

DMM

HIOKI

PRINT HI TESTER

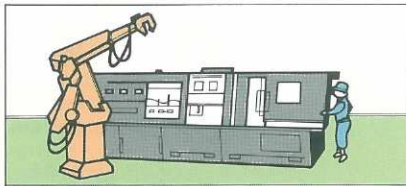
3215

Digital multimeter capable of digital/analog recording

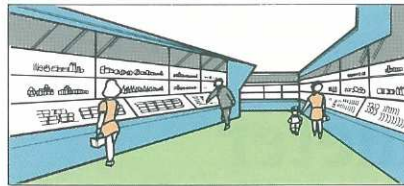


Data-logging DMM expands measurement fields.

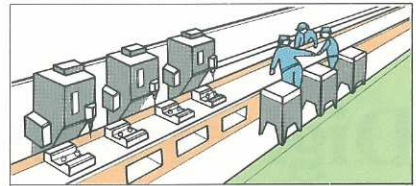
Monitoring and control of electrical equipment and machinery operations.
Used in conjunction with clamp-on sensors, alarms, or control devices, equipment operations can be automatically monitored and controlled.



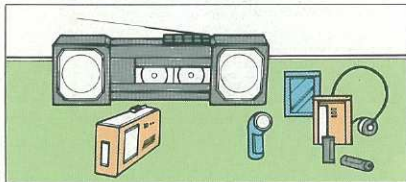
Temperature monitoring of freezers, showcases, and other thermostatically controlled equipment.
Temperatures can automatically be monitored by using a temperature adapter.



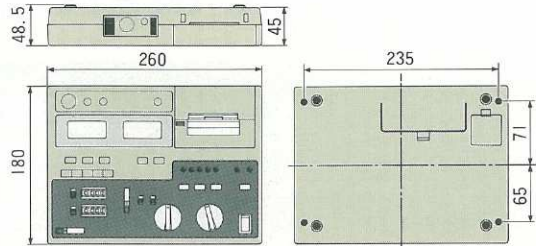
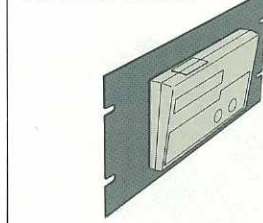
Go/No Go testing on production lines.
Used in parts testing on production lines, electrical and physical properties can be sensed, and decisions made regarding acceptability of the parts.



Battery life testing in portable electrical appliances.
Simplifies long-term testing of battery-operated devices. Data on battery-life is highly accurate.



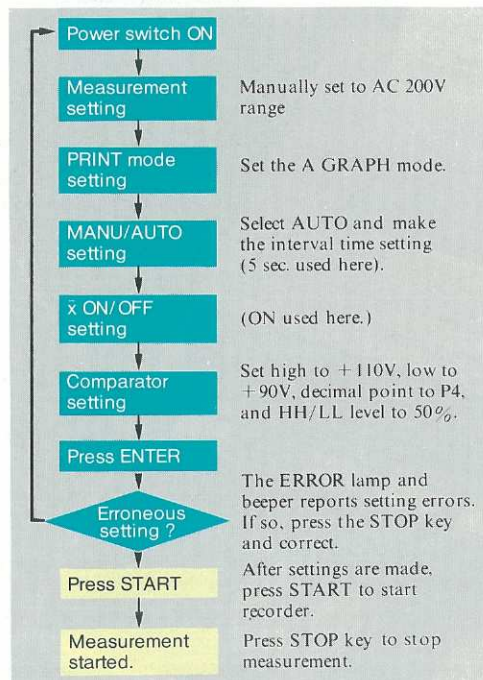
Rack-mountable



Application example 1

Digital values and expanded graphing capability make data analysis easier. (Example illustrates the A GRAPH mode used to measure and record voltage fluctuations in a commercial power supply.)

Operating procedure



When the comparator conditions have been set, pressing ENTER stores the conditions and prints out the settings.

Time interval
In the A GRAPH mode, this indicates the interval which values are stored; not the print interval.

Pressing the START key starts data print-out.

Print-out in the A GRAPH mode consists of plotting a graph based on 10 cycles of sequentially stored data, along with digital value print-out of the 10th piece of data.

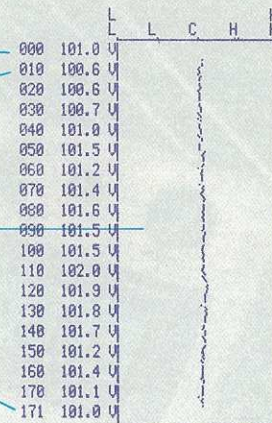
The graph represents an expanded view of changes occurring in the measurement value between LL (80V) and HH (120V).

At the point the STOP key is pressed, if 10 pieces of data have not been stored, the recording will be based on what has been stored, and the last digital value will be printed out.

When the x ON/OFF switch is ON, the number of data samples (N), average value (x̄), minimum, and maximum values will be printed out.

```
L CMP 000.0 V H CMP 110.0 V
LL CMP 000.0 V HH CMP 120.0 V
CENTER 100.0 V
```

TIME INT. = 5 S



```
N = 171
x̄ = 101.1 V
MIN. = 100.1 V
MAX. = 102.5 V
```

Application example 2 5-level comparator operations (Using A TEXT mode to classify resistors.)

Classifying ±20% 1kΩ resistors into five categories.

- LL level... -20% to -10% (800 to 900Ω)
- L level... -10% to -5% (900 to 950Ω)
- M level... -5% to +5% (950 to 1050Ω)
- H level... +5% to +10% (1050 to 1100Ω)
- HH level... +10% to +20% (1100 to 1200Ω)

Level settings are made as follows:

Set the high side to 1050, and the polarity switch to "+". Set the low side to 950, and the polarity switch to "+". The difference between H level and L level is 100. To set -10% (900Ω) and +10% (1100Ω), set the HH/LL level setting switch to 50%.

Additional notes on comparator operations.

The comparator functions to compare the measurement data in channel A with preset values. The results of that comparison are divided into five levels for print-out, and for the LED report.

In the NO PRINT mode, only the LED report is made.

Comparator results are divided into the five levels as follows:

HH Comp.	≤ measurement data	→ HH level
H Comp.	≤ measurement data HH Comp.	→ H level
L Comp.	≤ measurement data H Comp.	→ M level
LL Comp.	≤ measurement data L Comp.	→ L level
	measurement data LL Comp.	→ LL level

Applicable uses: Expanding fields of measurement

```
L CMP 0.950kΩ H CMP 1.050kΩ
LL CMP 0.900kΩ HH CMP 1.100kΩ
CENTER 1.000kΩ
```

```
001 1.006kΩ H
002 0.912kΩ L
003 1.032kΩ M
004 0.935kΩ M
005 0.875kΩ LL
006 1.170kΩ HH
007 1.100kΩ HH
008 1.099kΩ H
009 1.050kΩ H
010 1.049kΩ M
011 0.950kΩ M
012 0.949kΩ L
013 0.901kΩ L
014 0.900kΩ L
015 0.899kΩ LL
```

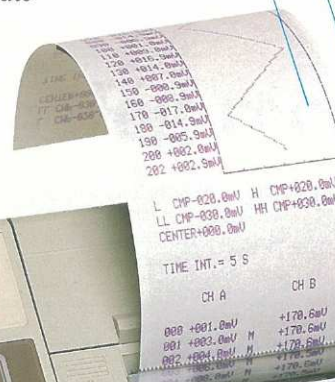
Five-level comparator capability.

Five-level comparator capability.
The 3215 Print Hi Tester is a digital multimeter with two channel (A, B) measurement capability, a 5-level comparator, and digital/analog recording capability. A unique and new idea in data logging DMMs, the 3215 greatly expands the field of measurement possibilities.

Digital/Analog recording
Data from channels A and B, comparator and calculation results are printed out by the dot-matrix impact printer. Channel A has a graphics mode for recording analog data. Together, you have enough information for fast and accurate data analysis.

Recording made in the A GRAPH mode.
ERROR
The ERROR LED lights and a beeper sounds when an erroneous comparator setting is made, when a data overflow occurs due to a function change, or when a printer malfunction occurs.

Option input terminal
Expands measurement range.
Channel B measurement section (DC V only)
Channel A measurement section (AC/DC V, mA, Ω)
Comparator output terminal (optional) (rear panel)



Recording made in the A-B TEXT mode.

Print START key
After the ENTER key has been pressed, tapping this key starts Print-out of measurement data.

ENTER key
After making the comparator and calculation settings, pressing this key enters the setting conditions, accompanied by a print-out of the settings made.

Time interval switch
12-step switch used to set the interval for data print or memory save from 5 seconds to 1 hour.

MANU/AUTO setting
HH/LL level setting switch
Whereas with conventional comparators featuring only high (H) and low (L) limit setting capability, HH and LL settings can also be made with the 3215. HH and LL levels are set according to the following equations.
 $HH = H \text{ level} + \{(H \text{ level} - L \text{ level}) \times K / 100\}$
 $LL = L \text{ level} - \{(H \text{ level} - L \text{ level}) \times K / 100\}$
Where K is selectable value of 0, 10, 25, 50, 100, or 200% set using the HH/LL level setting switch. (When 0% is used for K, the decision is made as to LL, M, and HH.)

Comparator level setting
High setting (upper-order 2 1/2 digits)
Low setting (upper-order 2 1/2 digits)
Decimal point setting

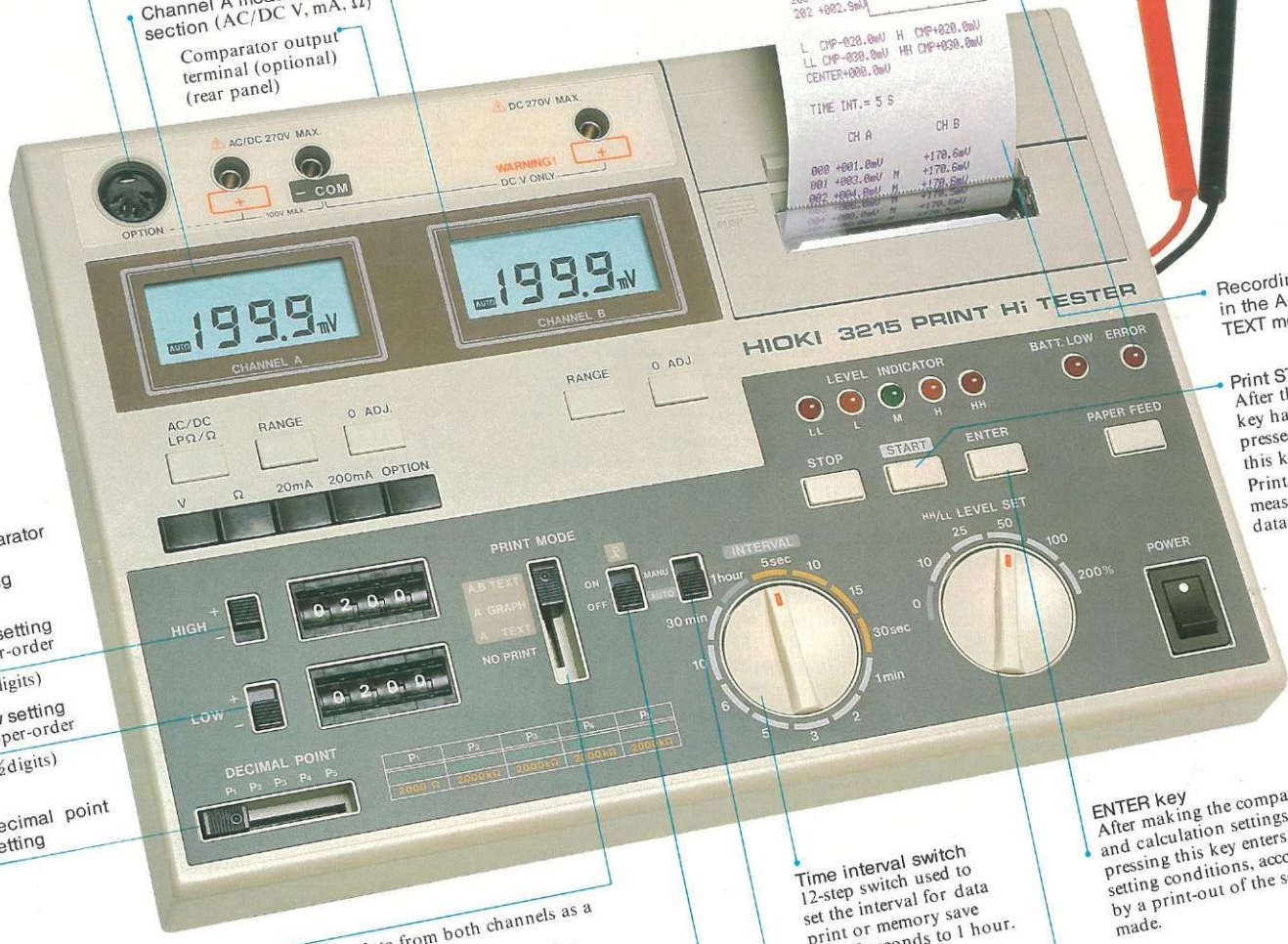
Print mode switches
A-B TEXT mode: Prints out the measurement data from both channels as a digital value.
A GRAPH mode: Prints out the measurement data from channel A using digital values and graphs.
A TEXT mode: Prints out only the measurement data from channel A as a digital value.
NO PRINT mode: Disables print out of measurement data. Only the comparator function is active.

Average value (\bar{x}) ON/OFF switch
An ON setting calculates the average value of channel A measurement data.

Two measurement channels
DC and AC V, mA, Ω , and LP Ω functions can be used with channel A, and DC V used with channel B. For normal measurements, the 3215 functions like a regular 3 1/2-digit DMM. An optional input terminal is available for connecting sensors and adapters to channel A, significantly expanding application possibilities.

5-level comparator function
The comparator section consists of two digital switches (to set high and low values) and a rotary switch. Switch combinations are used to set comparator levels for measurement values to LL, L, M, H, and HH. Decision results are reported by five LEDs, and a data print-out is produced. (Channel A only.)

\bar{x} calculation function
The \bar{x} calculation function of the 3215 works on up to 500 pieces of data ($n = 500$), printing out the average, maximum, and minimum value. Since the instrument also features autoranging (excluding mA), calculations automatically account for decimal point placement and changes in units. (Channel A only.)



General Specifications

Measurement method: Dual integrator operation.
 Display: 3½-digit white character LCD; digit height, 10mm.
 Measurement channels: Two (A and B).
 Recording method: Mechanical type dot-matrix impact printer.
 Printing modes: A & B TEXT, A TEXT, NO PRINT.
 Comparator: 5-level (LL, L, M, H, HH). Level indicators and signal output provided.
 Calculation function: Average value (\bar{x}), maximum, and minimum values calculated for up to 500 pieces of data.
 Operating temperature (accuracy assured): 18~28°C, <80% RH
 Operating temperature: 0~40°C, <80% RH

Storage temperature: -20~+50°C, <70% RH (For storage in excess of 3 mos: 35°C, <70% RH.)
 Continuous operating time*: Battery only, 5 hours (typ); used with charger, approx. 15 hours.
 Power consumption: With printer operations, 1W (typ); no printer operations, 0.35W (typ)
 Battery low indicator: LED lights when less than 4.6V.
 Power source: Built-in Ni-Cd rechargeable batteries (4.8V). (10 hours required for full charge.)
 Dimensions/Weight: 180H×260W×45D (mm) (excluding projections)/1.1kg (approx)
 Accessories provided: 9133 Battery Charger, 9170 Test Lead Set, recording chart (1 roll), alligator clips (red/black, 1 ea), crocodile clip test leads, 0.5A spare fuse.
 * Used in A-B TEXT mode, time interval setting of 5 sec.

Measurement Section
 Display digits: Max. reading, 1999 (two channels)
 Overrange display: MSD "1" flashes.
 Annunciators:
 A channel: Option input terminal provided.
 A-B channel: A and B channel are common.
 Range switching: Full autoranging, and manual ranging (Current ranges are manually set.)
 Sampling rate: Two-per-second.
 Zero adjust: Up to 99 digits can be cancelled.
 Loaded circuit protection: Voltage, DC 600V max, or DC + AC peak. Ω/ mA; 0.5A fuse (non-arcing, Ach only), AC/DC 250V max.
 COM.(Ach, Bch) COM. (option terminal: 2A fuse (non-arcing), AC/DC 250V max.
 Option terminal: AC/DC 100V (for 1 min.)

Measurement Functions:

(Accuracy specified for 23°C ±5°C, <80% RH, following 0 ADJ, no

	Range	Accuracy	Notes
D C V	200.0mV	±0.35%rdg. ±2dgt.	Input imp. >100MΩ
	2 V	"	
	20 V	±0.5%rdg. ±2dgt.	
	200 V	"	
A C V	270 V	±0.8%rdg. ±2dgt.	Input imp. approx. 1MΩ
	2 V	±0.8%rdg. ±4dgt.	
	20 V	"	
	200 V	"	
Ω	270 V	±1.0%rdg. ±4dgt.	Open Terminal 1.5V ±0.2V 0.65V ±0.07V
	200 Ω	±0.5%rdg. ±4dgt.	
	2kΩ	"	
	20kΩ	"	
	200kΩ	±1.2%rdg. ±4dgt.	
L P Ω	200kΩ	±0.75%rdg. ±5dgt.	Open Terminal <0.4 Voltage
	2kΩ	"	
	20kΩ	"	
	200kΩ	"	
D C A	20mA	±1.0%rdg. ±2dgt.	Input resistance approx. 10Ω approx. 1Ω
	200mA	"	
A C A	20mA	±1.2%rdg. ±4dgt.	Input resistance approx. 10Ω approx. 1Ω
	200mA	"	
Options	DC 200mV	±0.35%rdg. ±2dgt.	>100MΩ (40~500Hz)
	AC 200mV	±0.8%rdg. ±4dgt.	
	Zero offset	< 2 dgt.	

Note: Channel B has only the DC V function. Accuracy is the same as channel A DC V.

Comparator Section

Level setting: Effective setting range of 0000 thru 1990 (2½ -digits, "0" in LSD column fixed.)
 Polarity setting: Slide switch
 Decimal point setting: 5-position slide switch, settable for high and limit.
 HH/LL level setting:
 $HH = H \text{ level} + \{(H \text{ level} - L \text{ level}) \times K / 100\}$
 $LL = L \text{ level} - \{(H \text{ level} - L \text{ level}) \times K / 100\}$
 Where K is a selectable value of 0, 10, 25, 50, 100, or 200% set by a 6-position rotary switch.

Level indication: Comparator level results reported by five LEDs.
 Errors: Where high or low level is exceeded, a red LED lights, and a beeper sounds.
Calculation Section
 When \bar{x} data is required, placing the slide switch ON prints out the number of data samples (up to 500), maximum value, minimum value, and average value (\bar{x}) on the bottom of the chart.
Recorder Section
 Print format: Max. total of 192 dots per line.
 Printing speed: Approx. two lines-per-second.
 Character dimensions: 1.3W×2.4H (mm) (5×7 dot-matrix)
 Recording form: Plain-paper, width of 57.5 ±0.5mm, roll diameter of 35mm or less.
Paper feed:
 During printing operations, paper automatically feeds one pitch (0.33 mm) with the return of the print head. Space feed: Pressing the PAPER FEED key results in continuous and automatic space feed at the same pitch as for printing operations.
 Paper free mechanism: Pulling the paper straight out in the direction of paper feed frees it.
Inking: Color, purple; life, 250,000 characters (approx); Dimensions, 91W ×25D×7H (mm) (approx)
 Print modes: A-B TEXT mode; measurement data from both channels,

and comparator settings and results from channel A printed out digitally. A GRAPH mode; channel A measurement data, and comparator settings and results printed out digitally and in graph form.
 A TEXT mode; channel A measurement data printed out digitally.
 NO PRINT mode; no print-out.
 Time interval: 5 sec. to 1 hour (12-steps)
 Errors: After the ENTER key has been pressed to set all conditions, changing the measurement section function setting will cause the ERROR LED to light, and the beeper to sound.

Power Source Section

Internal batteries: Four rechargeable type Ni-Cd batteries.

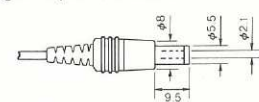
Battery charger specifications

Output	DC 6V, 600mA					
Input	100V	120V	220V	240V		
Standard	UL	CSA	CEE	CEE	SAA	
Country	S. Korea	USA Taiwan	Canada	W. Germany Italy Switzerland Holland Denmark	Finland Chile China Indonesia Singapore	Great Britain Australia

General specifications

Operating temperature: -10~+40°C
 Dielectric strength: AC 1000V for 1 min. between input and output.
 Insulation resistance: Over 100MΩ at DC 500V between input and output.
 Output voltage: Specified for rated input resistance load; no load: 8.8V ±0.4V; with DC 600mA load: 5.0V ±0.4V

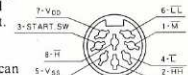
Charger input terminal



(+): 5.5mm (-): 2.1mm (center pin)
 Battery charger plug (center pin negative)

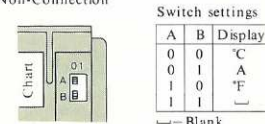
Charging time: 10 hours (approx)
 Repeatable charges: 500 (approx)
 Max. charge hold time: 1 month (approx)
Input/Output Terminals

○ Comparator output terminal...8-pin DIN connector External outputs include the comparator output and START key control output. The START key control terminal is wired parallel with the START key, and can be used for remote control in the manual mode. Active low-level (0V). (Minimum operating time, 50ms.)
 ○ Option input terminal...5-pin DIN connector Provided for use with options, the following table shows the wiring method for decimal point placement of the function switch. For print-out, unit symbols are switch selectable (open the printer cover).



P C A	P C B	Decimal Point
N.C.	N.C.	200.0
N.C.	Vss	2.000
Vss	N.C.	20.00
Vss	Vss	2000

N.C.: Non-Connection



Consumables-Optional Accessories
 9005 TRMS Type Clamp-On Current Transducer
 9008 Clamp-On Probe
 9022 Temperature Adapter
 9081 10A External Shunt
 9134 Carrying Case
 9135 Recording Chart (contains 5 rolls)

Standard Packing (double carton box)

Sets	N.W.kg	G.W.kg	M ³
3	11	13	0.10m ³

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