PQ3198
POWER QUALITY ANALYZER
Measurement Guide

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PQ3198A981-01

EN

600536921

Thank you for purchasing the Hioki PQ3198 Power Quality Analyzer.

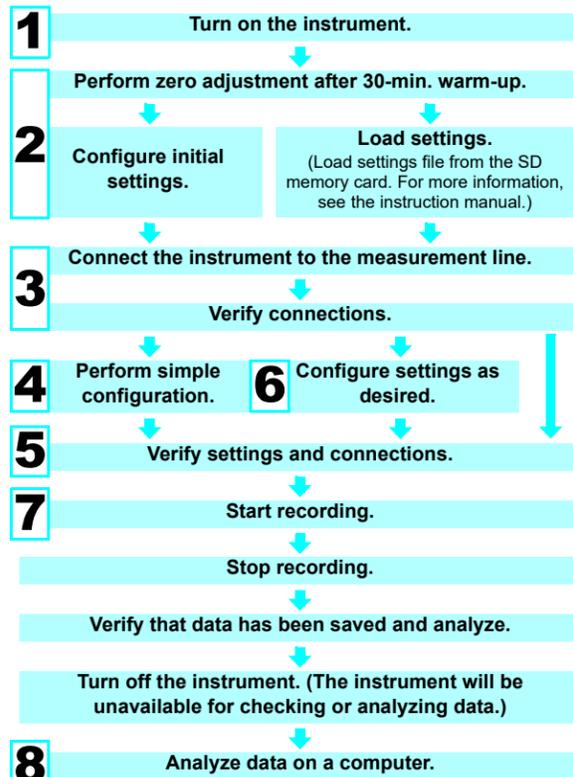This guide introduces the basic measurement procedure to first-time users.

Before using the instrument, be sure to read the instruction manual carefully.
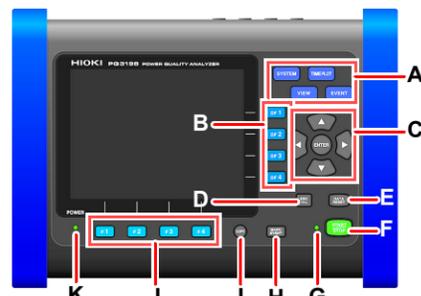
HIOKI

Read First

Measurement Procedure

(Number indicates reference step no.)

1 Turn on the instrument.

2 Perform zero adjustment after 30-min. warm-up.

Configure initial settings. | Load settings. (Load settings file from the SD memory card. For more information, see the instruction manual.)

3 Connect the instrument to the measurement line.

Verify connections.

4 Perform simple configuration. | **6** Configure settings as desired.

5 Verify settings and connections.

7 Start recording.

Stop recording.

Verify that data has been saved and analyze.

Turn off the instrument. (The instrument will be unavailable for checking or analyzing data.)

8 Analyze data on a computer.

PQ3198 mode

[Setting]
[Recording]
[Analyzing]

Key functions

A. Menu keys
SYSTEM: Configure various settings and event thresholds.
VIEW: Display instantaneous values and waveforms.
TIMEPLOT: Display measurement data as a time series graph.
EVENT: Display measured events as a list.

B. DF keys
Select detailed screen display from each screen.

C. Cursor key, ENTER key
Select and accept settings.

D. ESC key
Cancel selections and changes.

E. DATA RESET key
Delete displayed measurement data. (Data stored on the SD memory card will not be deleted.)

F. START/STOP key
Start and stop recording.

G. START/STOP LED
Recording standby : Flashing green
Recording : Steady green

H. MANU EVENT key
Generate events.

I. COPY key
Record data on screen currently being displayed.

J. F keys
Select and change display content and settings.

K. POWER LED
When using AC adapter: Steady green
When using battery : Steady red

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1 Getting ready

For more information, see the instruction manual.

After purchasing the instrument (first time only)
- Attach the Z1003 Battery Pack to the instrument.
- Turn on the instrument and set its clock.

Preparation before measurement
- **-1** Perform the pre-measurement inspection.
- **-2** Insert an SD memory card into the instrument. (Be sure to close the cover.)
- **-3** Connect the AC adapter.
- **-4** Connect the voltage cords and current sensors.
- **-5** Turn on the instrument.

2 Initial settings

Perform zero adjustment. Configure the connection and current sensor settings.

1 SYSTEM Push

(Shown: Connection selected)

2 DF 1 Push to display

3
Select a setting
Display pull-down menu
Select
Accept

4 F 1 Push
(Zero adjustment will be performed.)

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3 Verify connections to the measurement line.

Connect the instrument to the measurement line, referring to the connection diagram shown on the screen.
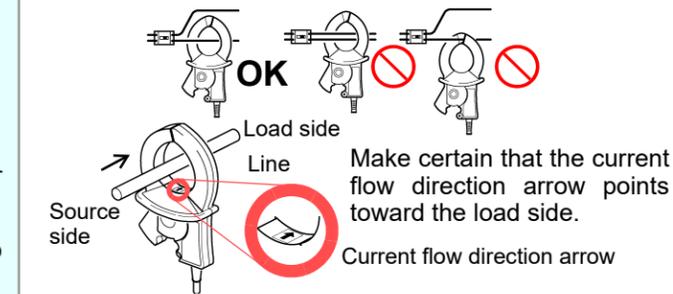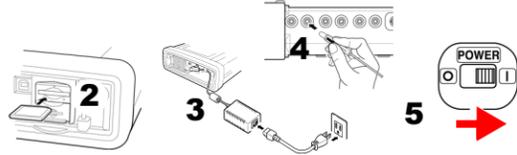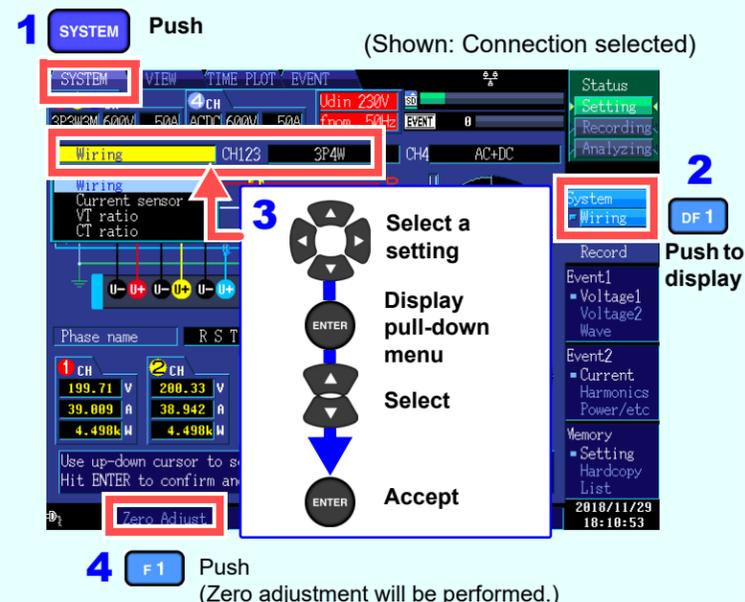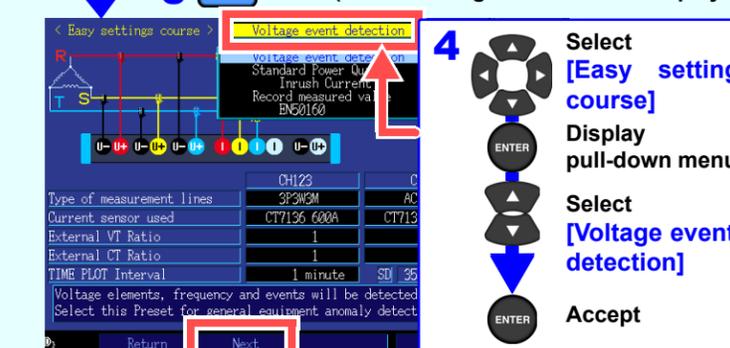

Vector diagrams

Measured values
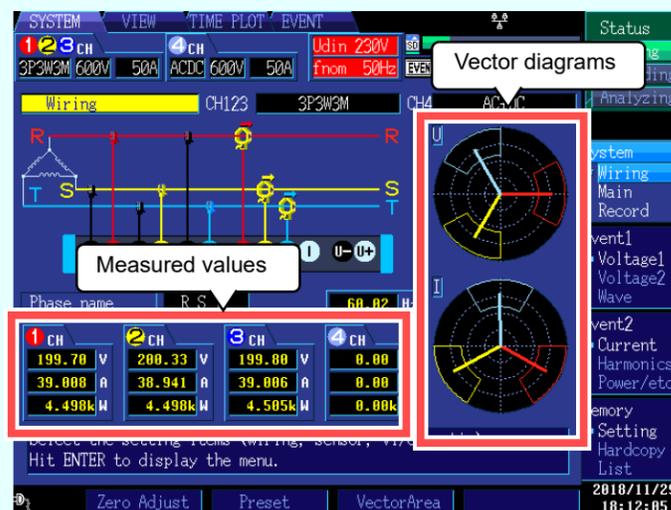
Attach voltage cords to measurement lines
Securely clip the leads to <u>metal parts</u> such as terminal screw terminals or bus bars. (Example: Secondary side of breaker)
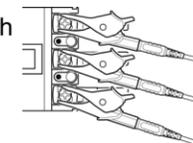
Applying clamp sensors to lines to be measured
Always clamp the instrument around only one conductor. Clamping the instrument around two or more of conductors in a bundle prevents the instrument from measuring any current regardless of whether the measurement target is a single-phase or three-phase circuit.

OK

Load side
Line
Source side
Current flow direction arrow

Make certain that the current flow direction arrow points toward the load side.

Verify that the connections are correct, referring to the vector diagrams and measured values on the **[Wiring]** screen.

If you discover an error, verify the connections and return to step (2) to reconfigure the initial settings.

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4 Simple configuration

Example: Configuring settings for the abnormal voltage detection pattern

Settings such as the current range, nominal input voltage, measurement frequency, and event thresholds will be automatically configured based on the selected connection mode.

(You will need to set the measurement line type, current sensor type, and external VT/CT ratio.) Select from the five available patterns according to your objective. To investigate the cause of a power supply issue, select the abnormal voltage detection pattern. To investigate power supply quality (i.e., to monitor a power system), select the basic power supply quality measurement pattern.

1 SYSTEM Push

2 DF 1 Push to display

3 F 2 Push (The following screen will be displayed.)

4
Select **[Easy setting course]**
Display pull-down menu
Select **[Voltage event detection]**
Accept

5 F 2 Push (The following screen will be displayed.)

6 Verify **[Declared input voltage]** and **[Frequency]**
These values will be set automatically. Change the values if they are incorrect.
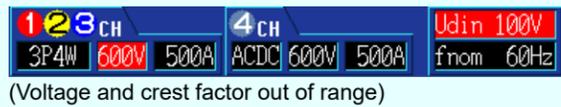
7 F 2 Push (A message informing you that the simple configuration process is starting will be displayed. Select **[Yes]** to continue with the process.)

■ **Easy setting course patterns**

Setting Contents	Description
Voltage event detection	Monitors voltage factors (dips, swells, interruptions, etc.) and frequency to detect events. This pattern is used to investigate the cause of equipment malfunctions. The TIMEPLOT interval will be set to 1 minute.
Standard Power Quality	Monitors voltage factors (dips, swells, interruptions, etc.), frequency, current, voltage and current harmonics, and other characteristics to detect events. This pattern is primarily used to monitor systems. The TIMEPLOT interval will be set to 10 minutes.
Inrush Current	Measures rush current. The TIMEPLOT interval will be set to 1 minute, and the rush current threshold will be set to 200% of the RMS current (reference value) set during simple configuration.
Record measured value	Records measured values over an extended period of time using a TIMEPLOT interval of 10 minutes. All event detection functionality other than manual, start, and stop events is turned off.
EN50160	Performs EN50160-compliant measurement. Standard-compliant evaluation and analysis can be performed by analyzing data using the application software PQ ONE.

■ **For more information about settings, see the instruction manual.**

5 Verifying settings and connections

-1. Are measured values or crest factors out of range?

If you see any warning indicators, the clamp sensor, range, or connection settings may be incorrect. Verify the connections and return to step (2) to reconfigure the initial settings.

Warning indicators: Values shown in red as below.

1 2 3 CH 4 CH | Udin 100V
3P4W 600V **500A** | ACDC 600V 500A | fnom 60Hz

(Current and crest factor out of range)

1 2 3 CH 4 CH | Udin 100V
3P4W **600V** 500A | ACDC 600V 500A | fnom 60Hz

(Voltage and crest factor out of range)
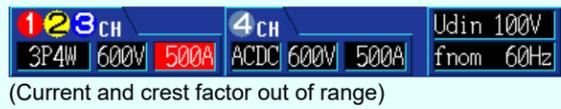
-2. Are too many events occurring?

(Is the EVENT icon shown continuously?)

If too many events are occurring, check which events are being generated on the event list on the [EVENT] screen (see step 7) after recording some data and then change the thresholds for the problematic events.

Alternately, wiring (connections) to the measurement line may be incorrect. Verify the connections.

Event icon
Normally shown in white but turns orange when too many events occur.

Event indicator
Counting starts when recording starts. Reaches capacity at 9999 events.

No. of events recorded

■ Up to 9999 events can be recorded. (when [Max. recordable events] is set to [9999].)
Measurement data continues to be recorded even when the number of events exceeds 9999.

-3. Are the voltage and current phase relationships shown properly in the vector diagrams?

If not, the wiring (connections) to the measurement line or current sensor orientations may be incorrect. Verify the connections and current sensor orientations.

SYSTEM Push

The vectors should resemble a fan shape.

DF 1 Push to display
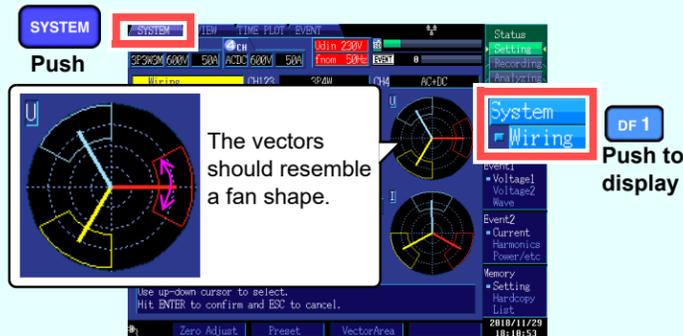
-4. Are waveforms and measured values shown properly?

If waveforms and measured values are not shown properly, the clamp sensor, range, or connection settings may be incorrect. Return to step 2 to reconfigure the initial settings. Alternately, wiring (connections) to the measurement line or current sensor orientations may be incorrect.
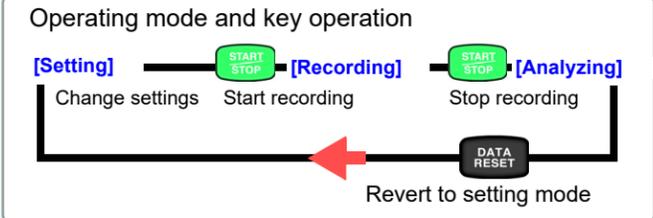
VIEW Push

DF 1 Push to display — Waveform Volt/Curr

DF 3 Push to display — DMM Power

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6 User settings (changing settings)

1 SYSTEM Push

Example: To change the voltage RMS (Upper limit)

2 DF 2 Push to display

3 Select [(Upper limit)]

4 F 2 Push

5 ENTER → Select the level setting → Change the threshold → ENTER Accept

You can change event thresholds, the recording start date and time, recorded items, and other settings as desired.

1 SYSTEM Push

Example: To change the [Time Start] start date and time (example: set to 12:00)

2 DF 1 Push to display

4 Select → Select the value so it can be changed → Set to [12] → Accept

3 F 2 Push

■ The time can only be changed when the [Time Start] setting is [Time].

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7 Starting recording

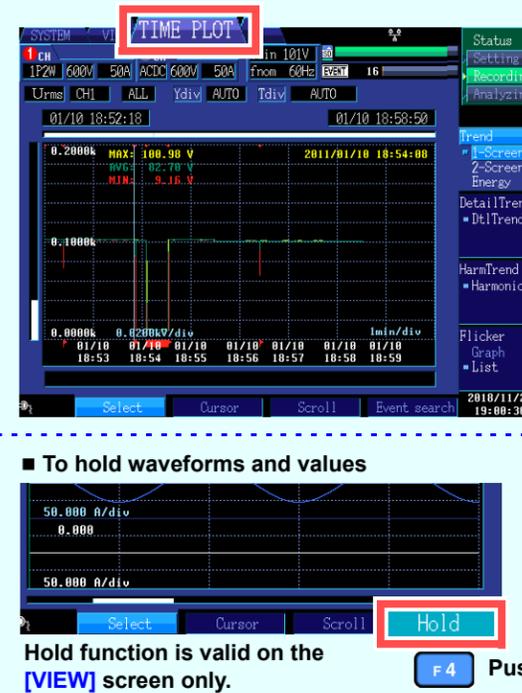**Press the START/STOP key to start recording. Data will be automatically saved to the SD memory card.**

- When recording, the operating mode indicator on the top right of the screen will show **[Recording]**.

- To change a setting, set the operating mode to **[Setting]**. (Settings cannot be changed while recording or analyzing.)

Operating mode and key operation

[Setting] — START/STOP — [Recording] — START/STOP — [Analyzing]
Change settings | Start recording | Stop recording

DATA RESET — Revert to setting mode

Monitoring fluctuations in measured values

TIMEPLOT

You can view measured items in the form of a time series graph. You can also display flicker values as a graph or list.

Press the **TIMEPLOT** key to display the **[TIMEPLOT]** screen. You can change the screen display with the **DF** keys.
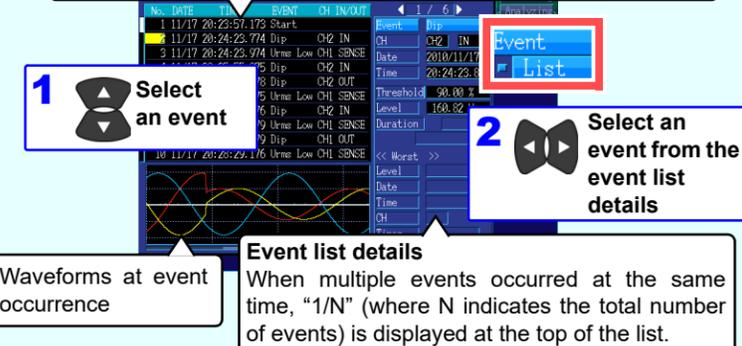
Monitoring event generation

EVENT

You can check whether events are occurring and the number of events occurring with the event list.

Press the **EVENT** key to display the **[EVENT]** screen.

Event list
Select an event and press the **ENTER** key to view waveforms and measured values at the time of its generation on the **[VIEW]** screen.

1 Select an event

2 Select an event from the event list details

Waveforms at event occurrence

Event list details
When multiple events occurred at the same time, "1/N" (where N indicates the total number of events) is displayed at the top of the list.

■ **To hold waveforms and values**

Hold function is valid on the [VIEW] screen only.

F 4 Push — Hold
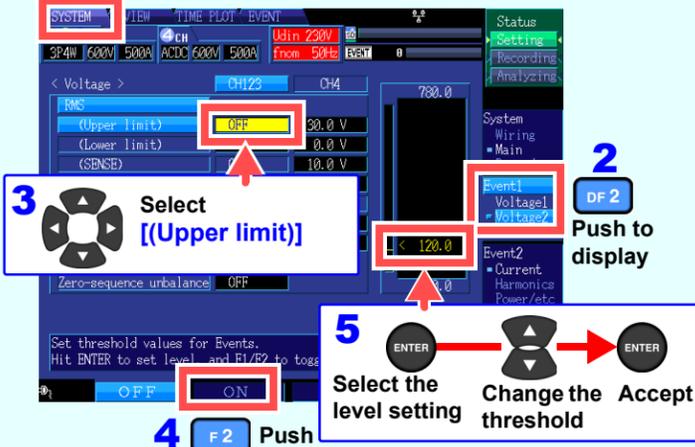
■ **To active the key lock**

ESC Press and hold for at least 3 seconds. To cancel the key lock, press and hold for at least 3 seconds again.

■ **To check instantaneous values**

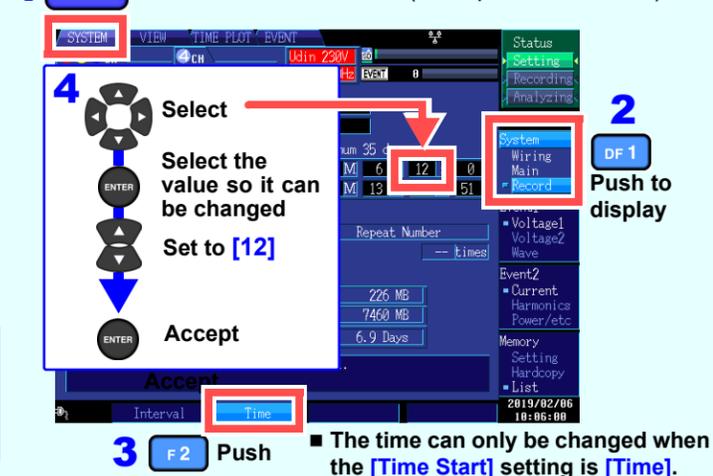**VIEW Push** (Switch screens with the DF key.)

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8 Analysis

After recording has stopped, data can be analyzed on a computer using the application software PQ ONE.

■ For more information, see the PQ ONE instruction manual. You can download from Hioki's website. See. Instruction manual "Information on download site"

★ **Viewing data**
Use event statistics functionality to analyze measurement data at a high level of detail. By reviewing event occurrence by date or time, you can discover events that are likely to occur at a specific time or on a specific day of the week.

★ **Easily create graphs to suit your needs**
Organize time plot graphs by convenient times or group three phases of data together on a single graph.

★ **Converting data**
Convert event data and time plot data (binary data) to the CSV format so that it can be opened with a spreadsheet application on a computer.

★ **Creating reports**
Output information shown on the screen as-is in the form of a report. Create reports that suit your needs without the need to configure complex settings.

★ **Display file data in list form**
Drag and drop folders containing measurement data to display a list of settings information and event occurrence data for all the data contained in the folder.

★ **Calculating demand and integral power**
Display a demand graph, or display the maximum and integrated power values for a specified interval.