

# Tachometers/Speed Meters

# Earth Tester

## Tachometer

### SE-200

Contact type digital tachometer



- Ergonomic design & palm size
- Easy to use contact type
- One push button operation
- Auto data hold for 10 sec.
- Auto power off

#### DATA HOLD

SE-200	
Measuring range	60~2000rpm 1~333rps
Accuracy	X1 range : ±1dgt, X10 range : ±2dgt
Measuring method	Contact
Display	9999 (LED display)
Battery	R6P×4
Size	183×42×31mm
Weight	Approx. 210g
Standard accessories included	Contact adaptor (SE-200AD) Contact rubber tip (SE-210AD) Hexagonal wrench (SE-220AD) Instruction manual

#### Optional accessories

Carrying case : C-SE2  
Tangential speed ring : SE-10 (circumference 10cm, width 10mm),  
SE-0.9 (circumference 10cm, width 0.9mm)

### SE-100

Non contact type digital tachometer



- Ergonomic design & palm size
- Free of measuring error, non contact type
- One push button operation
- Auto data hold for 10 sec.
- Auto power off
- LED to check right detection

#### DATA HOLD

SE-100	
Measuring range	60~5000rpm 1~833rps
Accuracy	X1 range : ±1dgt, X10 range : ±2dgt
Measuring method	Non contact
Display	9999 (LED display)
Detection distance	10~150mm
Battery	R6P×4
Size	170×42×31mm
Weight	Approx. 170g
Standard accessories included	Reflective mark 20 sheets, Instruction manual

#### Optional accessories

Carrying case : C-SE2  
Reflective mark : 20marks x 5sheets (total 100marks)

## Speed Meter

### SE-9000 SE-9000M (with external encoder)

For elevator maintenance, 2ch display

- Suitable for elevator speed measurement of high building
- 2 independent display
- Analog output terminal to record measuring data
- 2 external hold terminals for remote control
- Remote control by external encoder
- Easy to read LED display
- Auto power off
- Low battery power alarm

#### AP OFF

Measuring range	0~1999.9m/min. 4-digit Red LED display (2 ch.) (Max 999.9) (LED at upper left in the display will blink when the measured value exceeds 999.9m/min.)
Measuring time	0.2 sec. (sampling time)
Accuracy	±2dgt
Analog output	DC0~1999.9mV (at 0m/min.~1999.9m/min.) Analog output accuracy : ± (0.5%±1mV)
Data hold	Ch.1, Ch.2 isolated Operation by main switch or external hold switch
Auto power off	After 3 minutes of no operation except for during measurement
Battery	R6P×4 (with battery alarm)
Size / Weight	H174×W50×D50MM/Approx. 480g
Standard accessories included	Speed ring thickness 10mm (SE-10)×1 Speed ring thickness 0.9mm (SE-0.9)×1 Cord for hold input (SE-L-H)×2 Cord for analog output (SE-L-O)×1 Hex wrench×1, Carrying case (C-SE)×1 External encoder (speed ring)×1 (SE-9000M only) Instruction manual

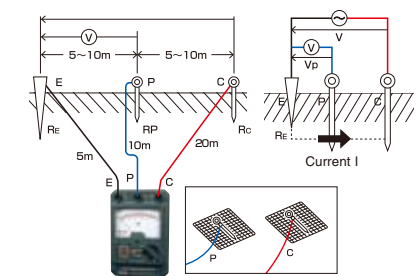


## Purpose of earth resistance

When some extraordinary cases occur, fault current and overcurrent may cause damages to equipment or a risk to humans because the equipment is not grounded. To prevent such risks, grounding plays an important role to assure safety. Grounding provides an escape way to electricity from an electric appliance through metal rod driven into the ground. After grounding works are performed to prevent hazards and assure safety, the earth resistance is measured. To measure the earth resistance, two grounding rods are stuck into the ground. Assuming that two rods are E and C, AC current I is applied between E and C. The earth resistance can be measured from the voltage generated between E and C. The relation between the current I and voltage V is expressed as follows. From this the earth resistance R obtained this way includes not only the

earth resistance at the grounding electrode E but also the earth resistance at the grounding electrode C. If a third grounding electrode P is provided between the grounding electrodes E and C, the earth resistance RE at the grounding electrode E alone can be obtained from the current I and voltage Vp between E and C.

\* Although the grounding electrode P, too, has a resistance zone, it hardly affects the measurement because the impedance of the power supply of AC constant current is high.



## Arrangement of grounding rods

### Three-electrode method

Arrange the earth E and auxiliary grounding rods P and C in a straight line at intervals of about 5 to 10m.

\* If they cannot be arranged in a straight line because of the presence of an obstacle, arrange E-P and E-C at angles of about 30 degrees or less.

### Two-electrode method

If an earth E whose grounding resistance is known is present nearby, the unknown grounding resistance can be measured by using it. Connect the terminal E of the earth resistance meter and the earth E by a cord. Measurements are taken between E and P / C assuming P and C terminals as one terminal.

\* The indicated value includes the known resistance value of the earth E. Subtract the grounding resistance of E to obtain the true value.

- △ Sand, gravel and frozen soil → Expose soil.
- △ Concrete → Use a net. Flush enough water on the net to let it have a close contact with the ground.
- × Asphalt → Cannot be measured.

## Earth Tester



### PDR-301

Analog type display

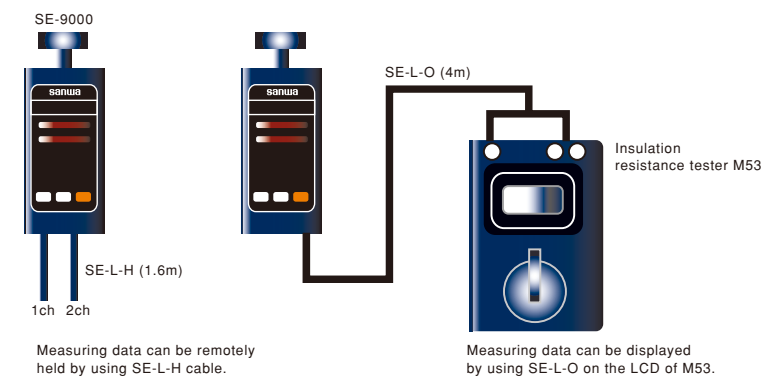
- Phase detection system circuit for stable measurement
- Easy self calibration
- AC 30V range to avoid indication errors caused by leak current
- Power saving design with push switch
- Exorbitance warning LED of auxiliary earth electrode resistance

#### Optional accessories

Carrying case : C-PDR300

Earth resistance measuring range	10/100/1000Ω
Accuracy	Accuracy : X1 range ±5% of full scale : X10, X100 range ±2.5% of full scale
Earth resistance measuring range	0~30V
Accuracy	Accuracy ±2.5% of full scale
Display	Analog
Operation	Constant current system (tripolar or bipolar)
Battery	R6P×6
Size / Weight	W175×H118×D55mm/Approx. 500g
Standard accessories included	Earth bar set (SET-PDR201), Instruction manual

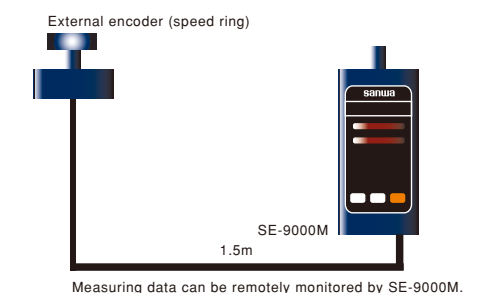
### Remote control by SE-9000 / SE-9000M



Measuring data can be remotely held by using SE-L-H cable.

Measuring data can be displayed by using SE-L-O on the LCD of M53.

### Remote control by external encoder (SE-9000M only)



Measuring data can be remotely monitored by SE-9000M.