

**Digital Power Recorder**

**MPR-601W**

---

**Instruction**

**Manual**

Thank you for purchasing our model MRP-601W Digital Power Recorder.

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

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

**MULTI MEASURING INSTRUMENT CO.,LTD.**

Akihabara Murai Bldg. 7F, 1-26 Kanda Sakuma-cho,

Chiyoda-ku, Tokyo, 101-0025 Japan

TEL: 81-3-3251-7013 FAX: 81-3-3253-4278

URL: <http://www.multimic.com/>

E-mail: [multi@multimic.com](mailto:multi@multimic.com)

## APPENDIX

Thank you for purchasing MPR-601W Digital Power Recorder.  
Please read the appendix carefully along with the instruction manual.

●Regarding USB flash drive used on MRP-601W:

One 4GB USB Memory Stick is included as a standard accessory.  
Use this memory stick, as there might be possibility that the logging (measurement record) cannot be done by other USB memory.

USB flash drive made with flash memory, called semiconductor memory.

The semiconductor memory is deteriorated every time writing data; therefore, USB flash drive has a limit to the number of writing. The longevity of USB flash drive depends on manufactures, products, individual differences, and usage. Generally, its limit is approximately 2,000 to 10,000 times.

To extend the life of the USB, in MPR-601W, write to the USB memory together as a single batch of 50 pieces data logging. If using USB flash drive of a limit of 2,000 times memory, total 100,000 pieces (2,000×50) logging data can be stored.

If USB flash drive, which has been used for a long time is used on the logging mode, the logging might be suspended. To avoid unexpected suspension, use never-used USB flash drive for a long-time measurement on the logging mode.

## ▪ ▪ ▪ CAUTION FOR INSTRUCTION MANUAL ▪ ▪ ▪

● Carefully read this instruction manual and comprehend the contents completely before using 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.

● Follow the instructions about the safety in this manual by all means.

● The contents of this manual are subject to change without notice due to the development of specifications & functions of the instrument in the 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.

● It is prohibited to reprint and or to copy this instruction manual in all or partially without permission.

● Read carefully the guarantee regulations at the final page.

● "Microsoft<sup>®</sup>" & "Windows<sup>®</sup>" are the trade marks registered by Microsoft Corporation in U.S.A. and other countries.

The names of corporations & merchandise are their trade marks or the registered trade marks.

# Contents

Cautions for Instruction Manual	1
Table of Contents	2
Safety Summary	3
Cautions for the operation of POWER RECORDER	5
1. Introduction	6
2. Suggestions before use	6
3. Name of each part & function	7
4. Cautions for the measurement	9
5. Wire Connection	10
5.1 Measuring Circuit	10
6. Operation	
6.1 Preparation for use	13
1. Install MPR-601W Data Viewer	13
2. Place the Battery	13
3. Prepare USB memory	14
6.2 Operation Procedure	
1. Power Switch on	15
2. Setting for measuring conditions	16
3. Measurement	18
4. Management for memory(logging data)	21
5. Import Logging data to PC	23
7. Specifications	
7.1 Basic Specification	25
7.2 Function Specification	26
7.3 General Specification	28
7.4 Clamp CT Specification(CT-40PB)	28
7.5 Clamp CT Specification(CT-80PB), option	29
7.6 Composition of Measuring Range	30
7.7 Calculation Formulas	31
8. Repair Service	32
9. Warranty	32

## SAFETY SUMMARY

observe by all means

- 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 electrified, 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 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 the damage to the instrument and or the electrical accident.
- To avoid electrical shock and short-circuit accident, connect the voltage sensor cords with the lines to be measured after cut off the power supply of the lines.

○ CONNECTIONS FOR SECONDARY CIRCUIT & SENSOR CORDS AND OPERATION OF ACCESSORIES

△ DANGER

- Connect the input line of POWER RECORDER to the secondary circuit of breaker. Firstly, connect the clamp CTs and the voltage sensors to the instrument body and then, connect them to the active power lines.
- Be careful sufficiently, if the clip of voltage sensor removes and touches the line between two wires, it will cause short-circuit and or electrical shock accident.
- 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.
- Examine 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 examination, do not use it definitely.

△ CAUTION

- 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.

○ HOW TO USE

- When direct voltage input, must have clip to the active power terminals. Be carefully for short-circuit accident, in case of touch between 2 wires at the time of clipping.
- Do not apply the voltage to the current input terminals.  
The instrument will be damaged.
- The max. input rated voltage is AC500V. The excess input than the rated voltage will cause the damage of instrument and the human accident.
- 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.

△ CAUTION

- Be careful sufficiently. It may cause the damage of instrument in case of the over input of voltage & current than each measuring range.
- Do not apply the current to clamp CT more than 600A. It may cause the damage of CT.
- Use the exclusive AC adapter from the accessories. It may cause the damage of instrument, in case of the use of other adapters than designated.

## ○ CAUTION FOR OPERATING POWER RECORDER

The apparent power & power factor measured by this instrument are calculated by the operation expressions indicated in this manual and based on the measured voltage(V), current(I) and active power(P). It may cause the different display value from the instruments with different operation principle and or different operation expression.

The integral values of this instrument are calculated by the operation on the software from the measured values of power. It may cause the different integral values from the instrument with different response speed and or sampling rate, etc.

This instrument is designed exclusively for AC current and cannot measure the line of AC current mixed with DC.

This instrument has the function for the measurement of frequency but may be unable to do the correct measurement, in case that the input wave form is extremely distorted.

When using external transformers (PT,CT), it may cause big error in the measurement of power due to their phase differences. For the accurate measurement, use the PT&CT with phase difference, as small as possible.

When using PT&CT, use the magnification function and read the measurement value directly.

## 1. INTRODUCTION

This digital power recorder (Model: MPR-601W) can measure voltage, current, active power and power factor up to three phase/4 wires(3P4W), which are necessary for the electric power control and can storage the measured data into USB flash memory. The measured data on USB flash memory can be stored, processed and managed on your computer.

## 2. SUGGESTIONS BEFORE USE

After opening the package, check the appearance of the instrument and the accessories. If you find any damage of appearance and/or the lack of accessories, contact the dealer you bought from.

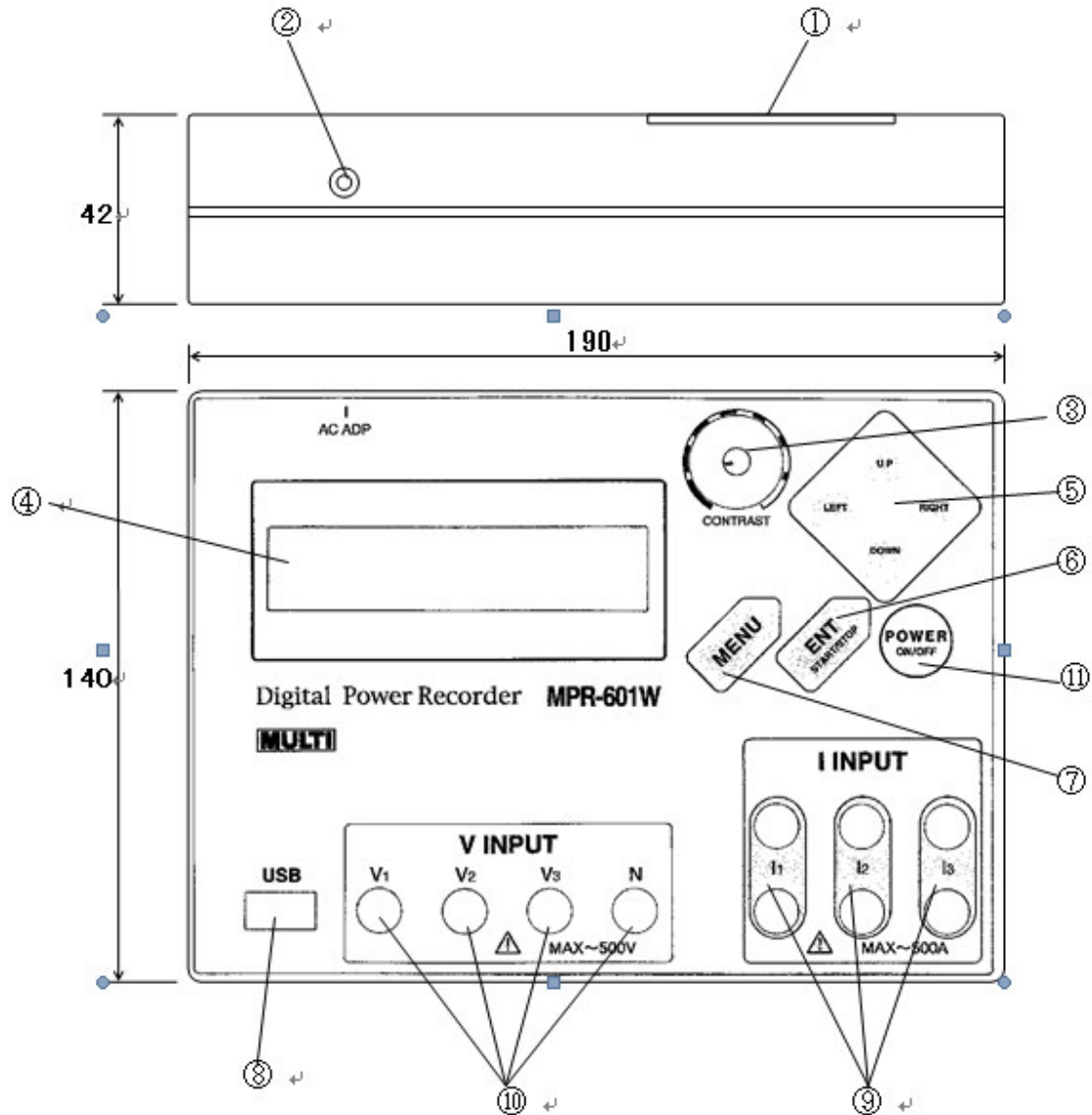
### [ACCESSORIES]

Voltage Clip Sensor (Red, White, Black, Green, 1 each)	1 set
Clamp-on CT (CT-40PB) (for R Phase, S Phase, and T Phase, 1 each)	1 set
AC Adapter (UIA312-0716)	1 pce.
CD-ROM(MPR-601W Data Viewer) *	1 pce.
Instruction Manual	1 pce.
Hand Carrying Case	1 pce.
USB Memory Stick (4GB formatted)	1 pce.

\* MPR-601W Data Viewer can comply with the following software:  
windows7 (32 Bit, 64Bit), windows8, windows8.1, windows10



### 3. NAME AND FUNCTION OF THE INSTRUMENT



- ① Battery Compartment: install four AA batteries in correct polarity
- ② AC Jack for ADP(Automatic Data Processing): to connect AC adaptor.
- ③ Contrast: for adjustment of light and shade of the LCD. When the display value or letter can be hardly read, adjust lightness by turning this knob.
- ④ Display: 2 lines x 20 letters for the display of configured items for measurement condition and measured values
- ⑤ LEFT, RIGHT, UP, and DOWN key: to move the cursor on the display and or to see the values
- ⑥ Input Start and Stop Switch: switch to input the configured measurement conditions and values into the internal memory
- ⑦ Menu key: press this key to go back to the initial display

- ⑧ USB Terminal: to insert USB flash memory (1GB or larger recommended). As USB flash memory is not build in this instrument, USB flash memory will be needed to store measured data at each interval when measuring by logging mode.
- ⑨ Current Input Terminals: for current input. Connect clamp CTs.
  - For single phase/2 wires, use I1 side.
  - For single phase/3 wires, use I1 and I3 side.
  - For 3 phase/3wires, use I1 and I3.
  - For 3 phase/4 wires, use I1, I2 and I3.
- ⑩ Voltage Input Terminals: for voltage input.

Connect red code to V1, white code to V2, black code to V3, and green code to N. For single phase/2 wires, connect V1 and N. For single phase/3 wires, connect V1, V3 and N. For 3 phase/4 wires, connect V1, V2, V3 and N.
- ⑪ Power Switch: for power on or off. Power will be turned off automatically 10 minutes after last operation. When AC adaptor inserted, timer-set set out to on, and logging, auto-power off won't

#### 4. CAUTION FOR MEASUREMENT

##### 1) Caution For Connection

#### △WARNING

- When connection voltage clip sensors to the hot-line (in case of direct voltage input), pay attention thoroughly to avoid electrical shock and or short-circuit accident.
- Do not apply the voltage to the current input terminal at all.

##### 2) Voltage Input Range

The available direct voltage input values are between 50V-500V.

For input of voltage more than 500V, use PT output voltage.

##### 3) Current Input Range

The available current input values by clamp CTs are between 0.1A-500A.

For input of current more than 500A, use CT output of measuring instrument.

##### Examples for Setting of PT Ratio

Measuring Circuit	Output Voltage of Using PT	PT Ratio of Using PT	PT Ratio Setting of MPR-601W
AC 50V-500V	No Use	-	1
AC 3300V	AC 110V	30:1	30
AC 6600V	AC 110V	60:1	60
AC 11000V	AC 110V	100:1	100
AC 22000V	AC 110V	200:1	200

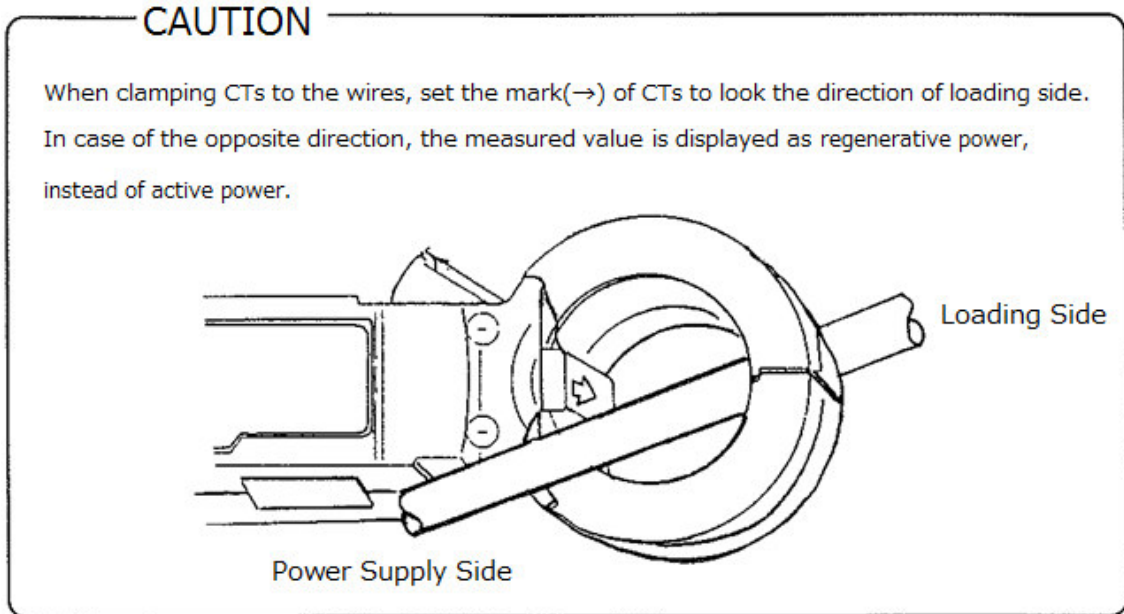
##### Examples for Setting of CT Ratio

Measuring Circuit	Output Voltage of Using CT	PT Ratio of Using CT	CT Ratio Setting of MPR-601W
AC 0.1A-500A	No Use	-	1
AC 100A	AC 5A	20:1	20
AC 300A	AC 5A	60:1	60
AC 500A	AC 5A	100:1	100
AC 1000A	AC 5A	200:1	200

When using CT-80PB(Optional), set the CT ratio of MPR-601W to 2.

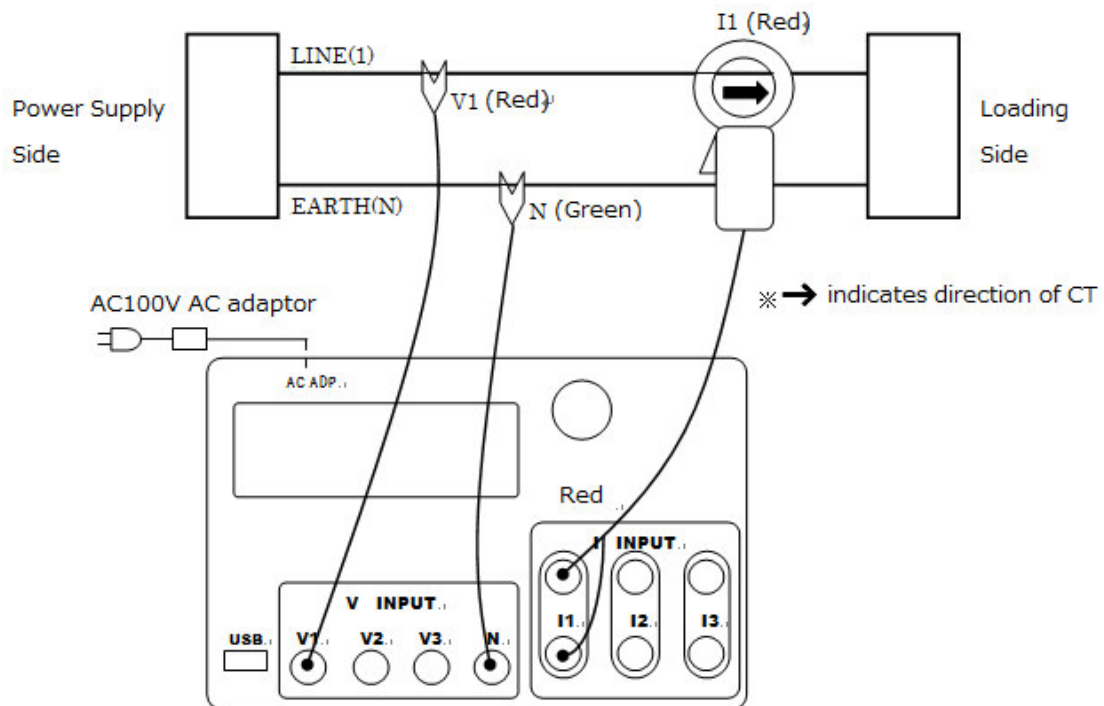
## 5. WIRE CONNECTION

This instrument can apply to the measurement of single phase/2 wires, single phase/3 wires, 3 phases/3 wires, and 3 phases/4 wires. For voltage input, apply the alligator clip part of voltage sensors.

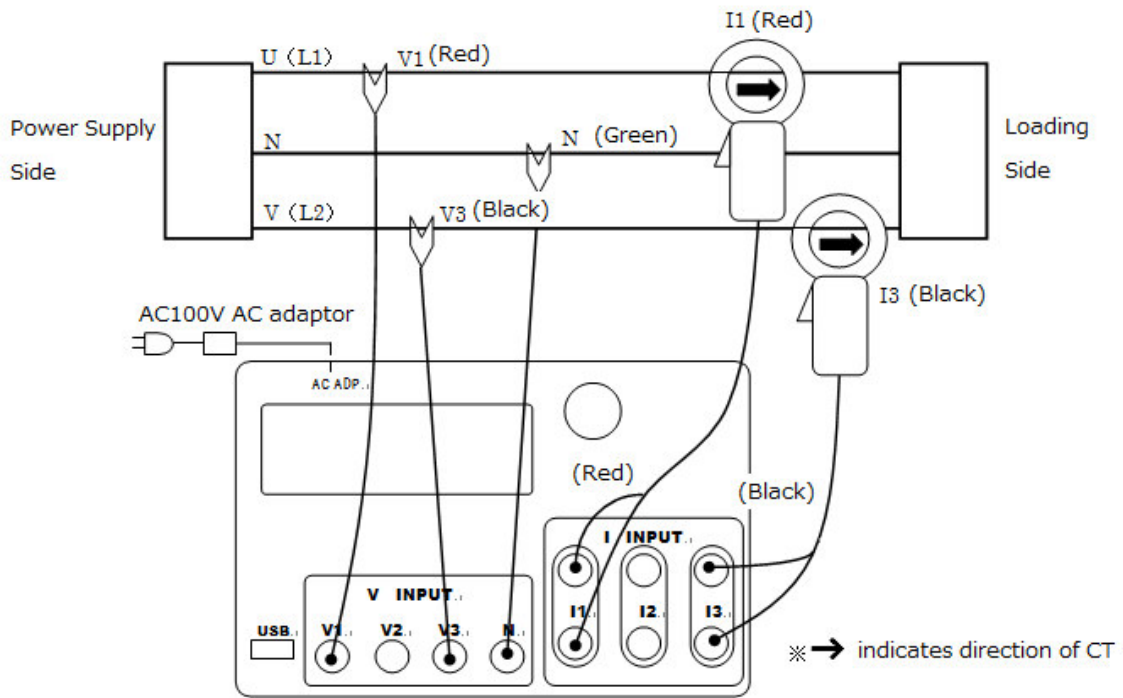


### 5.1 Measuring Circuit

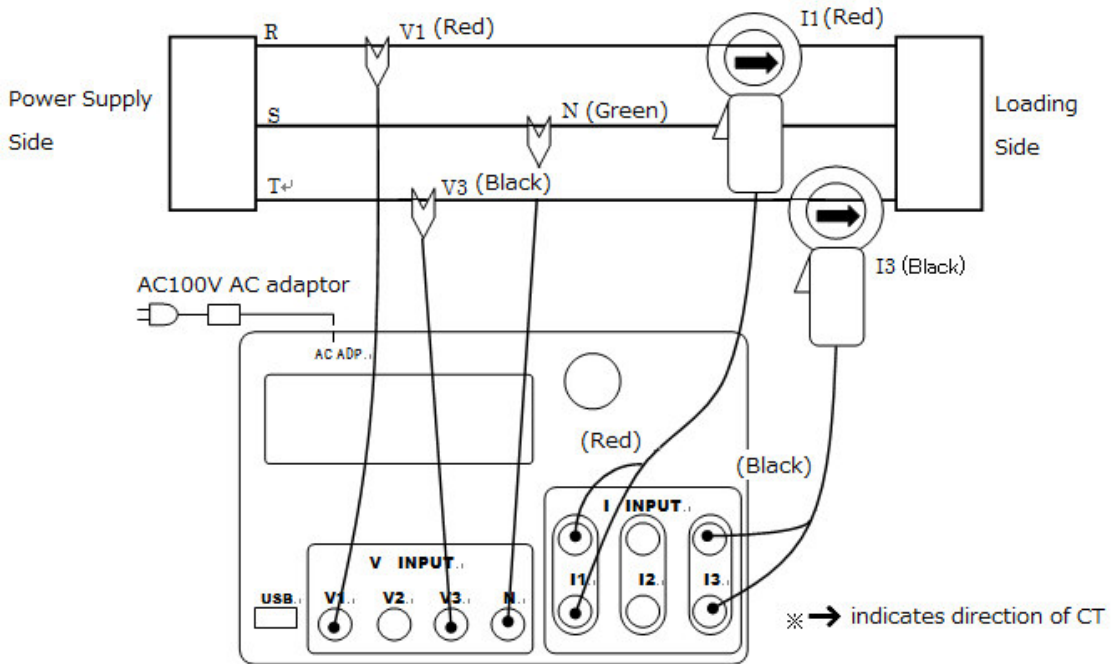
#### 1) Single Phase/2 Wires(1P2W)



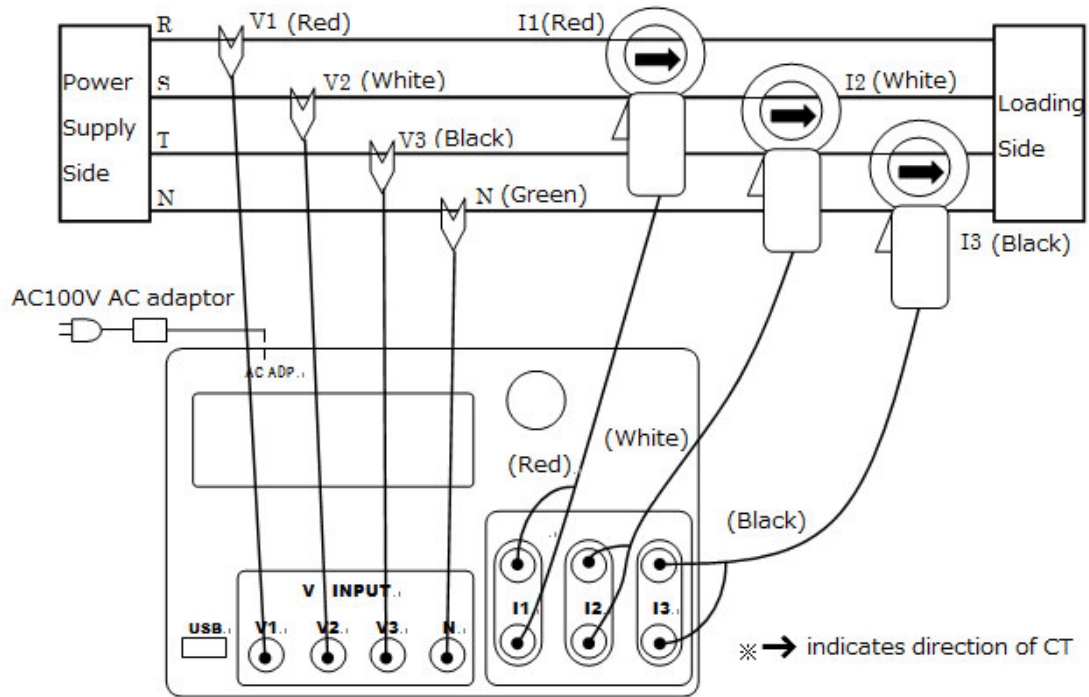
2) Single Phase/3 Wires(1P3W)



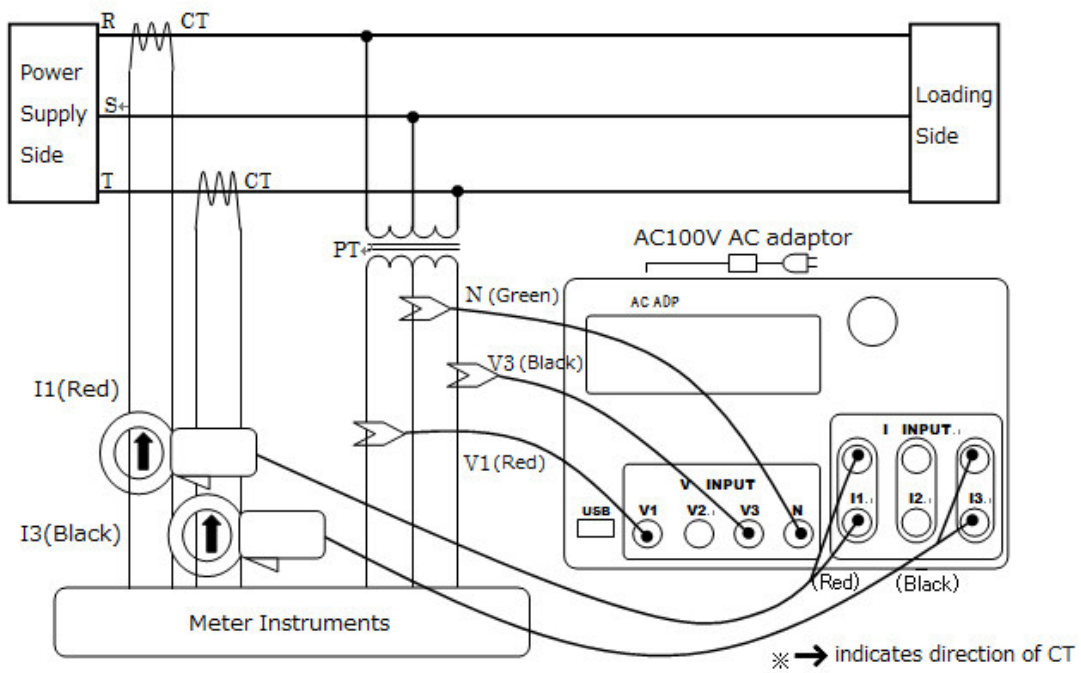
3) 3 Phases/3 Wires(3P3W)



4)3 Phases/4 Wires(3P4W)



5)Circuit using CT and PT



## 6. OPERATION

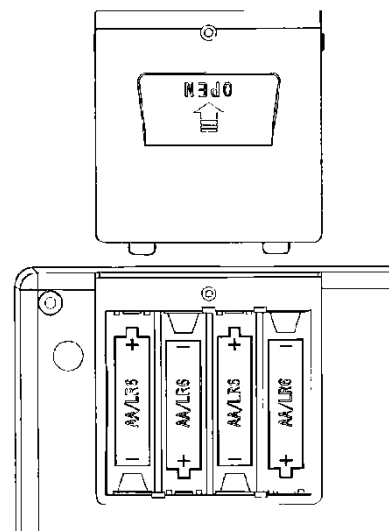
### 6.1 Preparation before use

#### 1) Install "MPR-601W Data Viewer" on your PC.

- 1.start Windows(Operating Systems : Windows XP SP2 or later, with USB port)
2. insert the CD-ROM to CD Drive.
3. execute "Setup.exe".
4. follow a direction displayed on the screen
5. when install finished, "MPR-601W Data Viewer" icon is created both on desktop and start menu program.

#### 2)Place the battery

1. unscrew and slide a battery cover to remove a battery cover(as shown at right)
2. place the battery observing correct polarity as indicated in the battery compartment. Use four LR-6(AAA) batteries.
3. install the battery cover and tighten the screws.



#### △WARNING

It may cause electric shock.

- ◆ Never replace the battery during a measurement.
- ◆ Be sure to set back the battery cover to original position. Never make measurement when left the battery cover opened.

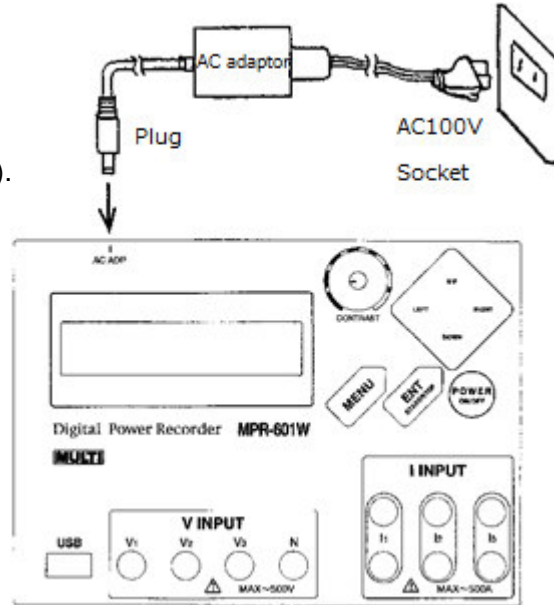
#### △CAUTION

It may cause malfunction.

- ◆ When the instrument will not be in use for a long period, place it in storage after removing the batteries.
- ◆ Do not mix old and new batteries.
- ◆ Do not use the battery not specified in the instruction.

3)use AC adaptor for long time use.

1. insert the plug of AC adaptor to the jack of the instrument body(AC ADP).
2. connect AC adaptor to the outlet(AC 100V).



Built-in battery is supplementary for unexpected power failure. Normally, use AC adaptor included in the package.

#### △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.

4)prepare USB memory

#### △CAUTION

- ◆ As flash memory is not built-in, USB memory(interface USB2.0/1.1) is needed when measuring data on the logging mode
- ◆ Use USB memory with the capacity more than 1GB and less than 4GB. Even if using USB memory with larger capacity, the number of logging time is maximum 99999 times per one block.
- ◆ Be sure to turn the power off before inserting or removing USB memory.
- ◆ Use USB memory which is only for general use. Do not use password-lock, virus-check, encryption software, etc.
- ◆ Do not store any other file than measured data in USB memory.
- ◆ When formatting USB memory on computer, select FAT as file system. (FAT12, FAT16, FAT32, NTFS or exFAT cannot be used).



## 6. 2 Operation Procedure

1) Press "POWER"⑪ switch once.

2) Set measurement condition

(1) Press "DOWN"⑤ key twice.

(2) Press "ENT"⑥ key once.

Move cursor to desired item and press "ENT"⑥ key.

Move cursor up and down to set to your desired item and press ENT key.

Move the cursor down by pressing "DOWN" key once.

Move the cursor up by pressing "UP" key once.

(Display)

Power Recorder
MPR-601W Ver. 1.00

Initial Display

(Top Menu)

■ Measure

↓ DOWN key

(Top Menu)

■ Operate Memory

↓ DOWN key

(Top Menu)

■ Set Configuration

↓ ENT key

■ Line(System) 1P2W

Range 10A

↓ DOWN key

■ PT 1

CT 1

↓ DOWN key

■ Set Timer OFF

Interval 1 min.

↓ DOWN key

■ Start Time(Logging)

2009/09/30 18:00

↓ DOWN key

■ Stop Time(Logging)

2009/10/06 9:30

↓ DOWN key

■ Now Time(System)

2009/09/30 17:26

(3)Set "Line"

Move cursor to "Line" and press "ENT" to set electrical circuit.

(See 6. Wire Connection for your reference)

Use "UP", "DOWN", "RIGHT", or "LEFT" key to move cursor and press "ENT" key.

```
(Line)  ■ 1P2W 3P3W
        ■ 1P3W 3P4W
```

(4)Set "Range"

Move cursor to "Range" and press "ENT" key to set current range.

Use "UP", "DOWN", "RIGHT", or "LEFT" key to move cursor and press "ENT".

```
(Range) ■ AUTO 10A
        50A 100A 500A
```

(5)Set "PT"

Move cursor to "PT" and press "ENT" key to set "PT" ratio.

The setting values are 4 figures and set the value by each figure. Use "UP" and "DOWN" key to set the value of first figure, and then use "RIGHT" and "LEFT" key to change the figure.

```
(PT)
                                     0001
```

(6)Set "CT"

Move cursor to "CT" and press "ENT" key to set "CT Ratio".

The setting values are 4 figures and set the value by each figure. Use "UP" and "DOWN" key to set the value of first figure, and then use "RIGHT" and "LEFT" key to change the figure.

```
(CT)
                                     0001
```

(7)Set "Timer"

Move cursor to "Set Timer" and press "ENT" key to set "Set Timer". Determine whether using timer or not in the logging mode.

Use "UP" or "DOWN" key to set "ON" or "OFF" and press "ENT" key.

```
(Set Timer)  ■ OFF
              ON
```

(8)Set "Interval"

Move cursor to "Interval" and press "ENT" key to set the interval time for importing data on the logging mode.

Use "UP", "DOWN", "RIGHT", or "LEFT" key to set the interval time.

Move cursor to desired interval time and press "ENT" key.

```
(Interval)  ■ 1 5 min.
            10 15 30 60min.
```

(9)Set "Start Time (Logging)"

Move cursor to "Start Time" and press "ENT" key. Determine whether using timer or not in the logging mode.

```
(Start)
                2009/10/01 00:00
```

By using "UP" or "DOWN" key, set the number from Year and by using ""RIGHT" key move cursor to the side by turns. After finishing Minute entry, press "ENT" key.

(10)Set "Stop Time(Logging)"

Move cursor to "Stop Time" and press "ENT" key.  
Determine whether using timer or not in the logging mode.

(Stop)
2009/10/01 00:00

Set from Year to Minute as same as setting start time and press "ENT" key.

(11)Set "Now Time(System)"

Move cursor to "Now Time" and press "ENT" key to set the present time.

(Now)
2009/10/01 00:00

In the same manner as for start time, set the numbers from Year to Minute and then, press "ENT" key.

Please note that Minute might not be updated at Now Time (System) as clock sees date of Real Time Clock Data once a 30 seconds.

After completing all settings, go back to "Top Menu".

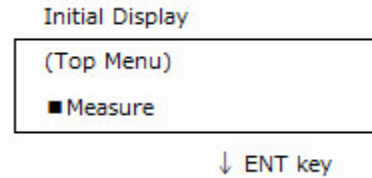
When pressing "MENU" key, the message, "wait !!(Save !!)" will be displayed and settings will be applied.

When the power is turned off without being pressed "MENU" key, the settings will not be applied and return to the previous setting.

### 3) Measurement

#### 1) Measurement for Instant Value

Set cursor to "Measure" on the initial display and press "ENT" key.

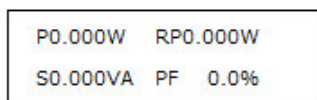


● Appeared display differs according to "LINE" setting conditions on Set Configuration.

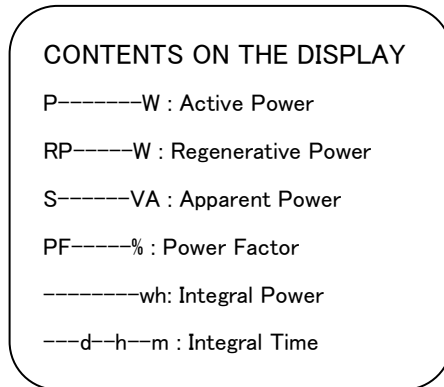
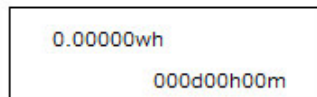
(Display of 1P2W)



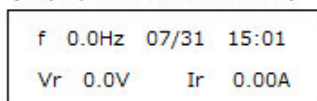
↓ DOWN key



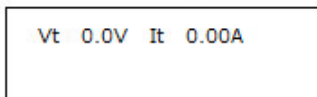
↓ DOWN key



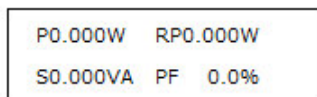
(Display of 1P3W and 3P3W)



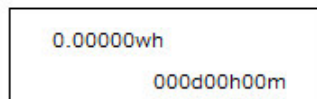
↓ DOWN key



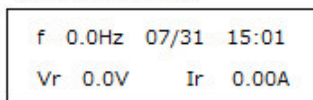
↓ DOWN key



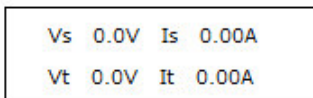
↓ DOWN key



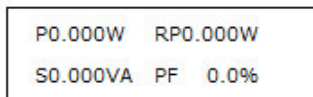
(Display of 3P4W)



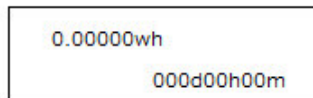
↓ DOWN key



↓ DOWN key



↓ DOWN key



● According to the setting conditions, connect the voltage sensors and CT clamps to the instrument body.

● Apply the sensors to the circuit to be measured. (See 6. Wire Connection for your reference.)

● As to the range of current, select most suitable range, referring to the display of instant value measurement.

In case of big changes of the loading current, recommend to select "AUTO" range.

△CAUTION

- Cannot display the current data only, as the displayed current value is synchronized with the voltage. Even in case of getting the current data only, arrange for the voltage input.
- In case of the appearance of –(minus) on the display of power(P), the application method of voltage or current sensors is wrong.
- In the case of the big difference of power factor beyond expectation, check again the setting of “Line” or wiring connection.
- When connecting sensors, read the cautions for connection carefully and do the operation in safety.
- When “B” sign lightening on the display, the internal battery is almost exhausted. Replace the batteries to new ones.

2) Measurement by Logging Mode

1. Manual Operation

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

- Set AC adaptor to instrument body and insert USB memory.
- Set to “Set Configuration” and set interval.
- Press “ENT(START/STOP)” key on instant value measurement.

“R” sign is lightening at the upper right of display and the logging mode starts.

At the time of of lightening “R”, the addition Integration of power start. The integration is done by one minute.

Power Integral →  
Time passed since the start →

```
f 0.0Hz 07/31 15:01
Vr 0.0V Ir 0.00A
```

↓ DOWN key

```
P0.000W RP0.000W
S0.000VA PF 0.0%
```

↓ DOWN key

```
R0.00000wh R
000d00h00m
```

R” sign on the upper right will be

c

△CAUTION

- By pressing “ENT(START/STOP)” key in case that the memory blocks (0-9) are fully occupied, a message, “Memory Over!!(Clear Block)” is shown on the display and logging mode does not start. In this case, delete the memory block and then, start the measurement again.
- When the battery is exhausted, the measurement may stop on the way. Use AC adaptor for logging mode measurement.

2)Operation with Timer

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

- Connect AC adaptor and insert USB memory to the instrument body.
- Set the display to “Set Configuration” and enter “Start Time” and “Stop Time”.
- Set “Set Timer” to “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 off and the logging mode terminated.

△CAUTION

- When setting “Set Timer” on, the auto power off function does not work.
- When the internal battery is exhausted, the measurement may stop in the middle. Use AC adaptor for logging mode measurement.
- Before setting “Timer “, check the status of memory block. In case that all memory blocks are occupied, the logging will not start.
- The manual operation is prior to “Timer”.
- When setting the timer, please note the stop time settings. For example, if you would get the measuring data during 12:00-18:00 with 5 minutes interval, set the “Stop Time” to 18:01. If you set it to 18:00, you cannot get the data during 17:55-18:00.

### 3)Memory Management(Import Data)

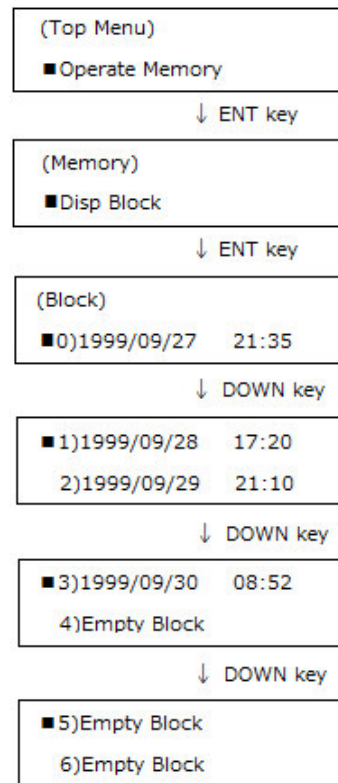
Manage the data imported to USB memory in the following manner.

#### (1)Operation for memory

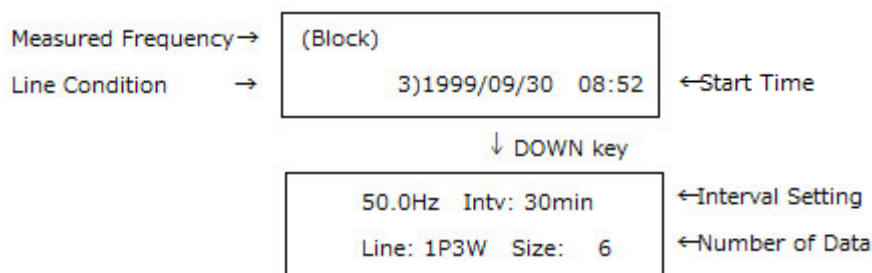
●Set cursor to “Operate Memory” on the initial display and press ”ENT” key once.

●Set cursor to “Disp Block” and press “ENT” key once.

●The information about the memory blocks currently occupied is shown on the display. Memory blocks are divided into 10 and the block not in use is shown as “Empty Block”.



●To get the internal information of one memory block, set cursor to the memory block position to be shown and press “ENT” key.



●To go back to the initial display, press “MENU” key twice or three times.

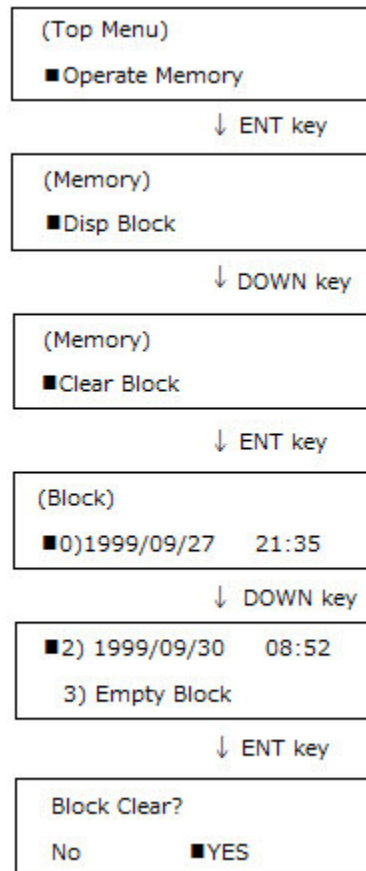
#### △CAUTION

●The logger numbers memorized into one block are 99999 pcs. at the most. In case of the logging with 15 minutes interval, data of approximately 1041 days can be memorized

●In case of the wrong termination during logging mode (ex. The power turned off or the internal battery is exhausted), “Error” message will be shown at Size on Block display. The data will be broken consequently.

## 2) Deletion of Memory

- Set cursor to "Operate Memory" on the initial display.
  - Press "ENT" key once.
  - Set cursor to "Clear Block" and press "ENT" key once.
  - The information about the memory blocks presently occupied is shown on the display.
  - Set cursor to the block to be deleted and press "ENT" key once.
  - Set cursor to "YES" and press "ENT" key.



(For example, when deleted Block 1)

Block 0 remained the same

Block 1 deleted

Block 2 moved to Block 1

Block 3 moved to Block 2

Block 3 becomes Empty



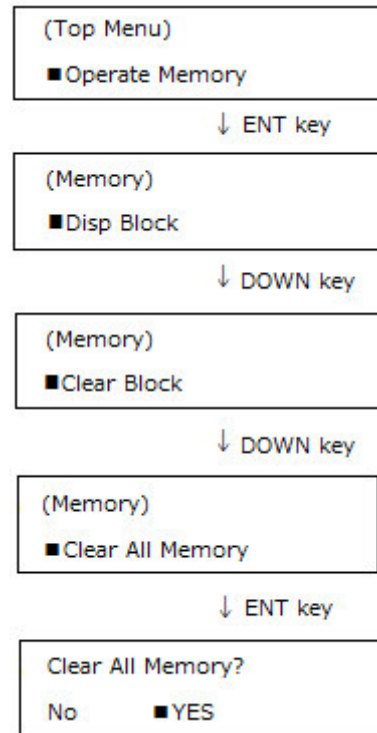
### 3) Deletion of All Memories

● Set cursor to “Operate Memory” on the initial display and press “ENT” key.

● Set cursor to “Clear All Memory?” and press “ENT” key once.

● On the display, will show “Clear All Memory?”. Set cursor to “Yes” and press “ENT” key.

● All memories are deleted.



### 4) Import data to MPR-601W Data Viewer

(1) Insert USB memory into USB terminal.

You may need to install the driver when inserting USB flash drive into your PC.  
If so, please refer to the instructions of the USB flash drive.

(2) Start up MPR-601W Data Viewer.

(3) Choose “Open”(D) from “File”(F) Menu

(4) Choose the data you want to import from memory data and press “Download”.

(5) Imported data, graph display, and data list will be displayed.

(6) Save data “Save as” as if needed. The data is stored as CSV format. The number behind “E”

## ●Function of MPR-601W Data Viewer

### 1)Graph Display

- By checking checkbox of graph display, only the selected items of measured data will be displayed.
- The menu appears when you right-click the Y axis at various vertical tick charts, you can change the Y axis scale, etc.
  
- The menu appears when you right-click on the time axis at the horizontal axis tick charts and you can change the time axis scale.
- The total measurement time scale is displayed when you double left click on the time axis graph area.
- Time axis scale will be expanded when you right-click on the graph area and drag it to the right side.
- Time axis scale will be reduced when you right-click on the graph area and drag it to the left side.
- Display area will be moved when you left-click on the graph area and drag it along with the Time axis.

### 2)Numerical Data List

- Graph moves to the position relative to the time where you double left-click on any data in the numerical data list.
- The width of each item when printing numerical data is proportional to the width of the data grid.
- When printing numerical data, the item will not be printed if you minimize the width of the data.
- All data will be optimized when double clicking the border of the width of the data grid.(Windows Standard Specification)
- The number behind “e” in the data indicates ten’s power.

$$\text{e.g.) } 516.8\text{e-}2 = 516.8 \times 10^{-2} = 5.168$$

$$121.2\text{e+}1 = 121.2 \times 10^1 = 1212$$

### 3)Print measured data

- Select Print numerical data or Print graph from File(F) menu on the menu bar.
- On the Print numerical data, contents of numerical data list window will be printed.
- On the Print graph, contents of graph display window will be printed. The graph to be printed is the graph displayed presently.

## 7. SPECIFICATIONS

### 7.1 Basic Specifications

1)Conditions of Accuracy:	Sine Wave Input Power Factor = 100% Temp. & Hum. 23°C±3°C Less than 80%RH
2)Measurement Lines:	Basic Frequency 45-65 Hz Single-Phase/2 wires, Single-Phase/3 wires, Three-Phase/3 wires, Three-Phase/4 wires
3)Measurement Items:	Voltage, Current, Apparent Power, Active Power, Regeative Power, Power Integral, Time Inegra, Power Factor, Frequency
4)Input Method:	Voltage/direct input by clip sensor Current/input by CT clamp
5)Display:	LCD, 20 letters/characters × 2 lines
Display Range:	0.5%-100%(Zero suppress less than 0.5%)
Effective Measuring Range:	10%-100% of the range
Display Renewal Rate:	Approx. two times/second
6)Each Measurement Article:	
[Voltage & Current Measurement]	Voltage 0-500.0V(one range) Current 10.00A/50.00A/100.0A/600.0A/Auto Range
AC/DC Conversion Method:	True RMS value
Measuring Accuracy:	Voltage ±0.5rdg±0.3F.S Current ±0.5rdg±0.3F.S + Clamp Accuracy
Crest Factor:	Voltage less than 2(at input voltage less than AC400.0V) Current less than 2(at full scale input)
[Active Power Measurement]	
Measurement Range:	according to voltage × current.(refer to drawing 1)
Measuring Accuracy:	±0.5%reg±0.5%F.S. + clamp accuracy(Power Factor = 1)
[Apparent Power Measurement]	
Measuring Range:	according to voltage × current.(refer to drawing 1)
Measuring Accuracy:	±5%rdg from the calculation of each measurement value
[Power Integral Measurement]	
Measuring Range:	0.00000wh-999.999Twh

Integral Accuracy: active power accuracy  $\pm 2\text{dgt}$   
Timer Accuracy:  $\pm 200\text{ppm} \pm 10 \text{ seconds}(25^\circ\text{C})$   
Measurement addition of active power(with 1 minute interval)  
Display: Integral time from the start

[Power Factor Measurement]

Measuring Range: 100%-0%  
Accuracy:  $\pm 2\% \text{rdg}$  to true value + clamp accuracy  
Polarity Display: -(minus) power factor

[Frequency Measurement]

Measuring Range: 45Hz-65Hz  
Possible Input 10%-100% of the range  
Range:

Measuring Source: Voltage V1 phase  
Accuracy:  $\pm 0.5\% \text{rdg} \pm 1\text{dgt}$   
7)Measuring Digital Sampling Method  
Method;

8)Real Time  $\pm 200\text{ppm} \pm 10 \text{ seconds}(25^\circ\text{C})$   
Accuracy;

## 7.2 Basic Specification

[General Measuring Mode]

Instant Value Voltage, Current, Active Power , Apparent Power, Power Factor,  
Display: Frequency  
Relative Setting contents of setting mode  
Contents:

[Integration Measuring Mode]

Integration Display: Power Integral with 1 minute interval  
Time passed from the start(logging start)  
Integration Start Time Indication/Manual  
Method: \*Indication Year. Month. Day. Hour. Minute

[Logging Measuring Mode]

Measuring Interval: selection from 1/5/10/15/30/60 minutes  
Memory Contents: Measuring Time, Measuring Condition, Average Voltage, Current,  
Active Power, Apparent Power, Power Factor &Power Integral  
during measuring interval  
Start Time: Year, Month, Data, Hour, Minute  
Stop Time: Year, Month, Data, Hour, Minute

[Setting Mode]

Line Setting: selection from 1P2W/1P3W/3P3W/3P4W

Current Range selection from 10/50/100/500/AUTO

Setting:

PT Ratio Setting: 1-9999

CT Ratio Setting: 1-9999

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

[USB Memory Function]

Confirmation of Memory Status: Display of Start Time by Year, Month, Day, Hour & Minute(0-9 Block)

Confirmation of Memory Contents: Measuring Frequency, Interval Setting, Wiring Condition, Numbers of Data

Memory Capacity: At most 99999 pcs. per block. Approx. 1 year with 30 minutes interval

[Alarm Function]

“Over” Display: As to Voltage, when exceeding 106% of the range, will show “OVER”. As to Current, when exceeding 160% of the range, will show “OVER”.

Low Battery Display: Lightening “B” sign on the upper right of display

Display:

Logging Display: Lightening “R” sign on the upper right of display

USB memory not inserted: When trying to USB memory, will display “!!!Error USB!!!”, “USB Write failed”, “USB access failed”

USB memory fully occupied: When Memory Block of 0-9 are used, will display “Memory Over!!”(Clear Block)

[Other Function]

Auto Power Off Function: After final key operation, automatically power off in 10 minutes. When using AC adaptor and/or Timer set is ON, this function does not work.

Adjustment of Contrast: Adjusting by the contrast knob

### 7.3 General Specifications

Operation Place:	indoor, up to 2000m height
Operation Temp. & Hum.:	0°C-40°C, less than 80%RH(non-condensing)
Storage Temp. & Hum.:	-10°C-60°C, less than 80%RH(non-condensing)
Input Method:	Voltage/isolated input by phase transformer    Current/isolated input by CT clamp
Input Impedance:	Voltage/Approx. 1MΩ Current/Approx. 0.8Ω
Withstanding Voltage:	AC 3700V/1 minute between the voltage terminal and case AC 1500V/1 minute between power supply source and outer case
Insulation Resistance:	DC 500V/100MΩ or more between the voltage terminal and outer case DC 500V/50MΩ or more between power supply source and outer case
Power Supply Source:	①AC adaptor ②AAalkali battery LR-6×4
Current Consumption:	depending on USB memory (instrument body approx.. 70mA, without USB memory)
Battery Life:	depending on USB memory (instrument body approx. 8 hours, without USB memory)
Dimension:	190(W)×140(H)×42(D)mm
Weight:	approx. 460gs. (instrument body only, battery not included)
Accessories:	Voltage Sensor (Red, White, Black) for 1 pce. Each Clamp CT (CT-40PB) × 3 (with fuse) AC adaptor × 1 MPR-601W Data Viewer (CD) × 1 Hand Carry Case × 1 Instruction Manual × 1
Option:	CT Sensor for Big Current (CT-80PB) × 1

### 7.4 Clamp CT (CT-40PB) Specification

Operation Place:	indoor, up to 2000mA
Rated Primary Current:	up to AC 600A
Rated Secondary Current:	up to AC 300mA

Accuracy Condition:	23°C±3°C, 45Hz-65Hz
Secondary Current	±1.0%rdg±0.3%F.S.
Amplitude	
Accuracy:	
Secondary Current	within ±2°C
Phase Accuracy:	
Effect from	within 0.5%
Conductor Position:	
Max. Operation	AC 500Vrms. (isolated conductor)
Circuit:	
Max. Allowable	AC 800A (10 minutes)
Input:	
Withstanding	AC 3700V, 1 minute (between CT core and outer case)
Voltage:	
Max. Diameter of	φ40mm
Measuring	
Conductor:	
Length of Cord:	approx. 2.5m
Dimension:	70(W) × 180(H) × 30(D)mm
Weight:	approx.. 160gs.

#### 7.5 Clamp CT (CT-80PB) Specification

Operation Place:	indoor, up to 2000mA
Rated Primary	up to AC 1200A
Current:	
Rated Secondary	up to AC 600mA
Current:	
Accuracy Condition:	23°C±3°C, 45Hz-65Hz
Secondary Current	±1.5%rdg±0.3%F.S.
Amplitude	
Accuracy:	
Secondary Current	within ±3°C
Phase Accuracy:	
Effect from	within 0.5%
Conductor Position:	
Max. Operation	AC 500Vrms. (isolated conductor)
Circuit:	

Max. Allowable AC 1500A (10 minutes)  
 Input:  
 Withstanding AC 2000V, 1 minute (between CT core and outer case)  
 Voltage:  
 Max. Diameter of  $\phi$ 74mm  
 Measuring  
 Conductor:  
 Length of Cord: approx. 2.5m  
 Dimension: 138(W)  $\times$  225(H)  $\times$  34(D)mm  
 Weight: approx.. 480gs

### 7.6 Composition Table of Measuring Range

- Range composition of voltage, current and power (active, apparent) are as followings:

Range Composition Table

Voltage	Measuring Mode	Current			
		10.00A	50.00A	100.0A	500.0A
300V	Single Phase/2 wires (1P2W)	3.000kw	15.00kw	30.00kw	150.0kw
	Single Phase/3 wires (1P3W)	6.000kw	30.00kw	60.00kw	300.0kw
	Three Phase/3 wires (3P3W)	6.000kw	30.00kw	60.00kw	300.0kw
	Three Phase/4 wires (3P4W)	9.000kw	45.00kw	90.00kw	450.00kw



### 7.7 Calculation Formula

	Apparent Power (VA)	Active Power (W)	Reactive Power (var)	Power Factor (PF)
1P/2W	$VA = V \times A$	$W$	$\sqrt{(VA)^2 - W^2}$	$\frac{W}{VA}$
1P/3W	$VA_i = V_i \times A_i$ $i = 1, 3$ $\Sigma VA$ $= VA_1 + VA_3$	$W_i$ $i = 1, 3$ $\Sigma W$ $= W_1 + W_3$	$var_i$ $= \sqrt{(VA_i)^2 - W_i^2}$ $i = 1, 3$ $\Sigma var$ $= var_1 + var_3$	$PF_i$ $= \frac{W_i}{VA_i}$ $i = 1, 3$ $\Sigma PF$ $= \frac{\Sigma W}{\Sigma VA}$
3P/3W	$VA_i = V_i \times A_i$ $i = 1, 3$ $\Sigma VA$ $= \frac{\sqrt{3}}{2} (VA_1 + VA_3)$	$W_i$ $i = 1, 3$ $\Sigma W$ $= W_1 + W_3$	$var_i$ $= \sqrt{(VA_i)^2 - W_i^2}$ $i = 1, 3$ $\Sigma var$ $= var_1 + var_3$	$PF_i$ $= \frac{W_i}{VA_i}$ $i = 1, 3$ $\Sigma PF$ $= \frac{\Sigma W}{\Sigma VA}$
3P/4W	$VA_i = V_i \times A_i$ $i = 1, 2, 3$ $\Sigma VA$ $= VA_1 + VA_2 + VA_3$	$W_i$ $i = 1, 2, 3$ $\Sigma W$ $= W_1 + W_2 + W_3$	$var_i$ $= \sqrt{(VA_i)^2 - W_i^2}$ $i = 1, 2, 3$ $\Sigma var$ $= var_1 + var_2 + var_3$	$PF_i$ $= \frac{W_i}{VA_i}$ $i = 1, 2, 3$ $\Sigma PF$ $= \frac{\Sigma W}{\Sigma VA}$

## 8. 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.

## 9. 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 instrument shall be repaired at free of charge, provided that we judge the cause of defect is obviously resulted from our responsibility.