

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

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.











			PW3365	
	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 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

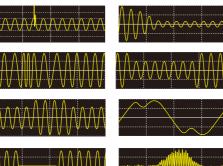
Predictive maintenance & power surveying

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

POWER LOGGER PW3365

Accurately measure power consumption, also available with noncontact 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











Trend Graph

Products comparison











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- 44
TOTAL S
13286-0
13200-0

	AND MIN					
	Application use	PQ3198	PQ3100	PW3360-21	PW3365	CM3286-01
Energy audit and power survey		Advanced	Standard			
Measure V, I, P, kW, PF/DPF, kWh		✓	✓	✓	✓	1
Measure MIN/MAX and AVG values	Conduct newsrand energy curveys to understand the newer consumption and validate energy saving	✓	✓ /	✓	✓	/
Voltage, current and power trend recording	Conduct power and energy surveys to understand the power consumption and validate energy saving	✓	/	✓	✓	-
Energy cost measurement		_	1	✓	✓	_
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	✓	/	/	✓	1
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)	✓
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 2 kHz to 80 kHz	High-order harmonic 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	1	1	✓ (PW3360-21)	=	-
Standard power quality troubleshooting						
Detailed trend recording for V and I	For conducting power surveys to understand the current power quality status	✓	1	-	_	_
Power quality event recording	Measurement according to the EN50160 standard includes transient, swell, dip, interruption, frequency (200 ms) and flicker.	✓	1	_	_	_
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.	✓	1	-	-	-
High speed sampling for transient measurement Advanced Features	Measure the duration and peak voltage of the transient event to determine the power quality problem	✓	_	-	-	_
Anti-theft detection	Compare the measurement values with the electric meter measurement to detect the differences	_			<u> </u>	
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.	1	1	-	-	_
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.	1	/	-	-	-
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.	✓	1	-	-	-
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.	✓	1	-	_	-
DC measurement	Measurement for DC loads or systems	✓	1	-	-	-
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		/ (F - : : : : : : : : : : : : : : : : : :	/	- (D I - 1/0 - 1 - 1)	_	_
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		_	_		/	_

Which clamp sensors should I choose?

Our recommendation

Do you measure both AC and DC load?

	Yes					
T	AC and DC simultaneously	Sometimes AC, sometimes DC	AC only measurement			
Туре	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, PQ31	00								
Features	Make measurements over extended peri	Wake 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	81	\	91						
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	ф33 mm	ф33 mm	ф55 mm						

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Features	Attaches easily	to thick cables, even in	confined spaces	Accui	Measuring leakage current			
Model name	AC FL	EXIBLE CURRENT SE	NSOR	l l	AC LEAKAGE CURRENT SENSOR			
Model	CT7044	CT7045	CT7046	CT7126	CT7131	CT7136	CT7116	
Appearance					% / 9 /		<u>}</u> \	
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	φ100 mm			mm	ф46 mm	φ40 mm	

PW3365, PW3360

Features	Load current levels: voltage output								
Model name	CLAMP ON SENSOR								
Model	9694 9660 9661 9669 9695-02 9695-0								
Appearance	BNC BNC BNC		BNC	BNC Requires the 9219 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	ore jaw diameter φ15 mm φ15 mm		ф46 mm	φ46 mm		ф15 mm			

Features	Loa	d current levels: voltage ou	tput	Leak current: voltage output				
Model name	AC F	LEXIBLE CURRENT SEN	CLAMP ON LEAK SENSOR					
Model	CT9667-01	CT9667-02	CT9667-03	9657-10	9675			
Appearance	BNC BNC		BNC	BNC character General purpose ZCT	BNC A mainter Branch circuit ZCT			
Rated measurement current	t 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	ф100 mm		ф254 mm	φ40 mm	ф30 mm			

^{*}At center of flexible loop



• USB cable

Color clips

Strap

Spiral tubes

Measurement guide

PQ3198 Accessories

AC ADAPTER Z1002

VOLTAGE CORD L1000

• BATTERY PACK Z1003

• PQ ONE (software CD)

· SD MEMORY CARD Z4001







PQ3100 Accessories

• VOLTAGE CORD L1000-05 • AC ADAPTER Z1002

• BATTERY PACK Z1003

• PQ ONE (software CD)

Measurement guide







PW3360 Accessories

• AC ADAPTER Z1006

Instruction manual

Bundled accesories/Options

C1002

Z5004

Measurement guide

• VOLTAGE CORD L9438-53

• USB cable 0.9 m (2.95 ft.)

(black, red, yellow, blue: 1 each)







PW3365 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

 Color clips (red, blue, yellow, white: 2 each) Spiral tubes x 5

User manual User manual

Strap

• USB cable

· Color clips

Spiral tubes

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



D/M336E D/M3360

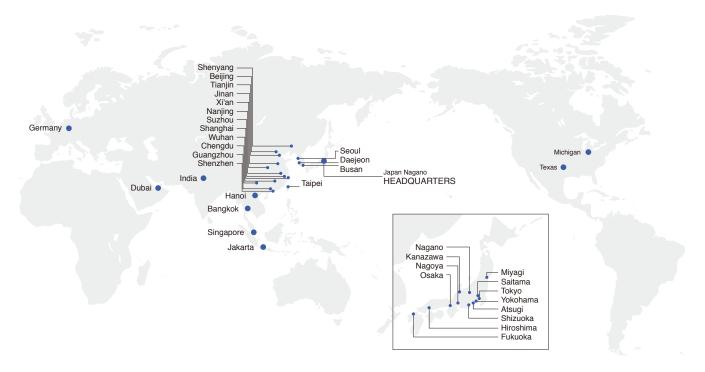
MAGNETIC STRAP Z5020

PW336	5, PW3360	
	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 × 4
Voltage	3 MAGNETIC ADAPTER 9804-01	For PW3360, red, Ф11 mm (0.43 in.)
voitage	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
	8 SD MEMORY CARD 8GB Z4003	are not guaranteed for SD cards made by other manufacturers.
Communication	9 LAN CABLE 9642	5 m (16.4 ft.), straight, cross conversion adapter
Communication	10 POWER LOGGER VIEWER SF1001	Software to analyze measurement data
	11 AC ADAPTER Z1008	For PW3365, 100 V AC to 240 V
Power	12 AC ADAPTER Z1006	For PW3360, 100 V AC to 240 V
supply	13 BATTERY SET PW9002	Battery case and 9459 Set
	14 BATTERY PACK 9459	
	15 CARRYING CASE C1005	
Other	16 CARRYING CASE C1008	For PW3365
	17 MAGNETIC STRAP Z5004	

Extra strength



	Software/application													
Software name	Туре	Products	Data transfer	Trend graph	Import raw data (CSV/original format)	Export data (CSV)	analyzina	Saving images and GPS information	monitoring and			Export report to MS Word	Price	Where to get
GENNECT Cross	For data saving and extra applications	CM3286-01	Bluetooth®	1	1	1	1	1	-	1	1	1	Free	https://gennect.net/en/cross/index
GENNECT One	For communications and data management	PW3360, PW3365, PQ3100, PQ3198	LAN	1	1	1	-	-	✓	1	1	1	Free	https://gennect.net/en/one/index
Power Logger Viewer	For data analysis	PW3360, PW3365	-	1	1	1	1	-	-	1	1	1	Paid software	Contact your nearest distributor
PQ One	For advanced data analysis	PQ3100, PQ3198	_	1	1	1	1	_	-	1	1	1	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	_	1	-	-	-	-	_	-	-	-	_



Global sales network

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	HEADQUARTERS : HIOKI E. E. CORPORATION (Nagano)
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	Nagano Sales Branch
	Kanazawa Branch
	Kita-Kanto Sales Branch (Saitama)
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	Atsugi Office
	Shizuoka Sales Branch
	Nagoya Sales Branch
	Osaka Sales Branch
	Hiroshima Office
	Fukuoka Sales Branch
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UAE	MEA Representative Office (DUBAI)
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