

PA—3020

# ANALOGUE MULTIMETER INSTRUCTION MANUAL



PARAMETERS  
by Nilsen Technologies

6. Never use uncased meter.
7. Be sure to use a fuse of the specified rating or type.  
Never use a substitute of the fuse or never made a short circuit of the fuse.
8. Always keep your fingers behind the finger guards on the probe when making measurements.
9. Be sure to disconnect the test pins from the circuit when changing the function or range.
10. Before starting measurement, make sure that the function and range are properly set in accordance with the measurement.
11. Never use meter with wet hands or in a damp environment.
12. Never use test leads other than the specified test leads.
13. Never open tester case except when replacing batteries or fuses.  
Do not attempt any alteration of original specifications.
14. To ensure safety and maintain accuracy, calibrate and check the meter at least once a year.

## SAFETY INFORMATION

The following are precautions to prevent accidents such as electrical shocks. Be sure to read them before using the tester.

- Symbols  
The following cautionary signs appear on the multimeter and in this manual.
  - ⚠ Disobedience to instructions with this sign may lead to troubles of the tester and accidents such as electrical shock.
  - ⚡ Risk of electric shock.
- Precautions for safety measurement.

### ⚠ WARNING

To ensure that the meter is used safely, follow all safety and operating instructions

1. Never use meter on the electric circuit that exceed 3KVA.
2. Pay special attention when measuring the voltage of AC30 Vrms or DC 60V or more to avoid injury.
3. Never apply an input signals exceeding the maximum rating input value.
4. Never use meter for measuring the line connected with equipment (i.e. motors) that generates induced or surge voltage since it may exceed the maximum allowable voltage.
5. Never use meter if the meter or test leads are damaged or broken.

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## SPECIFICATIONS

- General specification

Items	Specification
Drop shock proof	Taut-band structure is adopted in the meter section. The meter section is designed to withstand shock.
Circuit protection	The circuit is protected by fuse even when voltage of up to AC 230V is impressed on each range for 5 seconds.
Internal battery	R6 (IEC) or UM-3 1.5Vx 2
Internal fuse	0.5A/250V 5.2mm dia x 20mm
Standard calibration temp. And humidity range.	23 ± 2°C 45-75% RH
Operating temperature and humidity range.	0-40°C, 80%RH max. No condensation
Withstand voltage	3KV AC(1 min) between input terminal and case
Dimensions and weight	150 x 100 x 38mm approx. 300g
Accessories	Instruction manual Test leads.

## APPLICATION AND FEATURE

- Application  
This instrument is portable multimeter designated for measurement of small Current circuits.
- Feature
  1. Panel face protection cover which serves also as a stand is employed.

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- 13. Never open tester case except when replacing batteries or fuses.  
Do not attempt any alteration of original specifications.
- 14. To ensure safety and maintain accuracy, calibrate and check the meter at least once a year.

- Our technology has made it possible to measure high resistance (up to maximum 200M $\Omega$ ) with low voltage.
- Taut band meter is drop shock type with high sensitivity.
- Overload protection circuit up to maximum 230V is provided.

Measurement Rang and Accuracy

Function	Full scale value	Accuracy	Remarks
DCV	0.1	$\pm 5\%$ against full scale	Input impedance 20k $\Omega$ /V
	0.5/2.5/10/50	$\pm 3\%$ against full scale	
	250/1000		Input impedance 9k $\Omega$ /V
ACV~	10/50/250/1000		$\pm 4\%$ against full scale
DCA	50u	$\pm 3\%$ against full scale	Voltage drop 0.1V
	2.5m/25m/0.25		Voltage drop 0.18V
	10A		
$\Omega$	2K/20K/200K/2M (x 1/ x 10/ x 100 x 1K)	$\pm 3\%$ of arc	Center value 20 $\Omega$ Max. Value 2k $\Omega$ release Voltage 3V
	200M(x100k)	$\pm 5\%$ of arc	
dB	-10dB~+22 (for 10VAC) ~+62 dB	—	Input impedance 9K $\Omega$ /V

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**⚠ WARNING**

Confirm the range to use before measurement.

• Preparation for measurement

- 1. Adjustment of meter zero position:  
Turn the zero position adjuster so that the pointer may align right to the zero position.
- 2. Range selection:  
Select a range proper for the item to be measured with the range selector knob.

NOTE:

When determining measuring range, select range for the higher voltage than the value to be measured. However, select the maximum range if the value to be measured can not be predicted.

• Measuring DCV

- 1. Set the range selector knob to an appropriate DCV range.
- 2. Apply the black test pin to the minus potential of Measured circuit and the red test pin to the plus potential.
- 3. Read the movement of pointer by DCV—A

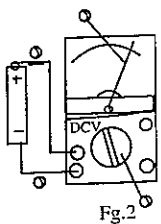
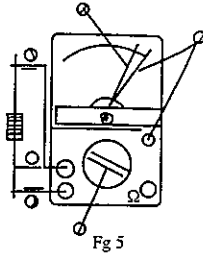


Fig.2

NOTE: the positive (+) polarity of the battery is Connected to the positive (+) terminal of meter there fore, The polarity of the terminal is reversed for resistance measurements. With output voltage from the - COM terminal being positive (+) and output voltage from the (+) terminal negative (-).



● Measuring AF Output (dB).

NOTE: Eliminate DC component with a capacitor of 0.1uf or more when measuring such signal as having DC component. dB (decibel) is measured in the same way as ACV measurement reading the dB scale instead. For measurement on the 10V range, the dB scale (-10dB~+22dB) is read directly, but when measured on the 50V range, 14dB is added. On the 250V range, 28dB is added to reading on the scale, and on the 1000V range, 40dB added. Thus, the maximum dB readable is 22+40=62 (dB) measured on the 1000V range.

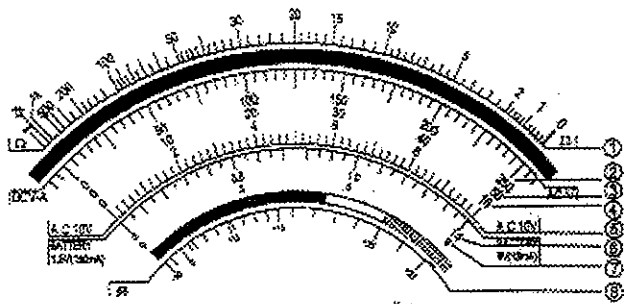
FUSE AND BATTERY REPLACEMENT

⚠ WARNING

Never replace the fuse or batteries during measurements, Make su to set the range selector switch to off position and remove the te leads from the instrument before replacing the fuse and batterie always use the F250V 0.5A fuse as specified.

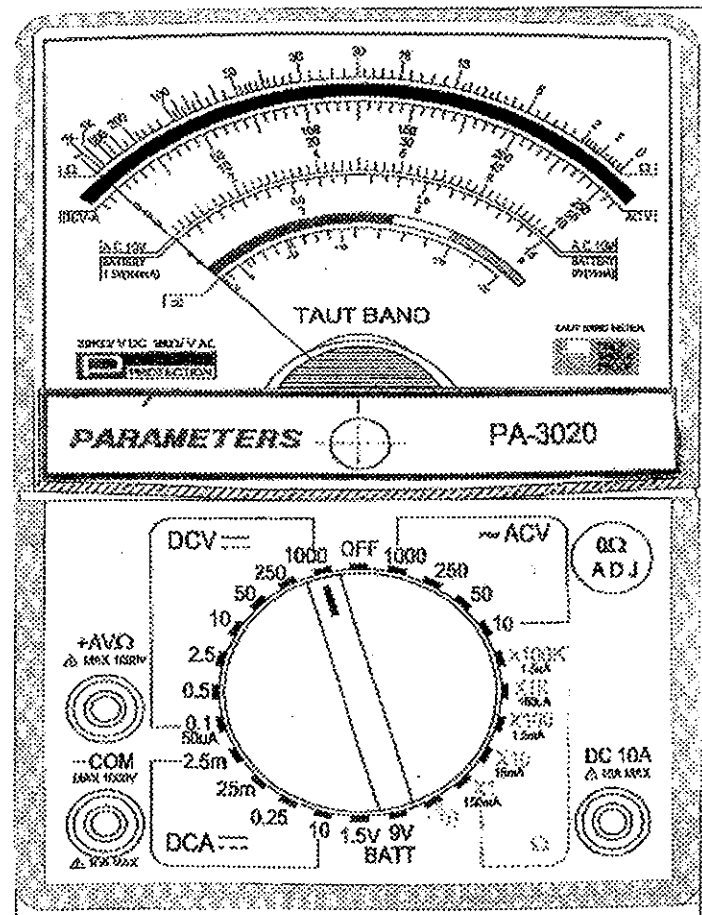
1. When the fuse blows, the instrument dose not operate except on the 10ADC range remove the housing case by unscrewing the case fixing screw to replace the fuse.
2. When 2 x 1.5V battery (R-6P, SUM-3 or equivalent) are exhausted it is no longer possible to zero ohm adjust on the x 1Ω range, remove the housing case by unscrewing the case fixing screw to replace the batteries observe correct polarity when replacing the batteries.

SCALE READING



	range	Multiplied
①	ACV 50	x1
④	DCV 0.1	x0.01
	DCV 10	x1
	DCV 1000	x100
	ACV 1000	x100
	DCA 10	x1
⑤	ACV 10	x1
⑥	BATT 1.5	x1
⑦	BATT 9	x1
⑧	ACV 10	x1
	ACV 50	14dB added
	ACV 250	28dB added
	ACV 1000	40dB added

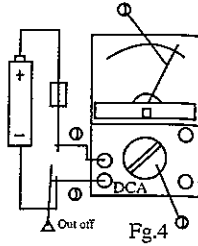
	range	Multiplied
①	Ωx100K	x100K
	x1K	x1K
	x100	x100
	x10	x10
	x1	x1
②	DCV 250	x1
	DCV 2.5	x0.01
	ACV 250	x1
	DCA 0.25	x0.001
	DCA 25m	x0.1
	DCA 2.5m	x0.01
③	DCV 50	x1
	DCV 0.5	x0.01



## MEASURING PROCEDURE

### ● Measuring ACV~

1. Turn the range selector knob to an appropriate ACV range.
2. Apply the test leads to measured circuit.
3. Read the movement of pointer by DC-A.  
(Use AC 10V scale for 10V range only.)



- Since this instrument employs the Mean value system for its AC Voltage measurement circuit, AC Wave from other than sine wave may cause error.

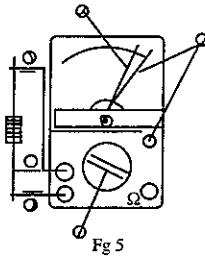
### ● Measuring DCA

**Warning**  
Connect the meter in series with the load.

1. Turn the range selector knob to an appropriate DCA range.
2. Take out measured circuit and apply the black test pin to the minus potential of measured circuit and the red test pin to the plus potential.
3. Read the movement of pointer by DCV -A.

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NOTE: the positive (+) polarity of the battery is Connected to the positive (+) terminal of meter there fore, The polarity of the terminal is reversed for resistance measurements. With output voltage from the - COM terminal being positive (+) and output voltage from the (+) terminal negative (-).



### ● Measuring AF Output (dB).

NOTE: Eliminate DC component with a capacitor of 0.1uF or more when measuring such signal as having DC component. dB (decibel) is measured in the same way as ACV measurement reading the dB scale instead. For measurement on the 10V range, the dB scale (-10dB~+22dB) is read directly, but when measured on the 50V range, 14dB is added. On the 250V range, 28dB is added to reading on the scale, and on the 1000V range, 40dB added. Thus, the maximum dB readable is 22+40=62 (dB) measured on the 1000V range.

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### ● Measuring Ω

**Warning**  
Do not measure a resistance in a circuit where a voltage is present.

### CAUTION

Make the zero ohm adjustment after every change of the measuring range to obtain a more accurate reading.

1. Turn the range selector knob to an appropriate Ω range.
2. Short the red and black test pins and turn the 0 Ω adjuster so that the Pointer may align exactly to 0 Ω.

NOTE: if the pointer fails to swing up to 0 Ω even when the 0 Ω adjuster is turned clockwise fully, replace the internal battery with a fresh one.

3. Apply the test pin to measured resistance.
4. Read the movement of polarity pointer by Ω scale.

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## FUSE AND BATTERY REPLACEMENT

### WARNING

Never replace the fuse or batteries during measurements, Make sure to set the range selector switch to off position and remove the test leads from the instrument before replacing the fuse and batteries. always use the F250V 0.5A fuse as specified.

1. When the fuse blows, the instrument does not operate except on the 10ADC range remove the housing case by unscrewing the case fixing screw to replace the fuse.
2. When 2 x 1.5V battery (R-6P, SUM-3 or equivalent) are exhausted it is no longer possible to zero ohm adjust on the x 1Ω range, remove the housing case by unscrewing the case fixing screw to replace the batteries observe correct polarity when replacing the batteries.

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