

AVTM220003  
Rev. B  
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**Instruction Manual AVTM220003**  
for

**DC  $\mu$ A**  
**Strip Chart Recorder**  
Catalog Nos. 220003 and 220003-47

**Megger** 

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**DC  $\mu$ A**  
**Strip Chart Recorder**  
**Instruction Manual**

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# Section 1

## Introduction

### *Receiving Instructions*

Check the equipment received against the packing list to ensure that all materials are present. Notify Megger of any shortage. Telephone (610) 676-8500.

Examine the instrument for possible damage received in transit. If any damage is discovered, file a claim with the carrier at once and notify Megger or its nearest authorized sales representative, giving a detailed description of the damage.

This instrument has been thoroughly tested and inspected to meet rigid specifications before being shipped. It is ready for use when set up as indicated in this manual.

### *General Information*

The Megger<sup>®</sup> Strip Chart Recorder is an accessory designed for use with the Megger<sup>®</sup> DC Dielectric Test Sets. It makes permanent records of quantities of dc current which appear in the test circuit when a specimen is energized by the Dielectric Test Set.

The recorder is packaged in a carrying case with a hinged lid that provides storage space for the power cord and instrument cable. All controls necessary for operating the recorder are contained in the unit.

Connection to the current circuit of the Dielectric Test Set is made by plugging the instrument cable of the recorder into the external instrument jack of the test set. A 120 V (220003) or 240 V (220003-47) ac outlet is required to energize the chart drive of the recorder.

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# Section 2

## Safety

This instrument and the recommended operating procedures have been designed with careful attention to safety. Megger has made formal safety reviews of the initial design and any subsequent changes. Regardless of these efforts, it is not possible to eliminate all hazards from electrical test equipment. For this reason, every effort has been made to point out in this instruction manual the proper procedures and precautions to be followed by the user in operating the equipment. However, it is not possible to foresee every possible hazard which may occur. It is therefore essential that the user carefully consider all safety aspects of the test before proceeding. The following general guidelines apply to all operating and service personnel.

The strip chart recorder is not in itself a source of high electrical energy; however, because it is connected to such a source, the same precautions apply. Refer to the Safety section of the Dielectric Test Set manual for explicit safety instructions.

- Safety is the responsibility of the user.
- Misuse of this equipment can be extremely dangerous.
- Do not use this equipment or its accessories for any purpose other than that described in this manual.
- Refer fuse replacement to qualified personnel only. To avoid electric shock and fire hazard, use only the specified fuse, which is identical in type, voltage rating, and current rating.

### Warning

**Never insert or remove the input plug of the recorder from the EXTERNAL INSTRUMENT JACK of the Dielectric Test Set while the test set is energized. To do so may present a shock hazard to the operator or cause damage to the test set.**

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# Section 3

## Specifications

### *Dimensions and Weight*

Overall: 9 x 7-1/2 x 7-1/2 x 7-1/2 in. (23 x 19 x 19 cm) (L x W x H);  
5.5 lb (2.5 kg)

Recorder only: 3-5/8 x 5-5/8 x 4-5/8 in.; 3-1/2 lb

### *Controls and Connectors*

#### **Range Switch**

This toggle switch can be set to 50  $\mu$ A, 500  $\mu$ A, or SHORT.

When set to SHORT, the recorder system is protected against damage from physical shock and transient voltages. Use this switch position when setting the recorder zero.

#### **POWER Switch and Indicator**

When set to ON, this toggle switch energizes the recorder chart drive motor. The indicator, when lit, shows that voltage is present.

#### **Input Cable**

This cable, which stores in the lid of the carrying case, connects the recorder to the Dielectric Test Set by plugging into the EXTERNAL INSTRUMENT JACK of the test set.

#### **Power Cord**

This 7-1/2 ft molded plug and receptacle can be removed from the panel socket and stored in the lid of the carrying case.

#### **Fuse**

0.50 A, type AGC, replaceable by removing the fuse holder cap (220003).

0.25 A, type AGC, replaceable by removing the fuse holder cap (220003-47).

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**Recorder**

Accuracy:	$\pm 2\%$ of full scale
Response time:	1 second full scale
Recording rate:	1 dot per 2 seconds
Chart type:	pressure-sensitive paper
Chart speed:	60 in./hr
Chart overall width:	2-9/16 in. ( $\pm 1/64$ )
Chart analog span:	2-1/8 in. wide
Chart length:	62 ft a roll
Power requirements:	120 V, 60 Hz $\pm 10\%$ (220003) 240 V, 50 Hz $\pm 10\%$ (220003-47)

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# Section 4

## Operation

### *Paper Installation*

Either of two methods can be used to handle the recorded portion of the chart. The Reroll method routes the chart paper onto a roller for storage or review at a later time. The Feed-Through/Tear-Off method routes the chart paper upward through the top of the door so that it may be easily reviewed during recording or, if desired, torn from the rest of the chart.

### **Reroll Method**

1. Remove signal and power inputs so that stylus is in its zero position and non-actuated.
2. To gain access to the chart drive components, press down on the door release latch and carefully swing the door downward.
3. Flip chassis latch outward.
4. Flip roller-retaining locking clips upward to release rollers.
5. Remove supply roller from recorder (or if replacing paper from old roll) and insert it into perforated end of new chart supply roll.
6. Place cardboard sleeve from accessory package onto reroll-roller (if replacing paper from old roll).
7. Tape end of chart paper to cardboard sleeve —perforations in chart must be at geared end of roller; roll chart a few turns onto roller, keeping it straight and taut.
8. Hold reroll roller in left hand and supply roll in right hand so that blank side of paper is facing upward between rollers. Slip paper under right side plate and maneuver chart perforations over sprockets on drive rollers.
9. Press supply roll tension arm toward left side plate, then seat supply roller and reroll roller in their respective notches and snap roller retaining locking clips to locked position.



10. Take up slack in chart by rotating reroller upward.
11. Press down on right-hand side plate and flip up chassis latch (press latch against side plate until it snaps in place). Close door, reconnect power, and rotate thumb wheel on outside of door to advance chart to desired position.

### **Feed-Through/Tear-Off Method**

1. Remove signal and power inputs so that stylus is in its zero position and non-actuated.
2. To gain access to the chart drive components, press down on the door release latch and carefully swing the door downward.
3. Flip chassis latch outward.
4. Roll two O-rings from center of feed-through roller outward until they sit in grooves of roller.
5. Flip up roller-retaining lock clips to release empty supply roller; set reroll-roller in notches.
6. Remove supply roller from recorder (if replacing paper from old roll) and insert it into perforated end of chart supply roll.
7. Hold loose end of chart in left hand and supply roll in right hand so that blank side of paper is facing upward between left hand and roller. Slip chart paper under right-hand side plate, and carefully maneuver chart perforations over sprocket and drive rollers.
8. Press supply roll tension arm toward left side plate, then set supply roller pins in notches of side plate and snap roller retaining lock clips down to locked position.
9. Pull chart out from supply roll until extended beyond top of door.
10. Press down on right-hand side plate and flip chassis latch up (press latch against side plate until it snaps in place), close door, reconnect power and rotate thumb wheel on outside of door to advance chart to desired position.

### ***Operation Procedure***

1. With the Dielectric Test Set de-energized, and the range switch of the recorder set to SHORT, plug the input cable into the EXTERNAL INSTRUMENT JACK of the test set.

2. Plug the power cord of the recorder into a 120 V, 60 Hz (220003) or 240 V, 50 Hz (220003-47) outlet. Set the POWER switch to ON and observe the indicator to be certain that power is being supplied to the recorder.

To conserve recorder chart paper, the POWER switch should be off except when an actual record is desired. Check the zero of the recorder and reset if required. To set zero, remove the nameplate from the recorder and adjust the zero set screw, with the range switch on SHORT, until the printed trace is on the zero line.

3. With the test specimen properly connected, as described in the Dielectric Test Set manual, adjust the output voltage to the required level. Observe the current meter of the test set to be sure that the current level does not exceed the desired range.
4. Switch the recorder range switch to the proper range and set the POWER switch to ON. Maintain the test voltage for the required test time. The recorder will record the test circuit current during the test interval.
5. When the required test time has elapsed, return the Dielectric Test Set VOLTAGE CONTROL to zero, set the recorder range switch to SHORT, and turn the POWER switch off.

Follow this procedure for each succeeding test record.

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# Section 5

## Maintenance

### *Routine Maintenance*

The recorder is designed for long, trouble-free operation and should require little attention during use. Periodic inspections are recommended to check for low chart paper supply, accumulation of dirt, loose hardware, damaged wiring, loose connections or worn parts. If operational problems are encountered, refer to the Troubleshooting Chart.

### Cleaning Exterior

#### **Warning**

**Before servicing or cleaning, always disconnect power. Do not disturb parts or wiring during cleaning.**

Light dirt marks can be removed from the case finish with a damp, lint-free cloth or sponge. Heavier dirt smudges can be removed with any commercially available liquid detergent. Grease stains should be removed by using a lint-free cloth dampened with naphtha (use a clean portion of the cloth for each application to prevent spreading the stain). A mild soap or detergent may be used on the front windows and removable rollers.

### Cleaning Interior

Remove chart paper, the removable rollers, and the gear-train, then clean with a soft bristled brush or a low vacuum system.

### Fuse Replacement

To change the fuse, remove the cap of the fuse holder by following the arrows printed on the cap. Replace with a 0.5 A (220003) *or* a 0.25 A (220003-47) AGC type fuse.

### *Calibration*

Your recorder was carefully tested and calibrated before being shipped from the factory. However, it may be necessary to perform recalibration procedures to maintain rated recorder accuracy over the life of the instrument. Calibration procedures should only be performed by qualified technicians.

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## **Zero Adjustment**

Check and adjust the mechanical zero of instrument as follows:

1. Make sure instrument is in proper operating position.
2. Remove analog input signals from recorder and short circuit recorder input terminals.
3. With the chart drive motor running, manually advance the chart a short distance.
4. Recorded trace should register on the zero reference line of the chart span. If not, pry off nameplate on front of case and turn the zero adjust screw.
5. Remove short from input, reconnect analog signal, replace nameplate, and resume recording operations.

## **Full-Scale Calibration Procedure**

1. Set mechanical zero as described previously.
2. Produce full-scale deflection by applying a calibrated signal generator to the recorder input. Generator should be accurate within  $\pm 1\%$ .
3. With chart drive meter running, check for full scale stylus deflection by observing the recorded trace on the chart. Manually advance the chart paper as required.
4. If full-scale calibration is not within the specified tolerance, carefully reset span adjust finger-wheel adjustment.
5. Remove reference signal generator and check recorder operation.

## ***Troubleshooting and Repair***

Megger offers a complete repair service and recommends that its customers take advantage of this service in the event of any equipment malfunction. Please indicate all pertinent information including problem symptoms and attempted repairs. The catalog number and serial number of the equipment should also be specified. Equipment returned to the factory for repair must be shipped prepaid and insured and marked for the attention of the Repair Department.

If you suspect that your recorder is defective, refer to the following chart to see if your symptom is listed. If so, make the checks or remedies suggested.

## Troubleshooting Chart

<b>Symptom</b>	<b>Possible Cause</b>	<b>Check/Remedy</b>
Inoperative chart drive system	Loss of power  Chart, rollers, or gear train incorrectly installed	Check power source connector, wiring, and motor. check gear train spring tension.
Chart will not feed through slot at top of case	O-rings not positioned correctly on feed-through roller	Roll O-rings outward until they sit firmly in roller grooves.
Chart bunches across table	Reroll—roller not engaging drive gear	Lift roller retaining lock clips and move roller to reroll roller notches in side plates.
Inoperative recording system	Source failure or faulty connection. Open or defective measuring circuit	Check analog input and all connections. Test movement and circuit components.
Record on chart above or below zero without input signal. Reversed signal polarity.	Movement out of adjustment.	Adjust zero.
Movement will not adjust to zero reference point.	Bent stylus or defective movement. Defective circuit component.	Replace movement assembly. Replace component.
Record on chart below zero with input signal	Reversed signal polarity.	Make proper connections input connector.
Instrument produces continuous trace with sluggish response.	Bent stylus.	Replace movement assembly.
Erratic stylus deflection	Intermittent connection or defective measuring circuit. Improper analog input or external interference.	Check all connections and circuit components. Check signal source and environmental conditions.

## **Warranty**

Products supplied by Megger are warranted against defects in material and workmanship for a period of one year following shipment. Our liability is specifically limited to replacing or repairing, at our option, defective equipment. Equipment returned to the factory for repair must be shipped prepaid and insured. This warranty does not include batteries, lamps, or other expendable items, where the original manufacturer's warranty shall apply. We make no other warranty. The warranty is void in the event of abuse (failure to follow recommended operating procedures) or failure by the customer to perform specific maintenance as indicated in this manual.