

PM-7
PS-8
 DIGITAL MULTIMETER

取扱説明書
 INSTRUCTION MANUAL

SANWA

三和電気計器株式会社

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② 96.06①

1-1 SAFETY INFORMATION

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

1-1 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 meter and accidents such as electrical shock.

DCV	Direct current voltage
ACV	Alternating current voltage
OHM	Ω (Resistance)
$\rightarrow $	Diode
BZZZ	Buzzer
OFF	Power off
MAX 500	Maximum voltage 500V

1-2 Precautions for Safety Measurement

⚠ WARNING

1. Never use the meter on the electric circuits that exceed 1 kVA.
2. Pay special attention when measuring the voltage of AC 30 Vrms (42.4 peak) or DC 0V 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.
6. Never use uncased meter.
7. Never touch the test pin the test leads with fingers during measurement.
8. Be sure to disconnect the test pins from the circuit when changing the function or range.
9. Before starting measurement, make sure that the function and range are properly set in accordance with the measurement.
10. Never use meter with wet hand or in a damp environment.
11. Never use test leads other than the specified test leads.
12. To ensure safety and maintain accuracy, calibrate and check the meter at least once a year.

[2] SPECIFICATIONS

2-1 General Specifications

Operating method	Dual slope integration
Display	3-1/2 digit in LCD, character height 10 mm, MAX reading 1999 with units, symbols, etc.
Range selection	Full autorangeing system
Overranging indication	M5B "1" blinks
Polarity indication	Automatic switching ("—" is indicated when negative voltage inputted.)
Low battery indication	"B" mark is lit when battery power becomes less than 1.2V ($\pm 0.1V$).
Sampling rate	Two times/sec.
Accuracy guaranteed temperature and humidity ranges	18-29°C, 80% R.H. or below. No dew condensation is permitted.
Using temperature and humidity ranges	5-40°C 80% R.H. or below. No dew condensation is permitted.
Storage temperature and humidity ranges	-10 ~ -50°C, 70% R.H. or below. No dew condensation is permitted.
Power source	Two LR44 button type batteries exclusive for the PM-7.*
Power consumption	3mW Max.
Dimensions	115 X 57 X 18 mm
Weight	About 85 g
Accessory	Operator manual

*The PS-8 uses rechargeable battery, so no battery replacement is necessary.

2-2 Functions

Input impedance

DCV: About 100M Ω or more
(200 mV range)

DC/ACV: About 11M Ω (2 range)

DC/ACV: About 10M Ω
(Except 200 mV and 2V ranges)

Measuring resistance (OHM)

Release voltage about 0.43V

Testing continuity (BUZZ)

Threshold level: About 380 Ω

Response time: Within 100 msec.

Release voltage: About 0.43V

Testing diode (\rightarrow)

Release voltage: About 1.3V

∇ Circuit protection against excess load

DC/ACV: 650V AC/DC Max. (1 min)

OHM/BUZZ: \rightarrow 250V AC/DC Max. (1 min)

Measuring functions

DCV: $\pm 200mV/\pm 2.000V/\pm 20.00V/\pm 200.0V/\pm 500V$

ACV: 2.000V/ 20.00V/ 200.0V/ $\pm 500V$
(40 Hz-500 Hz)

OHM: 200.0 Ω / 2.000k Ω / 20.00k Ω / 200.0k Ω /
2000k Ω / 20.00M Ω

2-3 Measurement Range and Accuracy

18-28°C, below 80% R.H. No dew condensation is permitted.

Function	Range	Accuracy	Remarks
DCV	200.0 mV	± (2.0% rdg + 4 dgt)	
	2.000 V	± (0.7% rdg + 4 dgt)	
	20.00 V	+ (1.3% rdg + 4 dgt)	
	200.0 V	.	
ACV	2.000 V	± (2.3% rdg + 8 dgt)	40 Hz-500 Hz
	20.00 V	.	.
	200.0 V	.	.
	500 V	.	.
OHM	200.0 V	± (2.0% rdg + 4 dgt)	
	2.000 kΩ	.	
	20.00 kΩ	.	
	200.0 kΩ	.	
	2000 kΩ	.	
	20.00 MΩ	± (20% rdg + 4 dgt)	

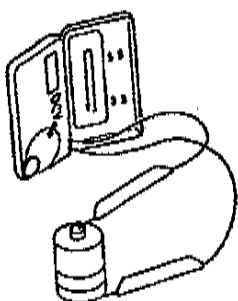
⚠ The specifications described in this manual are subject to change without notice.

131 MEASUREMENTS

⚠ CAUTION

Model PS-8 adopts solar charged Ni-Cd battery. As the battery discharges naturally, use the meter after the battery is fully re-charged, especially soon after you bought it or you did not use it for a long time.

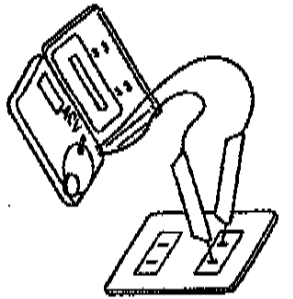
3.1 Measuring DCV...



⚠ Note

Some figure is indicated in DC 200 mV and 2V ranges with the test leads being in an open condition. This is caused because input impedance in these ranges is 100 MΩ or more. Do not consider it abnormal.

3.2 Measuring ACV~



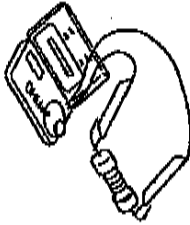
⚠ Note

1. Since this instrument employs the means value system for its AC voltage measurement circuit, AC waveforms other than sine wave may cause error.
2. There occurs error under such frequencies other than specified in the specification.

3-3 Measuring OHM (Ω)

⚠ WARNING

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



⚠ Note

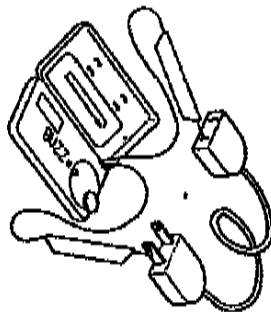
1. Operating voltage of OHM (Ω) function for this multimeter is about 0.43V.
2. Overrange indication is made if the measuring terminals are in an open state.
3. Do not touch resistor or test pin with bare fingers.

3-4 Testing Continuity (BUZZ), Diode

⚠ WARNING

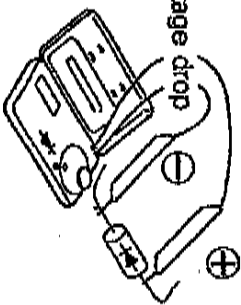
Do not measure a resistance in a circuit where a voltage is present.

Testing continuity (BUZZ)



Testing diode (→←)

Forward voltage drop



Indicated value remains unchanged if the test leads are connected reversely.

[4] BATTERY

WARNING

The button-type battery is made of oxidized silver, etc. Please keep it away from little children lest they should swallow it in.

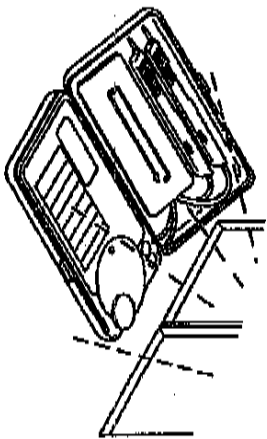
• **PS-8 Solar Charged Ni-MH Battery**

The PS-8 uses solar charged Ni-MH battery that can be recharged by the sunlight. Therefore, the recharged volume varies largely according to brilliance.

Reference Value

Place	Recharging time (with POWER switch off)	Using time (continuously in DCV range)
Alongside window	20 hours	40 hours
	8 hours	16 hours

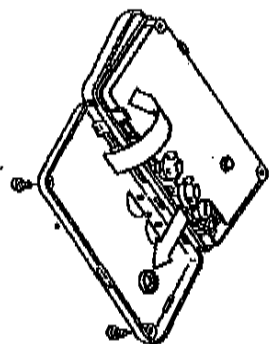
Avoid the direct rays of the sun when the battery is recharged. Place it towards a bright direction. When "B" mark is lit, be sure to use the meter after the battery is fully recharged (about 20 hrs.). A lot of time is necessary when the battery is recharged under the brilliance of fluorescent lamp.



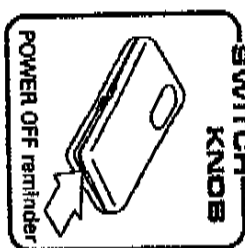
• **PM-7**

LR-44 or SR-44 (1.5V x 2)

Continuous use of about 260 hours is possible.



[5] STORES



16] PRECAUTIONS

1. Avoid storing the meter under the direct rays of the sun or in a high temperature and humidity.
2. Do not wipe the meter with thinner and the like or place it near a heated soldering iron and the like as the panel and rear case are made of plastic resin (ABS, acrylic).
3. Avoid using the meter in a high or low temperature and high humidity.
4. Take care that indication may be unstable when measurement is performed near devices generating noises or in the place where temperature changes suddenly and drastically.

17] REPAIR AND INQUIRY

1. Repair

We repair defective products at cost. When mailing us a meter for repair, the user is requested not to use the same corrugated cardboard box in which the meter was delivered, because the meter may receive damages in transit. Instead, the user is asked to send the product in a box at least five times larger than the said box with enough cushioning material stuffed around it.

You will have to bear it in your mind that repairing cost may sometimes be higher than the purchase cost when such main parts or components as LSI, PCB, etc. are damaged by erroneous application of excess voltages (including pulse element and surge) beyond the voltages as specified in FUNCTIONS, CIRCUIT PROTECTION AGAINST EXCESS LOAD and have to be repaired.

2. Question and Inquiry

If there is any question or complaint about our products, please do not hesitate to contact the dealer, or selling agent.

【7】 フラクターサーパスについて

7-1 保証期間について
本品の保証期間は、お買い上げ日より1年間です。

7-2 修理について

- 1) 修理依頼の前に次の項目をご確認ください。
 - ・内蔵電池の容量はありますか？ 装置の極性は正しいですか？
 - ・テストリードは断線していませんか？

2) 保証期間中の修理

- ・保証書の記載内容によって修理させていただきます。
- 3) 保証期間経過後の修理

- ・修理によって本来の機能が維持できる場合、ご要望により有料で修理させていただきます。
- ・修理費用や輸送費用が製品価格より高くなる場合もありますので事前にお問い合わせください。
- ・本品の補修用性能部品保有期間は、製造打切後6年間です。補修用性能部品保有期間の入手が不可能になった場合、保有期間が短くなる場合もありますのでお含みおきください。

4) 修理品の送り先

- ・製品の安全輸送のため、製品の5倍以上の容積の箱に入れ、十分なクッションを詰めさせていただきます。
- ・箱の表面に「修理品在中」と明記させていただきます。
- ・輸送にかかる往復送料はお客様のご負担とさせていただきます。

【送り先】 三和テスメックス株式会社・サービス課
〒205 東京都羽村市神明台4-7-15
TEL (0425) 54-0113

7-3 お問い合わせ

- 一般のお問い合わせ TEL 東京 (03) 3253-4871
三和電業計器株式会社 大阪 (06) 631-7361
- 技術のお問い合わせ TEL 三和テスメックス株式会社 羽村 (0425) 54-0114