

**MULTI CIRCUIT (8 CHANNELS)
LEAKAGE CURRENT MONITOR**

MCM-8000

INSTRUCTION MANUAL

Thank you for your purchasing our model MCM-8000
Leakage Current Monitor..

Before use the instrument, read this instruction manual
thoroughly and operate it correctly.

Keep this instruction manual carefully to take out
whenever you need.

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• • • CAUTION FOR INSTRUCTION MANUAL • • •


- Read this instruction manual thoroughly and comprehend the contents completely before use the instrument.
- Keep this instruction manual carefully, as it would not be reissued.
- Cannot guarantee the safety for the use other than the original applications of this instrument and provided in this instruction manual.
- Obey to the instructions about the safety in this manual by all means.
- The contents of this manual subject to change without notice due to the development of specifications & functions of the instrument in future.
- There may be the differences between the display of the instrument mentioned in this instruction manual and the actual instrument.
- The drawings in this manual may have been omitted partially and or been abstracted.
- Although trying to make assurance doubly sure, please inform us through the dealers if you find any suspicious point, error and or omission in this instruction manual.
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- To use this instrument safely, read this "SAFETY SUMMARY" carefully and apply the instrument correctly.
- The CAUTIONs and WARNINGs which appear on the following pages are stated to prevent the operator & other people from the dangers and their properties from the damages beforehand.

 WARNING : This symbol indicates the contents "Possibilities of the death or the serious wound can be supposed" caused from mis-operations.

 CAUTION : This symbol indicates the contents "Possibilities of the injury or only the material damage can be supposed" caused from mis-operations.

○ OPERATION ENVIRONMENT

CAUTION

- Do not use or storage this instrument under the condition of direct rays of the sun, high temperature & humidity and or condensation, as it may cause the deformation and or the isolation defect of the instrument.
- Do not use this instrument in the environment influenced by acids, alkalis, organic solutions. corrosive gas, etc.
- Do not use or storage this instrument where the mechanical vibration can be directly transmitted, as it may cause defect of the instrument.
- Do not use this instrument nearby the appliances which generate strong magnetic field and or electric field, as it may cause mis-movement of the instrument.
- This instrument does not have the water / dust-proof structure. Do not use this instrument in the environment with a lot of dust and drops of water, as it may cause defect of the instrument.

○ OPERATION CONDITION & CONNECTION

WARNING

- Take notice that the measurement by wetted instrument and or wetted hands may cause the electrical shock accident. If the water gets into the inside of instrument, stop the operation immediately.
- In case of measurement for active lines, use protection tools such as rubber gloves, etc. for the safety and to avoid electrical shock.
- Before input the power, confirm that the voltage indicated on AC Adapter of this instrument conforms with the power supply voltage to be used.
- Do not apply the voltage except the indicated power supply voltage, as it may cause damage to the instrument and or the electrical accident.
- Do not insert foreign substances into the transmission connector and or the current input plug.

CONNECTIONS OF SENSOR CORDS AND OPERATION OF ACCESSORIES

DANGER

- Apply Clamp CTs only to the coated cables and do not clamp bare cables, as it may cause electrical shock.
- If excessive current is applied to CT, it will be heated. Use the CT according to the rating current, as it may cause electrical shock or fire hazard accident.
- Inspect the connection cable sensors (including power supply cable) every time before use (disconnection, contact defect, break of coating, etc.). If there is anything unusual after inspection, do not use it definitely.

CAUTION

- FOR SAFETY USE.
- Do not drop the instrument & CTs and or do not give the strong shock.
- Do not put heavy goods on the cables of instrument, CTs & accessories and do not modify those cables.
- If dropping CTs and or giving strong shock, the joint surface of CTs are damaged and it may cause wrong influences to the measurement.
- To avoid defect of CTs due to the break of cables, do not bend and or pull the cables at the base of CTs. Handle them very carefully.
- This instrument is for the use of low voltage circuit less than AC 500V. Before use, confirm the voltage of circuit to be measured.

CAUTION

- If inputting the voltage and current exceeding each measuring range, it may cause the defect to the instrument. Take care sufficiently.
- Do not apply the current more than 20A to the clamp CT, as it may cause the damage of CT.
- Use the specific AC adaptor attached as an accessory. In case of the use of not specified one, it may cause the damage to the instrument.

. . . **SOFTWARE UTILIZATION AGREEMENT** . . .
(Leakage Monitor Controller for Windows)

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1. GENERAL

The purpose of this instrument is to memorize successively the leakage current values for long time period and it can display each value at the real time as well as memorizing the average leakage current values between the intervals (max. 8 channels) and can transmit the memorized data to PC by RS-232C.

Also, it can set the observation value in the same way as protective relay and can memorize the generated & terminated year, date, time and max. current values incase of exceeding the observation value. At the same time, the alarm signal (non-voltage contact) is outputted when the value exceeds in any channel of 8 circuit.

The clamp type CTs are used as sensor which enable to measure safety and simply.

2. SUGGESTIONS BEFORE USE

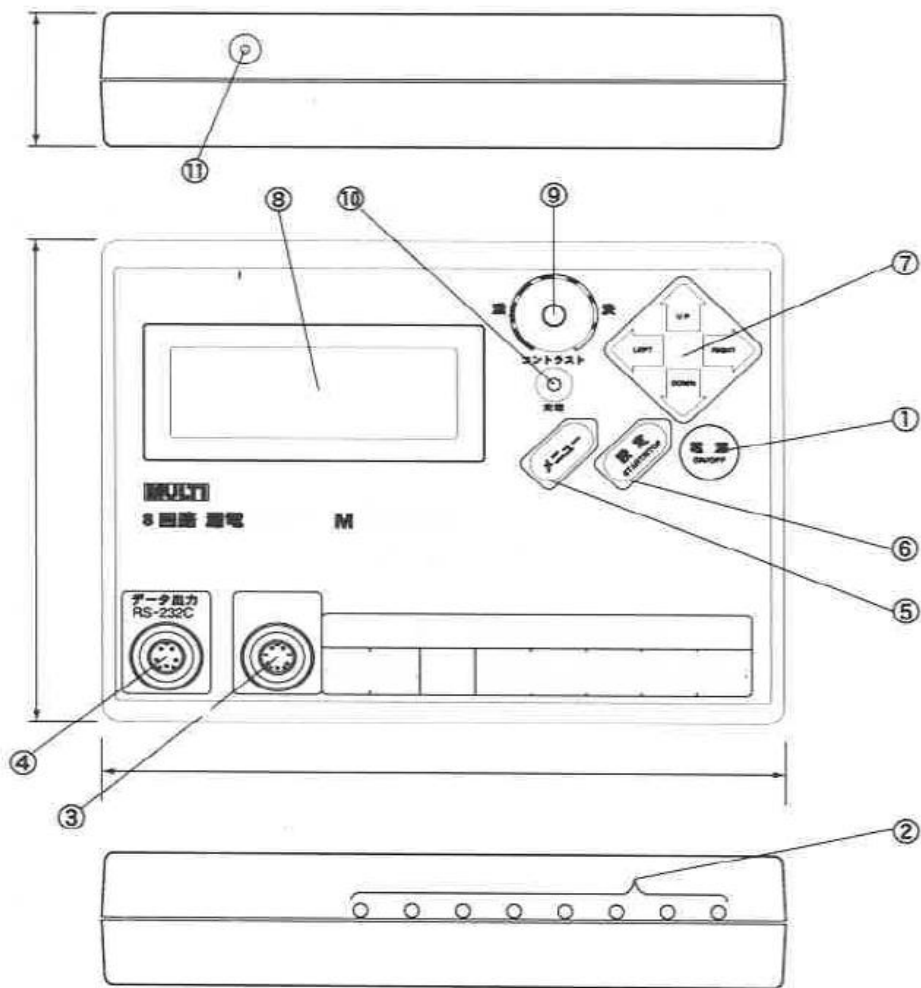
After opening the package, inspect the appearance of the instrument and check the accessories.

If you find any damage of appearance and or the lack of accessories, inform to the dealer you bought the instrument.

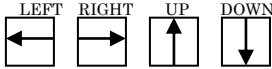
«ACCESSORIES»

- RS-232C Cable 1 pce.
- AC Adapter (MPRA-10) 1 pce.
- Software (Leakage Monitor Controller for Windows) 1 set
- Carrying Case 1 pce.
- Instruction Manual 1 pce.

3. NAME OF PART & EXPLANATION



- ① Power Switch (ON/OFF) : For power on or off. Not in case of logging mode, the power will get off automatically.
- ② Current Input Terminals : For current input. Connect clamp CTs. (options) Max. 8 channels.

- ③ Signal Output : Terminal for signal output to the relay in case of exceeding the observation values.
- ④ Data Output : Terminal for RS-232C transmission cable.
- ⑤ Menu Switch : Press this switch to get back initial display.
- ⑥ Input, Start & Stop Switch (START/STOP) : Switch to input the configured measurement conditions and values into the internal memory.
- ⑦  Key : To move the cursor on the display and or to set the values.
- ⑧ Display (LCD) : 4 lines x 20 letters for the display of configuration items for measurement condition and measured values.
- ⑨ Knob for Contrast (CONSTANT) : for adjustment of light & shade of the LCD. When the display value or letter can be hardly read, adjust lightness by turning this knob.
- ⑩ Charge Lamp (CHARGE) : At the time of charging the internal battery by charger, this lamp is lighting. The lamp becomes red during rapid charging and turns to green when trickle charging.
- ⑪ Jack for charger (AC ADP) : for the connection point with the battery charger.

4.. CAUTION FOR MEASUREMSNT

1) Caution for connection

WARNING

- To avoid the electric shock, apply the current detective sensors (CT) to the circuit after connected them to the instrument.
If applied CTs prior, the voltage may occur at the secondary side of CT, as it is open at this side.
- Do not apply CTs by wet hand, as it may cause electric shock..

2) Confirm the input range of leakage current. The measuring range is 0 – 2000mA.

5. OPERATION

5.1 PREPARATION BEFORE USE

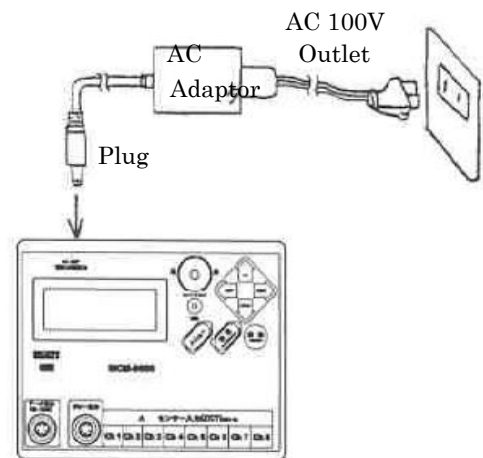
1) Install the belonging software (Leakage Monitor Controller for Windows ®) to PC.

- ① Move up Windows 95/98/2000/ME/XP
- ② Insert the belonging CD to the driver of PC.
- ③ Move up CD and enter “SET UP, EXE”.
- ④ Operate PC according to instructions of PC display. .
- ⑤ After installment completed the holder of Leakage Monitor Controller is composed on the program of start menu and the sign of Leakage Monitor Controller is registered.

2) Charge the battery of Leakage Monitor Controller

- ① As the right side drawing insert the plug of AC Adaptor to the jack of the instrument body (AC ADP).
- ② Connect AC adaptor to the outlet.
- ③ “CHARGE” lamp turns on a light red and rapid charging starts.
- ④ The charging will be completed approx. 4 hours and “CHARGE” lamp turn to green.

※ In case of long time measurement, use the instrument, use the instrument at full charged condition.



WARNING

- Do not input power to AC adaptor except the indication, as it may cause a fire.
- Do not touch the plug with wet hands or in the condition of water drops, as it may cause electrical shock.
- Do not use AC adaptor other than accessory, as it may cause damage of instrument and or electrical accident.

BATTERY PACK

※ This instrument has Ni-hydrate Battery Pack internally. Use this battery correctly following to the contents as below mentioned.

In case of not using the instrument for a long period:

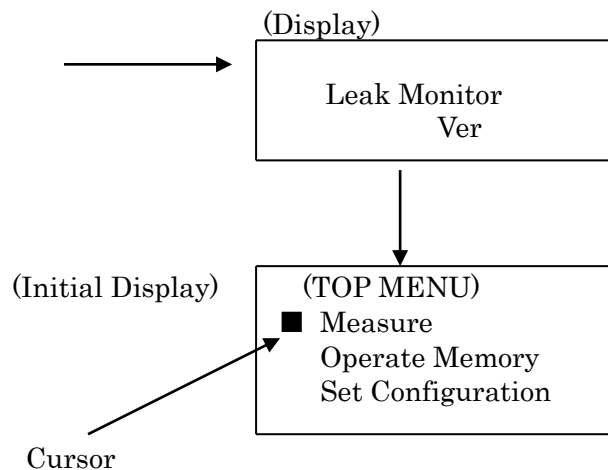
- Charge the battery once 6 months at least, as the charging may not be done sufficiently for the battery pack which has not been used for a long time.
- Keep the instrument at dry place.
- Even the fully charged battery pack consumes power by the self discharging if no use for a long time. Before use the instrument, charge the battery pack certainly.

※ about the battery life:

- In case that operation time is short even after the full charge of battery, the battery has run down.
Change the battery to the new one. For the change of battery, contact to the dealer you bought this instrument.

5.2 OPERATION PROCEDURE

1) Press "POWER" switch ① once



- 「P」 is lightening on the right upper side of display:
operation by the internal battery.
- 「B」 is lightening on the right upper side of display:
The voltage of internal battery is getting lower.

2) Setting of Measuring Conditions

- (1) From the initial display, press “DOWN” key ⑦ twice and set cursor “Set Configuration”.

(TOP MENU) Measure Operate Memory ■ Set Configuration
--

- (2) Press “START/STOP” switch ⑥ once.

Then, set cursor at the position to be configured
And press “START/STOP” switch ⑥

■ Cont. Level For Leak 1: 50mA 4: 50mA 2: 50mA 5: 50mA 3: 50mA 6: 50mA
--

(By pressing “DOWN” key ⑦, cursor moves to below).

7: 50mA 8: 50mA
<input type="checkbox"/> Leak End Level 50%
<input type="checkbox"/> Set Timer ON
<input type="checkbox"/> Interval 1 min

(By pressing “UP” key ⑦, cursor moves to up).

(By pressing “RIGHT” key, cursor moves to the end line).

<input type="checkbox"/> Start Time (Longing) 2003/09/26 00:00
<input type="checkbox"/> Stop Time (Longing) 2003/12/31 00:00

(By pressing “LEFT” key, cursor moves to the top line).

<input type="checkbox"/> RS232C (System) 8/NON/1/9600
<input type="checkbox"/> NOW Time (System) 2003/09/30 00:00

(3) Setting of Peak Current Value

■ 1: 50mA 5: 50mA
2: 50mA 6: 50mA
3: 50mA 7: 50mA
4: 50mA 8: 50mA

Set cursor to “Cont. Level For” and press “START/STOP” switch.

- by using “UP” or ”DOWN” key, chose the appropriate value and press “START/STOP” switch. (Numbers of 1~8 are complied with the input channels).

(Level For Leak) 1ch <u>0</u> 50mA

- By using “UP” & “DOWN” key s well as “RIGHT” key, press “START/STOP” switch to select each channel and them, set the value from 10~1999mA.
- By press of MENU key ⑤, the display returns to the measuring conditions.

(4) Setting of recovery ratio of leakage current

(Level End Level) <u>50</u> %

Set cursor to “Level End Level” and press “START/STOP” switch.

- By using “UP” & “DOWN” key, press “START/STOP” switch.
- Can set the ratio from 10% to 90% (with 10% interval).

(5) Setting for Timer

Set cursor to “SET TIMER” and press “START/STOP” switch to fix the start of logging time by Timer or not.

Set “OFF” or “ON” by “UP” & “DOWN” key and press “START/STOP” switch.

(The manual operation start is prior to the timer set).

(6) Setting for Interval

Set cursor to “Interval” and press “START/STOP” switch to fix the interval time for data acquisition on the logging mode.

■ 1 min	15 min
5 min	30 min
10 min	60 min

By using “UP”, “DOWN” or “LEFT” key, chose the interval time and press “START/STOP” switch.

(7) Setting for Start Time

Set cursor to “Start Time” and press “START/STOP” switch to fix the stating time of logging mode by timer.

By using “UP” or “DOWN” key, set the number from Yea and by using “RIGHT” key, move cursor to the side by turns.

After finished Minute entry, press “START/STOP” switch.

(8) Setting for Stop Timer

Set cursor to “Stop Timer” and press “START/STOP” switch to fix the stop time of logging mode by timer.

In the same manner as for start time, set the numbers from Year to Minute and then, press “START/STOP” switch.

(9) Setting for transmission of RS-232C

Set cursor "RS-232C" and press "START/STOP" switch to fix the transmission condition.

(char)	8 bit / 7 bit	Character Length Setting
(Pari)	ODO/EVEN/NON	Parity Setting
(Stop)	1 bit / 2 bit	Stop Bit Setting
(BPS)	48/96/192/384	Port Rate Setting

By using "LEFT" or "RIGHT" key, set from Character length and by using "DOWN" key, move cursor to below.

After completed each setting, press "START/STOP" switch.

These setting are for purpose of down-loading the logging data to PC and or of controlling the instrument by PC. These setting conditions must comply with the transmission conditions on system configuration of the belonging software.

(10) Setting for Now Time

Set cursor to "Now Time" and press "START/STOP" switch to fix the present time.

By using "UP" or "DOWN" key, set from Year and change to the side in turns by using "RIGHT" key. After completed Minute entry, press "START/STOP" switch by the time-signal.

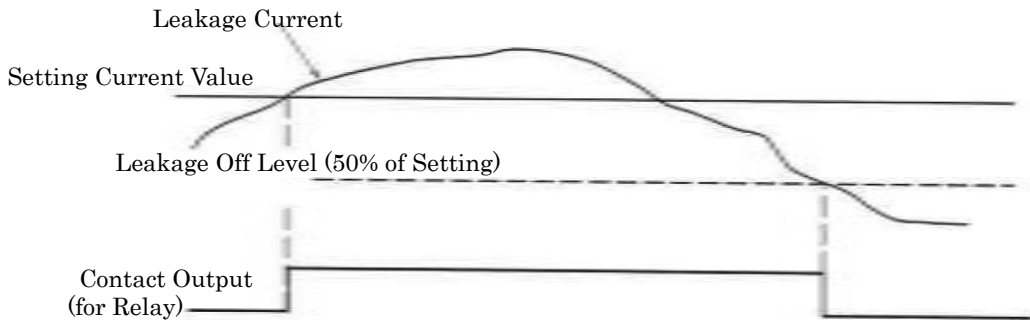
There might be a case that Minute cannot be renewed during setting, as the clock system of instrument watches real time clock data once 30 seconds.

(11) After completed all these settings, get back to the initial display.

By using "MENU" switch, "wait (Save)" will appear on the display and the setting conditions will be inputted to the memory.

When making Power OFF without pressing "START/STOP" key, the setting conditions will be released and will get back to the former conditions.

- Will count as one time, when the leakage current exceeds to the setting value and recovers under the recovery ratio.



3) MEASURENENT

(1) Measurement for Instant Value

- Set cursor to “Measure” on the initial display and press “START/STOP” switch.

Leak'03/10/01 10 : 46	← Display of present time.
Ch 1 2 3 4 5 6 7 8	
Now ○ ○ ○ ○ ○ ○ ○ ○	← 「○」 indicates the channel, of which leakage current exceeds the setting peak value on time.
Old	

By “UP” key, show the above display

By “DOWN” key, show the below display.

1: 0mA	5: 30mA	● Display for present leakage current value of each channel. In case of more than 2000mA, the display shows “Over”.
2: 60mA	6: Over	
3: 20mA	7: 45mA	
4: 0mA	8: 10mA	

By “UP” key, show the above display

By “DOWN” key, show the below display

Power Down	● Display for electricity failure
Start' - - / - - / - - - - : - -	
Stop' - - / - - / - - - - : - -	

CAUTION

- When lightening 「B」 mark on the right upper side of display, the initial battery is getting exhausted. Charge the battery by AC adaptor immediately. This instrument can be used during charging.

(2) Measurement by Logging Mode

① Manual Operation

If there is no unusual instant measuring value, will take measuring data into the memory with the configured interval.

- Press “START/STOP” switch once by the display of instant measuring value.

「R」 sign is lightening on the right & up side of display and the logging mode starts

```

Leak'03/10/01 10:46 R
Ch 1 2 3 4 5 6 7 8
Now  ○           ○ ○
Old ○ ○         ○ ○ ○
    
```

Display of present time

Show the exceeding channel by「○」presently

Show the exceeding channel by「○」presently
(The channel has the memory of leakage cunt)

By “UP” key, show the above display

By “DOWN” key, show the above display



```

1: 0mA      5: 30mA  R
2: 60mA     6: Over
3: 20mA     7: 45mA
4: 0mA      8: 10mA
    
```

- Display for present leakage current value of each channel. In case of more than 2000mA, the display shoes “Over”.

By “UP” key, show the above display

By “DOWN” key, show the above display



```

Power Down      R
Start' - - / - - / - - - - : - -
Stop'  - - / - - / - - - - : - -
    
```

- Display for electricity failure
(When the electricity failure does not happen presently)

By “UP” key, show the above display

By “DOWN” key, show the above display



```

Power Down      R
Start' 03 / 10 / 01 10:46
Stop'  - - / - - / - - - - : - -
    
```

- Display for electricity failure happened presently.

- To stop the logging mode, pres “START/STOP” switch once more.

「R」 sign will be off and the mode will be changed to the general.

CAUTION

- By pressing “START/STOP” switch in case that the memory blocks are fully occupied, 「Logging Memory Full !!」 or 「Leak Memory Full !!」 is shown on the display and the logging mode does not start. In this case, delete memory block and then, start the measurement again. As to deletion of memory block, refer to P19.
- When the initial battery is exhausting, the measurement may stop on the way. Use AC adaptor for logging mode measurement.

② Operation by Timer Booking

The logging mode can start at the appointed time by setting Timer Set.

- Connect AC adaptor to the instrument body.
- Set the display to "Set Configuration" and enter Start Time & Atop Time
- Then, make Set Timer On.
- Get the instant measurement display.
- Keep the power on by the instant measurement display.
- At the Start Time, 「R」 gets lightening and the logging mode starts.
- At the Stop Time, 「R」 gets of and the logging mode terminated.

※ Even during the manual or timer logging measurement, the display can show the logging memory, leak memory and power down memory by menu switch → Top Menu → Operate Memory → Disp. Block.

 CAUTION

- When setting Set Timer ON, the auto power off function does not work.
- When the initial battery is exhausting, the measurement may stop on the way. Use AC adaptor for logging mode measurement.
- Before setting Timer Booking, check the situation of memory block. In case that all memory blocks are occupied, the logging will not start.
- The manual operation is prior to Timer Booking.
- Pay attention for the setting of Stop Time by Timer Booking. For example, if you would get the measuring data during 12:00~18:00 with 5 minutes interval, set the Stop Time to 18:05. If you set to 18:00, you cannot get the data during 17:55~18:00. Set the time with one more interval.

4) Disposal of Memory (Input Data)

Dispose the data memorized by logging mode.

(1) Operation for Memory

(TOP MENU)
 Measure
 ■ Operate Memory
 Set Configuration

- Set cursor to 「Operate Memory」 on the initial display.



(Memory)
 ■ Disp Block
 Clear Block
 Clear All Memory

- Press “START/STOP” switch once.
- set cursor to 「Disp Block」 and press “START/STOP” switch once.



(Select)
 ■ Logging Memory
 Leak Memory
 Power Down Memory

Display of Select

① Set cursor to “Logging Memory” and press “START/STOP” switch

(Block)
 ■ 01) 03/09/26 17:59
 02) 03/10/01 15:26
 03) Empty Block

Start time of logging

Block not used

By “UP” key, show the above display
 By “DOWN” key, show the above display



■ 24) Empty Block

- To confirm the initial information of Logging Memory, set cursor to the number intended and press “START/STOP” switch

Block 01)
 Start' 03/09/26 17:59
 Intv : 5 min
 Size : 12

Start time of logging

Interval time

Numbers of logging data

- In case of setting cursor to Empty Block and pressing “START/STOP” switch:

```

Block 00)
Start' - - / - - / - - - - : - -
Intv : min
Size : 0
  
```

- ② Set cursor to “Leak Memory” and press “START/STOP” switch.

```

(Block)
■ 01) 03/09/26 17:59
   02) 03/10/01 15:26
   03) Empty Block
  
```

→ Start time of logging

→ Block not used

By “UP” key, show the above display
 By “DOWN” key, show the above display

↑ ↓

```

■ 04) Empty Block
   05) Empty Block
   06) Empty Block
  
```

- To confirm the interval information of Leak Memory, Set cursor to the number intended and press “START/STOP” switch. The numbers of count for each channel are displayed.

```

■ 1ch [0012] 5ch [0067]
   2ch [0000] 6ch [0002]
   3ch [0047] 7ch [0108]
   4ch [0003] 8ch [0009]
  
```

- The numbers of [] part show the count that the leakage current of each channel exceeds the setting value and recovers under the recovery ratio value. Use “UP”, “DOWN”, “LEFT” & “RIGHT” key to move the cursor.

- Set cursor to the channel, of which contents to be confirmed, and press “START/STOP” switch. The newest data will be displayed.

```

1ch [0012] Level 50mA
Start' 03/10/01 15:27
Stop'  03/10/01 15:31
Max           125mA
  
```

→ Display of the count numbers by channel and setting peak value

→ Year, Month, Date, Hour, Minute of exceeding

→ Year, Month, Date, Hour, Minute of recovery

→ Max. current value during Start - Stop

By “UP” key, display one older data
 By “LEFT” key, display the oldest data

↑ ←

1ch [0001] Level 50mA
Start' 03/09/30 10:12
Stop' 03/09/30 10:19
Max 62mA

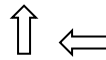
- The smaller number of each channel is the older data.
- By “DOWN” key, display one newer data.
- By “RIGHT” key, display one newest data

③ Set cursor to “Power Down Memory” and press “START/STOP” switch.

Power Down [0032]
Start' 03/10/01 15:45
Stop' 03/10/01 15:51

- Numbers of count for electricity failure
- Time of failure
- Time of recovery

By “UP” key, display one older data
 By “LEFT” key, display the oldest data



Power Down [0001]
Start' 03/09/30 17:59
Stop' 03/09/30 18:07

- The smaller number of each channel is the older data.
- By “DOWN” key, display one newer data.
- By “RIGHT” key, display one newest data

 CAUTION

- The logger numbers memorized into one block are for max. 113 days with 5 minutes interval. Set the logging according to this condition.
- The count numbers are max. 2040 for leakage current and max. 4096 for electricity failure. The instrument does not memorize the data exceeding the above counts.

(2) Deletion of Memory

(TOP MENU)
 Measure
 Operate Memory
 Set Configuration

- Set cursor to 「Operate Memory」 on the initial display.



(Memory)
 Disp Block
 Clear Block
 Clear All Memory

- Press “START/STOP” switch once.
- Set cursor to 「Clear Block」 and press “START/STOP” switch once.



(Select)
 Logging Memory
 Leak Memory
 Power Down Memory

Display of Select

① Set cursor to “Logging Memory” and press “START/STOP” switch

(Block)
 01) 03/09/26 17:59
 02) 03/10/01 15:26
 03) Empty Block

- Start time of logging
- Block not used

By “UP” key, show the above display
 By “DOWN” key, show the above display



24) Empty Block

- The information of memory block presently used is displayed.
- Set cursor to memory block intending to delete and press “START/STOP” switch once.



Block Clear?
 NO
 YES

- Set cursor to “YES” and press “START/STOP” switch.

(3) Deletion of All Memories

- Set cursor to 「Operate Memory」 on the initial display.
- Press “START/STOP” switch once.
- Set cursor to 「Clear All Memory」 and press “START/STOP” switch once.
- On the display, will show 「Clear All Memory?」. Set cursor to Yes and press “START/STOP” switch.
- All memories are deleted.

(TOP MENU)
Measure
■ Operate Memory
Set Configuration



(Memory)
Disp Block
Clear Block
■ Clear All Memory



Clear All Memory?
NO
■ YES

5) Taking the data into PC

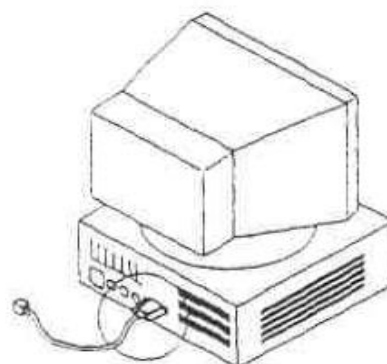
(1) Connect RS-232C cable (standard accessory) to PC

- The transmission cable has D-Sub 9 Pin connector.

Examples of Serial Port Mark

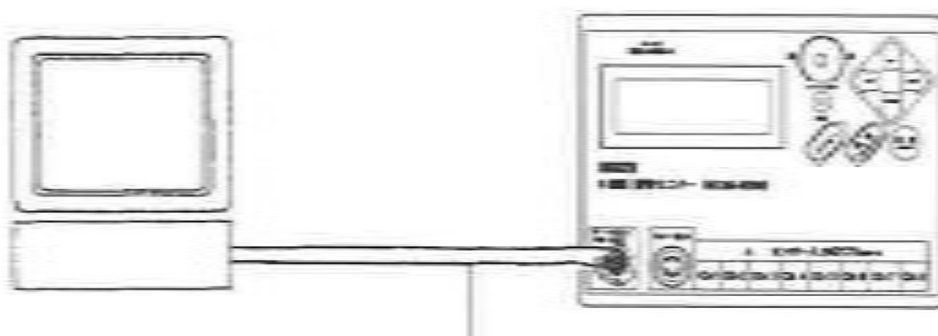


Connect the cable to the terminal with such marks.



- Pay attention. The transmission cannot be made if the cable is connected with other port, except for serial port.
- Insert the connector of transmission cable firmly to avoid contact failure.

(2) Connect PC with MCM-8000



Accessory transmission cable

- (3) Start up “Leak Monitor Controller for Windows” on PC.
- (4) Make Power On of MCM-8000.
- (5) Set the transmission condition of RS-232C.
- (6) Set the transmission condition of MCM-8000.) to be same !
- (7) Select “Down Load” (D) on File Menu. (F).
- (8) Select the data to be taken from the memory data table and click “Down Load” (D).
- (9) After data downloaded, the graph and data are displayed.
- (10) Storage the data if necessary.

6. SPECIFICATIONS

6. 1 MEASURING PART

- 1) Number of Measuring Circuit: 8 circuits (channels)
- 2) Detection Method : Clamp-on CT Method
- 3) Measuring Range : 0~2000mA (over 2000mA, display "OL")
- 4) Minimum Resolution : 1mA
- 5) Measuring Accuracy : $\pm 3\%rdg \pm 2dgt$ (by standard CTs)
- 6) AC Conversion Method : Average rectifier mode (RMS conversion)
- 7) Sampling : Approx. 20mS
- 8) Filter Function : Internally equipped filter for cutting high frequency
(Secondary low pass filter : 130 Hz)
- 9) Range of Setting Values : 10~1000mA (Initial setting : 50mA)
- 10) Recovery Range : 10~90% of the setting value (by 10% interval)
- 11) Real Time Accuracy : $\pm 200ppm \pm 10sec.$ (25°C)

6. 2 FUNCTION SPECIFICATIONS

[General Measuring Function]

The list for the instant values and alarm signal output of each channel is displayed.

Instant Value Display : Leakage Current of each channel

Alarm Signal Output : List of display

Electricity Failure Display : Power down measured value

[Logging Measuring Function]

The average leakage current value of each channel between the setting interval is displayed and memorized.

Measuring Interval : Selection from 1/5/10/15/30/60 minutes
(common for 8 channels)

Memory Contents : Measuring time, channel number, average leakage current
value between the measuring interval (each channel).

Memory Capacity : Average approx. 14 days with 5 minutes interval,
max. approx. 113 days

[Peak Value Measuring Function]

In case of exceeding the setting value during logging measurement, the time and year, month, date of leakage generation and recovery as well as the max. value are displayed and memorized.

Memory Contents : setting current value, numbers of count, year/month/date/time of exceeding the setting value and of recovery, the max. leakage current value and year/month/date/time of generation, Setting current value : 10mA~1000mA by 1mA resolution.

Memory Capacity : Average approx. 340 times, max. approx. 2040 times (each channel).

[Electricity Failure Measuring Function]

Year/month/date/time of electricity failure generation and recovery are memorized.

Electricity Failure Measurement : when the charge from AC adapter is stopped during logging measurement

Memory Contents : Approx. 4000 times (generation & recovery are as one data)

[Setting Mode]

Measuring Interval : Selection from 1/5/10/15/30/60 minutes (common for 8 channels)

Peak Setting Value : 10~1000mA by 1mA resolution (by each channel)

RS-232C : Character length, parity, stop bit, port rate.

Real Time Setting : Year, Month, Date, Hour, Minute

Timer Setting : Year, Month, Date, Hour, Minute of measuring start.
Year, Month, Date, Hour, Minute of measuring end.
Timer ON & OFF.

[Alarm Signal Output Function]

In case of exceeding the setting value, non-voltage relay contact will be "ON".

Number of Output Contact : 1 contact ("OR" signal of 8 channels)

Output Method : Non-voltage relay "a" contact

Output Contact Capacity : 30V/1A (AC.DC)

[Confirmation of Memory Contents]

Even during operation, can see the memorized data and electricity failure situation on the display from the memory contents.

[Warning Function]

- Over Indication : In case of exceeding 2000mA by each channel, the display is 「OVER」.
- Battery Active Indication : 「P」 sign is lightening on the right upper side of display.
- Low Battery Indication : 「B」 sign is lightening on the right upper side of display.
- Logging Operating Indication : 「R」 sign is lightening on the right upper side of display.

[Other Function]

- Auto Power Off Function : The power will be automatically 「OFF」 approx. 10 minutes after the final key operation. (No effective when AC adapter is connected, timer setting is “ON” and during logging operation).
- Adjustment of Contrast : Adjusting by the contrast knob.
- Battery Charging Display : At the time of rapid charge, red lamp lightening.
At the time of trickle charge, green lamp lightening.

6. 3 GENERAL SPECIFICATIONS

- Operation Place : Indoor, up to 2000m height
- Measuring Temperature : 0~50°C, less than 80%RH w/o condensing
- Storage Temperature : -10~60°C, less than 80%RH w/o condensing
- Measuring Circuit Voltage : less than AC500V (insulated conductor)
- Withstanding Voltage : AC1500V (50/60Hz) one minute between power Supply source and housing case
- Insulation Resistance : more than 100M Ω by DC500V insulation tester (between input terminal and housing case)
more than 50M Ω by DC500V insulation tester (between power supply source and housing case)
- Power Supply : AC100V~240V with adapter
Internal Ni-hydride Battery
- Current Consumption : Approx. 40mA
- Battery Life : Approx. 4 days at continuous use by full charge (depends on the times of charging & discharging).
- Dimensions & Weight : 190(W) x 140(H) x 42(D)mm, approx. 700gs (Instrument Body only)

Standard Accessories	: RS-232C Cable x 1 AC Adapter x 1 Software (Leakage Monitor Controller) x 1 Instruction Manual x 1 Carrying Case x 1
Optional Accessories	: CT Sensors with 5m ling lead wire ZCT-18SCM (Φ 18mm), ZCT-30SCM(Φ 30mm), ZCT-40SCM (Φ 40mm), ZCT-80SCM (Φ 80mm), ZCT-1100SCM(Φ 108mm), Carrying Case for CT Sensor

7. REPAIR SERVICE

When requesting for repair service, please bring the instrument directly to the dealer where you bought.

When mailing the instrument, always pack it in its original or equivalent packing materials to avoid any damage during the transportation and also put together with documents showing your name, address, phone number and defect point.

8. WARRANTY

This instrument is sent out from our factory after the sufficient internal inspections but if you find any defect due to the fault in our workmanship or the original parts, please contact the dealer where you bought the instrument.

The warranty period is 12 months from the date of purchase and the instrument shall be repaired at free of charge, provided that we judge the cause of defect is obviously resulted from our responsibility.