



Conformance to IEC348

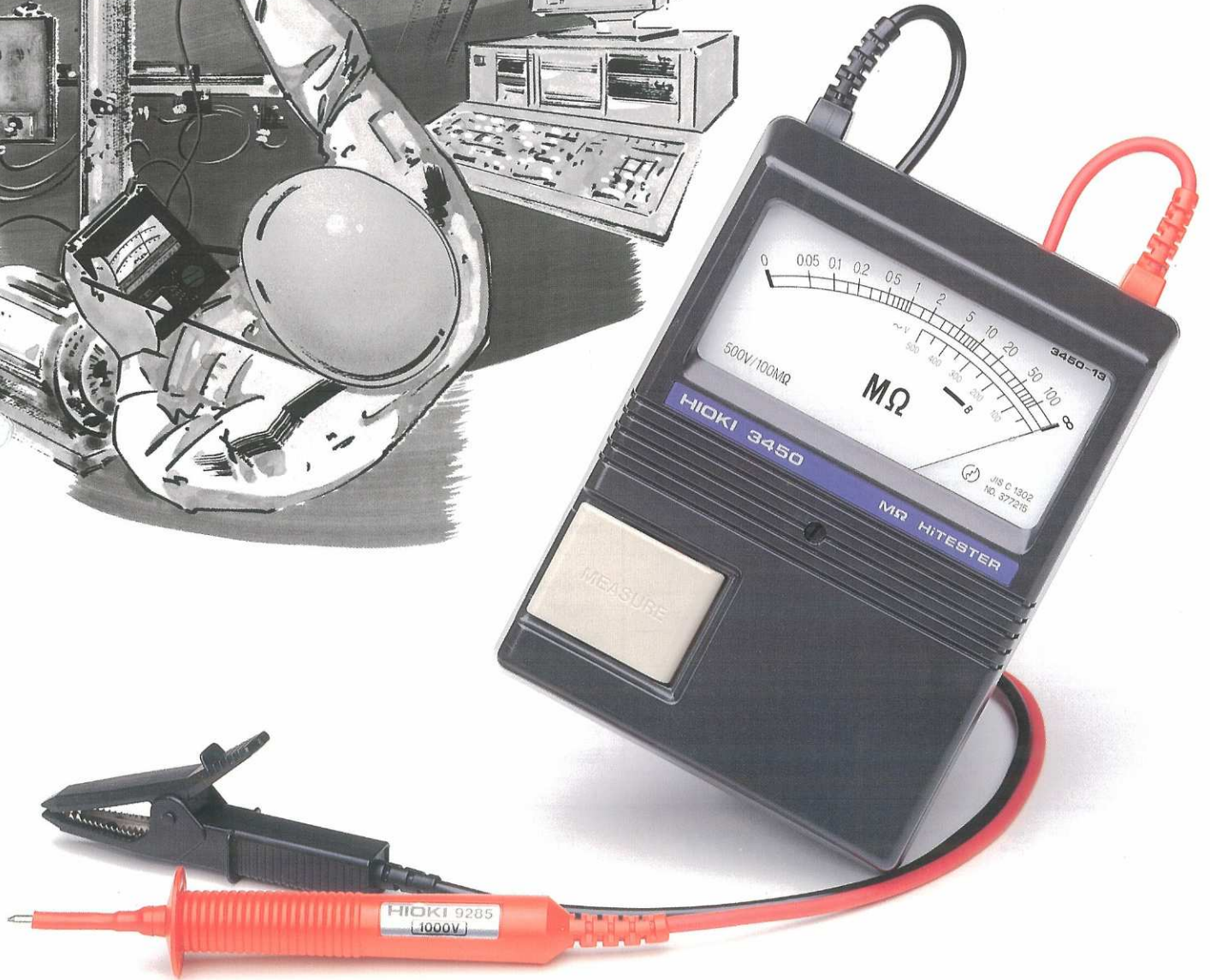
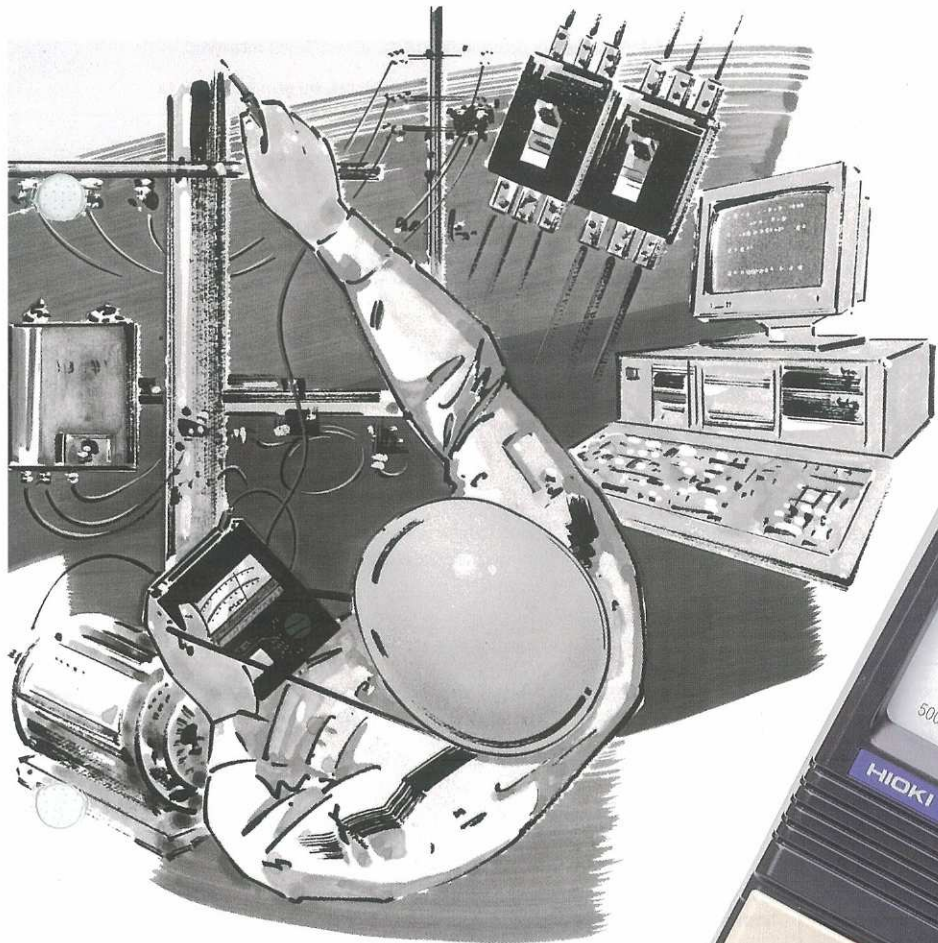
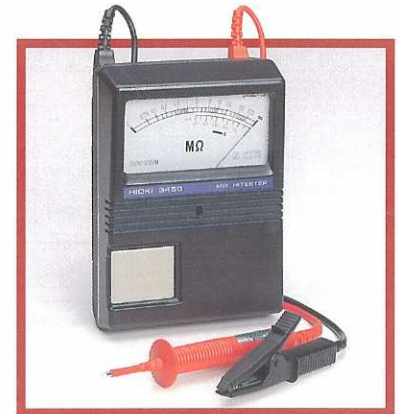
*Insulation resistance meter  
satisfying the terminal voltage  
characteristics of VDE0413*

# HIOKI

Field Measuring Instruments 1994

## 3450

MΩ HITESTER



# Measurement at the rated voltage is possible down to low resistance values

The 3450 is an insulation resistance meter satisfying the terminal voltage characteristics laid down by the German VDE0413 standard. The principal difference from previous HIOKI products is the higher voltage capacity of the measurement terminals and increased withstand voltage. The 3450 MΩ HiTESTER combines these features with safety design features complying with IEC348 in a compact insulation resistance meter.

- Measurement at the rated voltage possible down to low resistance values
- Three types, from 125 V / 20 MΩ to 500 V / 100 MΩ
- Conformance to IEC348 safety class II (withstand voltage 4000V)
- Compact and lightweight
- Function for active line check
- Function for battery check
- Discharge function for discharging charge accumulated during measurement

The principal changes from the previous model (the 3117) are shown below.

## 1. Changes made to comply with VDE0413

	Previous product (3117)	3450	VDE0413
Measurement terminal voltage characteristics	Zero-load voltage	Rated measurement voltage $\pm 10\%$	Not more than 1.3 times rated measurement voltage
	Lower resistance limit at which rated measurement voltage can be maintained	1/50 of effective maximum resistance indication (at least 90% of rated voltage)	Resistance given by rated measurement voltage / rated measurement current (at least rated voltage)
Rated measurement current *	Not specified	1 mA +20% -0%	At least 1 mA
Shorting current	Not specified	1.2 mA DC max.	12 mA DC max.

\* Rated measurement current 1 mA ..... means the capacity to provide a current of 1 mA while maintaining the rated measurement voltage.

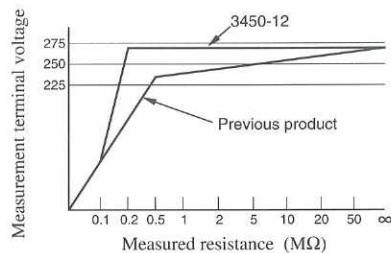
## 2. Changes made to comply with IEC348

	Previous product (3117)	3450
Withstand voltage	2000 V AC	4000 V AC
Double insulation	No	Yes

It is generally regarded as preferable for the terminal voltage of an insulation resistance meter to be the same as that of the line. With a conventional 100 V / 20 MΩ meter on a 100 V line, when the resistance measured is 0.1 MΩ the voltage applied has fallen to approximately 60 V. Under these conditions, an insulation resistance meter producing 100 V will need to be a 250 V / 50 MΩ or 500 V / 100 MΩ model. These, however, when measuring resistances in the tens or hundreds of megohms apply several times the rated voltage of the line, and this can lead to damage or deterioration of the device being measured.

The 3450 has been designed to avoid these problems, by providing a measurement voltage close to the rated line voltage. (See figure below.)

Thus more appropriate measurement can be achieved, using a 100 V or 125 V range for a 100 V circuit, a 250 V range for a 200 V circuit, and a 500 V range for a 400 V circuit, and reducing the danger of damage to equipment.



Example: for 250 V and 50 MΩ

## Measurement ranges (23°C $\pm$ 5°C, 45% to 75% R.H., no condensation)

Model	3450-11	3450-12	3450-13
Rated measurement voltage	125 V DC	250 V DC	500 V DC
Effective maximum indication	20 MΩ	50 MΩ	100 MΩ
First effective measurement range and tolerances	0.02M to 10 MΩ	0.05M to 20 MΩ	0.1M to 50 MΩ
	$\pm 5\%$ of scale indication		
Second effective measurement range and tolerances	More than 10 M to 20 MΩ, within 0.01 M to 0.02 MΩ	More than 20 M to 50 MΩ	More than 50 M to 100 MΩ, within 0.05 M to 0.1 MΩ
	$\pm 10\%$ of scale indication		
0 MΩ and infinity indication	$0.7\%$ of range scale		
Open-circuit terminal voltage	Not more than 1.3 times rated measurement voltage		
Lower resistance limit at which rated measurement voltage can be maintained	0.125 MΩ	0.25 MΩ	0.5 MΩ
Rated measurement current	1 mA +20% -0%		
Shorting current	1.2 mA max.		
Scale center indication	0.5 MΩ	1 MΩ	2 MΩ
Response time	$\infty \rightarrow$ scale center indication, $\infty \rightarrow 0$ MΩ within 3 s		
AC voltage scale (50/60 Hz) and tolerances	0 to 250 V	0 to 300 V	0 to 500 V
	$\pm 5\%$ of maximum scale reading		
Input resistance	70 kΩ approx.	100 kΩ approx.	140 kΩ approx.
Overvoltage protection (for 10 s)	300 Vrms	360 Vrms	600 Vrms

- Temperature characteristics (0 to 40 °C): At scale center indication add  $\pm 5\%$  tolerance  
For  $\infty$  indication and 0 MΩ indication add  $\pm 0.7\%$  tolerance
- Insulation resistance: At least 50 MΩ at 500 V DC between electrical circuits and case
- Withstand voltage: 4 kV AC rms (50/60 Hz for 1 minute) between electrical circuits and case
- Operating temperature and humidity: 0 to 40 °C, 90% R.H. or less
- Safety rating: Conformance to IEC348 safety class II
- Power supply: R6P/AA  $\times$  6
- Continuous operating time: Using 3450-13 for measurement at scale center indication, minimum approximately 21 hours (using R6P cells)
- Dimensions and weight: 145 H  $\times$  106 W  $\times$  49 D mm ; 480 g approx.
- Accessories: 9359 carrying case (1), 9285 test probe (1)

Option  
9282 breaker pin



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