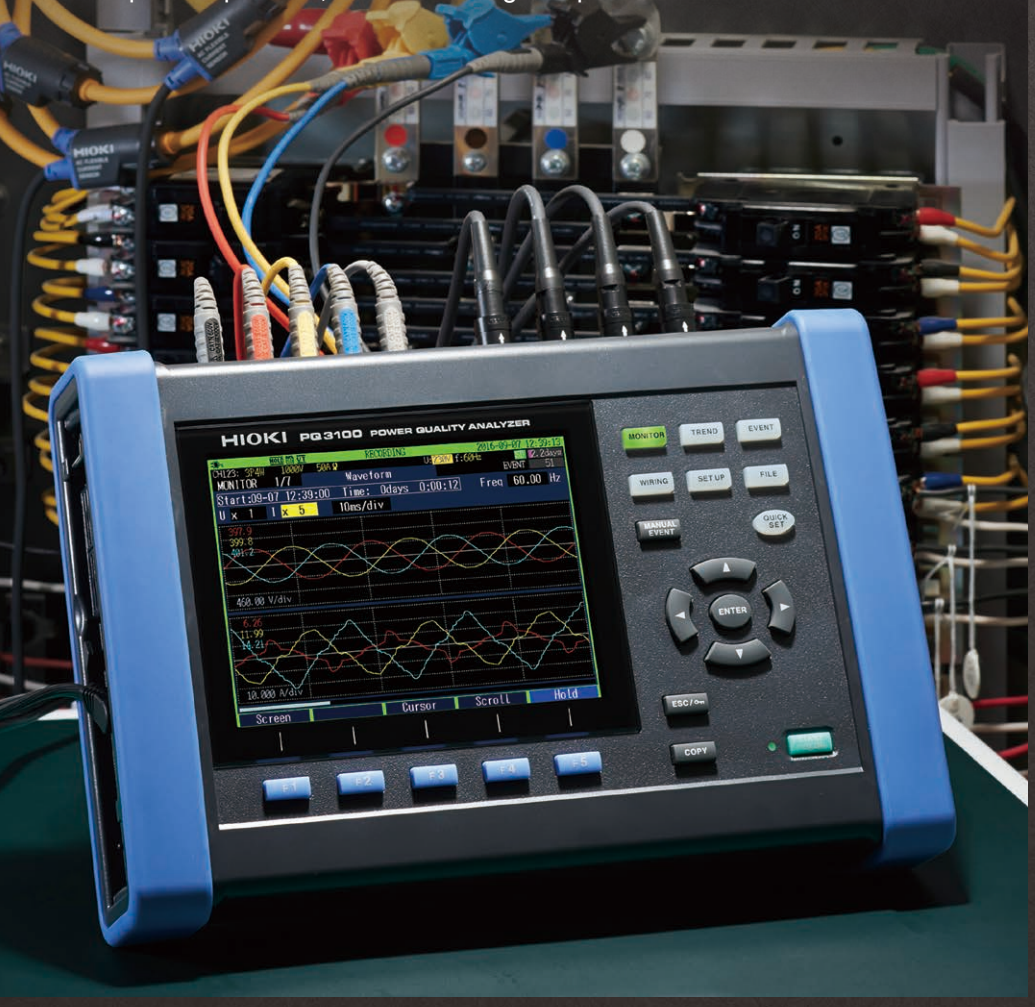
HIOKI

Selection Guide
Power Quality Analyzers I Power Loggers

PQ3198, PQ3100, PW3365, PW3360, CM3286

Power Quality and Energy Management

The critical importance of electrical power in today's society necessitates daily maintenance and management to ensure that problems don't occur.
When they do, engineers face the need to analyze the cause, such as an equipment failure or abrupt surge in demand, as quickly as possible.
From measurement to long-term recording and analysis, HIOKI's tools support reliable power analysis with superior operability for efficient power operation, troubleshooting and predictive maintenance.



Efficient operation of electricity

Reduce costs through efficient operation of electricity

- Power saving activity, leakage current prevention, electricity operation improvement, etc.
- Energy cost calculation
- Check for discrepancies with an electricity meter

Predictive maintenance & power survey

Reduce the impact of poor power quality on asset costs

- By monitoring the quality of the power supply on a long-term or regular basis, it is possible to detect signs of trouble and prevent it from happening in the first place.
- Check the system capacity before adding loads.

Troubleshooting

Find the cause of equipment problems, diagnose and take countermeasures.

- Conduct power quality investigations at sites where problems such as equipment failure or malfunction are occurring.
- Check the condition of before and after the installment of an electrical equipment.

Resolving disputes

Contracted dispute resolution

- Help to resolve disputes between the supplier and consumer

Choose the tools that meet your purpose.

View website
Click
PQ3198

View website
Click
PQ3100

View website
Click
PW3360

View website
Click
PW3365

View website
Click
CM3286-50

	Power Quality Logger and Analyzer -Advanced	Power Quality Logger and Analyzer -Standard	Power Logger	AC Clamp Power Meter
What?	Used when precise measurements are necessary, for example, for contracted jobs that may require resolving disputes, verifying compliance with standards, etc.	This is a tool for understanding power trends and consumption, constant monitoring, analyzing power quality, troubleshooting and analyzing other applications where can't comprehend.	Power loggers are instruments for you to understand and constantly monitor power trends.	The AC Clamp Power Meter is a tool for you to check the power at sites from manufacturing plants to households.
When?	When you need to examine, diagnose, and countermeasure the power supply condition that causes issues in equipment When two separate circuits need to be measured simultaneously	When you need to conduct a power survey to understand the load size in a system or to understand the power quality in a system. It's also great for preventive maintenance.	When you need to understand the power consumption of a facility or system When you need to support power saving activities to achieve your SDGs goals.	When you need to detect electricity theft and check the power condition at the power transmission and distribution side
Who?	Data center engineers, power utility engineers, power measurement consultants, power quality specialists, substation facilities manufacturers, and engineers who measure commercial line inverter efficiency.	Facility managers, plant managers, industrial engineers and technicians, utility company engineers, and power consultants	Facility managers and utility companies	Utility company electricians and on-site technicians
Why?	The two line measurement feature is a dedicated function for measuring two different lines accurately and safely. High sampling rates for transient measurement and high-order harmonics (supraharmonics) measurement capability help to identify the causes of the power quality issues. The dedicated software, PQ One, with statistical data analysis will help you understand and analyze your power condition.	The Quick Set function will help you with the power survey settings and makes your power quality survey easier. The dedicated software, PQ One with statistical data analysis will help you understand and analyze your power condition.	Compact size for easier installation in distribution boards Being able to use the power supply from measurement line will also help you with long-term power surveying. Non-metallic contact for safe power measurement	The Bluetooth connected app, GENNECT Cross, will help you identify when there is electricity theft. Easy to check the power condition from single-phase to 3-phase connection systems

Efficient operation of electricity

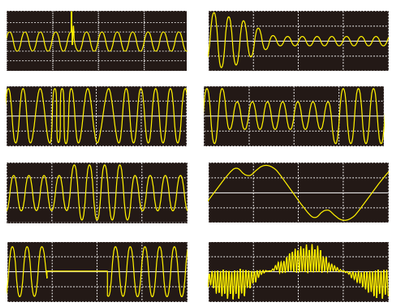
Predictive maintenance & power surveying

Troubleshooting

Resolving disputes

POWER QUALITY LOGGER & ANALYZERS PQ3100, PQ3198

Power anomalies are a major cause of equipment malfunction and damage. The PQ3198 and PQ3100 detect power supply abnormalities without fail to help diagnose the cause of problems.

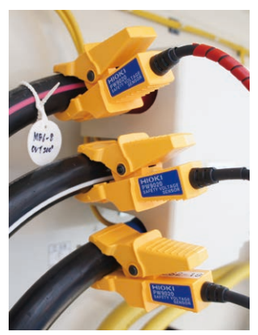


Capture all of these power anomalies simultaneously

- Transient voltages
- Voltage swells
- Voltage dips
- Interruptions
- Frequency fluctuations
- Inrush current
- Harmonics
- High-order harmonics (Supraharmonics)

POWER LOGGER PW3365

Accurately measure power consumption, also available with non-contact voltage sensors for added safety



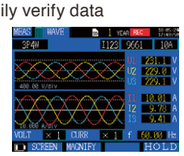
SAFETY VOLTAGE SENSOR PW9020
(for PW3365 only)

- Clamp on top of cable insulation
- Quick setup
- Safely avoid contact with live parts

(Compared with standard alligator clips that are hard to use and require metal-to-metal contact)

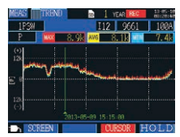
Toggle displays to easily verify data

List display



Waveform

Demand Graph



Trend Graph

Products comparison

	Application use	 PQ3198	 PQ3100	 PW3360-21	 PW3365	 CM3286-50
Energy audit and power survey		**Advanced**	**Standard**			
Measure V, I, P, kW, PF/DPF, kWh	Conduct power and energy surveys to understand the power consumption and validate energy saving	✓	✓	✓	✓	✓
Measure MIN/MAX and AVG values		✓	✓	✓	✓	✓
Voltage, current and power trend recording		✓	✓	✓	✓	–
Energy cost measurement		–	✓	✓	✓	–
Basic harmonics measurement						
THD measurement (V & I)	This value can be monitored to assess waveform distortion for each item, providing a yardstick that indicates the extent to which the total harmonic components are distorting the fundamental waveform	✓	✓	✓	✓	✓
Harmonics 1 to 30 for V & I	When the level of the harmonic component is high, it may cause serious accidents such as overheating or noise in motors or transformers, and burn out reactors in phase compensation capacitors.	✓	✓	✓ (1-40.PW3360-21)	✓ (1-13)	✓ (When Z3210 is installed)
Advanced harmonics measurement						
Harmonics 0 to 50 for V & I	When the level of the harmonic component is high, it may cause serious accidents such as overheating or noise in motors or transformers, and burn out reactors in phase compensation capacitors. Detect the DC element on the AC circuit (0th order).	✓	✓	–	–	–
High order harmonics (Supraharmonics) 2 kHz to 80 kHz	High-order harmonic (supraharmonic) components can damage equipment and power supplies, cause equipment operation to be reset, or result in abnormal sound from TVs and radios.	✓	–	–	–	–
Inter-harmonics	Inter-harmonics are caused when the voltage or current waveform is distorted due to static frequency conversion equipment, cycloconverters, Scheribus drive, induction motors, welders, or arc furnaces. The term refers to frequency components that are not a whole multiple of the fundamental wave.	✓	✓	–	–	–
Power harmonics	Detect the harmonics direction	✓	✓	✓ (PW3360-21)	–	–
Standard power quality troubleshooting						
Detailed trend recording for V and I	For conducting power surveys to understand the current power quality status	✓	✓	–	–	–
Power quality event recording	Measurement according to the EN50160 standard includes transient, swell, dip, interruption, frequency (200 ms) and flicker.	✓	✓	–	–	–
Advanced power quality troubleshooting						
Detect multiple events simultaneously	Multiple events may occur for a single power quality problem. Detecting them simultaneously may help you pinpoint the cause.	✓	✓	–	–	–
High speed sampling for transient measurement	Measure the duration and peak voltage of the transient event to determine the power quality problem	✓	–	–	–	–
Advanced Features						
Anti-theft detection	Compare the measurement values with the electric meter measurement to detect the differences	–	–	–	–	✓
Frequency fluctuation	Frequency fluctuation occurs due to line separation caused by circuit issues, shutdown of a high-capacity generators, or changes in the supply/demand balance of active power.	✓	✓	–	–	–
Transient voltage (impulse)	Transient voltage occurs due to phenomena such as lightning, breaker damage, or closure of the circuit breaker or relay. It often occurs when there is a radical change in voltage or when the peak voltage is high.	✓	✓	–	–	–
Voltage dip (SAG)	Most dips are caused by natural phenomena such as lightning. When an equipment fault is detected and taken offline due to the occurrence of a power system ground fault or short-circuit, a large inrush current caused by a motor startup or another load can occur, causing a temporary voltage dip.	✓	✓	–	–	–
Voltage swell (SURGE)	Swells occur when the voltage rises momentarily. Some examples of these are when a power line turns on or off due to lightning or a heavy load, when a high-capacity capacitor bank is switched, when a one-line ground occurs, and when a high-capacity load is cut off. This phenomenon also includes voltage surges due to grid-tied dispersed power supplies (e.g. solar power).	✓	✓	–	–	–
Flicker	Flicker consists of voltage fluctuations resulting from causes such as blast furnaces, arc welding, and thyristor control loads. Manifestations include light bulb flickering.	✓	✓	–	–	–
Interruption (momentary power outage)	Interruptions consist of momentary, short-term, or extended power supply outages as a result of factors such as circuit breakers being tripped due primarily to power company issues (interruption of power due to lightning strikes, etc.) or power supply short-circuits.	✓	✓	–	–	–
Unbalance	Unbalance is caused by increases or decreases in the load connected to each phase of a power line, distortions in voltage and current waveforms, voltage dips, or negative phase voltage caused by the operation of equipment or devices that run with uneven power supply to load.	✓	✓	–	–	–
Inrush current	Inrush current is a large current that flows momentarily, for example when electric equipment is turned on.	✓	✓	–	–	–
DC measurement	Measurement for DC loads or systems	✓	✓	–	–	–
Mains signaling voltage	The control signal, one of the measurement parameters required by IEC 61000-4-30, is applied to the mains to control various industrial equipment remotely.	✓	–	–	–	–
400 Hz measurement	Power measurement for aviation systems and shipboard systems	✓	–	–	–	–
Power inverter/converter efficiency	Measure the primary side and secondary side of power of inverters or converters to evaluate the system efficiency.	✓	–	–	–	–
GPS time synchronization	GPS time synchronization eliminates any time difference between instruments. It allows analysis that preserves the simultaneity of phenomena measured with multiple instruments.	✓	–	–	–	–
Interface						
USB		✓	✓	✓	✓	–
Ethernet		✓	✓	✓	✓	–
Bluetooth connectivity		–	–	–	–	✓
SD card		✓	✓	✓	✓	–
RS-232C		✓	✓	–	–	–
Pulse		✓ (Event input function)	✓ (Event input function)	✓ (Pulse I/O terminals)	–	–
Safety		**600 V (CAT IV)**	**600 V (CAT IV), 1000 V (CAT III)**	**600 V (CAT III)**	**600 V (CAT III)**	**600 V (CAT IV)**
Non-metallic contact power measurement		–	–	–	✓	–
Power from measurement line		–	–	✓	–	–

Which clamp sensors should I choose?

Our recommendation

Do you measure both AC and DC load?

Type	Yes		AC only measurement	
	AC and DC simultaneously	Sometimes AC, sometimes DC		
	Power Quality Logger and Analyzer (PQ3198 only)	Power Quality Logger and Analyzer	Power Quality Logger and Analyzer	Power Logger
Best choice	CT7045x3, CT7731x1	CT7731	CT7045x4	9661x3
CT secondary side measurement	CT7126x3, CT7731x1	–	CT7126x4	9694x3
Other choices	CT7136x3, CT7742x1	CT7742	CT7136x4	CT9667-02x3

CURRENT SENSOR

PQ3198, PQ3100

Features	Make measurements over extended periods of time without zero-adjustment, even in locations with temperature variations		
Model name	AC/DC AUTO-ZERO CURRENT SENSOR		
Model	CT7731	CT7736	CT7742
Appearance			
Rated measurement current	100 A AC/DC	600 A AC/DC	2000 A AC/DC
Max. rated voltage to earth	(AC/DC) CAT IV 600 V	(AC/DC) CAT IV 600 V, CAT III 1,000 V	(AC/DC) CAT IV 600 V, CAT III 1,000 V
Core jaw diameter	ϕ33 mm	ϕ33 mm	ϕ55 mm

Features	Attaches easily to thick cables, even in confined spaces			Accurately measuring load current			Measuring leakage current
Model name	AC FLEXIBLE CURRENT SENSOR			AC CURRENT SENSOR			AC LEAKAGE CURRENT SENSOR
Model	CT7044	CT7045	CT7046	CT7126	CT7131	CT7136	CT7116
Appearance							 Insulated conductor
Rated measurement current	6,000 A AC	6,000 A AC	6,000 A AC	60 A AC	100 A AC	600 A AC	6 A AC
Max. rated voltage to earth	(AC) CAT IV 600 V, CAT III 1,000 V	(AC) CAT IV 600 V, CAT III 1,000 V	(AC) CAT IV 600 V, CAT III 1,000 V	(AC) CAT III 300 V	(AC) CAT III 300 V	(AC) CAT IV 600 V,CAT III 1,000 V	Insulated conductor
Core jaw diameter	ϕ100 mm	ϕ180 mm	ϕ254 mm	ϕ15 mm		ϕ46 mm	ϕ40 mm

PW3365, PW3360

Features	Load current levels: voltage output					
Model name	CLAMP ON SENSOR					
Model	9694	9660	9661	9669	9695-02	9695-03
Appearance	 BNC	 BNC	 BNC	 BNC	 Requires the 9219 Insulated conductor Not CE marked	 Requires the 9219 Insulated conductor Not CE marked
Rated measurement current	5 A AC	100 A AC	500 A AC	1,000 A AC	50 A AC	100 A AC
Max. rated voltage to earth	(AC) CAT III 300 V	(AC) CAT III 300 V	(AC) CAT III 600 V	(AC) CAT III 600 V	(AC) CAT III 300 V	(AC) CAT III 300 V
Core jaw diameter	ϕ15 mm	ϕ15 mm	ϕ46 mm	ϕ55 mm 80 × 20 mm busbar	ϕ15 mm	ϕ15 mm

Features	Load current levels: voltage output			Leak current: voltage output	
Model name	AC FLEXIBLE CURRENT SENSOR			CLAMP ON LEAK SENSOR	
Model	CT9667-01	CT9667-02	CT9667-03	9657-10	9675
Appearance	 BNC	 BNC	 BNC	 BNC Insulated conductor General purpose ZCT	 BNC Insulated conductor Branch circuit ZCT
Rated measurement current	5,000 A AC, 500 A AC	5,000 A AC, 500 A AC	5,000 A AC, 500 A AC	10 A AC	10 A AC
Max. rated voltage to earth	(AC) CAT IV 600 V (AC) CAT III 1,000 V	(AC) CAT IV 600 V (AC) CAT III 1,000 V	(AC) CAT IV 600 V (AC) CAT III 1,000 V	Insulated conductor	Insulated conductor
Core jaw diameter	ϕ100 mm	ϕ180 mm	ϕ254 mm	ϕ40 mm	ϕ30 mm

*At center of flexible loop


L1000


L1000-05


Z1002


Z1003


Z4001

PQ3198 Included accessories

- VOLTAGE CORD L1000
- AC ADAPTER Z1002
- BATTERY PACK Z1003
- PQ ONE (software CD)
- SD MEMORY CARD Z4001
- USB cable
- Color clips
- Spiral tubes
- Strap
- Measurement guide
- User manual

PQ3100 Included accessories

- VOLTAGE CORD L1000-05
- AC ADAPTER Z1002
- BATTERY PACK Z1003
- PQ ONE (software CD)
- USB cable
- Color clips
- Spiral tubes
- Strap
- Measurement guide
- User manual


L9438-53


Z1006

PW3360 Included accessories

- VOLTAGE CORD L9438-53 (black, red, yellow, blue: 1 each)
- AC ADAPTER Z1006
- USB cable 0.9 m (2.95 ft.)
- Instruction manual
- Measurement guide
- Color clips (red, blue, yellow, white: 2 each)
- Spiral tubes × 5


PW9020


Z1008

PW3365 Included accessories

- SAFETY VOLTAGE SENSOR PW9020 × 4
- AC ADAPTER Z1008
- USB cable 0.9 m (2.95 ft.)
- Instruction manual
- Measurement guide
- Color clips (red, blue, yellow, white: 4 each)
- Spiral tubes × 10

Included accessories/Options

PQ3198, PQ3100

Voltage	1	VOLTAGE CORD L1000	Red/yellow/blue/gray: 1 each, black x 4, 3 m (9.84 ft.) , alligator clip x 8
	2	VOLTAGE CORD L1000-05	Red/yellow/blue/gray/black: 1 each, 3 m (9.84 ft.) , alligator clip x 5
	3	MAGNETIC ADAPTER 9804-01	Red, alternative tip for the L1000-05
	4	MAGNETIC ADAPTER 9804-02	Black, alternative tip for the L1000-05
	5	GRABBER CLIP L9243	Alternative tip for the L1000-05
	6	PATCH CORD L1021-01	For PQ3198, 0.5 m (1.64 ft.), red, banana branch-banana
	7	PATCH CORD L1021-02	For PQ3198, 0.5 m (1.64 ft.), black, banana branch-banana
Memory	8	SD MEMORY CARD 2GB Z4001	Use only SD Cards sold by HIOKI. Compatibility and performance are not guaranteed for SD cards made by other manufacturers.
	9	SD MEMORY CARD 8GB Z4003	
Communication	10	RS-232C CABLE 9637	For PQ3100, 9 pin - 9 pin, cross, 1.8 m (5.91 ft.)
	11	LAN CABLE 9642	5 m (16.4 ft.), straight, cross conversion adapter
Power supply	12	AC ADAPTER Z1002	100 V AC to 240 V AC
	13	BATTERY PACK Z1003	7.2 V, Ni-MH
Connection	14	WIRING ADAPTER PW9000	For PQ3198, for 3-phase/3-wire connection (3P3W3M)
	15	WIRING ADAPTER PW9001	For PQ3198, for 3-phase/4-wire connection (3P4W)
	16	GPS BOX PW9005	For PQ3198
Other	17	CARRYING CASE C1009	Bag type
	18	CARRYING CASE C1001	Soft type
	19	CARRYING CASE C1002	Hard trunk type
	20	MAGNETIC STRAP Z5004	
	21	MAGNETIC STRAP Z5020	Extra strength


1 L1000


2 L1000-05


3 9804-01


4 9804-02


5 L9243


6 L1021-01


7 L1021-02


8 Z4001


9 Z4003


10 9637

11 9642

12 Z1002

13 Z1003

14 PW9000

15 PW9001

16 PW9005

17 C1009

18 C1001

19 C1002

20 Z5004

21 Z5020

PW3365, PW3360

Voltage	1	SAFETY VOLTAGE SENSOR PW9020	For PW3365, 3 m (9.84 ft.)
	2	VOLTAGE CORD L9438-53	For PW3360, black/red/yellow/blue, 3 m (9.84 ft.) length, alligator clip x 4
	3	MAGNETIC ADAPTER 9804-01	For PW3360, red, Φ11 mm (0.43 in.)
	4	MAGNETIC ADAPTER 9804-02	For PW3360, black, Φ11 mm (0.43 in.)
	5	PATCH CORD L1021-01	For PW3360, 0.5 m (1.64 ft.), red, banana branch-banana
	6	PATCH CORD L1021-02	For PW3360, 0.5 m (1.64 ft.), black, banana branch-banana
Memory	7	SD MEMORY CARD 2GB Z4001	Use only SD Cards sold by HIOKI. Compatibility and performance are not guaranteed for SD cards made by other manufacturers.
	8	SD MEMORY CARD 8GB Z4003	
Communication	9	LAN CABLE 9642	5 m (16.4 ft.), straight, cross conversion adapter
	10	POWER LOGGER VIEWER SF1001	Software to analyze measurement data
Power supply	11	AC ADAPTER Z1008	For PW3365, 100 V AC to 240 V
	12	AC ADAPTER Z1006	For PW3360, 100 V AC to 240 V
	13	BATTERY SET PW9002	Battery case and 9459 Set
	14	BATTERY PACK 9459	
Other	15	CARRYING CASE C1005	
	16	CARRYING CASE C1008	For PW3365
	17	MAGNETIC STRAP Z5004	

1 PW9020

2 L9438-53

3 9804-01

4 9804-02

5 L1021-01

6 L1021-02

7 Z4001

8 Z4003

9 9642

10 SF1001

11 Z1008

12 Z1006

13 PW9002

14 9459

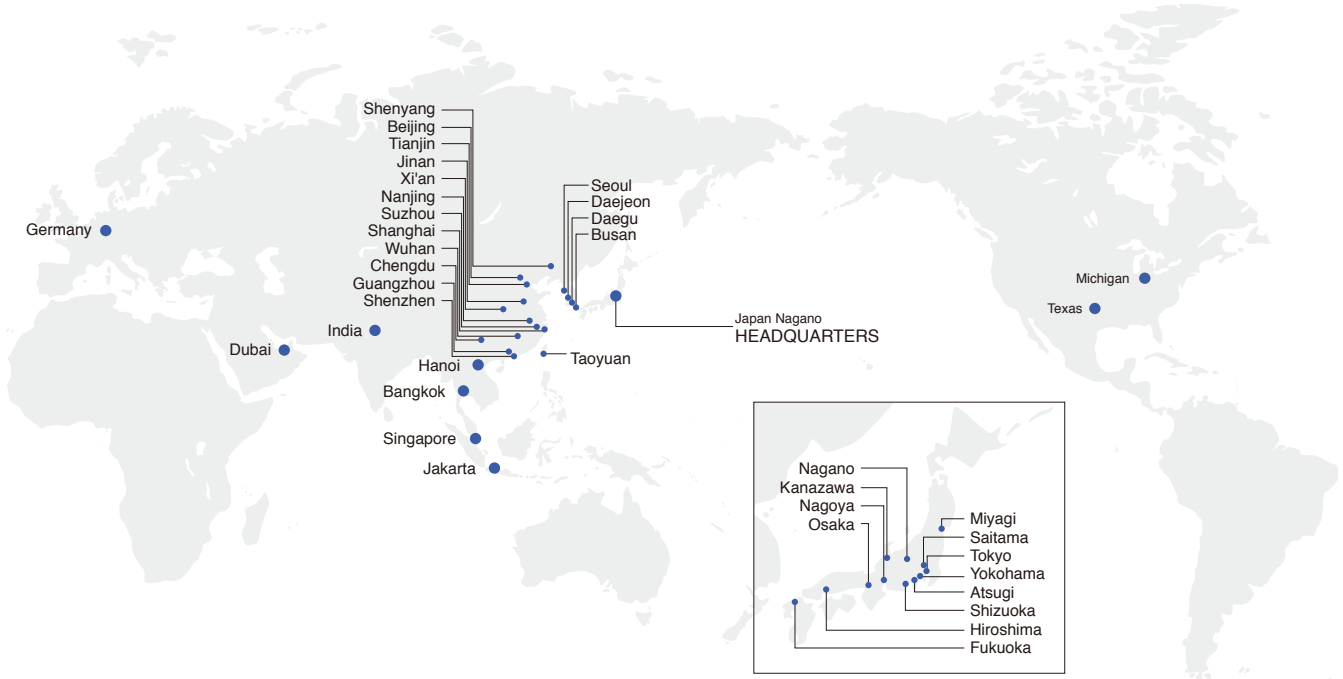
15 C1005

16 C1008

17 Z5004

Software/application

Software name	Type	Products	Data transfer	Trend graph	Import raw data (CSV/original format)	Export data (CSV)	Waveform viewing/ analyzing	Saving images and GPS information	Real-time monitoring and remote control	Automatic reporting	Customized reporting	Export report to MS Word	Price	Where to get
GENNECT Cross	For data saving and extra applications	CM3286-50 (When Z3210 is installed)	Bluetooth®	✓	✓	✓	✓	✓	–	✓	✓	✓	Free	https://gennect.net/en/cross/index
GENNECT One	For communications and data management	PW3360, PW3365, PQ3100, PQ3198	LAN	✓	✓	✓	–	–	✓	✓	✓	✓	Free	https://gennect.net/en/one/index
Power Logger Viewer	For data analysis	PW3360, PW3365	–	✓	✓	✓	✓	–	–	✓	✓	✓	Paid software	Contact your nearest distributor
PQ One	For advanced data analysis	PQ3100, PQ3198	–	✓	✓	✓	✓	–	–	✓	✓	✓	Free (sample data inclued)	https://www.hioki.com/global/support/download/software
Mass Storage Function	Raw file data download	PW3360, PW3365, PQ3100, PQ3198	USB cable or SD card	–	✓	–	–	–	–	–	–	–	–	–



Global sales network

Japan Bases	
Japan	HEADQUARTERS : HIOKI E. E. CORPORATION (Nagano)
	Tohoku Sales Branch (Miyagi)
	Nagano Sales Branch
	Kanazawa Branch
	Kita-Kanto Sales Branch (Saitama)
	Greater Tokyo Sales Branch (Tokyo)
	Yokohama Office
	Atsugi Office
	Shizuoka Sales Branch
	Nagoya Sales Branch
	Osaka Sales Branch
	Hiroshima Office
	Fukuoka Sales Branch
Representative Offices	
China	Tianjin Representative Office (CHINA)
UAE	MEA Representative Office (DUBAI)
Overseas Bases	
America	HIOKI USA CORPORATION (Plano, TX)
	HIOKI USA CORPORATION Michigan Office (Novi, MI)
China	HIOKI (Shanghai) MEASUREMENT TECHNOLOGIES CO., LTD. (Shanghai)
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	HIOKI (Shanghai) MEASUREMENT TECHNOLOGIES CO., LTD. Guangzhou Representative Office
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Vietnam	HIOKI SINGAPORE PTE. LTD. Vietnam Representative Office
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	HIOKI KOREA CO., LTD. Busan Office (Busan)
	HIOKI KOREA CO., LTD. Daegu Office (Daegu)
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