground wire which protrudes from the adapter to a ground line.**

**⚠ WARNING**

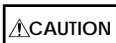
- **This unit is designed for safe operation only at low voltage. Ensure that no more than 60 V is present between any terminal and ground, and that the potential difference between any two terminals does not exceed 60 V. The unit cannot be guaranteed in an overrange situation, such as due to an inadvertent electric shock or faulty insulation, and we cannot accept responsibility for any consequences that might occur from misuse.**
- **The output terminals and the voltage and current input terminals (terminals for the standard resistor) are all isolated. Before connecting the terminals, ensure that the device being measured will not provide excessive output to, or require excessive input from, the terminals. The unit cannot be guaranteed in an overrange situation, such as due to an inadvertent electric shock or faulty insulation, and we cannot accept responsibility for any consequences that might occur from misuse.**

 **WARNING**

- **If the battery voltage drops while the unit is running off of battery power, the 7011 will automatically switch off the power supply. Note that if the unit is left in this state for an extended period of time, the optional 9420 BATTERY PACK may be discharged too much.**
- **If the battery is left in the battery compartment for a long time, it may leak. Such leakage may damage the unit, or cause an electrical hazard, so please remove the battery if the unit is not to be used for a long period.**

 **CAUTION**

- Do not store or use the unit where it will be exposed to direct sunlight, high temperature, high humidity, or condensation. If exposed to such conditions, the unit may be damaged, the insulation may deteriorate, and the unit may no longer satisfy its specifications.
- To avoid damage to the unit, do not subject the unit to vibrations or shocks during transport or handling. Be especially careful to avoid dropping the unit.



- If this unit is subject to shock or vibration, do not make any connections to the terminals until each of the display selections and measurement function selections have been checked to ensure that no damage has been sustained.
- Before generation or measurement, make sure of the function position.
If current or voltage in excess of generation or measurement range is input, the unit may be damaged.
- If output is impossible when "ON" is displayed which indicates outputting, set to "OFF" with OUTPUT ON/OFF and set output to "ON" again.
- The case is not hermetically sealed for protection against explosion, so do not use in a flammable atmosphere.

Layout of This Manual

Chapter 1

Product Overview

Describes the product generally, and lists the parts and functions.

Chapter 2

Before Starting Generation and Measurement

Preparing for the power cord or how to connect the input and output cord etc., and important precautions before operation.

Chapter 3

Outline of Basic Operation

Explanations of each function.

Chapter 4

Detailed Description of Functions

Detailed explanation of the functions.

Chapter 5

Detailed Description of Applications

The application of the sink function

Chapter 6

Maintenance, Adjustment, and Disposal

Chapter 7

Specification and Options

Chapter 1

Product Overview

1.1 Product Overview

The compact 7011 DC SIGNAL SOURCE uses LR6 alkaline batteries (optional 9420 BATTERY PACK or *9418-10 AC ADAPTER), and can output DC voltage and current, and thermocouple power equivalent to preset temperature (K, E, J, T, R, S, B). In addition, it can measure DC voltage, current and temperature which are electric potentially insulated from generation circuit.

This unit is intended primarily for the maintenance of measurement instrumentation systems and industrial meters, and for testing electronic circuits and machinery. It includes standard voltage and current source functions suitable for use in the research laboratory. The miniaturized design makes it easily portable, and the internal rechargeable battery power source ensures long term operation by simply recharging the battery in the field.

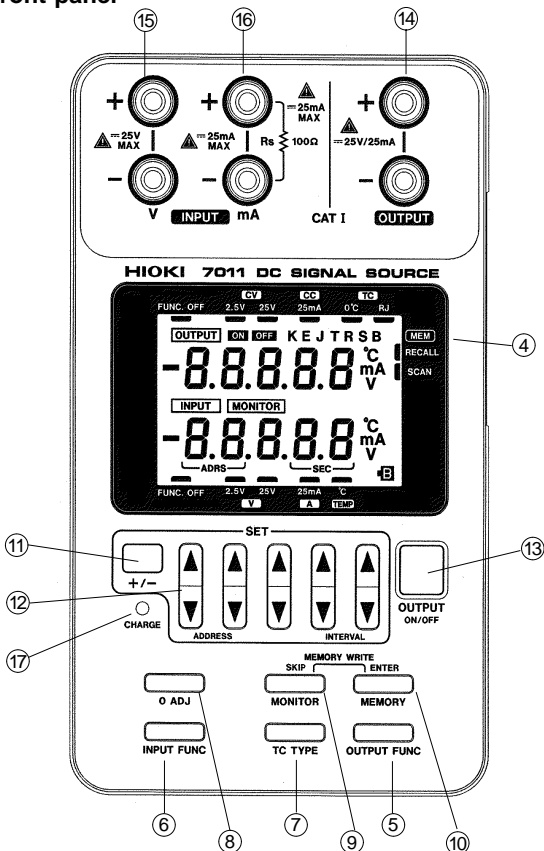
*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)

1.2 Product Features

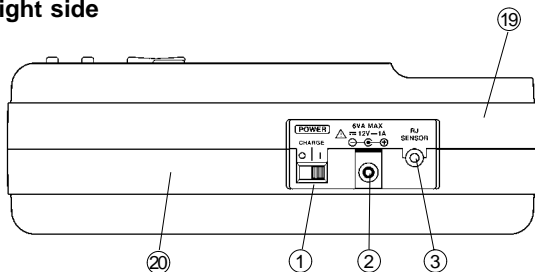
- Generation and measurement of DC voltage from -25.000 V to 25.000 V (minimum resolution 100 μ V), and of DC current from -25.000 mA to 25.000 mA (minimum resolution 1 μ A).
- Generate seven types of thermocouples K, E, J, T, R, S and B (JIS C 1602-1981) to a preset temperature.
- Temperature measurement from -25 to 80 with optional accessory 9184 TEMPERATURE PROBE.
- Bipolar output can be used for load current sink. So loop testing in the instrumentation system is possible.
- The 7011 is provided with following monitor functions: current when constant voltage generates, voltage when constant current generates, reference junction temperature when thermoelectric power generates.
- Up to 20 memories are available to each function to store displayed settings for different conditions. Memory contents can be recalled and can be generated in autoscan.
- Common alkaline batteries support use in situations where AC power is not available. The 9420 BATTERY PACK is available as an option for rapid recharging with the *9418-10 (less than 2 hours for full recharge).
- The optional *9418-10 allows continuous long-term operation.

1.3 Names and Functions of Parts

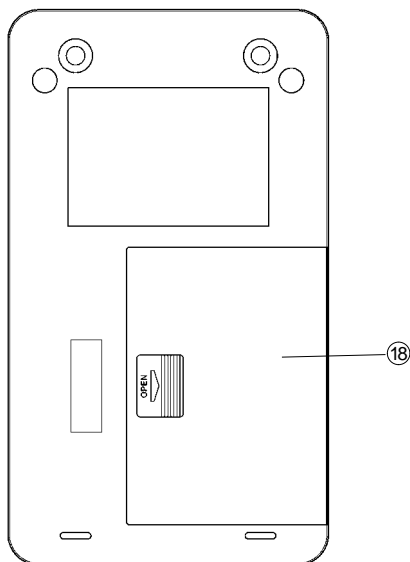
Front panel



Right side



Rear panel



① Power switch [POWER]

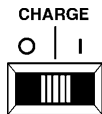
Turns the power for the unit on or off.

Power switch OFF

| Power switch ON

CHARGE BATTERY PACK is charging

Charge the optional 9420 BATTERY PACK using the *9418-10 AC ADAPTER. You can see the charging state by the charging lamp ⑰.

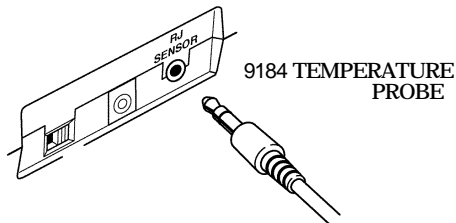


② AC adapter terminal

Terminal to insert the optional *9418-10 AC ADAPTER. The input voltage range is 12 V DC \pm 10% and a center pin with positive polarity.

③ RJ (reference junction compensation) sensor terminal

Terminal to insert the optional 9184 TEMPERATURE PROBE.



*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)

④ LCD display

Displays essential characters and symbols, such as generation levels, measured values, monitor values, thermocouples, polarities, units, output states, error messages of battery voltage drops of alkaline batteries or BATTERY PACK.

⑤ **OUTPUT FUNC** key (Generation function setting)

Sets the generation function for the unit.

FUNC.OFF Generation function is off.

CV 2.5V Constant voltage 2.5 V generation function

Generates DC constant voltage from -2.5000 V to 2.5000 V.

CV 25V Constant voltage 25 V generation function

Generates DC constant voltage from -25.000 V to 25.000 V.

CC 25mA Constant current 25 mA generation function

Generates DC constant current from -25.000 mA to 25.000 mA.

TC 0 Thermocouple junction 0

reference generation function.

Generates thermocouple power when reference junction is 0 .

TC RJ Thermocouple reference junction compensation generation function
Generates thermocouple power after reference junction compensation through the optional 9184 TEMPERATURE PROBE measurement temperature.

⑥ **INPUT FUNC** key (Measurement function setting)

Sets the measurement function for the unit.

FUNC.OFF Measurement function is off.

V 2.5V Voltage 2.5 V measurement function
DC voltage measurement from -2.5000 V to 2.5000 V.

V 25V Voltage 25 V measurement function
DC voltage measurement from -25.000 V to 25.000 V.

A 25mA Current 25 mA measurement function
DC current measurement from -25.000 mA to 25.000 mA.

TEMP Thermometric function
Temperature measurement from -25 to 80 with the optional 9184 TEMPERATURE PROBE

⑦ **TC TYPE** key (Thermocouple selection)

Sets the thermocouple type (for TC: 0 /RJ function) to be output .

K Generates thermoelectric power equivalent to temperature -176.0 to 1372.0 .

E Generates thermoelectric power equivalent to temperature -220.0 to 839.0 .

J Generates thermoelectric power equivalent to temperature -208.0 to 1108.0 .

T Generates thermoelectric power equivalent to temperature -169.0 to 400.0 .

R Generates thermoelectric power equivalent to temperature -50 to 1769 .

S Generates thermoelectric power equivalent to temperature -50 to 1769 .

B Generates thermoelectric power equivalent to temperature 300 to 1820 .

⑧ **0 ADJ** key (Zero adjustment)

Possible to return the display to "00000" for any input within the supported range with voltage measurement function (for V: 2.5V or 25V), or current measurement function (for A: 25mA).

⑨ **MONITOR/SKIP** key

- Monitor function

Displays monitor values for each generation function as follows:

Constant voltage (CV: 2.5V or 25V):

Load current

Constant current (CC: 25mA):

Voltage between output terminals

Thermocouple power (TC: 0 or RJ):

Reference junction temperature

- Skip setting

Memories that are set to be skipped during the memory write process do not appear in memory recall (**RECALL**) or memory autoscan (**SCAN**) operations.

- Memory write

Operate this key and **MEMORY/ENTER** together to enter to the memory write mode. Operate as the same manner again to leave the memory write mode.

⑩ MEMORY/ENTER key

- Memory generation function

Memory functions are selected in the following sequence: normal, memory recall (**RECALL**) and memory autoscan (**SCAN**).

- Enter setting

Memories that are set to be entered during the memory write process appear in memory recall (**RECALL**) or memory autoscan (**SCAN**) operations.

- Memory write

Operate this key and **MONITOR/SKIP** together to enter to the memory write mode. Operate as the same manner again to leave the memory write mode.

⑪ +/- key (Polarity)

Selects the polarity of the output setting value.

⑫ / key (Output value setting)

The digit increases or decreases by one count each time the key is pressed. Press and hold the key to change the digit continuously.

⑬ **OUTPUT ON/OFF** key

- Switches the output on or off with the generation function.
- This key can be used as the start/stop for memory generation function.

⑭ Output terminal [**OUTPUT**]

When output is on, the value specified will be output. This terminal is shorted with about 40 k resistance when output is off. The 7011 has built-in output protection fuse.

⑮ Voltage input terminal [**INPUT/V**]

Inputs voltage for voltage measurement. Input voltage is about 1 M .

⑯ Current input terminal [**INPUT/mA**]

Terminal for the standard resistor [**Rs/100**]

- Current input

Inputs current for current measurement function. The 7011 has built-in input protection fuse. The input resistance of current detection and input protection fuse is about 25 .

- Standard resistor

When current measurement function is off, a 100 standard resistor is connected for the 0 check of the 100 JIS C1603-1981 standard resistance thermometer.

⑰ Charging lamp [**CHARGE**]

When charging the optional 9420 BATTERY PACK, displays charging state. Use the *9418-10 AC ADAPTER in charging.

Red lamp: During charging

Green lamp: Charging completed

⑱ Battery cover

Open this battery cover to install the LR6 alkaline batteries or the optional 9420 BATTERY PACK.

⑲ Upper case

⑳ Lower case

When fuse replacement, remove the two screws and the lower case.

*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)



Chapter 2

Before Starting Output or Measurement

2.1 Preparing for the Power and Replacing the Batteries

WARNING

- To avoid electric shock when replacing the batteries, be quite sure first to turn the main switch off, and then disconnect the input and output terminals, optional *9418-10 AC ADAPTER, 9184 RJ SENSOR and so on from the power supply and from the object to be measured. Also, after replacing the batteries, always replace the cover before using the unit.
- When replacing the batteries, do not install used batteries with new ones, and do not mix different types of batteries. The battery compartment is protected against reversed installing. Do not insert forcibly batteries.

*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)



- **Do not short-circuit used batteries, disassemble them, or throw them in a fire. Doing so may cause the batteries to explode.**
- **Dispose of used batteries according to their type in the prescribed manner and in the proper location. Take the optional 9420 BATTERY PACK to a Ni-Cd battery recycling center or dispose of them to their type in the prescribed manner and in the proper location. If there are local regulations concerning the disposal of Ni-Cd batteries, dispose of the batteries in accordance with those regulations.**
- **For the optional *9418-10 AC ADAPTER: Input power supply voltage is 100 to 240 V AC , frequency specification is 50/60 Hz.**
- **Before turning on the power, make sure that the voltage of the power supply being used matches the supply voltage indicated on the part of the AC adapter terminal on the unit. If an attempt is made to use an improper supply voltage, particularly in excess of 13.2 V DC, there is danger of damage to this unit and of life-threatening risk to the operator.**

*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)

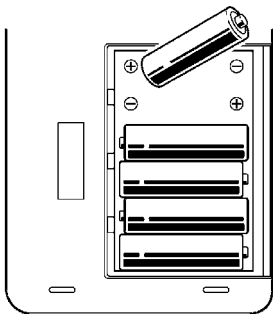
**⚠ WARNING**

- **When using the optional *9418-10 AC ADAPTER, after turning off the power for the unit, connect the AC ADAPTER to the unit and the AC ADAPTER to the commercial power supply.**
- **The optional *9418-10 AC ADAPTER is constructed so as to be connected to a ground line via a grounded two cable power cord such as the power cord that is supplied with the unit.**
- **In order to avoid electric shock, connect the unit to a properly grounded power supply socket using the power cord provided. In addition, if using a ground adapter, be absolutely sure to connect the green ground wire which protrudes from the adapter to a ground line.**

*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)

2.1.1 Installation of LR6 Alkaline Batteries or Optional 9420 BATTERY PACK

1. Turn the power switch off ().
2. Open the battery cover and install the batteries with the correct polarity.
 - When using LR6 alkaline batteries, install six of them in the battery compartment.
 - When using the optional 9420 BATTERY PACK, install three of them in the battery compartment with the correct polarity.(Use the batteries after seeing 2.1.3, "Charging the Optional 9420 BATTERY PACK" and recharging them.)



3. Be sure to close the battery cover.

2.1.2 Connecting the Optional 9418-10 AC ADAPTER

1. Turn the power switch off ().
2. Connect the AC adapter output plug to the AC adapter terminal for the unit.
3. After making sure that the voltage of the power supply being used matches the supply voltage of the AC ADAPTER, put the plug in the outlet.

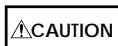
2.1.3 Charging the Optional 9420 BATTERY PACK

1. Prepare the 9420 BATTERY PACK and *9418-10 AC ADAPTER in order of the procedure of Sections 2.1.1 and 2.1.2.
2. Set the power switch to **CHARGE** position for the unit.
3. The charging lamp will turn red to start the charging.
4. When the charging lamp turns green, charging is completed.
5. Turn off () the power switch.

*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)



- **Do not recharge the battery which cannot be recharged.**
- **Recharge only the optional 9420 BATTERY PACK.**
- **Always carry out battery charging at an ambient temperature between 10 and 40 . Outside this range, not only is the charging capacity reduces, but also there is a possibility of reduced performance or electrolyte leakage.**



- Do not use alkaline batteries together with Ni-Cd batteries.
- When using the 9420 BATTERY PACK, always use together 3 pairs battery.
- Always use the 7011 when recharging the 9420 BATTERY PACK.
- Do not peel wrapping of the BATTERY PACK.
- The battery capacity is reduced as a result of self-discharge. Always carry out battery charging before initial use.

NOTE

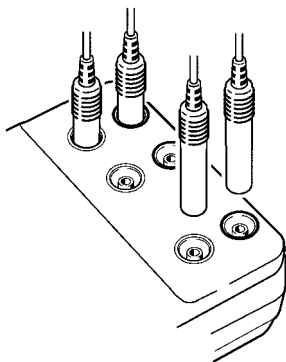
- When charging the battery, turn the power off () when the charging lamp turns green. If charging is continued, the BATTERY PACK will be overcharged, shortening the life of the battery.
- A completely discharged 9420 BATTERY PACK requires about two hours for a full recharge, when using the optional *9418-10.
- If the specified time elapses after setting the power switch to "CHARGE", and charging is still not completed, the battery protection fuse may have blown, or may be missing. Refer to Section 6.4, "Replacing the Battery Protection Fuse", and check the fuse.

*:9418-10 AC ADAPTER (PSA-30U-120, PHIHONG)

2.2 Connecting the Input and Output Terminals

The 7011 has output terminal, voltage input terminal and current input terminal (terminal for the standard resistor).

In addition, RJ sensor terminal is provided for temperature measurement.



2.2.1 Connecting Method

1. Output terminal

Always turn off the power to the 7011 before connecting to the device to be measured.

2. Voltage input terminal

Input only voltage to the voltage input terminal.

3. Current input terminal

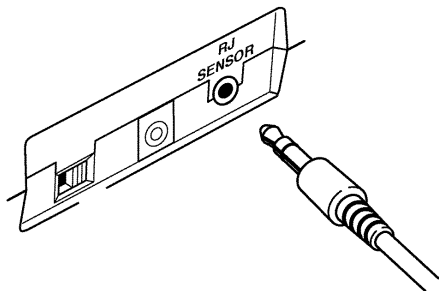
Input only current to the current input terminal.

4. Standard resistance terminal

Connect the JIS C1603-1981 standard resistance thermometer.

5. RJ sensor terminal

Connect the optional 9184 TEMPERATURE PROBE.





- **This unit is designed for safe operation only at low voltage. Ensure that no more than 60 V is present between any terminal and ground, and that the potential difference between any two terminals does not exceed 60 V. The unit cannot be guaranteed in an overrange situation, such as due to an inadvertent electric shock or faulty insulation, and we cannot accept responsibility for any consequences that might occur from misuse.**
- **The output terminals and the voltage and current input terminals (terminals for the standard resistor) are all isolated. Before connecting the terminals, ensure that the device being measured will not provide excessive output to, or require excessive input from, the terminals.**

The unit cannot be guaranteed in an overrange situation, such as due to an inadvertent electric shock or faulty insulation, and we cannot accept responsibility for any consequences that might occur from misuse.

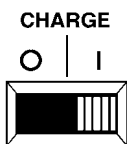
(For the maximum value of the output voltage/current and voltage/current input, refer to the specifications)

**CAUTION**

- Do not turn the power on or off while the device to be measured is connected to all of the terminals. In addition, do not connect the device to be measured to an output terminal once the output signal is on. In either of these cases, failure to heed this warning may result in damage to the unit or to the device to be measured.
- Do not input current more than 25 mA DC to the terminal for the standard resistor. Doing so may damage the resistor of the unit.
- When output is off, the +/– terminal is shorted with a resistance of 40 k Ω in the output terminal.
- Before connecting this unit, always be certain to first confirm that no power is being supplied to the output/test lines.
- After making all connections, recheck them to ensure that there are no wrong connections.
- Input resistance of the voltage input terminal is approx. 1 M Ω and of the current input terminal is approx. 25 Ω .
- Output terminal and current input terminal have circuit protection fuses. If the fuse is blown, output or current measurement is impossible.
(For replacing the fuse, refer to the Section 6.3, "Replacing the Circuit Protection Fuse".)

2.3 Turning the Power On and Off

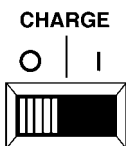
- The power switch ON



Set the power switch to the " | " position.

When the power switch is on, all settings except memory are initiated to appear initial screen after LCD display indications are all lit.

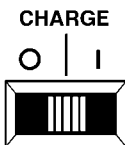
- The power switch OFF



Set the power switch to the " " position.

Turn off the power switch to goes off the LCD display indications.

- Charging the optional 9420 BATTERY PACK



When the power switch is set to the **CHARGE** position, the optional 9420 BATTERY PACK is recharged.



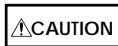
Red lamp: During charging
Green lamp: Charging completed
(For details, refer to Section 2.1.3, "Charging the Optional 9420 BATTERY PACK".)

**NOTE**

- If power switch is set to ON (|) for the unit, even when generation or measurement is not executed current is still consumed. The power supply switch should be turned off () when unused.
- Because turning the power on or off places a load on the unit, wait at least 5 seconds before turning the power off or on again.
- If the power doesn't turn on when turning on the power again, turn the power off and leave for more than 5 seconds.
- When using R6 alkaline batteries or the optional 9420 BATTERY PACK, if the unit does not power on when the power switch is set to the on " | " position, the battery protection fuse may have blown, or may be missing. Refer to Section 6.4, "Replacing the Battery Protection Fuse", and check the fuse.
- When using the optional 9420 BATTERY PACK, if the specified time elapses after setting the power switch to "CHARGE", and charging is still not completed, the battery protection fuse may have blown, or may be missing. Refer to Section 6.4, "Replacing the Battery Protection Fuse", and check the fuse.



Before turning on the power, make sure that the voltage of the power supply being used matches the supply voltage indicated on the part of the AC adapter terminal on the unit. If an attempt is made to use an improper supply voltage, particularly in excess of 13.2 V DC, there is danger of damage to this unit and of life-threatening risk to the operator.



Do not turn the power on or off while the device to be measured is connected to all of the terminals. In addition, do not connect the device to be measured to an output terminal once the output signal is on. In either of these cases, failure to heed this warning may result in damage to the unit or to the device to be measured.



Chapter 3

Basic Operation

**CAUTION**

Be sure to turn off the output in the output terminal when connection of the device to be measured is changed.

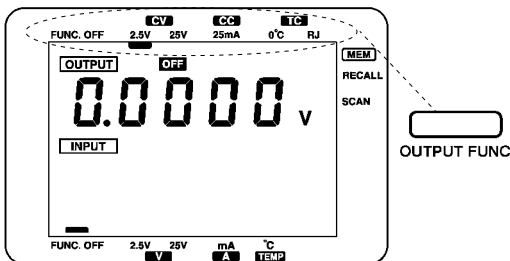
NOTE

- If the display shows all zeros and is out of the setting range, polarity changing is disabled.
- Holding / changes the setting continuously within the setting range, but if the result of a polarity change is out of range, or if the polarity is changed simultaneously with a digit, the polarity change is disallowed.

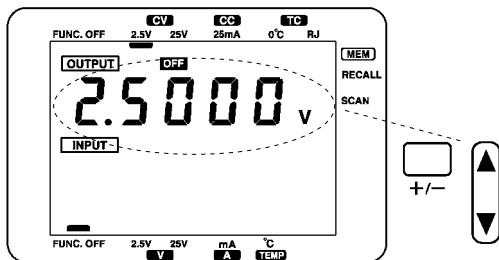
3.1 Constant Voltage (CV:2.5V/25V) Generation and Constant Current (CC:25mA) Generation

Outputs voltage or current as setting, regardless of load.

1. Press **OUTPUT FUNC** to set to the constant voltage (CV: 2.5V/25V), or constant current (CC: 25mA) generation function.



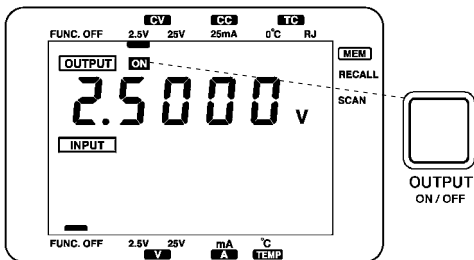
2. Use the $\frac{\square}{\square}$ keys and the $+/-$ key to set the output value.



The ranges within which the values can be set are as follows:

CV 2.5V	-2.5000 V to 2.5000 V
CV 25V	-25.000 V to 25.000 V
CC 25mA	-25.000 mA to 25.000 mA

3. Connect the device to be measured to the output terminal.
4. Press **OUTPUT ON/OFF** to output the setting value. The LCD display indicates **ON**.



5. The output value will change if the set value is changed with the **/** key or the **+/-** key.
6. Press **OUTPUT ON/OFF** to set output to off. The LCD display indicates **OFF**.

**⚠ WARNING**

Never connect to the voltage source when the constant voltage generation, and never connect to the constant current generation. Doing so may damage the unit and the device to be measured.

⚠ CAUTION

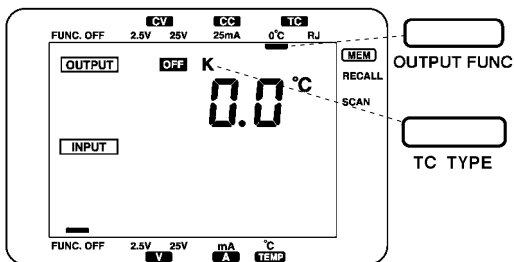
- When secondary battery charge/discharge tests, set to the constant current generation function for the unit, when charging set to plus polarity, and when discharging set to minus polarity.
- To avoid damaging this unit or the device to be measured, do not attempt to provide more than ± 25 mA with the constant voltage (CV: 2.5V/25V) generation functions, and do not attempt to output more than ± 25 V with the constant current function.
- When generating constant current, there is a possibility that overvoltage will be applied if the device to be measured is not connected correctly, which may result in damage to this unit or to the device to be measured.

3.2 Thermoelectric Power (TC: 0 /RJ) Generation

Outputs voltage according to the setting temperature instead of thermocouples. Uses thermocouple power (TC: 0 /RJ) generation functions depending on the occasion as follows:

- TC 0** When generating thermoelectric power of 0 reference using thermometer without reference junction compensation, or with compensation functions, or where the reference junction temperature is compensated to 0 with a vacuum bottle or similar system.
- TC RJ** When compensating for thermometer with reference junction compensation.

1. Press **OUTPUT FUNC** to set to thermocouple power (TC: 0 /RJ) function.
2. Press **TC TYPE** to set thermocouple (K, E, J, T, R, S or B).



3. Use the **/** keys and the **+/-** key to set the output value. The ranges within which the values can be set are as follows:

K	-176.0	to	1372.0
E	-220.0	to	839.0
J	-208.0	to	1108.0
T	-169.0	to	400.0
R	-50	to	1769
S	-50	to	1769
B	300	to	1820

4. Connect the thermometer to the output terminal, but thermocouple power (TC: 0) connection differs from (TC: RJ) connection.

TC 0 Connect it as indicated in Figure 1. The 9184 TEMPERATURE PROBE may be connected to the terminal for TEMPERATURE PROBE or not, without effect.

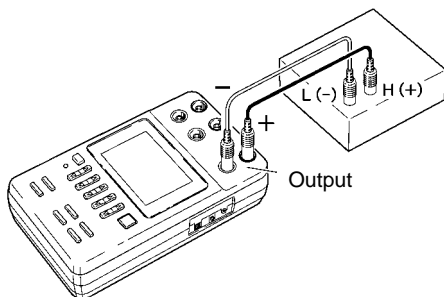


Figure 1

TC RJ Connect the optional 9184 TEMPERATURE PROBE to the terminal for TEMPERATURE PROBE. As indicated in Figure 2, connect the TEMPERATURE PROBE close to the thermometer when using a copper conductor, or close to the output terminal of the 7011 as indicated Figure 3, when using a thermocouple the same type as the thermometer or compensated conductors.

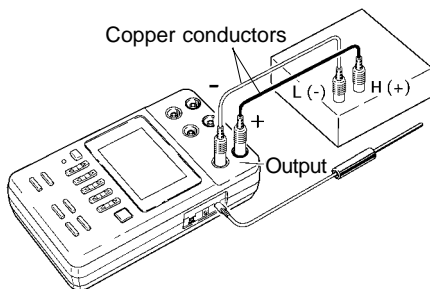


Figure 2

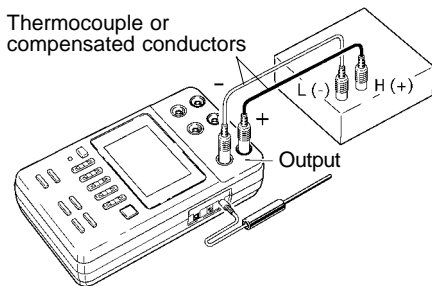


Figure 3

5. Press **OUTPUT ON/OFF** to output the setting value. The LCD display indicates **ON**.
6. The output value will change if the setting value is changed with the Δ / keys and the $+/-$ key.
7. Press **OUTPUT ON/OFF** to set output to off. The LCD display changes to **OFF**.



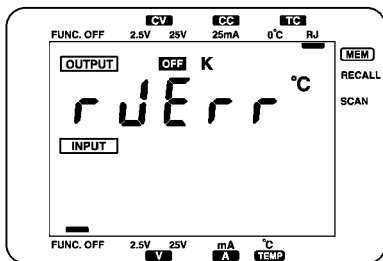
⚠ CAUTION

To avoid damage to the unit and the device to be measured, in the thermocouple power (TC: 0 and RJ) generation function, never apply an external voltage or current to the output terminal.

NOTE

- When thermocouple type is set to B, reference junction compensation temperature range is 0 to 80 in the thermocouple power (TC: RJ) generation function.
- In the thermocouple power (TC: 0 /RJ) generation function, use a thermocouples thermometer with an input resistance of at least 100 k . If the input resistance is under 100 k , the following error will be added to the specification precision:
 $100 \times (1 - R_{in} / (2.2 + R_{in}))\%$
 (where R_{in} is the thermocouples thermometer input resistance.)
- When output in the thermocouple power (TC: RJ) generation function is on, reference junction compensation will be performed about every 5 seconds, and the output value compensated.

- In the thermocouple power (TC: RJ) generation function, when the detected temperature of the RJ sensor is outside the -25 to 80 range, or if connection is incorrect, the messages "rJErr" will be displayed even when the output on switch is pressed, and output will remain off.

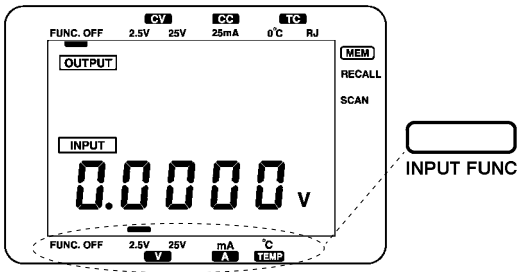


- To perform reference junction compensation at a temperature out of the operating temperature range of the main unit, be careful that the ambient temperature of the main unit.
- If the instrument is moved to a new location, or the thermometer being compensated for is changed, errors may result due to changes in the time-temperature constants. Do not attempt to perform measurements until the instrument has had sufficient time to reach thermal stability.

3.3 Voltage (V: 2.5V/25V) Measurement, Current (A: 25mA) Measurement

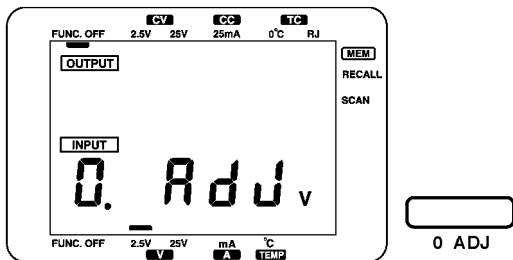
Measure DC voltage or DC current as following procedure.

1. Press **INPUT FUNC** (measurement function setting) to set to voltage (V: 2.5V/25V) or set to current (A: 25mA) measurement functions.



2. Testlead

- To measure voltage, connect the testlead to the voltage input terminal for the unit and short out the ends of the testlead.
 - To measure current, connect the testlead to the current input terminal for the unit and open the ends of the testlead.
- Press **0 ADJ** to execute the zero adjustment.



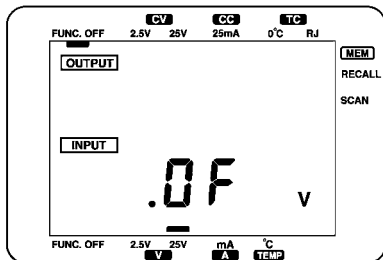
3. Connect the end of the input cord to the circuit to be measured and read the displayed value.

CAUTION

In order to prevent damage to the unit or the device to be measured, do not input voltage in excess of ± 25 V to the voltage input terminal and do not input current in excess of ± 25 mA to the current input terminal. Do not input voltage to the current input terminal.

NOTE

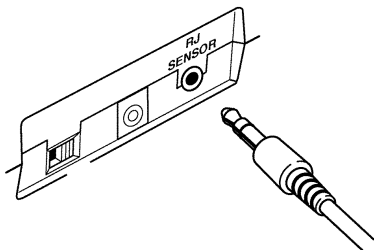
- If the input is outside the measurement range, the display will indicate "OF".



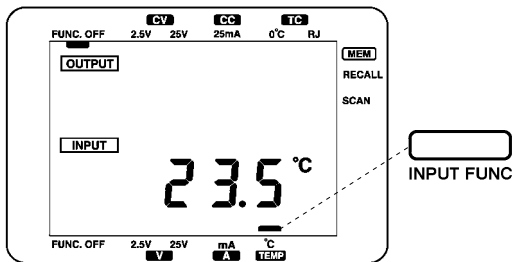
- When using the unit to measure voltage or current, you can press **0 ADJ** to memorize the displayed value and zero the display, after which the display shows the difference between the memorized value and any new value (until you select another function).
- Pressing **0 ADJ** again memorizes the new value (overwriting any previously memorized value), and again the difference between the memorized value and the present measurement is displayed.
- If the input value is more than ± 2.5000 V, ± 25.000 V or ± 25.000 mA in the zero adjustment, zero adjustment function does not work.

3.4 Temperature Measurement (TEMP)

Temperature measurement is possible with the optional 9184 TEMPERATURE PROBE.

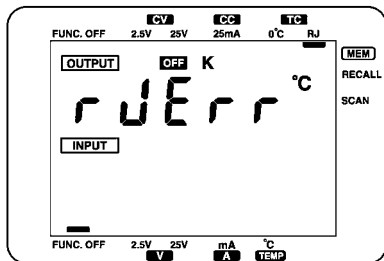


1. Connect the TEMPERATURE PROBE to the unit.
2. Set to "TEMP" with INPUT FUNC.
3. Read the display value.



NOTE

- If the temperature measurement function is selected without the 9184 TEMPERATURE PROBE being connected, the message "rJErr" will be displayed. Even if error message is displayed, connect the TEMPERATURE PROBE to start measuring temperature after error message is disappeared.

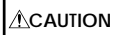


- This unit cannot be used out of the temperature measurement range between -25 and 80 . If measurement exceeds this temperature range, the lead insulation of the TEMPERATURE PROBE being used is damaged.
- If the input is outside measurement range, the display will indicate "rJErr".



3.5 0 Check of the 100 Resistance Thermometer

Connect a 100 reference resistor for the 0 check of the 100 JIS C1603-1981 standard resistance thermometer. Usable except for current (A: 25 mA) measurement function.



Do not input current in excess of ± 25 mA. Doing so may damage the unit and the device to be measured.

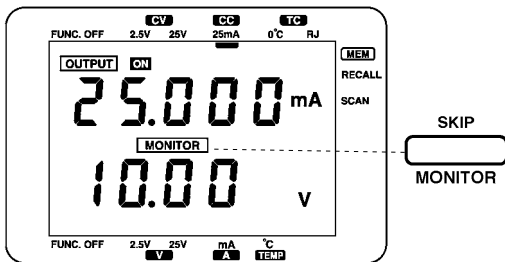
Chapter 4

Detailed Description of Functions

4.1 Output Monitor

- In the constant voltage (CV: 2.5V/25V) generation function, the current that flows into the device to be measured and the results are displayed on the LCD display.
- In the constant current (CC: 25mA) generation function, the voltage in the output terminal is measured and the results are displayed on the LCD display.
- In the thermocouple power (TC: 0 /RJ) generation function, the reference junction temperature is measured and the results are displayed on the LCD display.

1. Press **MONITOR** to change input function to output monitor function and **MONITOR** is displayed.



Monitor ranges are shown below:

- | | |
|----------------|---|
| CV 2.5V | Load current
-25.00 mA to 25.00 mA |
| CV 25V | Load current
-25.00 mA to 25.00 mA |
| CC 25mA | Output terminal voltage
-25.00 V to 25.00 V |
| TC 0 | Reference junction temperature
0 |
| TC RJ | Reference junction temperature
-25.0 to 80.0 (except B)
0 to 80.0 (B) |

2. Press the next **MONITOR** key to change output monitor to input function and **INPUT** is displayed.

Switches alternately between input function and output monitor function and also switches indications.

⚠ CAUTION

If the output is outside this range, the display will indicate "OF" in the constant voltage (CV: 2.5V/25V) and constant current (CC: 25mA) generation function, and "rJErr" in the thermocouple power (TC: RJ) function. In this case, turn off the output and confirm the device to be measured. If output is continued, the unit and the device to be measured may be damaged.

NOTE

If the output is OFF, the display will indicate " ---- ".

4.2 Memory Generation

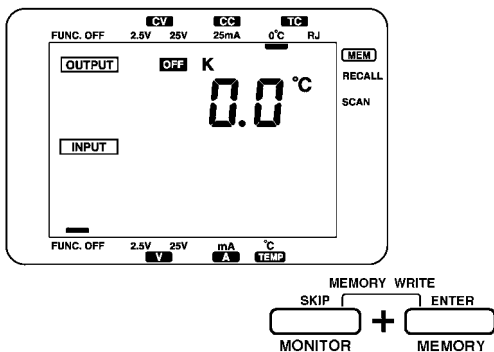
Outline of Memory Generation

The Memory functions can be used to store data in memories for later recall in the same sequence as it was stored.

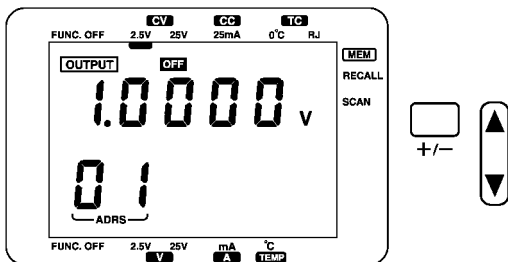
Memorized data can be recalled manually by keystrokes with the Recall function, or automatically scanned sequentially with the Scan function, at a programmable rate.

4.2.1 Data Store to Memory

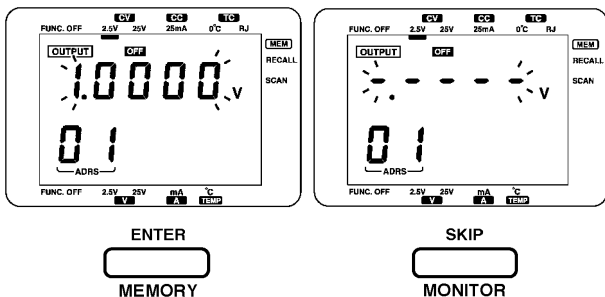
1. Set to the function to be stored with **OUTPUT FUNC.** Memory function is set to **OFF**.
2. When **MEMORY** and **MONITOR** are pressed together, the system will shift to the memory write mode.



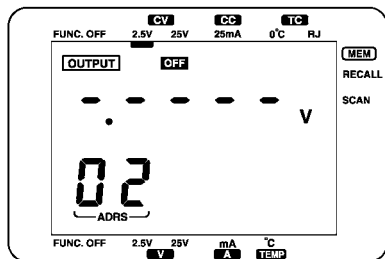
- "01" is displayed in the memory address and output setting value of the address is displayed. At this time, if the address "01" has been skipped before, "----" is displayed and numerical value is not displayed.
- Set output value with the / keys and the +/- key.



- Press ENTER to store the displayed data, and if you do not want to assign a memory number to the data, press SKIP.



6. Press **ENTER** or **SKIP** to change to the next address. "02" is displayed in the memory address and output setting value of the address is displayed. The operation in steps 4 to 5 is then repeated. Up to 20 memories are available to store displayed settings.



7. Press **SKIP** and **ENTER** together to exit from the memory write mode.

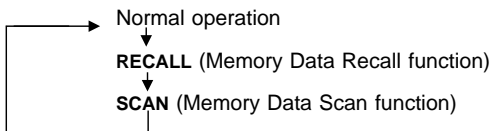
If **SKIP** and **ENTER** are not pressed, settings will be disabled.

NOTE

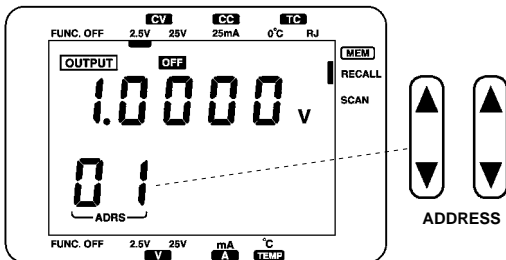
- When memory write mode is exited, the data is stored in nonvolatile memory.
- If power switch is turned off before exiting from the memory write mode, the data changing is disabled.
- Memory data is shared in the (TC: 0) and (TC: RJ) functions.

4.2.2 Memory Data Recall Generation

1. Set to the function to be stored with **OUTPUT FUNC.**
2. Press **MEMORY** to set to the memory data recall (**RECALL**) generation function.
If you change operating mode inadvertently, you can cycle through the other modes to return to the desired mode, as follows:



3. Set the starting memory number using the two / (ADDRESS) keys. If the resulting memory is one that was set for SKIP, the ten's key will do nothing, and pressing the one's key will select the next memory that was not set to be skipped.

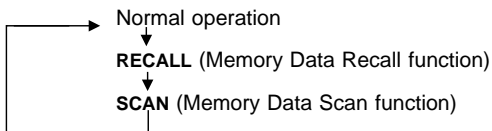


4. Connect the device to be measured.
5. Press **OUTPUT ON/OFF** to output the address output setting value and you can change the output ON/OFF by each pressing.
6. Press the / (ADDRESS) keys to output the next address value.
7. To exit the Memory Data Recall functions, press **OUTPUT ON/OFF** to select OFF, and press **MEMORY** twice. Refer to step 2.

4.2.3 Memory Data Autoscans Generation

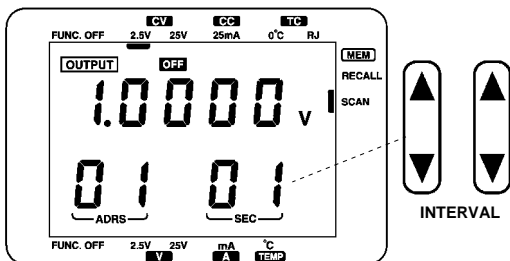
1. Set to the function to be stored with **OUTPUT FUNC.**
2. Press **MEMORY** to set to the memory data scan (SCAN) generation function.

If you change operating mode inadvertently, you can cycle through the other modes to return to the desired mode, as follows:



3. Set the starting memory number using the two / (ADDRESS) keys. If the resulting memory is one that was set for SKIP, the ten's key will do nothing, and pressing the one's key will select the next memory that was not set to be skipped.

4. Set the scanning interval between 1 and 99 seconds using the two / (INTERVAL) keys.



5. Connect the device to be measured.
6. Start output by pressing **OUTPUT ON/OFF**.
The memories are displayed sequentially for the pre-stored interval. Press the key again, as desired, to stop scanning and restart scanning with the next memory.
When not scanning, you can use the two / (ADDRESS) keys to select any other memory from which to scan.
7. To exit the Memory Scan functions, press **OUTPUT ON/OFF** to select OFF, and press **MEMORY** once. Refer to step 2.

NOTE

- Output settings cannot be changed during Memory Recall and Scan operations: the / keys serve only to select memories and set the scan interval.
- Measurement cannot be executed when output is off in the Memory Recall and Scan mode.

4.2.4 Memory Clear

- Clears the memory settings for each or all functions.
- Use this feature when restarting memory storage, or to erase function contents that are no longer used.
- The contents of a memory after executing Clear default to the following:

Display value: 00000

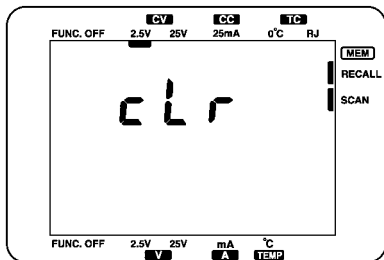
Selection setting: skip

Scan interval: 1 second

Thermocouple: K (TC: 0 or RJ generation function)

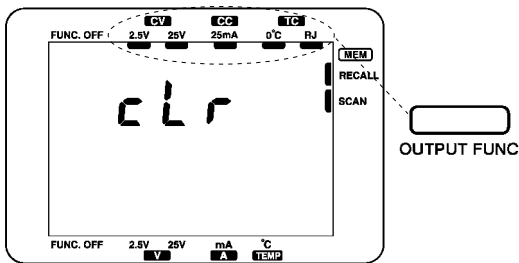
Memory Clear Operation

1. Switch on the power while holding both the **0 ADJ** and the **MEMORY/ENTER** keys.
2. The display shows "cLr" when the Memory Clear function is activated. If it does not, repeat step 1.

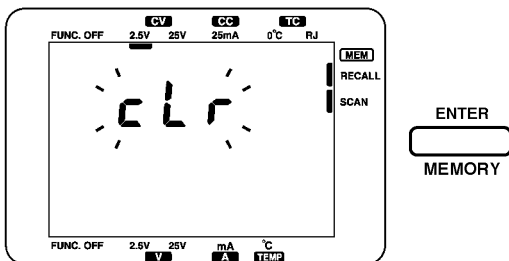


3. Press **OUTPUT FUNC** to select the output function to be cleared. After selecting the thermocouple functions, all functions will be selected:

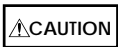
CV CC TC
 2.5V → 25V → 25mA → 0 °C · RJ → All Functions



4. Press **MEMORY** to clear the selected memory data: "cLr" should then blink.



5. Turn the power off.

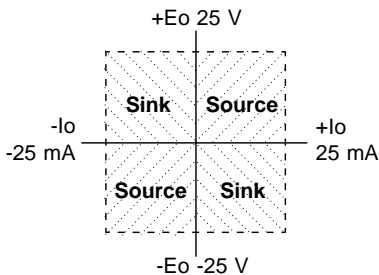


To avoid damaging the unit, do not turn the power off in the middle of the Memory Clear procedure. The "cLr" display should be blinking before turning the power off.

Chapter 5 Applications

The 7011 can act as a source and as a sink to the load. It is useful for secondary battery charging/discharging tests and signal loop tests in instrument systems.

5.1 Source and Sink Area



5.2 Secondary Battery Charge/Discharge

Battery charge: 7011 side current supply
(source)

Battery discharge: 7011 side current sinking
(sink)

1. Set to constant current (CC: 25mA) generation function with **OUTPUT FUNC.**
2. Set output setting value with the / keys and set the polarity of the 7011 side with the +/- key.

When charging battery: set to plus.

When discharging battery: set to minus.

For example, when discharging secondary battery of 10 mA, set the setting value to "-10.000mA".

3. Connect the secondary battery and the output terminal between plus polarities and between minus polarities.
4. Press **OUTPUT ON/OFF** to start charging/discharging.
5. It is possible to confirm the secondary battery output voltage with **MONITOR**.

 **CAUTION**

When output is OFF, the +/- terminal is shorted with a resistance of 40 k in the output terminal.

NOTE

Pay attention to overcharge or overdischarge when charging/discharging secondary battery. In such case, the secondary battery may be damaged.

5.3 Signal Loop Testing of Industrial Machinery

Two types of measurements are typically made with industrial machinery: current measurement with a 4- to 20-mA current output, and voltage measurement with a signal 1- to 5-V or 1- to 10-V loop.

Example

Measure temperature with the thermocouple [K], converting transducer output to 4- to 20-mA. Observe output on the controller and record changes. Transducer power is included in the signal loop.

A typical device configuration for this example is described below.

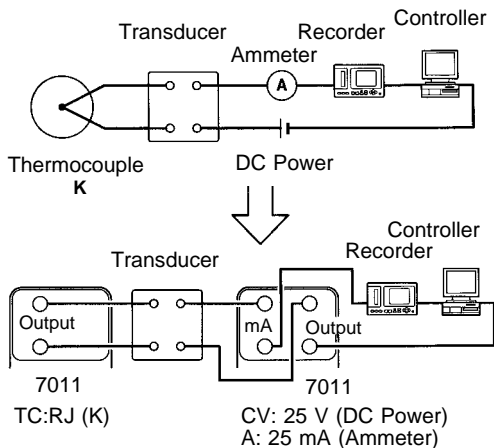
1. Transducer Input

Substitute thermocouple output to the transducer with the signal source. Set the source mode to the thermocouple source (TC: RJ) function, and thermocouple [K]. Refer to Section 3.2, "Thermoelectric Power (TC: 0 / RJ) Generation" for connections to the transducer including the TEMPERATURE PROBE.

2. Transducer Output

The power source and the ammeter at the transducer output are replaced by the 7011 constant voltage (CV: 25 V) and current (A: 25 mA) functions. The 7011 output terminals connect to the power source terminals, and the current measurement terminals replace the ammeter, so connections to the output side of the transducer can be handled by a single unit.

3. The output of the unit at the transducer input sets the transducer input conditions, and the other unit at the transducer output measures the 4- to 20-mA output.



Connection Diagram

Chapter 6

Maintenance, Adjustment, and Disposal

6.1 Maintenance and Servicing

In order to use the 7011 safely, the following maintenance and checking procedures should be executed at the proper intervals.

- Be sure to read assiduously the various items highlighted in this manual for attention, in order to use the unit correctly.
- If the unit is not functioning properly, first confirm the Section 6.6, "Troubleshooting Checklist". If operation still appears abnormal, stop using the unit, and dispatch it for service at an approved HIOKI service facility.
- Getting the 7011 unit wet or letting oil or dust enter inside its casing will certainly damage it, and is quite likely to cause an electric shock accident or a dangerous conflagration. If the unit has gotten seriously wet, oily, or dusty, stop using it and send it for service at an approved HIOKI calibration facility.

- Periodic calibration is necessary in order to maintain and authenticate the accuracy of this testing device. When such calibration is necessary, you should utilize the services of an approved HIOKI calibration facility.

Cleaning the unit

- Gently wipe dirt from the surface of the unit with a soft cloth moistened with a small amount of water or neutral cleanser. Do not under any circumstances use benzine, alcohol, acetone, ether, paint thinner, lacquer, or ketone solvents on the unit, as these may cause deformation or discoloration.
- Periodically wipe the face of the LCD display screen gently with a clean soft dry cloth.

6.2 Changing the Battery

- If this unit is being powered by battery and the battery voltage drops, the **B** indicator appears on the LCD display. If this happens, turn the output off and then turn the power switch off as soon as possible. After inserting a new battery, you may resume using the unit.
- For the battery changing method, refer to Section 2.1, "Preparing for the Power and Replacing the Batteries".

⚠CAUTION

- If, once the **B** indicator appears, the power is kept on and the unit continues to be used, internal control of the unit may be lost, resulting in abnormal output that could damage the unit or the device to be measured. Once the **B** indicator appears, turn the power off as soon as possible.
- The optional 9420 BATTERY PACK is Ni-Cd battery. If it is continued to use while the **B** indication is lighting, the BATTERY PACK will be overdischarged and shortening the life of the battery.
- Use the LR6 alkaline batteries or the 9420 BATTERY PACK.
- Do not use alkaline batteries together with Ni-Cd batteries.
- When using the 9420 BATTERY PACK, always use together 3 pairs battery.
- When replacing the batteries, always replace with all new ones.
- Always use the 7011 when recharging the 9420 BATTERY PACK.
- Do not peel wrapping of the BATTERY PACK.
- Do not use new batteries together with used ones, because problems may occur if batteries from different sets are mixed together.



- The battery capacity is reduced as a result of self-discharge. Always carry out battery charging before initial use.
- If the battery capacity remains very low after correct recharging, the useful battery life is at an end. Please purchase new BATTERY PACK.

6.3 Replacing the Circuit Protection Fuse

The fuses are fitted on the PCB where the lower case is removed.

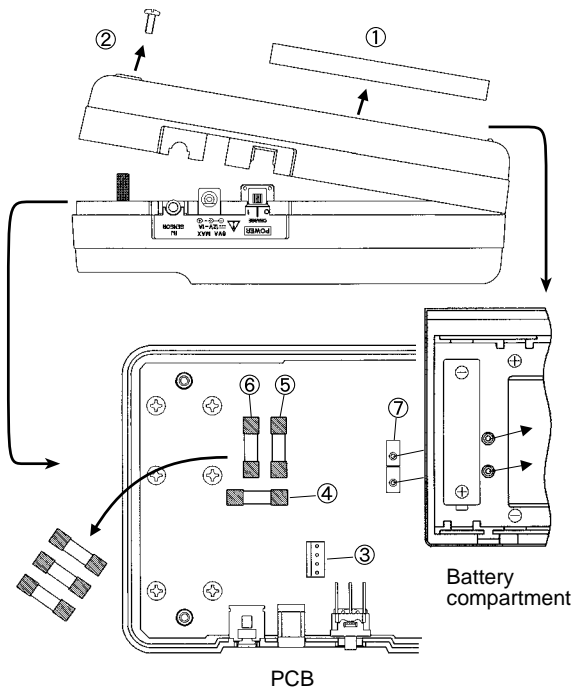
- The 7011 has three fuses: two of them are for generation function, one for measurement function.
- The fuse for the constant voltage (CV: 2.5V/ 25 V) and constant current (CC: 25 mA) generation functions is labeled "F301" on the circuit board.
- The fuse for the thermocouple power (TC: 0 / RJ) generation functions is labeled "F302" on the circuit board.
- The fuse for the current (A: 25 mA) measurement function is labeled "F303" on the circuit board.

 **WARNING**

- **When changing the circuit protection fuses, in order to avoid the risk of electric shock accident, be quite sure first to turn the main switch of the 7011 unit off, and then to remove the AC ADAPTER and batteries.**
- **Only use fuses of the specified type that is rated for the specified current and voltage. Using a fuse that does not meet the specifications or shorting the fuse holder may cause an accident that might result in injury or death.**
Specified fuse: 250VF50mAH, 20 mm × 5.2 mm dia.

1. Turn off the power switch ().
2. Remove the AC ADAPTER, if the AC ADAPTER or something is connected to the AC adapter terminal.
3. Remove the battery cover ① and then remove all batteries or BATTERY PACK.
4. Remove the two screws ② from the lower case, and then remove the lower case.
5. Remove the connector ③ from the PCB.
6. Change the blowing fuses. Confirm the following functions:
 - ④ F301 CV: 2.5 V/25 V, CC: 25 mA
Constant voltage 2.5 or 25 V generation functions and Constant current 25 mA generation function
 - ⑤ F302 TC: 0 /RJ
Thermocouple junction 0 reference generation function and thermocouple reference junction compensation generation function
 - ⑥ F303 A: 25 mA
Current 25 mA measurement function
7. Mount the connector ③ in the PCB.
8. Hook the back of the case into the tracks in the front of the case. Make sure that the switches ⑦ fit through the holes in the battery compartment.

9. Retighten the two screws ②.
10. Install the batteries and mount the battery cover ①.



6.4 Replacing the Battery Protection Fuse

This unit has a battery protection fuse in the fuse holder connecting the lower case and the circuit board.

To replace the fuse, refer to Section 6.3, "Replacing the Circuit Protection Fuse", and replace the fuse in the fuse holder connecting the lower case and the circuit board.

**WARNING**

- To avoid the possibility of electric shock when replacing the fuse, always turn the power off first (power switch in the " " position), and disconnect the batteries and AC adapter.
- Always use a fuse of the specified characteristics, rated current, voltage, and format. Be warned that using other than the specified fuse, or short-circuiting the fuse holder can lead to a serious accident.
Fuse rating: 250VF630mAL, 20 mm × 5.2 mm dia.

6.5 Shipping the Unit

When shipping the unit, use the same packing materials in which it was originally delivered to you.

6.6 Troubleshooting Checklist

If the 7011 unit appears to be faulty, check the following possibilities before sending the unit for service:

Although you have turned on () the power switch, the screen display does not appear.	<ul style="list-style-type: none"> • Are the batteries correctly inserted ? • Is the useful battery life at an end ? <p style="padding-left: 20px;">Insert the new batteries.</p>
	<ul style="list-style-type: none"> • Is the optional 9420 BATTERY PACK charged ? <p style="padding-left: 20px;">Recharge the BATTERY PACK.</p>
	<ul style="list-style-type: none"> • Is the optional 9418-10 AC ADAPTER (PSA-30U-120, PHIHONG) connected ? <p style="padding-left: 20px;">Connect the AC ADAPTER.</p>
	<ul style="list-style-type: none"> • Is the battery protection fuse installed? • Has the battery protection fuse blown? <p style="padding-left: 20px;">Change the fuse referring to Section 6.4, "Replacing the Battery Protection Fuse."</p>

<p>Charging is not possible even when the power switch is set to the "CHARGE" position.</p>	<ul style="list-style-type: none">• Is the battery protection fuse installed?• Has the battery protection fuse blown? <p>Change the fuse referring to Section 6.4, "Replacing the Battery Protection Fuse."</p>
<p>Constant voltage, constant current, thermoelectric power generation or current measurement are impossible.</p>	<ul style="list-style-type: none">• Is the fuse fitted ?• Has the fuse blown ? <p>Change the fuse referring to Section 6.3, "Replacing the Circuit Protection Fuse."</p>



6.7 Disposing of the Unit.

This unit use batteries or the AC ADAPTER for power supply. When the 7011 unit is finally to be scrapped, remove the batteries and dispose of it in accordance with relevant laws and regulations. For details of battery replacement, see the Section 2.1.1 "Installation of LR6 Alkaline Batteries or Optional 9420 BATTERY PACK".



Be sure to dispose of used batteries properly. Take used batteries to a Ni-Cd battery recycling center or dispose of them according to their type in the prescribed manner and in the proper location. If there are local regulations concerning the disposal of Ni-Cd batteries, dispose of the batteries in accordance with those regulations.

Chapter 7

Specifications

7.1 General Specifications

Output generation	Bipolar sink-source system
A/D operation	Delta-sigma method
Temperature coefficient	
CV: 2.5 V	$\pm (50\text{ppm of setting} + 0.3 \text{ dgt.})/$
CV: 25 V	$\pm (50\text{ppm of setting} + 0.2 \text{ dgt.})/$
CC: 25 mA	$\pm (50\text{ppm of setting} + 0.2 \text{ dgt.})/$
TC: 0	$\pm (50\text{ppm of setting} + 0.05 \text{)}/$ (K, E, J, T)
	$\pm (50\text{ppm of setting} + 0.10 \text{)}/$ (R, S, B)
TC: RJ	$\pm (100\text{ppm of setting} + 0.10 \text{)}/$ (K, E, J, T, R, S, B)
V: 2.5 V	$\pm (50\text{ppm of rdg.} + 0.1 \text{ dgt.})/$
V: 25 V	$\pm (50\text{ppm of rdg.} + 0.1 \text{ dgt.})/$
A: 25 mA	$\pm (50\text{ppm of rdg.} + 0.1 \text{ dgt.})/$
TEMP	$\pm (0.05 \text{)}/$
MONITOR	$\pm (100\text{ppm of rdg.} + 0.1\text{dgt.})/$ (CV: 2.5V/25 V)
	$\pm (100\text{ppm of rdg.} + 0.1\text{dgt.})/$ (CC: 25 mA)
Rs	$\pm (50\text{ppm of rdg.})/$
Zero adjustment function	All measurement ranges (V: 2.5 V/25 V, A: 25 mA)

Display	LCD 5-digit, maximum value 25000 (generation, measurement)
● Function	FUNC.OFF / CV : 2.5 V, 25 V / CC : 25 mA / TC : 0 , RJ (Constant voltage and constant current generations) FUNC.OFF / V : 2.5 V, 25 V / A : 25 mA / TEMP : (Voltage and current measurements) RECALL, SCAN (memory data generation)
● Generation	OUTPUT
● Measurement	INPUT
● Monitor	MONITOR
● Numerical value	Max. 5-digit, "25000" (both generation and measurement function)
● Polarity	- (minus only)
● Unit Symbols	V , mA , , ADRS, SEC
● Thermocouples Symbols	K, E, J, T, R, S, B
● Output ON/OFF	ON OFF
● Battery Power Low	B
Operating temperature and humidity range	0 to 40 , 80% RH or less (with no condensation)
Storage temperature and humidity range	-20 to 50 , 80% RH or less (with no condensation)
I/O protection	250VF50MAH (20 mm × 5.2 mm dia.) fuse (generation and measurement) (without connecting to the live lines in excess of ± 25 V or ± 25 mA.)
Dielectric strength	500 V AC for 1 minute Between I/O terminals and the case Between power supply and the case

Power supply	<p>Six LR6 alkaline batteries Rated supply voltage 1.5 VDC × 6 Maximum rated power 6VA</p> <p>9418-10 AC ADAPTER (PSA-30U-120, PHIHONG) (center plus) Rated supply voltage 100 to 240 VAC (Voltage fluctuation of 10% from the rated supply voltage are taken into account.) Rated supply frequency 50/60 Hz Rated output voltage 12 V ± 10% Maximum rated power 6 VA</p> <p>9420 BATTERY PACK 1.2 VDC × 2 (Ni-Cd battery) Rated supply voltage 1.2 VDC × 6 Maximum rated power 6 VA</p>
Battery protection	Fuse rating: 250VF630mAL, 20 mm × 5.2 mm dia.
Continuous operating time	9420 BATTERY PACK
CC: 25 mA	When 25 mA output terminal is shorted: approx. 80 minutes (after full recharge)
V: 2.5 V	When input terminal is shorted: approx. 180 minutes (after full recharge)
Charging time	9420 BATTERY PACK approx. 120 minutes or less (with 9418-10 AC ADAPTER; PSA-30U-120, PHIHONG)
Dimensions and mass	approx. 104W × 180H × 58D mm, approx. 590 g (except batteries)

Included accessories	One set of 9168 INPUT CABLE One set of 9170-10 TEST LEADS Three spare fuses of 250VF50MAH (20 × 5.2 mm dia.)
Optional accessories	9184 TEMPERATURE PROBE (for reference junction compensation) 9380 CARRYING CASE 9418-10 AC ADAPTER (PSA-30U-120, PHIHONG) 9420 BATTERY PACK
Standards Applying	
Safety	EN61010-1:1993+A2:1995 Pollution degree 2 Overvoltage category I (anticipated transient overvoltage 330 V)
EMC	EN55011:1991 EN50082-1:1992
Accuracy guarantee	for temperature and humidity For 1 year (Please refer to the accuracy table for the guaranteed accuracy after 6 months and 1 year, respectively.)

7.2 Generation and Measurement Ranges, Accuracy

Generation function

Constant voltage

Accuracy for 6 months

Range	Resolution	Accuracy
CV: 2.5V 0 to ± 2.5000 V	100 μ V	$\pm 0.03\%$ of setting ± 3 dgt.
CV: 25V 0 to ± 25.000 V	1 mV	$\pm 0.03\%$ of setting ± 3 dgt.
Note	Approx. ± 25 mA (sink-source) When shorted, approx, 50mA.	

Accuracy for 1 year

Range	Resolution	Accuracy
CV: 2.5V 0 to ± 2.5000 V	100 μ V	$\pm 0.06\%$ of setting ± 6 dgt.
CV: 25V 0 to ± 25.000 V	1 mV	$\pm 0.06\%$ of setting ± 6 dgt.
Note	Approx. ± 25 mA (sink-source) When shorted, approx, 50mA.	

Constant current

Accuracy for 6 months

Range	Resolution	Accuracy
CC: 25mA 0 to ± 25.000 mA	1 μ A	$\pm 0.03\%$ of setting ± 3 dgt.
Note	Approx. ± 25 V (sink-source) When open, approx, 35V.	

Accuracy for 1 year

Range	Resolution	Accuracy
CC: 25mA 0 to ± 25.000 mA	1 μ A	$\pm 0.06\%$ of setting ± 6 dgt.
Note	Approx. ± 25 V (sink-source) When open, approx, 35V.	

Thermoelectric power

Accuracy for 6 months

Range	Resolution	Accuracy
TC: 0		
K -176.0 to 1372.0	0.1	$\pm 0.05\%$ of setting ± 0.5
E -220.0 to 839.0	0.1	$\pm 0.05\%$ of setting ± 0.5
J -208.0 to 1108.0	0.1	$\pm 0.05\%$ of setting ± 0.5
T -169.0 to 400.0	0.1	$\pm 0.05\%$ of setting ± 0.5
R -50 to 100 101 to 1769	1	$\pm 0.05\%$ of setting ± 1.5 $\pm 0.05\%$ of setting ± 1.0
S -50 to 100 101 to 1769	1	$\pm 0.05\%$ of setting ± 1.5 $\pm 0.05\%$ of setting ± 1.0
B 300 to 600 601 to 1820	1	$\pm 0.05\%$ of setting ± 2.5 $\pm 0.05\%$ of setting ± 1.5
Remarks	Internal resistance: Approx. 2.2	

Accuracy for 1 year

Range	Resolution	Accuracy
TC: 0		
K -176.0 to 1372.0	0.1	$\pm 0.10\%$ of setting ± 1.0
E -220.0 to 839.0	0.1	$\pm 0.10\%$ of setting ± 1.0
J -208.0 to 1108.0	0.1	$\pm 0.10\%$ of setting ± 1.0
T -169.0 to 400.0	0.1	$\pm 0.10\%$ of setting ± 1.0
R -50 to 100 101 to 1769	1	$\pm 0.10\%$ of setting ± 3.0 $\pm 0.10\%$ of setting ± 2.0
S -50 to 100 101 to 1769	1	$\pm 0.10\%$ of setting ± 3.0 $\pm 0.10\%$ of setting ± 2.0
B 300 to 600 601 to 1820	1	$\pm 0.10\%$ of setting ± 5.0 $\pm 0.10\%$ of setting ± 3.0
Remarks	Internal resistance: Approx. 2.2	

Accuracy for 6 months

Range	Resolution	Accuracy
TC: RJ		
K -176.0 to 1372.0	0.1	Add to accuracy of TC: 0 ± 0.5 added (23 ± 5) ± 1.0 added (0 to 50) ± 2.0 added (-25 to 80)
E -220.0 to 839.0	0.1	
J -208.0 to 1108.0	0.1	
T -169.0 to 400.0	0.1	
R -50 to 100 101 to 1769	1	
S -50 to 100 101 to 1769	1	
B 300 to 600 601 to 1820	1	
Remarks	Internal resistance: Approx. 2.2 Using 9184 RJ SENSOR Added temperature measurement accuracy of the range of reference junction compensation temperature (-25 to 80)	

Accuracy for 1 year

Range	Resolution	Accuracy
TC: RJ		
K -176.0 to 1372.0	0.1	Add to accuracy of TC: 0 ± 1.0 added (23 ± 5) ± 2.0 added (0 to 50) ± 4.0 added (-25 to 80)
E -220.0 to 839.0	0.1	
J -208.0 to 1108.0	0.1	
T -169.0 to 400.0	0.1	
R -50 to 100 101 to 1769	1	
S -50 to 100 101 to 1769	1	
B 300 to 600 601 to 1820	1	
Remarks	Internal resistance: Approx. 2.2 Using 9184 RJ SENSOR Added temperature measurement accuracy of the range of reference junction compensation temperature (-25 to 80)	

Memory generation

Range	Accuracy
RECALL/SCAN CV: 2.5V CV: 25V CC: 25mA TC: 0 · RJ	Accuracy of signal generated depends on accuracy of selected function. Accuracy of interval time is not rated.
Remarks	One of above four functions Maximum number of steps: 20 Interval time: 1 to 99 s Memory data is shared in TC:0 and TC: RJ functions.

Standard resistor

Accuracy for 6 months

Range	Accuracy
Rs 100	± 0.2% of rdg.
Remarks	When current measurement function is off, standard resistance input terminal

Accuracy for 1 year

Range	Accuracy
Rs 100	± 0.4% of rdg.
Remarks	When current measurement function is off, standard resistance input terminal

Measurement Functions

(Measurement)

Voltage

Accuracy for 6 months

Range	Resolution	Accuracy
V: 2.5 V 0 to ± 2.5000 V	100 μ V	$\pm 0.03\%$ of rdg. ± 2 dgt.
V: 25 V 0 to ± 25.000 V	1 mV	$\pm 0.03\%$ of rdg. ± 2 dgt.
Remarks	Input resistance :Approx. 1 M (After executing a zero adjustment)	

Accuracy for 1 year

Range	Resolution	Accuracy
V: 2.5 V 0 to ± 2.5000 V	100 μ V	$\pm 0.06\%$ of rdg. ± 4 dgt.
V: 25 V 0 to ± 25.000 V	1 mV	$\pm 0.06\%$ of rdg. ± 4 dgt.
Remarks	Input resistance :Approx. 1 M (After executing a zero adjustment)	

Current

Accuracy for 6 months

Range	Resolution	Accuracy
A: 25 mA 0 to ± 25.000 mA	1 μ A	$\pm 0.03\%$ of rdg. ± 2 dgt.
Remarks	Input resistance: Approx. 25 M (Including approx. 15 for the fuse) (After executing a zero adjustment)	

Accuracy for 1 year

Range	Resolution	Accuracy
A: 25 mA 0 to ± 25.000 mA	1 μ A	$\pm 0.06\%$ of rdg. ± 4 dgt.
Remarks	Input resistance: Approx. 25 M (Including approx. 15 for the fuse) (After executing a zero adjustment)	

Temperature

Accuracy for 6 months

Range	Resolution	Accuracy
TEMP -25.0 to 80.0	0.1	± 0.5 (23 \pm 5) ± 1.0 (0 to 50) ± 2.0 (-25 to 80)
Remarks	Using 9184 RJ SENSOR	

Accuracy for 1 year

Range	Resolution	Accuracy
TEMP -25.0 to 80.0	0.1	± 1.0 (23 \pm 5) ± 2.0 (0 to 50) ± 4.0 (-25 to 80)
Remarks Using 9184 RJ SENSOR		

(Monitor)

Load current

Accuracy for 6 months

Range	Resolution	Accuracy
CV: 2.5 V 0 to ± 25.00 mA	10 μ A	$\pm 0.1\%$ of rdg. ± 2 dgt.
CV: 25 V 0 to ± 25.00 mA	10 μ A	$\pm 0.1\%$ of rdg. ± 2 dgt.

Accuracy for 1 year

Range	Resolution	Accuracy
CV: 2.5 V 0 to ± 25.00 mA	10 μ A	$\pm 0.2\%$ of rdg. ± 4 dgt.
CV: 25 V 0 to ± 25.00 mA	10 μ A	$\pm 0.2\%$ of rdg. ± 4 dgt.

Load voltage

Accuracy for 6 months

Range	Resolution	Accuracy
CC: 25 mA 0 to ± 25.00 V	10 mV	$\pm 0.1\%$ of rdg. ± 2 dgt.

Accuracy for 1 year

Range	Resolution	Accuracy
CC: 25 mA 0 to ± 25.00 V	10 mV	$\pm 0.2\%$ of rdg. ± 4 dgt.

Reference junction temperature

Accuracy for 6 months

Range	Resolution	Accuracy
TC: 0		± 0.0
TC: RJ -25.0 to 80	0.1	± 0.5 (23 ± 5) ± 1.0 (0 to 50) ± 2.0 (-25 to 80)
Remarks	0 reference Using 9184 RJ SENSOR	

Accuracy for 1 year

Range	Resolution	Accuracy
TC: 0		± 0.0
TC: RJ -25.0 to 80	0.1	± 1.0 (23 ± 5) ± 2.0 (0 to 50) ± 4.0 (-25 to 80)
Remarks 0 reference Using 9184 RJ SENSOR		

HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION
Manufacturer's Address: 81 Koizumi, Ueda, Nagano
386-11, Japan

Product Name: DC SIGNAL SOURCE
Model Number: 7011
Product Options: 9168 INPUT CORD
9170 TEST LEADS
9184 RJ SENSOR
9420 BATTERY PACK

The above mentioned product conforms to the following product specifications:

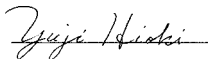
Safety: EN61010-1:1993+A2:1995
EMC: EN55011:1991 Group1 ClassB
IEC801-2:1991/EN50082-1:1992 $\pm 4\text{kV CD} \pm 8\text{kV AD}$
IEC801-3:1984/EN50082-1:1992 3V/m
IEC801-4:1988/EN50082-1:1992 $\pm 0.5\text{kV}$

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC, but is not applicable to the Low Voltage Directive 73/23/EEC.

HIOKI E.E. CORPORATION

1, December, 1996



Yuji Hioki
President

7011A999-00

