







Data Logger Multicanale

						
Modello	LR8410/20	LR8400/20	LR8401/20	LR8402/20	LR8431/20	8423
Misure						
Tensione Vcc	Portate: ±10mV a ±100V	Portate: ±10mV a ±100V			Portate: ±10mV a ±100V	Portate: ±10mV a ±100V
Temperatura termocoppie	K, J, E, T, N, R, S, B, da -200°C a +2000°C	K, J, E, T, N, R, S, B, W, da -200°C a +2000°C			K, J, E, T, N, R, S, B, da -200°C a +2000°C	K, J, E, T, N, R, S, B, da -200°C a +2000°C
Temperatura termoresistenze	PT100 e jPT100, da -200°C a +800°C	PT100 e jPT100, da -200°C a +800°C			-	PT100 e jPT100, da -200°C a +800°C
Umidità	con sensore 2000Z da 0% a 100% U.R.	con sensore 2000Z da 0% a 100% U.R.			-	con sensore 9701 da 0% a 100% U.R.
Resistenza Rdc	Portate: da 10Ω a 200Ω	Portate: da 10Ω a 200Ω			-	-
Impulsi	-	8 canali	8 canali	8 canali	4 canali	120*
Ingressi logici	-	8 canali	8 canali	8 canali	-	120*
Prestazioni di misura e registrazione						
Velocità di campionamento	da 10msec a 60 min	da 10msec a 60 min			da 10msec a 60 min	da 10msec a 60 min
Memoria interna	16MB	16MB	16MB	16MB	7MB	32MB
Card	2GB	2GB	2GB	2GB	2GB	1GB
Ingressi di misura						
Ingressi isolati tra loro	SI*	SI*	SI*	SI*	SI	SI*
Tensione max tra canali	300Vcc	300Vcc*	300Vcc*	300Vcc*	60Vcc	200Vcc*
Tensione max verso terra	300Vcc/ca	300Vcc/ca	300Vcc/ca	300Vcc/ca	60Vcc	600Vcc/ca*
Max ingressi analogici	105	60	60	60	10	120
Max ingressi digitali	-	8	8	8	4 (solo impulsi)	120
Moduli di ingresso	Max 7, con Bluetooth	Max 4 per totale 60 canali analogici			-	Max 8 da 15 canali
Display						
Dimensioni display grafico	5.7 pollici	5.7 pollici	5.7 pollici	5.7 pollici	4.3 pollici	su PC tramite software
Interfacce						
USB	SI	SI	SI	SI	SI	SI
Slot per chiavi USB	SI	SI	SI	SI	SI	-
LAN	SI	SI	SI	SI	SI	SI
SD Card	SI	-	-	-	-	-
CF Card	-	SI	SI	SI	SI	SI
Alimentazione						
Diretta in CA	-	-	-	-	-	SI
Tramite adattatore in CA	SI	SI	SI	SI	SI	SI
Tramite batterie ricaricabili**	SI	SI	SI	SI	SI	-
Diretta in CC	SI	SI	SI	SI	SI	-

(*) Le caratteristiche indicate con asterisco (*) sono da valutare in funzione dei moduli di ingresso intercambiabili (opzionali) installati sull'unità principale
 (**) non fornite in dotazione

Mini Data Logger Bluetooth®



Modello	LR8512	LR8513	LR8514	LR8515	LR8520
Misure					
Tensione Vcc	-	-	-	±50Vcc	-
Corrente Acc	-	fino a 2000Acc	-	-	-
Corrente Aca	-	fino a 1000Aca	-	-	-
Temperatura	-	-	-40°C ... +80°C	-	-40°C ... +80°C
Termoresistenze (K e T)	-	-	-	-200°C ... +1000°C	-
Umidità	-	-	0% ... 100%	-	0% ... 100%
Conta-Impulsi/ Contagiri	2 canali	-	-	-	-
Indice fungino	-	-	-	-	SI
Prestazioni di misura e registrazione					
Quantità di canali	2 canali	2 canali	2+2 canali	2 canali	1+1 canali
Memoria interna	500.000 dati/canale				500.000 dati
Cadenza di registrazione	da 0.1sec a 60min	da 0.5sec a 60min		da 0.1sec a 60min	da 0.5sec a 60min
Tipo di registrazione	Valore istantaneo	Istantaneo e medio	Valore istantaneo		
Comunicazione e interfaccia					
Tipo di connessione	Bluetooth®2.1 + EDR				
Dispositivi supportati	Windows PC e Android tablet + smartphone				
Sistemi Operativi	Windows 8.1/8/7/Vista (32-64bit) – Android OS 4.0.3 o superiore				
Software di analisi dati	Logger Utility (in dotazione)				
Display	40 x 25 mm				
Connettività a Data-Logger	tramite Bluetooth® a LR8410/20				
Alimentazione					
Tramite batterie	Nr. 02 batterie alcaline LR6 (in dotazione)				
Tramite adattatore in CA	Alimentatore in CA (opzionale)				
Esterna in CC	Da 5Vcc a 13.5Vcc (anche tramite USB con apposito cavetto, non fornito)				
Accessori in dotazione					
Batterie LR06	02	02	02	02	02
Cavetteria	L1010 (02)	-	-	-	L1010 (01)
Accessori opzionali					
Sensori	-	7 modelli, da 500mA a 2000A	Z2010 Z2011	-	Z2010 Z2011
Alimentatore in CA	Z2003 (da 100Vca a 240Vca, 50-60Hz – uscita 12Vcc)				
Supporto magnetico	Z5004 (cinghia di fissaggio con supporto magnetico)				

(*) Le caratteristiche indicate con asterisco (*) sono da valutare in funzione dei moduli di ingresso intercambiabili (opzionali) installati sull'unità principale
 (**) non fornite in dotazione

HIOKI

LR8410/20

Logger Bluetooth®,
il gusto di essere i primi!



Registratore multicanale
fino a 105 canali*,
totalmente senza filo

Espandibilità senza ostacoli, fino a 105 canali di misura

L'unità master LR8410/20 gestisce fino a 7 unità di misura in contemporanea per una registrazione simultanea di 105 segnali.

Ogni singolo canale di ingresso può essere registrato con un campionamento minimo di 100millisecondi e salvato istantaneamente su memoria interna, SD card o USB key.

Il software Logger Utility fornito in dotazione consente di analizzare e gestire i dati di 5 unità LR8410/20 per un totale di 525 segnali.



Unità di misura wireless

Conta-impulsi/giri
2 canali
LR8512



Corrente CC-CA
2 canali
LR8513



Temperatura-Umidità
4 canali (2+2)
LR8514



Tensione-Temperatura
2 canali
LR8515



Tensione-Temperatura
15 canali
LR8510



Tensione-Resistenza-Umidità-Temperatura
15 canali
LR8511



Comunicazione Bluetooth: fino a 30 metri in linea diretta a vista

LR8410/20 può gestire fino a 7 unità di misura wireless in combinazione mista

		LR8510	LR8511	LR8512	LR8513	LR8514	LR8515
Q.tà di canali		15	15	2	2	4 (2+2)	2
Misura	Tensione	SI	SI				SI
	Temperatura	SI	SI			SI	SI
	Umidità		SI			SI	
	Resistenza		SI				
	Impulsi			SI			
	Corrente					SI	

LR8510/LR8511

Voltage

Fully isolated input channels

Maximum rated voltage to earth: 300 VAC, DC
Max. inter-channel voltage: 300 VDC

LR8510/LR8511

Thermocouple

K, J, E, T, N, R, S, B, W

Measurement range varies with thermocouple type (see specifications page).

LR8511

Pt100/ JPt100

Pt100 :-100 to 800 °C

JPt100 :-100 to 500 °C
3-wired/ 4-wired, 1mA testing current

LR8511

Resistance

0 to 200 Ω

Measurement ranges:
10/20/100/200Ω

LR8511

Humidity

5.0 to 95.0 %rh

Requires Humidity Sensor Z2000 (option).

LR8512

Pulse

Flow rate-No. of revolutions

Non-voltage "a" contact
Open collector, or voltage input (0 to 50V)

LR8513

Current using sensors

AC and DC load current and AC leak current

Measurement range varies with clamp type (see option page).

LR8514

Temperature, humidity

Dedicated temperature and humidity sensor (optional)

Z2010 (50 mm long, including sensor)
Z2011 (cable length: 1.5 m)

LR8515

Voltage

0 to 50V

Measurement range:
50m/500m/5/50V

LR8515

Thermocouple

K, T

Requires thermocouple

Operatività in qualsiasi ambiente estremo

Le unità di misura wireless possono essere utilizzate con sicurezza e tranquillità in ambienti caldi quali l'abitacolo di un'auto sotto il sole estivo o il quadro elettrico di un impianto di risalita (funivia, seggiovia) al freddo gelido dell'inverno.

* la temperatura di funzionamento del pacco batterie ricaricabili Z1007 (per LR8510 e LR8511) è compreso tra +5°C e +35°C.



Protezione dati tramite funzione di backup e batterie interne

Se manca alimentazione durante la misura

L'unità master salva i dati su SD card prima di spegnersi completamente e, al ripristino, riavvia automaticamente la comunicazione con i moduli di misura e riattiva le relative registrazioni.

Le unità di misura mantengono in memoria i dati registrati fino a quel momento perdendo solamente le misure occorse in fase di black-out.

Se avviene una perdita di comunicazione dati

Le unità di misura e master sono dotate di memoria buffer che mantiene i dati durante l'interruzione.

Al ripristino, i dati vengono trasferiti senza perdite all'unità centrale master.

Inoltre, l'unità master rileva la situazione di allarme e può inviare segnalazioni di avviso via mail, anche nel caso in cui le batterie siano scariche o esauste.

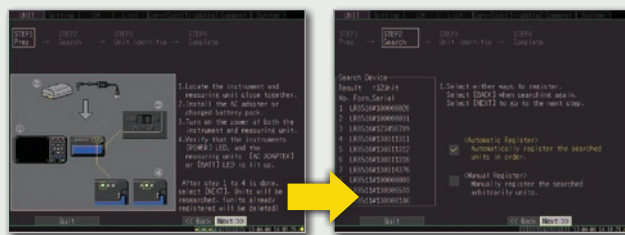
Le unità di misura LR8510 e LR8511 hanno una memoria flash locale sovrascrivibile con capacità di 65536 dati per ognuno dei 15 canali di misura.

PROTECT IMPORTANT DATA



Configurazione facilitata tramite QUICK-SET

In accensione, la funzione QUICK-SET avvia la ricerca automatica delle unità di misura; ogni unità connessa viene identificata da un numero progressivo da 1 a 7. Il data-logger LR8410/20 può supportare una lista di unità di misura associabili fino a 30 unità.



Elevata capacità di registrazione a lungo termine

Il data-logger LR8410/20 consente di registrare a lungo termine i valori provenienti dai canali di misura di ogni modulo di ingresso, su memoria interna 16MB, su SD Card 2GB o su chiave USB. In caso di improvvisa mancanza di alimentazione, il file viene correttamente chiuso prima dello spegnimento definitivo e al ripristino la registrazione può ripartire automaticamente.

Massima capacità di registrazione (registrazione da 2 unità – 30 canali, senza allarmi e calcoli aritmetici)

Intervallo di registrazione	100msec	200msec	500msec	1sec	2sec	5sec	10sec
Memoria interna 16MB	7h46m	15h32m	1g14h50m	3g5h40m	6g11h20m	16g4h21m	32g8h43m
SD card Z4001 (2GB)	41g10h12m	82g20h24m	207g3h1m	> 1 anno	> 1 anno	> 1 anno	> 1 anno

*la massima capacità di registrazione è inversamente proporzionale alla quantità di canali di registrazione

*i dati in tabella non tengono conto della porzione di file destinata alle forme d'onda; la capacità reale massima è il 90% di quanto in tabella

Registrazione e condivisione dati

Registrazione in tempo reale con "Logger utility"

In connessione USB o LAN, è possibile osservare in tempo reale i dati in registrazione, potendo scorrere la forma d'onda su tutta la sua durata.

Registrazione in tempo reale su SD card

LR8410/20 salva i valori di misura provenienti dalle unità di misura wireless su SD card o su chiavetta USB, con una periodicità di 1 minuto circa.

Se la cadenza di registrazione configurata è superiore ad 1 minuto, il salvataggio avviene con periodicità identica alla cadenza.

Cambio SD card con la registrazione in corso

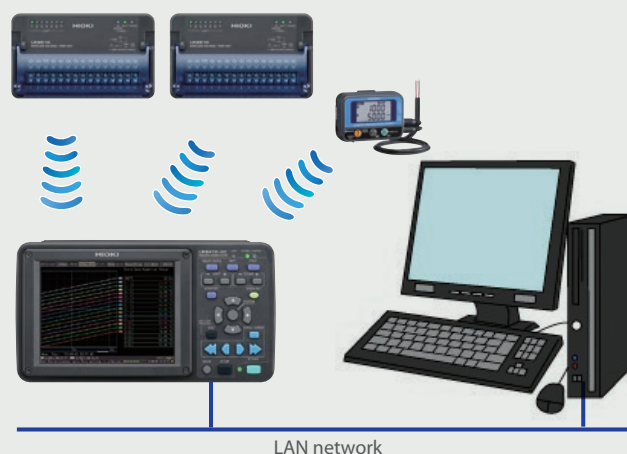
Grazie alla sua memoria buffer locale, LR8410 consente di cambiare SD card senza perdere alcun dato. Il nuovo file su nuova SD card conterrà tutti i dati disponibili sulla memoria interna di LR8410/20.

* sebbene le chiavette USB possano registrare dati in real time, è consigliabile utilizzare la SD card mod. Z4001



Gestione remota da computer tramite funzioni HTTP/FTP

Acquisizione dati con FTP	Tramite la funzione FTP è possibile scaricare su PC i dati registrati su memoria interna, SD card e chiavetta USB. <i>Non è possibile scaricare le forme d'onda durante la fase di acquisizione</i>
Trasferimento dati con FTP	I file salvati su SD card o chiavetta USB possono essere trasferiti via FTP in modo automatico a intervalli regolari, anche con acquisizione in corso.
Notifiche via mail	LR8410/20 può inviare segnalazioni mail a PC o smartphone connessi in rete, per situazioni di Bluetooth interrotto, batteria esaurita o memoria piena su unità di misura, avvenuto trigger di stop, allarme su un livello di misura.
Controllo remoto con HTTP	Utilizzando un browser di internet, si può gestire lo strumento in maniera totalmente remota. Configurazioni, impostazioni, settaggi, misure, tutto a portata di click. <i>Non è possibile scaricare le forme d'onda durante la fase di acquisizione.</i>



3 modalità di alimentazione per le unità di misura wireless

Batterie alkaline, alimentatore CA, tensione CC
I moduli di misura wireless possono essere alimentati con 2 batterie alkaline LR6, tramite alimentatore CA opzionale mod. Z2003, in tensione CC da 5 a 13.5V o tramite USB con apposito cavetto (non fornito).



Operatività continuativa		con batterie Z1007	con batterie alkaline LR6			
		LR8510/ LR8511	LR8512	LR8513	LR8514	LR8515
Cadenza di registrazione	0.1 secondi	Circa 24 ore	Circa 5 giorni			Circa 2 giorni
	0.5 secondi			Circa 5 giorni	Circa 5 giorni	
	1 secondo		Circa 7 giorni	Circa 7 giorni	Circa 7 giorni	Circa 4 giorni
	1 minuto	Circa 120 ore	Circa 10 giorni	Circa 10 giorni	Circa 10 giorni	Circa 10 giorni

WIRELESS LOGGING STATION LR8410 (Product and accuracy guaranteed for one year)

General specifications

Controllable devices	LR8510, LR8511, LR8512, LR8513, LR8514, LR8515
No. of controllable devices	Max. 7 units (up to 105 channels when used with the LR8510 or LR8511)
Control and communications (Between instrument and units)	Bluetooth® 2.1 + EDR (between Wireless Logging Station and logging modules); communication range: 30 m (line of sight), SSP security
Internal buffer memory	8 MWords volatile RAM (SDRAM)
Clock functions	Auto calendar, clock accuracy: ± 3 s/day (@23°C, 73.4°F)
Timebase accuracy	± 0.2 s/day while measuring (@23°C, 73.4°F)
Backup battery life	At least five years for clock and settings (@23°C, 73.4°F)
Operating temp. & humidity	-10 to 50°C (14 to 122°F), 30 to 80%RH or less (non-condensating)
Storage temp. & humidity	-20 to 60°C (-4 to 140°F), 80% RH or less (noncondensating)

Applicable standards	Safety: EN61010 EMC: EN61326 class A, EN61000-3-2, EN61000-3-3 Wireless certification: Japan (type :Incorporates a wireless module that has been certified certification) as compliant with applicable technical standards. US(FCC) : Part 15.247 (Contains FCC ID: QOQWT111A) Canada(IC) : RSS-210 (Contains IC: 5123A-BGTWT111A) EU : EN 300 328, EN 301 489-1, EN 301 489-17
Vibration endurance	JIS D 1601:1995 5.3(1), Category 1: Vehicle, Condition: Category A equiv.
External control terminal	External trigger input, trigger output, four alarm channel outputs, ground
Dimensions and Mass	230mm (9.06in)W × 125mm (4.92in)H × 36mm (1.42in)D, 700 g (24.7oz.) (excluding Battery Pack)
Accessories	Instruction manual ×1, Measurement guide ×1, SD Memory Card (2GB) Z4001 × 1, CD-R (data collection software "Logger Utility") ×1, USB cable ×1, AC Adapter Z1008 × 1

Data storage media

SD memory card	SD standard-compliant × 1, Hioki Z4001 (2 GB), Data format: FAT16, FAT32
USB memory	Series A receptacle

Communication functions

LAN Interface	IEEE802.3 Ethernet 100BASE-TX DHCP, DNS •Data acquisition and measurement criteria setting with the Logger Utility •Setting and measurement by communications commands •Manual file transfer by FTP server (from the instrument memory or removable storage). •Auto sending files by FTP client •Remote control by HTTP server •E-Mailing
USB Interface	USB2.0 compliant High Speed, Series-mini B receptacle • Data acquisition, condition settings used with the Logger Utility software (supplied as standard) • Configure the unit and measure using communication commands • Transfer data from the SD memory card to a PC via USB drive mode (data transfer not possible from USB memory sticks)

Display section

Display	5.7 inch TFT color liquid crystal display (640 × 480 pixel), horizontal 16 division, vertical 10 division, selectable between English and Japanese displays, back light saver available
LCD Brightness	Selectable from 100, 70, 40, or 25 %

Power supplies

AC adapter	Using the AC Adapter Z1008 (supplied as standard, 100 to 240 VAC, 50/60 Hz), Power consumption: 8 VA (with battery pack removed and maximum brightness)
Battery	Using the Battery Pack Z1007 (Li-ion 7.2V 2170mAh) (optional accessory, AC adapter has priority when used in combination with battery pack), continuous operation time: 3 hours (at 23 °C, LCD brightness 25 %) Fast recharging time: 7 hours (the AC Adapter or a 10 to 28 V DC external power supply can be connected while the Battery Pack Z1007 is installed.)
External power	10 to 28 VDC (Please contact your HIOKI distributor for connection cord) 15 VA (when battery is charged, and w/LCD max. blightness)

Trigger functions

Trigger mode, timing	Modes : Single / Repeat, Timing : Start / Stop / Start & Stop, Logical sum (OR) and product (AND) of each trigger source, selectable for each channel
Analog signal source	Up to 105 channels, depending on how many Wireless Voltage/ Temp Units LR8510 and Wireless Universal Units LR8511 are connected (U1-1 to U7-15). [Level trigger] Triggers when rising or falling through preset level [Window] Triggers when entering or exiting range defined by preset upper and lower limit values [Pattern trigger] Applies the trigger when a pattern defined in terms of 1, 0, ×, and values is matched (Setting only available when using logic measurement with the LR8512)
Interval trigger	Set year, month, date, hour, minute and second (triggers when specified measurement interval is passed)
Trigger output	Open-drain output, Trigger output terminal: Push-button type terminal block (5 V voltage output, active low, pulse width: at least 100 ms) Output response time: Recording interval + 3 sec. or less (with 1 measurement unit, good communications) Recording interval + 5 sec. or less (with 7 measurement units, good communications)

Alarm output

Number of channels	4 channels, non-isolated (common ground with chassis)
Alarm source	Analog input: Up to 105 channels, depending on how many Wireless Voltage/ Temp Units LR8510 and Wireless Universal Units LR8511 are connected (U1-1 to U7-15). When thermocouple burn-out detection is enabled, when the Wireless Voltage/ Temp Unit LR8510 or Wireless Universal Unit LR8511 battery is low, or when a communications error occurs
Alarm type	Level, window, output latch/ no latch, cancel alarm while measuring
Alarm sound	Buzzer, ON/OFF possible
Alarm output	Open drain output (with 5 V pull-up, active low), output response time: Recording interval + 3 sec. or less (with 1 measurement unit, good communications) Recording interval + 5 sec. or less (with 7 measurement units, good communications)
Output sink current	200 mA at 5 V to 30 VDC

Measurement settings

Recording intervals (sampling period)	*1, *2 100 ms, *2 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, 1 h (16 selections) <i>All input channels are scanned at high speed during every recording interval</i> *1 Setting not available when the thermocouple burnout detection setting is on. *2 The data update rate of the LR8513 and LR8514 is 500ms.
Recording length (time span)	Enable continuous recording ON (records until the Stop key is pressed), or continuous recording OFF (enable a specified time span)
Repeat measurement recording	Set Off or On. When On, measurement repeats at the set recording interval.

Display

Time axis	200 ms to 1day/divisions
Voltage axis	Select by position (magnification can be x100 to x1/2, 0 Position : Set between -50 to 150%) or upper/ lower limits
Waveform scrolling	Time-axis scrolling is available by left/right arrow keys while measuring and when measurement stops (waveform drawing period).
Jump function	Selects the displayed span of the waveform.
Monitor function	Confirm instantaneous values and waveforms without recording data.
Unit battery life remaining display	Displays the remaining battery life for wirelessly connected units as 1 of 3 levels.
Signal strength display	Displays the signal strength for wirelessly connected units as 1 of 3 levels.

Data saving

Save destination	Select a SD memory card or USB memory (use only SD memory cards sold by Hioki).
Storage operation	Auto: Save waveform data or time divided calculation results in real time Manual: Push the save key (operation select: item choose/ directly save)
Real-time saving	Possible: Waveforms are saved approximately every one minute as binary or text data to the SD memory card or the USB memory (if sampling rate is slower than 1 minute, waveforms are saved at each interval) To the PC: Waveforms are saved to the HDD in the PC via LAN or USB communication when used with the Logger Utility Software. Data can be saved in real time to the SD memory card or USB memory at the same time.
Split save	Simple divide: Save waveform data at pre-set times into separate files from the time measurement starts. On schedule: Designate a reference time within 24 hours and save data into separate files at every set time interval starting from the reference time.
Overwriting save	Endless loop saving: New file overwrites the oldest file when the SD memory card or USB memory capacity runs short
Remove external media	Storage media may be removed during real-time save after message confirmation. Upon inserting the storage media again, data saved in internal memory during that time will be saved as a separate file in the media.
Data protection	If a power outage occurs or the battery runs out during real-time saving, power is cut off after the file is closed (protection becomes possible approximately 10 min. or more after the instrument is turned on).
Save types	Setting condition, waveform data (binary or text style), calculation of numerical value, screen data (compressed BMP), reservation settings
Reloading data	Stored binary data can be recalled by the logging station in 8 MB quantities

Calculation functions

Numerical value calculations	Six calculations are available at the same time Average value, peak value, maximum value, time to maximum value, minimum value, time to minimum value
Data range of calculation	During measurement or after stopping: Applies calculations to all data in internal buffer memory, or to the time-span specified by A/B cursors. Interval calculation: Calculate values at pre-determined 1 sec to 1 day intervals and display the latest value
Calculation value save	Possible: After measuring the last calculated value is automatically saved to the SD memory card or USB memory as a text file Timed save: Save calculated data at pre-determined 1 sec to 1 day intervals as text data to the SD memory card or USB memory in real time.
Waveform calculations	Calculate sum, difference, product, and quotient between channels, with calculated results displayed as channels W1 to W30 (valid only while measuring, saved in real time with a channel's waveform data.).

Other functions

Event marking	Search: Move to the event number entered and display the waveforms appearing before and after event Number of events: Maximum 1000 per measurement
A-B cursor	Measurement: Time difference between A/B cursors, measured value difference, cursor measured value, time Types: Select trace, vertical, or horizontal
Scaling	Convert and display the measurement value of each channel as a scaled value
Rate adjustment function	Scaling can be set for a channel so that its value is the same as that for UNIT1-CH1
Comment entry	Enter a title or a comment for each channel
Others	Start backup, save 5 types setting conditions into main unit, auto set up, start/stop key lock, key-lock, beep sound, schedule, Quick Set function

WIRELESS VOLTAGE/TEMP UNIT LR8510 / WIRELESS UNIVERSAL UNIT LR8511

Basic specifications (Product and accuracy guaranteed for one year)

No. of input channels	15 channels (select voltage or thermocouple for each channel) (Pt100/JPt100, resistance, and humidity are also selectable for each channel with the model LR8511)
Input terminals	[LR8510] M3 screw type terminal block (2 terminals per channel) [LR8511] Push-button terminals (4 terminals per channel)
Measurement objects	[LR8510] Voltage/ Thermocouple [LR8511] Voltage/ Thermocouple/ RTDs/ Resistance/ Humidity
Supported device	Wireless Logging Station LR8410-20
Control and communications	Bluetooth® 2.1+EDR (Communications range: 30 m, line of sight, security: SSP)
Backup memory	When recording n channels: (65,536/n) data points Data is maintained in the event of a communications error and resent when communications are restored.
Operating temperature and humidity	Temperature: -20°C to 60°C (-4 to 140°F) Humidity: -20°C to 40°C (-4 to 140°F) 80%RH or less (noncondensing) 40°C to 45°C (140 to 113°F) 60%RH or less (noncondensing) 45°C to 50°C (113 to 122°F) 50%RH or less (noncondensing) 50°C to 60°C (122 to 140°F) 30%RH or less (noncondensing) (temperature variation range is 5 to 35°C (41 to 95°F))
Storage temperature and humidity	Temperature: -20°C to 60°C (-4 to 140°F) Humidity: -20°C to 40°C (-4 to 140°F) 80%RH or less (noncondensing) 40°C to 45°C (140 to 113°F) 60%RH or less (noncondensing) 45°C to 50°C (113 to 122°F) 50%RH or less (noncondensing) 50°C to 60°C (122 to 140°F) 30%RH or less (noncondensing)
Input resistance	1 MΩ±5% (voltage and thermocouple measurement) 2 MΩ±5% (RTD and resistance measurement)
Maximum input voltage	±100 VDC
Max. inter-channel voltage	300 VDC (Channels are not isolated during resistance bulb, resistance, or humidity measurement.)
Maximum rated voltage to earth	300 VAC, DC
Digital filter	Select OFF/ 50 Hz/ 60 Hz (In order to remove harmonic components, during analog input the cut-off frequency is automatically set according to the sampling rate)
Applicable standards	Safety: EN61010 EMC: EN61326 Class A, EN61000-3-2, EN61000-3-3 Wireless certification Japan (type : Incorporates a wireless module that has been certified certification) as compliant with applicable technical standards. US(FCC) : Part 15.247 (Contains FCC ID: QOQWT111A) Canada(IC) : RSS-210 (Contains IC: 5123A-BGTWT111A) EU : EN 300 328 EN 301 489-1 EN 301 489-17
Vibration endurance	JIS D 1601:1995 5.3(I), Category I: Vehicle, Condition: Category A equiv.
Dimensions and mass	Approx.150W×90H×56D mm (5.91"W × 3.54"H × 2.2"D) (including cover), [LR8510] approx. 340 g (12.0 oz.), [LR8511] approx. 320 g (11.3 oz.)
Accessories	Instruction Manual× 1, AC Adapter Z1008 × 1, Bracket × 1

LR8511 input specifications

Temperature Resistance Temperature Detector (RTD): Pt 100/JPt 100; connection: 3-wire/4-wire; measurement current: 1 mA
Ratings: JIS C1604-1997 and IEC 751 (Pt 100), JIS C1604-1989 (JPt 100)

Type	Range	Max. Resolution	Measurable Range	Measurement Accuracy
Pt 100	100 °C f.s.	0.01 °C	-100 to 100 °C	±0.6 °C
	500 °C f.s.	0.05 °C	-200 to 500 °C	±0.8 °C
	2000 °C f.s.	0.1 °C	-200 to 800 °C	±1.0 °C
JPt 100	100 °C f.s.	0.01 °C	-100 to 100 °C	±0.6 °C
	500 °C f.s.	0.05 °C	-200 to 500 °C	±0.8 °C
	2000 °C f.s.	0.1 °C	-200 to 500 °C	±1.0 °C

Resistance Connection: 4-wire; measurement current: 1 mA

Range	Max. Resolution	Measurable Range	Measurement Accuracy
10 Ω f.s.	0.5 mΩ	0 to 10 Ω	±10 mΩ
20 Ω f.s.	1 mΩ	0 to 20 Ω	±20 mΩ
100 Ω f.s.	5 mΩ	0 to 100 Ω	±100 mΩ
200 Ω f.s.	10 mΩ	0 to 200 Ω	±200 mΩ

Humidity

Range	Max. Resolution	Measurable Range	Measurement Accuracy
100 %rh f.s.	0.1 %rh	5.0 to 95.0 %rh	(See Humidity Accuracy Table)

Analog input section

(@ 23±5°C /73±9°F, 80% RH or less, Defined after zero-adjustment has been performed. The 50/60 Hz cut-off setting is selected)

Voltage

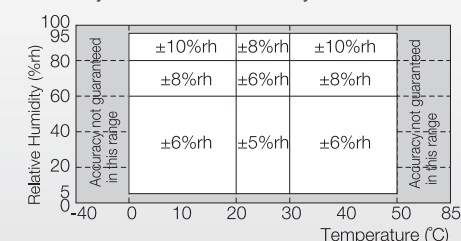
Range	Max. Resolution	Measurable Range	Measurement Accuracy
10 mV f.s.	500 nV	-10 mV to 10 mV	±10 μV
20 mV f.s.	1 μV	-20 mV to 20 mV	±20 μV
100 mV f.s.	5 μV	-100 mV to 100 mV	±100 μV
200 mV f.s.	10 μV	-200 mV to 200 mV	±200 μV
1 V f.s.	50 μV	-1 V to 1 V	±1 mV
2 V f.s.	100 μV	-2 V to 2 V	±2 mV
10 V f.s.	500 μV	-10 V to 10 V	±10 mV
20 V f.s.	1 mV	-20 V to 20 V	±20 mV
100 V f.s.	5 mV	-100 V to 100 V	±100 mV
1 - 5 V f.s.	500 μV	1 V to 5 V	±10 mV

Temperature(Thermocouples)

Type	Range	Max. Resolution	Measurable Range	Measurement Accuracy
K	100 °C f.s.	0.01 °C	-100 to 0 °C or less 0 to 100 °C	±0.8 °C ±0.6 °C
	500 °C f.s.	0.05 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 500 °C	±1.5 °C ±0.8 °C ±0.6 °C
	2000 °C f.s.	0.1 °C	-200 to -100 °C or less -100 to 1350 °C	±1.5 °C ±0.8 °C
J	100 °C f.s.	0.01 °C	-100 to 0 °C or less 0 to 100 °C	±0.8 °C ±0.6 °C
	500 °C f.s.	0.05 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 500 °C	±1.0 °C ±0.8 °C ±0.6 °C
	2000 °C f.s.	0.1 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 1200 °C	±1.0 °C ±0.8 °C ±0.6 °C
E	100 °C f.s.	0.01 °C	-100 to 0 °C or less 0 to 100 °C	±0.8 °C ±0.6 °C
	500 °C f.s.	0.05 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 500 °C	±1.0 °C ±0.8 °C ±0.6 °C
	2000 °C f.s.	0.1 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 1000 °C	±1.0 °C ±0.8 °C ±0.6 °C
T	100 °C f.s.	0.01 °C	-100 to 0 °C or less 0 to 100 °C	±0.8 °C ±0.6 °C
	500 °C f.s.	0.05 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 400 °C	±1.5 °C ±0.8 °C ±0.6 °C
	2000 °C f.s.	0.1 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 400 °C	±1.5 °C ±0.8 °C ±0.6 °C
N	100 °C f.s.	0.01 °C	-100 to 0 °C or less 0 to 100 °C	±1.2 °C ±1.0 °C
	500 °C f.s.	0.05 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 500 °C	±2.2 °C ±1.2 °C ±1.0 °C
	2000 °C f.s.	0.1 °C	-200 to -100 °C or less -100 to 0 °C or less 0 to 1300 °C	±2.2 °C ±1.2 °C ±1.0 °C
R	100 °C f.s.	0.01 °C	0 to 100 °C	±4.5 °C
	500 °C f.s.	0.05 °C	100 to 300 °C or less 300 to 500 °C 300 to 1700 °C	±4.5 °C ±3.0 °C ±2.2 °C
	2000 °C f.s.	0.1 °C	0 to 100 °C or less 100 to 300 °C or less 300 to 1700 °C	±4.5 °C ±3.0 °C ±2.2 °C
S	100 °C f.s.	0.01 °C	0 to 100 °C	±4.5 °C
	500 °C f.s.	0.05 °C	0 to 100 °C or less 100 to 300 °C or less 300 to 500 °C	±4.5 °C ±3.0 °C ±2.2 °C
	2000 °C f.s.	0.1 °C	0 to 100 °C or less 100 to 300 °C or less 300 to 1700 °C	±4.5 °C ±3.0 °C ±2.2 °C
B	100 °C f.s.	0.01 °C	0 to 100 °C	±1.8 °C
	500 °C f.s.	0.05 °C	0 to 500 °C	±1.8 °C
	2000 °C f.s.	0.1 °C	0 to 2000 °C	±1.8 °C

Reference junction compensation: Internal/ External, at INT RJC, total accuracy = add ±0.5 °C
Thermocouple burn-out detection: Enable/disable thermocouple burn-out detection at each recording interval.(The burnout detection setting cannot be used with a recording interval of 100 ms.)

Humidity Sensor Z2000 accuracy



Option

HUMIDITY SENSOR Z2000



Wireless Loggers LR8512, LR8513, LR8514, LR8515

Shared specifications

Control and communications	Bluetooth® 2.1+EDR (Communications range: 30 m, line of sight, security: SSP)
Internal memory	Nonvolatile memory (Flash memory)
Storage capacity	500,000 data items for each channel
Standard compliance	Same as Wireless Logging Station LR8410
Functions	Alarm, Scaling, Recording operation hold function, Erroneous operation prevention, Comment recording function, Energy saving function, Authentication function
Vibration endurance	JIS D 1601:1995 5.3(1), Category 1: Vehicle, Condition: Category A equiv.
Operating temperature and humidity	Temperature: -20 to 60 °C (-4 to 140 °F), Humidity: 80%rh or less (non-condensing) (Depends on battery and current sensor specifications when they are in use)
Power supplies	AC Adapter Z2003 (sold as a separate option), LR6 alkaline batteries × 2, 5 to 13.5 VDC external power source
Accessories	CD-R (Instruction Manual, Logger Utility) × 1, Measurement Guide × 1, Caution for Using Radio Waves × 1, AA alkaline batteries (LR6) × 2 Note: Only included with the LR8512: Connection Cable L1010 × 2

WIRELESS PULSE LOGGER LR8512

Basic specifications (Accuracy guaranteed for 1 year)

No. of input channels	2 channels (common GND)
Measurement modes	Integrating (cumulative/Instant), Revolution, Logic (Records an I/O for each recording interval)
Measurement ranges (Resolution)	Totalization: 1000M pulse f.s. (1 pulse) No. of revolutions: 5000/n[r/s]f.s. (1/n[r/s]) *n is the number of pulses, 1 to 1000, per revolution.
Supported input format	Non-voltage "a" contact (always-open contact point), open collector, or voltage input (DC 0 V to 50 V)
Recording intervals	0.1 to 30 sec, 1 to 60 min, 16 selections
Recording modes	Instantaneous value
Dimensions	85W×61H×31D mm (3.35W×2.40H×1.22D in)
Mass	95 g (Not including the battery)

WIRELESS CLAMP LOGGER LR8513

Basic specifications (Accuracy guaranteed for 1 year)

No. of input channels	2 channels (common GND)
Measurement items	AC load current, DC load current AC leak current (using current sensor)
Effective value calculation	Software calculates the true RMS value
Measurement ranges	AC 500.0 mA to 2000 A (By current sensor) DC 10.0 A to 2000 A (By current sensor) *Current and leak current that occur intermittently cannot be measured.
Measurement accuracy	±0.5% rdg. ±5 dgt. (DC, AC 50/60 Hz) *Add the sensor's accuracy when the current sensor is connected (Page 12)
Recording intervals	0.5 to 30 sec, 1 to 60 min, 14 selections
Recording modes	Instantaneous value, average value
Dimensions	85W×75H×38D mm (3.35W×2.95H×1.50D in)
Mass	130 g (Not including the battery)

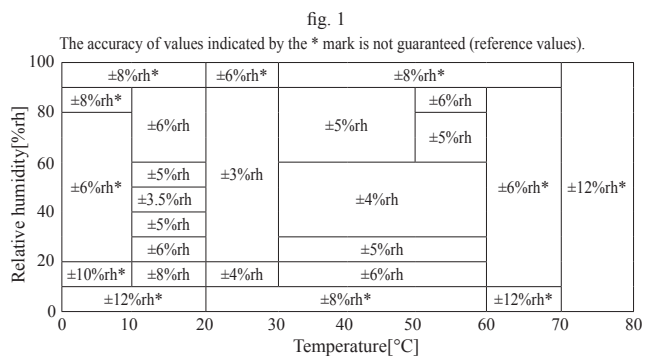
Sensor used	Range	Max. Resolution	Measurable Range
9675	500.0 mA	0.1 mA	AC 1.0 mA to 500.0 mA
	5.000 A	0.001 A	AC 0.010 A to 5.000 A
9657-10	500.0 mA	0.1 mA	AC 1.0 mA to 500.0 mA
	5.000 A	0.001 A	AC 0.010 A to 5.000 A
9695-02	50.00 A	0.01 A	AC 0.10 A to 50.00 A
	50.00 A	0.01 A	AC 0.10 A to 50.00 A
CT6500	50.00 A	0.01 A	AC 0.10 A to 50.00 A
	500.0 A	0.1 A	AC 1.0 A to 500.0 A
9669	1000 A	1 A	AC 10 A to 1000 A
CT9691-90	10.00 A	0.01 A	AC 0.10 A to 10.00 A DC± (0.10 A to 10.00 A)
	100.0 A	0.1 A	AC 1.0 A to 100.0 A DC± (1.0 A to 100.0 A)
CT9692-90	20.00 A	0.01 A	AC 0.10 A to 20.00 A DC± (0.10 A to 20.00 A)
	200.0 A	0.1 A	AC 1.0 A to 200.0 A DC± (1.0 A to 200.0 A)
CT9693-90	200.0 A	0.1 A	AC 1.0 A to 200.0 A DC± (1.0 A to 200.0 A)
	2000 A	1 A	AC 10 A to 2000 A DC± (10 A to 2000 A)

WIRELESS HUMIDITY LOGGER LR8514

Basic specifications

No. of input channels	2 ch for temperature + 2 ch for humidity (2 sensors can be attached)
Measurement items	Temperature, humidity
Temperature measurement accuracy	±0.5°C (10°C to 60°C), using Z2010/Z2011 If outside above temperature range: Add 0.015°C/°C (-40°C to 10°C) or 0.02°C/°C (60°C to 80°C)
Humidity measurement accuracy	±3% RH (20°C to 30°C, 20% to 90% RH) If outside above range, see Figure 1.
Recording intervals	0.5 to 30 sec, 1 to 60 min, 14 selections
Recording modes	Instantaneous value
Dimensions	85W×61H×31D mm (3.35W×2.40H×1.22D in)
Mass	95 g (Not including the battery)

Measurement objects	Range	Max. Resolution	Measurable Range
Temperature	100 °C f.s.	0.1 °C	-40 °C to 80 °C
Humidity	100%rh f.s.	0.1 %rh	0 to 100 %rh



*Only the temperature and humidity sensors affect the measurement accuracy and are subject to calibration. The LR8514 logger does not require calibration.

WIRELESS VOLTAGE/TEMP LOGGER LR8515

Basic specifications (Accuracy guaranteed for 1 year)

No. of input channels	2 ch (isolated; select voltage of thermocouple for each channel)
Measurement items	Voltage/Thermocouple (K, T)
Input terminals	M3 screw type terminal block (2 terminals per channel)
Measurement ranges	Voltage: 50 mV/500 mV/5 V/50 V Thermocouple: 1000°C (1832°F)
Maximum input voltage	DC±50 V
Max. inter-channel voltage	DC 70 V
Recording intervals	0.1 to 30 sec, 1 to 60 min, 16 selections
Recording modes	Instantaneous value
Dimensions	85W×75H×38D mm (3.35W×2.95H×1.50D in)
Mass	126 g (Not including the battery)

Measurement objects	Type	Range	Max. Resolution	Measurable Range	Measurement Accuracy
Voltage		50 mV f.s.	0.01 mV	-50 mV to 50 mV	±0.05 mV
		500 mV f.s.	0.1 mV	-500 mV to 500 mV	±0.5 mV
		5 V f.s.	1 mV	-5 V to 5 V	±5 mV
		50 V f.s.	10 mV	-50 V to 50 V	±50 mV
Thermocouples	K	1000 °C f.s.	0.1 °C	-200 °C to -100 °C	±1.5 °C
				-100 °C to 999.9 °C	±0.8 °C
	T	1000 °C f.s.	0.1 °C	-200 °C to -100 °C	±1.5 °C
				-100 °C to 0 °C	±0.8 °C
		0 °C to 400 °C	±0.6 °C		

Reference contact compensation: Switchable between internal and external
Reference contact compensation accuracy: ±0.5°C (When using internal compensation, add to thermocouple measurement accuracy.)
Temperature characteristics: Add (measurement accuracy × 0.1)°C to measurement accuracy.

Logger Utility specifications

Bundled application software(CD-R)



Operating environment	OS: Windows 8 (32/64 bit)/ 7 (32/64 bit)/ Vista/ XP (SP2 or later) (This software is compatible only to the Wireless Logging Station LR8410, Memory HiLogger LR8400 series, LR8431, 8423, and 8430)
Real-time data acquisition	Measurements on multiple loggers connected by LAN or USB can be controlled to sequentially acquire, display and save waveform data (for recording up to 10 million samples) Number of controllable instruments: up to 5 units (This software is compatible only with the LR8410, LR8400 series, LR8431, 8423, and 8430) Display: Waveforms (time-axis divided display possible), numerical values (logging), and alarm status can be displayed at the same time Numerical value display: Can be monitored in a separate window Scroll: Waveform scroll while measuring Data saving destination: Real-time data transfer to Excel, or Real-time data acquisition file (LUW format) Event marks: Can be set while measuring
Data acquisition settings	Data acquisition settings for the logger or logging station Saving: The setting for multiple loggers or logging stations can be saved together in one file (LUS format); Instrument configuration settings can be sent and received
Waveform display	Processed data file: Real-time data acquisition file (LUW format), Record to internal memory data (MEM format) Display format: Simultaneously display waveform and numerical value, (time-axis divided display possible) Maximum number of channels: 675 channels (measurement data) + 60 channels (waveform processing data) Others: Display each channel's waveform on 10 sheets, scroll, record event mark, cursor, screen hard copy, numerical value display

Data conversion	Target data: Real-time data acquisition file (LUW format), record to internal memory data (MEM format) Converted sections: All data, designation section Format: CSV format (separate by comma, space, tab), transfer to Excel spreadsheet, arbitrary data thinning
Waveform processing	Processing items: Four arithmetic operations Number of processing channels: 60 channels
Parameter calculations	Target data: Real-time data acquisition file (LUW format), record to internal memory data (MEM format), data acquired in real time, waveform processing data Calculation items: Average, peak, maximum values, time to maximum values, minimum values, time to minimum values, ON time, OFF time, count the number of ON time and OFF time, standard deviation, integration, area values, totalization
Search functions	Target data: Real-time data acquisition file (LUW format), record to internal memory data (MEM format) Search mode: Event mark, time and date, maximum position, minimum position, maximum pole, minimum pole, alarm position, level, window, amount of change
Print functions	Supported printer: Printer compatible with the OS Target data: Real-time data acquisition file (LUW format), record to internal memory data (MEM format) Print format: Waveform image, report format, list print (channel settings, event, cursor value) Print area: The entire area, area between cursors A and B Print preview: Supported

LR8410/20

WIRELESS LOGGING STATION LR8410-20



Accessories

Instruction manual ×1, Measurement guide ×1, SD Memory Card (2GB) Z4001 × 1, CD-R (data collection software "Logger Utility") ×1, USB cable ×1, AC Adapter Z1008 × 1

AC ADAPTER Z1008

SD MEMORY CARD 2GB Z4001



Measurement cannot be performed using the LR8410 alone. Measurement requires an LR8510/LR8511 measurement unit or an LR8512/LR8513/LR8514/LR8515 wireless logger.
(One LR8410 can control from one to seven units [different models can be mixed].)

Measurement units

WIRELESS VOLTAGE/TEMP UNIT	LR8510
WIRELESS UNIVERSAL UNIT	LR8511

LR8510, LR8511 Shared accessories

AC ADAPTER Z1008
100 to 240V AC, 50/60Hz



Wireless loggers

WIRELESS PULSE LOGGER	LR8512
WIRELESS CLAMP LOGGER	LR8513
WIRELESS HUMIDITY LOGGER	LR8514
WIRELESS VOLTAGE/TEMP LOGGER	LR8515

An optional AC adapter for the LR8512 to LR8515 is available for separate purchase.

LR8512-only accessories
CONNECTION CABLE L1010



1.5m

Use of the Wireless Logging Station

The LR8510/LR8511 measurement units, the LR8512/LR8513/LR8514/LR8515 wireless loggers, and the LR8410 Wireless Logging Station use the 2.4 GHz band. No radio station license is required in order to use these products, but the following precautions should be observed:

- Do not use with systems required to exhibit a high level of safety or reliability.
- Do not use in proximity to pacemakers or other medical devices.
- The communications range between the Wireless Voltage/ Temp Unit, Wireless Universal Unit, and Wireless Logging Station is 30 meters (line-of-sight distance). The presence of obstructions (such as walls or metal shielding) may compromise the reliability of communications or shorten the communications range.
- When used in proximity to other devices that use the same frequency band, for example wireless networking devices, transmission and reception of data may become unreliable, and product operation may be affected by the other devices.
- Although communications with the LR8510/LR8511 measurement units, the LR8512/LR8513/LR8514/LR8515 wireless loggers, and the LR8410 Wireless Logging Station are encrypted using SSP, the confidentiality of information sent and received in this manner is not guaranteed. Hioki is not liable for any damage sustained due to the interception of measured values sent using wireless communications.
- The LR8510/LR8511 measurement units, the LR8512/LR8513/LR8514/LR8515 wireless loggers, and the LR8410 Wireless Logging Station may only be used in the following countries: Japan, the U.S., Canada, the EU, Norway, Switzerland, Turkey, Russia, Vietnam, and India. The LR8510/LR8511 measurement units, the LR8512/LR8513/LR8514/LR8515 wireless loggers, and the LR8410 Wireless Logging Station emit radio waves. Use of radio waves is subject to licensing requirements in certain countries. Use in countries or regions other than those listed above may constitute a violation of law, exposing the operator to legal penalties.

WIRELESS VOLTAGE/TEMP UNIT
LR8510



2 terminals M-3 mm screw type,
15 ch Voltage, Temperature with thermocouple

WIRELESS UNIVERSAL UNIT
LR8511



4 terminals push-button type, 15 channels
Voltage, Temperature with thermocouple,
Resistance Temperature Detector (RTD),
Humidity, or Resistance measurement

LR8512



For pulse measurement

LR8513



For current measurement; used with separately available current sensor

LR8514



For temperature and humidity measurement; used with separately available temperature/humidity sensor

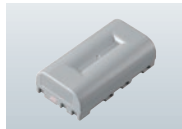
LR8515



For voltage and temperature measurement; used with separately available thermocouple sensor

Options

For use with the Wireless Logging Station LR8410



BATTERY PACK Z1007
Li-ion, 7.2V/2170mAh



CARRYING CASE C1007
Accommodates one LR8410 and four units.



FIXED STAND Z1009
Mount on a wall or use as a bench-top angled stand.

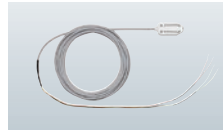


LAN CABLE 9642
Straight Ethernet cable, supplied with straight to cross conversion adapter, 5 m (16.41 ft) length

For the LR8510 and LR8511



BATTERY PACK Z1007
Li-ion, 7.2V/2170mAh



For the LR8511 only
HUMIDITY SENSOR Z2000
Cord length: 3 m (9.84 ft)

For the LR8512 to LR8515



AC ADAPTER Z2003
AC100 to 200V, 50/60Hz



MAGNETIC STRAP Z5004

For the LR8514 only



HUMIDITY SENSOR Z2010
Total length: 50 mm (including sensor)

For the LR8514 only



HUMIDITY SENSOR Z2011
Cord length: 1.5m (4.92 ft) (including sensor)

Current sensors for the LR8513



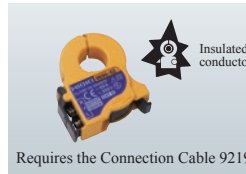
AC load current



CLAMP ON SENSOR CT6500
φ46mm, AC 500 A,
Accuracy: ±1.5%rdg.±0.03%f.s.
Cord length 3 m (9.84 ft)



CLAMP ON SENSOR 9669
φ55mm, AC 1000 A,
Accuracy: ±1.0%rdg.±0.01%f.s.
Cord length 3 m (9.84 ft)



CLAMP ON SENSOR 9695-02
φ15mm, AC 50 A,
Accuracy: ±0.3%rdg.±0.02%f.s.



CONNECTION CABLE 9219
For connecting the 9695-02,
Cord length 3 m (9.84 ft)

AC load current, DC load current



CLAMP ON AC/DC SENSOR CT9691-90
φ35mm, AC/DC 100 A,
Accuracy: ±1.5%rdg.±1.0%f.s.
(DC, 45 to 66Hz)
Cord length 2 m (6.56 ft)



CLAMP ON AC/DC SENSOR CT9692-90
φ33mm, AC/DC 200 A, Accuracy:
±1.5%rdg.±0.5%f.s.
(DC, 45 to 66Hz)
Cord length 2 m (6.56 ft)



CLAMP ON AC/DC SENSOR CT9693-90
φ55mm, AC/DC 2000 A,
Accuracy: ±2.0%rdg.±0.5%f.s. (DC)
±1.5%rdg.±0.5%f.s. (45 to 66Hz)
Cord length 2 m (6.56 ft)

AC leak current



CLAMP ON LEAK SENSOR 9657-10
φ40mm, AC 10 A, Accuracy:
±1.0%rdg.±0.05%f.s.
Cord length 3 m (9.84 ft)



CLAMP ON LEAK SENSOR 9675
φ40mm, AC 10 A,
Accuracy: ±1.0%rdg.±0.005%f.s.
Cord length 3 m (9.84 ft)