User Manual
ENGLISH

AEMC® INSTRUMENTS
CHAUVIN ARNOUX GROUP

Megohmmeters
Models 5050 & 5060

MEGOHMMETERS

Measure Up
WITH AEMC® INSTRUMENTS

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We guarantee that at the time of shipping your instrument has met the instrument's published specifications.

An NIST traceable certificate may be requested at the time of purchase, or obtained by returning the instrument to our repair and calibration facility, for a nominal charge.

The recommended calibration interval for this instrument is 12 months and begins on the date of receipt by the customer. For recalibration, please use our calibration services. Refer to our repair and calibration section at www.aemc.com/calibration.

Serial #: _____

Catalog #: **2130.20 / 2130.21**

Model #: **5050 / 5060**

Please fill in the appropriate date as indicated:

Date Received: _____

Date Calibration Due: _____

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TABLE OF CONTENTS

1. INTRODUCTION 6
1.1 PRECAUTIONS FOR USE 7
1.2 RECEIVING YOUR SHIPMENT 7
1.3 ORDERING INFORMATION 7
1.3.1 Accessories 8
1.3.2 Replacement Parts 8
1.4 ACCESSORY INFORMATION 8
1.4.1 DataView® Software (for Model 5060) 8
2. PRODUCT FEATURES 9
2.1 DESCRIPTION 9
2.1.1 Model 5050 10
2.1.2 Model 5060 10
2.2 MEGOHMETER FEATURES 11
2.3 DIGITAL FEATURES 12
2.4 BARGRAPH 12
2.5 SYMBOLS 13
2.6 PUSH-BUTTON FUNCTIONS 13
2.6.1 2nd Button 13
2.6.2 V-TIME / Button 14
2.6.3 R-DAR-PI-DD / R(t) Button 15
2.6.4 / ALARM Button 19
2.6.5 ► / Smooth Button 20
2.6.6 Button 20
2.6.7 SET-UP Function 21
2.6.8 Clearing the Memory 23
2.6.9 Communication Rate (USB Port) 23
2.6.10 Default Device Configuration 23
2.6.11 Voltage Disturbance Limit 24
2.6.12 Automatic Measuring Range 24
2.6.13 Blocking (Disabling) Test Voltages 25
3. MEASUREMENT FUNCTIONS 26
3.1 AC/DC VOLTAGE 26
3.2 INSULATION MEASUREMENT 26

4. OPERATION 28
4.1 MEASUREMENT PROCEDURE 28
4.2 INSULATION MEASUREMENT 28
4.3 OPERATION EXAMPLES 29
4.4 CAPACITANCE MEASUREMENT 30
4.5 RESIDUAL AND LEAKAGE CURRENT MEASUREMENT 30
5. MEMORY / USB PORT (5060) 31
5.1 USB PORT SPECIFICATIONS 31
5.2 SAVING / RECALLING VALUES (MEM/MR BUTTON) 31
5.3 PRINTING MEASURED VALUES 33
5.4 INSTANTANEOUS PRINTING OF MEASUREMENTS 33
5.5 PRINTING DATA IN MEMORY (PRINT MEM BUTTON) 34
6. DATAVIEW® 35
6.1 INSTALLING DATAVIEW® 35
6.2 MEGOHMMETER CONTROL PANEL 37
7. SPECIFICATIONS 38
7.1 REFERENCE CONDITIONS 38
7.2 VOLTAGE 38
7.3 INSULATION RESISTANCE 39
7.4 POWER SUPPLY 43
7.5 ENVIRONMENTAL SPECIFICATIONS 44
7.6 MECHANICAL SPECIFICATIONS 44
7.7 SAFETY SPECIFICATIONS 44
7.8 VARIATIONS IN OPERATING RANGE 45
8. MAINTENANCE 46
8.1 CHARGING THE BATTERY 46
8.2 FUSE REPLACEMENT 46
8.3 CLEANING 46
8.4 STORAGE 47
8.5 REPAIR AND CALIBRATION 47
8.6 TECHNICAL ASSISTANCE 47
8.7 LIMITED WARRANTY 48
8.7.1 Warranty Repairs 48

1. INTRODUCTION

Thank you for purchasing a **Megohmmeter Model 5050 or 5060**.

For the best results from your instrument and for your safety, please read the following operating instructions carefully, and comply with the precautions for use. Only qualified and trained operators should use this product.

Symbols and Definitions

	Signifies that the instrument is protected by double or reinforced insulation
	CAUTION - Risk of Danger! Indicates a **WARNING**. Whenever this symbol is present, the operator must refer to the user manual before operation
	Indicates a risk of electric shock. The voltage at the parts marked with this symbol may be dangerous
	Indicates Important information to acknowledge
	This product complies with the Low Voltage & Electromagnetic Compatibility European directives (73/23/CEE & 89/336/CEE)
	The UKCA marking certifies that the product is compliant with the requirements that apply in the United Kingdom, specifically regarding Low-Voltage Safety, Electromagnetic Compatibility, and the Restriction of Hazardous Substances.
	In the European Union, this product is subject to a separate collection system for recycling electrical and electronic components in accordance with directive WEEE 2002/96/EC

Definition of Measurement Categories (CAT)

CAT IV: Corresponds to measurements performed at the primary electrical supply (< 1000 V).

Example: primary overcurrent protection devices, ripple control units, and meters.

CAT III: Corresponds to measurements performed in the building installation at the distribution level.

Example: hardwired equipment in fixed installation and circuit breakers.

CAT II: Corresponds to measurements performed on circuits directly connected to the electrical distribution system.

Example: measurements on household appliances and portable tools.

1.1 PRECAUTIONS FOR USE

These safety warnings are provided to ensure the safety of personnel and proper operation of the instrument.

- Do not attempt to perform any tests with these instruments until you have read the instruction manual.
- Safety is the responsibility of the operator!
- Tests are to be carried out only on non-energized circuits! Check for live circuits before making resistance measurements (safety check).
- High voltage is present, as is the sample connected to it. Anyone performing or assisting in testing must follow all safety precautions to prevent electrical shock to themselves and others.
- Use personal protective equipment where appropriate.
- When testing samples with a capacitive component, make sure they have been properly discharged and are safe to touch. Dielectric insulation samples should be short-circuited for at least five times the amount of time they were energized.
- Megohmmeters should never be used in an explosive environment.
- Only use the leads that are supplied with the megohmmeter. If they are defective or worn, replace before testing.
- This instrument can be used on installations rated for 1000 V, Category III.

1.2 RECEIVING YOUR SHIPMENT

- Match the contents with the ordering information.
- Notify your distributor of any missing items.
- If the equipment appears to be damaged, file a claim immediately with the carrier and notify your distributor at once.

NOTE: Fully charge the instrument before use.

1.3 ORDERING INFORMATION

Megohmmeter Model 5050..... Cat. #2130.20

Includes extra large classic tool bag, set of three 10 ft (5 kV) safety leads (red/black/blue) with clips, one guard terminal jumper lead, US 115 V power cord, rechargeable battery pack, and user manual.

Megohmmeter Model 5060..... Cat. #2130.21

Includes extra large tool bag, set of three 10 ft (5 kV) safety leads (red/black/blue) with clips, one guard terminal jumper lead, US power cord, rechargeable battery pack, USB A-B cable, USB stick with DataView® software, and user manual.

1.3.1 Accessories

Cable, PC RS-232, DB9 F/F 6 ft Null Modem Cable
(For meters without USB port)..... **Cat. #2119.45**

Fuse, Set of 3, 0.1 A, 380 V, 5 x 20, .10 kA..... **Cat. #2119.84**

Extra Large Classic Tool Bag ..... **Cat. #2133.73**

Inverter – 12 VAC to 120 VDC 200 Watt for Vehicle use..... **Cat. #2135.43**

Cable – 10 ft USB Cable ..... **Cat. #2136.80**

Cable - 5 ft USB A-B Cable ..... **Cat. #2140.46**

1.3.2 Replacement Parts

Lead – Replacement set of 3, 10 ft (5 kV) Color-coded Safety
with Clips (JUMPER LEAD NOT INCLUDED)..... **Cat. #2151.30**

Lead – Replacement 1 ft Jumper Lead ..... **Cat. #2151.31**

Lead – Set of 3, 25 ft (5 kV) Safety with Clips..... **Cat. #2151.32**

Battery – Rechargeable 9.6 V ..... **Cat. #2960.21**

US 115 V Power Cord ..... **Cat. #5000.14**

Megohmmeter Calibration Checker..... **Cat. #5000.66**

1.4 ACCESSORY INFORMATION

1.4.1 DataView® Software (for Model 5060)

Dataview® software makes it possible to:

- Retrieve data from memory and plot graphs of the changes in insulation as a function of the time over which the test voltage is applied, R(t).
- Print out protocols of personalized tests depending on the user's needs.
- Create text files for use on spreadsheets.
- Set up and control the instrument entirely by the USB serial port.

Order Accessories and Replacement Parts Directly Online
Check our Storefront at www.aemc.com/store for availability

2. PRODUCT FEATURES

2.1 DESCRIPTION

The Megohmmeter Models 5050 and 5060 are portable instruments that are housed in rugged casing.

These megohmmeters are designed to check the safety of electrical installations and equipment.

Measures:

- Voltage.
- Insulation Resistance.
- Capacitance.
- Leakage Current.

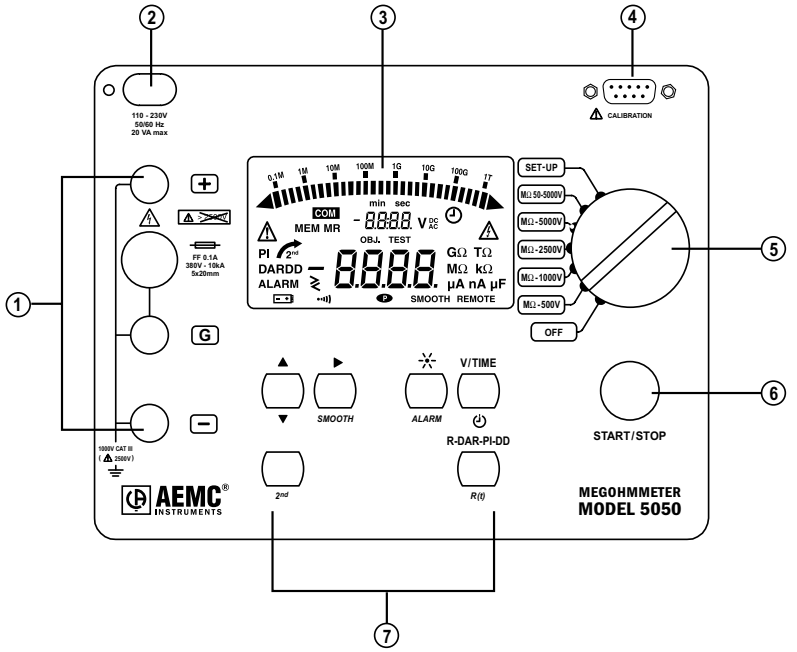
Advantages:

- Automatic voltage detection in all functions, before or during the measurement, which inhibits or stops the measurement.
- Automatic detection of external AC or DC voltages on the terminals.
- Threshold programming in each function to trigger audible alarms.
- Timed control of measurement duration.
- Fuse protection with defective fuse detection and indication.
- Digital filtering of insulation measurements.
- Automatic discharge of residual high voltage on the tested device.
- Automatic shut-off to save the batteries.
- Battery level indicator.
- Large, easy-to-read, and back-lit LCD.

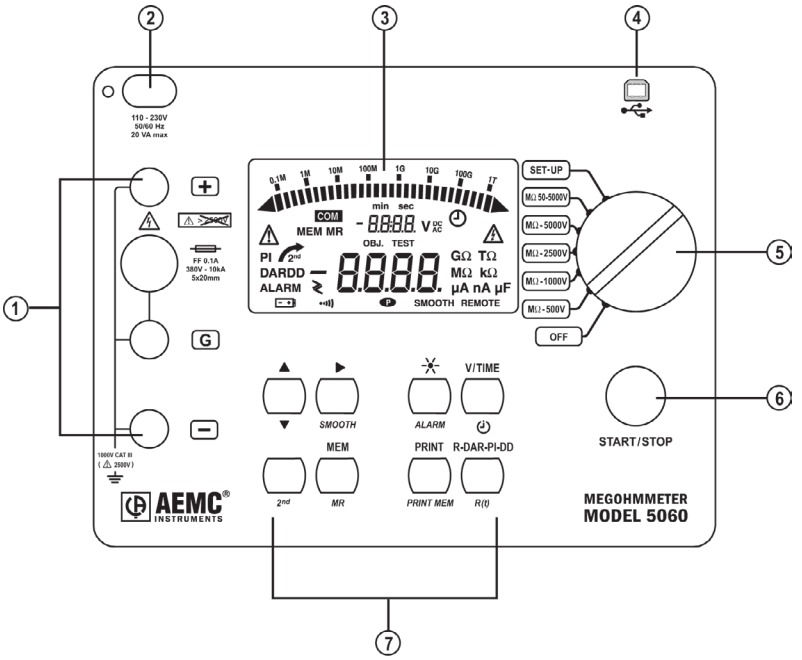
Additional Features (Model 5060):

- 128 kB memory, real-time clock, and USB serial port.
- Control and programming of the instrument from a PC (with DataView® software) for download, report, and printing.

2.1.1 Model 5050



2.1.2 Model 5060



2.2 MEGOHMETER FEATURES

1. Safety terminals: “+”, “G”, and “-” and access to the protective fuse.
2. AC power plug (direct operation on AC and battery recharge).
3. Back-lit liquid crystal display.
4. Serial interface.
   - Male plug 9 pin for calibration only (Model 5050).
   - USB port for connection to a PC (Model 5060).
5. Rotary selector switch with 7 positions:
   - **OFF** - Instrument is off.
   - **MΩ - 500 V** - Insulation measurement (to 2 TΩ).
   - **MΩ - 1000 V** -Insulation measurement (to 4 TΩ).
   - **MΩ - 2500 V** - Insulation measurement (to 10 TΩ).
   - **MΩ - 5000 V** - Insulation measurement (to 10 TΩ).
   - **MΩ - 50V-5000 V** - Insulation measurement with selectable test voltage.
   - **SET-UP** - Set-up of the megohmmeter.
6. START/STOP button.
7. 6 buttons (5050) or 8 buttons (5060), each with a first and second function The second functions are highlighted in yellow below each button:
   - **2nd (yellow button)** - Selects the second function on each button.
   - **R-DAR-PI-DD** - Lets you choose the type of measurement to be performed. Instantaneous Resistance (R), Dielectric Absorption (DAR), Polarization Index (PI), or Dielectric Discharge (DD).
   - **R(t)** - Shows/hides the interval values of insulation resistance, test voltage and time-stamping, following a time-controlled test.
   - **V/TIME** - When measuring insulation, pressing this button displays the time elapsed since the beginning of the measurement, then the exact voltage generated. When performing resistance or capacitance measurement, this button has no effect. In MR (memory recall), it displays the date and time at which the measurement was stored, the exact test voltage and the OBJ : TEST number.
   - ⏲ - Activates or deactivates the “time-controlled” test mode.
   - ☼ - Turns the display backlight ON or OFF.
   - **ALARM** - Activates or deactivates the alarms programmed in SET-UP.
   - ▶ - Selects a parameter to be modified.
   - **SMOOTH** - Stops/starts smoothing of displayed values during insulation testing.
   - ▲ - Increases the flashing parameter being displayed. To move about the list of interval insulation measurements, in the R(t) function.

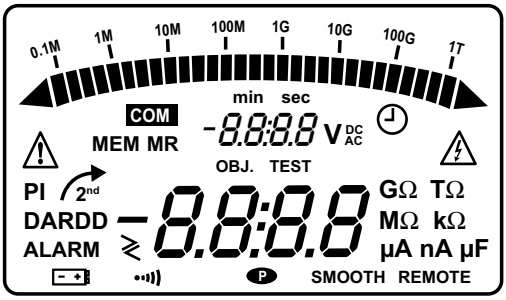
- ▼ - Decreases the flashing parameter being displayed. To move about the list of interval insulation measurements in the R(t) function.

  If the ▲ button or ▼ button is held down, the movement between parameters is increased to a faster rate.

Model 5060 only:

- **MEM** - Saves measured values.
- **MR** - Recalls saved data.
- **PRINT MEM** - Prints memory contents.
- Printing measurement data is completed through DataView® software.

2.3 DIGITAL FEATURES



Main Display

Indicates the value of:

- Insulation measurement (resistance, DAR and PI, DD, capacitance).

Small Display

Indicates:

- Voltage measured or applied by the instrument.
- Elapsed time or the output voltage, during insulation measurement.

After recording a set of data (5060), the small display also indicates the time and date in MR (memory recall) mode, and the memory address with the OBJ : TEST number.

2.4 BARGRAPH

- Active during insulation measurement (0.1 MΩ to 1 TΩ).
- Indicates the battery charge at start-up.
- Indicates free memory space. One segment represents approximately 100 groups of saved values with each group holding approximately 50 recordings (1 OBJ and 1 TEST).

2.5 SYMBOLS

MEM/MR: Memory address (5060) - indicates the memory operation.

OBJ:TEST: Memory address (5060) - the number is displayed on the small digital display.

COM: Flashes on the screen when data is transmitted to the serial interface (5060) or remains permanently displayed if there is a problem during transfer.

DAR/PI/DD: Indicates the mode chosen before insulation measurement or the results of these measurements.

Indicates dangerous voltage generated; V >120 V.

Indicates external voltage present, symbol is activated after pressing START, if V > 25 VAC ± 3 V or > 35 VDC.

Activation of “time-controlled test” mode or clock adjustment when in SET-UP (5060).

2nd (Yellow button) Selects the second (bottom) function of a button.

Flashes if the battery voltage is low to indicate that the battery should be recharged (see § 8.1). The voltage is displayed on the small display for 2 seconds when the instrument is turned on. The main display indicates “bat” when the test is carried on.

Warning buzzer is activated.

Indicates that the automatic switch-off function has been deactivated.

SMOOTH: Smooths the insulation measurements displayed.

REMOTE: Remote control via an interface (5060). In this mode, all the buttons and the rotary switch on the instrument are non-functional except for the OFF position.

FUSE -G-: Flashes if the “G” input fuse is defective.

2.6 PUSH-BUTTON FUNCTIONS

2.6.1 2nd Button

- Selects the second function (highlighted in yellow) of the buttons.
- The symbol appears. This symbol will disappear upon pressing the function button chosen unless the ▼ button is activated. In this case, it only disappears when the **2nd** button is pressed again or if other function buttons are pressed. This allows you to rapidly decrease parameters with the ▼ button without having to press the **2nd** button every time.

2.6.2 V-TIME / ⏲ Button

First Function - V/TIME

Displays all the secondary information available on the small display.

For Insulation Measurement:

- The time elapsed since the start of the measurement.
- The voltage between the instrument's "+" and "–" terminals.
- Date, time, test voltage and OBJ:TEST number in memory recall mode (MR).

Second Function - ⏲ Time-controlled Test

Displays the measurement duration programmed in **SET-UP** on the small display.

- The ⏲ symbol lights up.
- Pressing the **START** button begins the measurement process. The measurement duration is set to 15 minby default.
- As soon as the measurement starts, the small display counts down the remaining duration of the measurement. Once it reaches zero, the measurement stops.
- As the time-controlled test is carried out, interval samples (resistance/voltage values as a function of time) are automatically saved. The time between each sample is set to 30 s by default, but it can be changed in the **SET-UP** menu.
- The samples are displayed with the **R(t)** function (see § 2.6.3) as long as a new measurement has not been started. With each new measurement, the previous sample value is erased from the memory. These sample values are saved with the last value of the resistance if used with the **MEM** (memory storage) function.

NOTE: If the selector switch's position is altered or if the STOP button is pressed during measurement, the measurement will be interrupted. This function is only active for insulation measurement.

2.6.3 R-DAR-PI-DD / R(t) Button

First Function - R-DAR-PI-DD

The **R-DAR-PI-DD** button allows automatic measurement of:

- Dielectric Absorption Ratio (DAR).
- Polarization Index (PI).
- Dielectric Discharge Test (DD).

The PI and DAR values are useful on long cables or when monitoring aging insulation on electrical machines.

On this material, measurement is adversely effected at the beginning due to interfering currents (from capacitive charges, dielectric absorption), which eventually cancel each other out. In order to get an accurate measurement of the leakage current, it is necessary to perform the measurement over a long period of time to reduce the influence of any interfering currents at the beginning of the measurement.

Then, the **PI** or the **DAR** ratios are calculated:

- PI* = R10 min / R1 min (2 values recorded during a 10-minute measurement).
- DAR = R1 min / R30 s (2 values recorded during a 1-minute measurement).

The quality of insulation depends on the results found.

DAR	PI	State of the insulation
< 1.25	< 1	Inadequate, even dangerous
	< 2	
< 1.6	> 2 to < 4	Good
> 1.6	> 4	Excellent

**The 10 and 1 minute times can be modified in the SET-UP menu, to adapt to any changes or specific applications.*

If one layer is defective but all the others show strong resistance for multi-layer insulation, the calculation of the PI and PAR ratios is insufficient to show this type of problem.

Therefore, a dielectric discharge test (DD) is necessary to supplement the PI and DAR indications.

This test measures the dielectric absorption of heterogeneous or multi-layer insulation while ignoring the parallel-surface leak currents.

It consists of applying a test voltage for a period sufficient to electrically “charge” the insulation to be measured (a typical value is the application of a 500 V voltage for 30 minutes).

The test voltage is chosen in the same way as the insulation measurement in the SET-UP menu. The device will cause a fast discharge during which the insulation capacity is measured and measured again 1 minute after the residual current is circulating in the insulation.

The DD value is calculated from the formula below:

$$DD = \frac{\text{current measured after 1 minute (mA)}}{\text{test voltage (V) x capacity measured (F)}}$$

The indication of the insulation quality as a function of the resulting value is as follows:

DD value	Insulation quality
DD >7	Very bad
7 >DD >4	Bad
4 >DD >2	Doubtful
DD <2	Good insulation

NOTE: If The dielectric discharge test is suited for the insulation measurement of rotating machines and for the insulation measurement of heterogeneous or multilayer insulation containing organic materials in general.

Using the R-DAR-PI-DD Function:

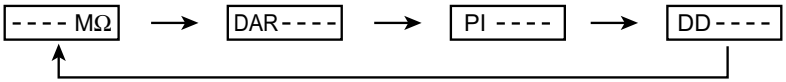
During or after measurement, the **R-DAR-PI-DD** button allows you to scroll through the following values:

- DAR (for measurements lasting > 1 min).
- PI (for measurements lasting > the programmed PI times).
- DD can only be calculated 1 minute after the end of the insulation measurement and circuit discharge, and only if it was selected before beginning the measurement.
- Capacitance in µF (only after the measurement has stopped and the circuit has been discharged).
- Residual leakage current circulating in the installation in µA or nA.
- Insulation resistance in MΩ, GΩ, or TΩ.

NOTE: During the measurement, the DAR value is not available if the DD value was preselected before the measurement. The PI value is not available if DAR or DD values were preselected before the measurement.

Automatic Measurement of DAR or PI:

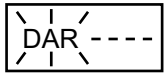
If the R-DAR-PI-DD button is pressed during the voltage measurement before the start of a measurement, the following will be displayed:



NOTE: The input current may be a depolarization current resulting from an earlier insulation measurement. It is recommended to start a new DAR and PI measurement after the current has dropped to a negligible value (on the order of 100 pA) to avoid variations on these measurements.

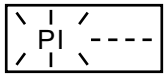
Depending on the choices (DAR or PI), the measurement will go as follows:

a) **DAR:** Press **START** - the **DAR** symbol will flash, and the display will indicate "- - - -" as long as the calculation of the ratio is not possible (t <1 min).

e.g.: 

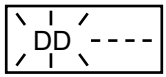
After 1 min, the measurement will stop and the main display will automatically show the DAR value. During or after measurement, the **R-DAR-PI-DD** button can be used to see the insulation measurement carried out, but it does not give the PI value since the measurement has not lasted long enough.

b) **PI:** Press **START** - the **PI** symbol flashes and the display indicates "- - - -" as long as the calculation of the ratio is not possible (t < programmed PI times).

e.g.: 

After the upper PI time has passed, the measurement stops and the main display automatically shows the PI value. During and after measurement, the **R-DAR-PI-DD** button makes it possible to display the DAR (after 1 min), the PI, and the insulation measurement.

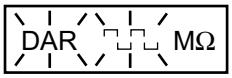
c) **DD:** Press **START** - the **DD** symbol will flash and the display will indicate "- - - -" as long as the calculation of the ratio is not possible (t < 30 min +1 min).

e.g.: 

1 minute after the measurement stops, the DD symbol will become steady, and the display will automatically show the value of DD.

Therefore: if the measurement lasts 1 min - DAR.
if the measurement lasts longer than the programmed PI time - PI.
if 1 min. after the end of the measurement - DD.

NOTE: If during DAR or PI measurement (automatic or not), a high external interference voltage becomes present, or the insulation resistance goes beyond the device's measurement range. Then, the DAR or PI measurements are interrupted and the screen indicates:



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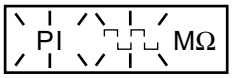

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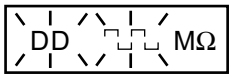


The display of the DD value is:

- Unknown (- - - -) if C < 1 nF and Idd < 100 pA.
- Known and flashing if 1n F ≤ C < 10 nF and 100 pA ≤ Idd < 1 nA.
- Known and permanent if C ≥ 10 nF and Idd ≥ 1 nA.

(with C = measured capacitance and Idd = measured leakage current).

NOTE: The 10 min / 1 min measurement durations for PI calculation can be modified in the **SET-UP** menu (see § 2.6.7), which allows changes to standards or to suit a particular application.

Second Function - R(t)

Used to access the interval insulation resistance values as a function of time after a measurement in "time-controlled test" mode (see § 2.6.2).

The time between each saved sample is programmed in the **SET-UP** menu.

This function is also available on the Model 5050, which has neither a read-write memory for saving measured data, nor an interface for data retrieval from the instrument by a PC.

Model 5050:

Up to 20 samples can be recorded during measurement at the sample rate chosen in **SET-UP** (the default value is 30 seconds). It is possible to save more than 20 samples depending on available memory.

Model 5060:

The number of saved samples is limited only by the memory space available.

To enter the display mode, press the **R(t)** button:

- The small display indicates the time 00:30 (e.g. the sampling frequency is every 30 s).
- The main display shows the corresponding R value.

Use the **V/TIME** button to alternate between the voltage and time (on the small display) associated with the R value on the main display.

The button is used to scroll down through the all the samples saved during measurement, which allows you to read the information in order to draw R(t) and V(t) graphs.

This makes it possible to carry out R(t) analysis on-site without a printer or a PC.

To exit this function, press the **R(t)** or **R-DAR-PI-DD** button again.

2.6.4 ☀ / ALARM Button

First Function - ☀

Turns the display back-light **ON** or **OFF**.

Second Function - ALARM

Activates/deactivates the ALARM function. The "**ALARM**" symbol is displayed when activated.

If activated and the high or low threshold values are programmed, the "**ALARM**" symbol will flash, and the buzzer (if activated) will sound continuously when the threshold is crossed.

It is possible to program a different limit in each function. These limits will be stored in memory even after the device is turned off.

Activating the Alarm Indication before a Test:

To activate the Alarm Indication before performing a test you must go through the following steps:

- Program the Alarm Set Point Resistance Value for the Test Voltage that you will use.
- Turn the Rotary switch to the Setup position.
- Press the Yellow 2nd button. Then, press the Alarm button to set Alarms. The first time you press 2nd & Alarm you will see the alarm setting for 50 volt tests.
- Press the 2nd & Alarm buttons repeatedly until you see the test in the top line of the display that you wish to set alarms for. The sequencing will be 500, 1000, 2500, 5000, and set.
- Use the cursor keys to adjust the Blinking value. First select KΩ, MΩ, GΩ or TΩ using the Up Arrow Key (▲).
- Next, press the Right Arrow Key (►) to move to the next selection which is the greater than (>) / less than (<) choice. Use the Up Arrow Key to make your selection.
- Press the Right Arrow Key again to move to the Resistance Value Set Point Selection. You can change this value digit by digit using the Up Arrow / Left Arrow combination working from the highest to lowest digit.
- When finished programming the alarm settings, place the rotary switch to the desired test function.
- Before initiating a test, press the Yellow 2nd button and the Alarm button to activate the Alarm Notification. The word "ALARM" will appear in the lower left side of the display.
- Next, press the round yellow Start/Stop button to begin the test. The Alarm symbol will flash and the buzzer will sound continuously if the Alarm set point is tripped.

NOTE: If the rotary switch is turned off prior to the next test, the alarm notification will be deactivated. You will need to press the Yellow 2nd button and the Alarm button to activate the Alarm Notification when you turn the unit back on before starting the next test if an alarm notification is desired.

2.6.5 ► / Smooth Button

First Function - ►

Selects the desired parameter to be modified. The selected parameter will flash.

The flashing parameter is modified using the ▲▼ button (see § 2.6.6).

Second Function - SMOOTH

Activates a digital filter for insulation measurement. It only has an effect on the displayed values (which are smoothed) and not the actual measurements.

For example, this function is useful when the displayed insulation values are highly unstable, brought about due to a capacitive component in the tested element.

2.6.6 ▲▼ Button

Changes the flashing parameters displayed, or views R(t) values (see § 2.6.3).

As a general rule, two figures (day, month, hour, min., sec., and OBJ:TEST) will flash.

The ▲ and ▼ functions have a "follow-on" mode (e.g. as soon as the high or low program limit is reached, the parameter to be modified switches automatically to the following low or high limit).

First Function ▲

- Press button briefly to increase the displayed number slowly.
- Press button for a longer time to increase at a faster rate.

Second Function ▼

- Press button briefly to decrease the displayed number slowly.
- Press button for a longer time to decrease at a faster rate.

Unlike all the second functions of other buttons, it is not necessary to press the **2nd** button each time to get to the ▼ function. The 2nd symbol remains displayed and is valid for the ▼ function (only), as long as the user does not deactivate it by pressing **2nd** or another button.

2.6.7 SET-UP Function

Configures the instrument.

After selecting **SET-UP** with the rotary selector switch:

- All the display segments are lit up for 1 second.
- Then, the software version number is displayed.
- Next, the instrument ID number is displayed.
- "**PUSH"** will appear on the small display and "**btn"** on the main display, which prompts the operator to press a button.

The SET-UP function is used to directly access the parameters to be programmed, by pressing the corresponding button.

- After a button is pressed, the corresponding figures or symbols will appear on the screen.
- The figures or the symbols that can be modified will flash on the screen.
- Use the ▶ and ▲▼ buttons.
- All parameters are immediately and permanently saved.

The following table defines the buttons that are functional when in SET-UP and the corresponding display with the possible range of adjustment.

Parameter program	Command Button	Display			
		main	small	symbol	value
Duration of "time-controlled test"	◷	tESt	30:00	min. sec	1:00 - 59:59
1st and 2nd times for PI calculation	R-DAR-PI-DD	second time (10:00)	first time (1:00)	min : sec	:30 - 59:59
Time between interval samples in "time-controlled test"	R(t)		00:30	min : sec	0:05 - 30:00
Limit for 500 V - 2 TΩ	ALARM	500 kΩ	500 V	ALARM <	30 k-2 TΩ and > / <
Limit for 1000 V - 4 TΩ	ALARM (2nd press)	1 MΩ	1000 V	ALARM <	100 k-4 TΩ and > / <
Limit for 2500 V - 10 TΩ	ALARM (3rd press)	2.5 MΩ	2500 V	ALARM <	300 k - 10 TΩ and > / <
Limit for 5000 V - 10 TΩ	ALARM (4th press)	5 MΩ	5000 V	ALARM <	300 k - 10 TΩ and > / <
Limit for Var - 50/5000 V	ALARM (5th press)	5 MΩ	Set	ALARM <	10 k - 10 TΩ and > / <
Time	V/TIME		12 :55	◷	hh (00-23) mn (00-59)
Date (European version)	V/TIME (2nd press)	17.03	2000		dd.mm.yyyy
Version : USA, European	V/TIME (3rd press)	USA/Euro			USA/Euro
Clear Memory	MEM then MEM (2 s)	cLr	ALL	MEM	
Selective clearing of memory	MEM then ▶ and ▲▼ and MEM (2 s)	FrEE/OCC	OBJ : TEST number	MEM	00...99
Baud	PRINT	9600	bAUd		300...9600
Buzzer	☀	On		•ıı))	ON / OFF
Auto switch-off	☀ (2nd press)	On		Ⓟ	ON / OFF
Default configuration	☀ (3rd press) then START	DFLt	SEt		
User selectable test voltage	☀ (4th press)	SEt	100 V	V	40 / 5100 V
Disturbance limit voltage	☀ (5th press)	0.03 V	dISt	V	0.03/0.10/0.20
Automatic range	☀ (6th press)	Auto	rAnG		Auto/1/2/3
Test voltage locking	☀ (7th press)	oFF	1000 V		ON / OFF 40-5100 V

The values shown on this table, in the "Display/main" and "Display/small" columns, are the factory default values. In case they are accidentally changed, it is possible to get them back. (see § 2.6.10).

2.6.8 Clearing the Memory

In **SET-UP**, press the **MEM** button:

- The **MEM** symbol flashes.
- The small display indicates “**ALL**."
- The main display indicates “**cLR**."

To clear the entire memory, press the **MEM** button again for 2 seconds:

- The **MEM** symbol is displayed without flashing.
- The small display indicates “**ALL**."
- The main display indicates “**FrEE**."

To clear the contents of a specific OBJ : TEST number:

- Select the number using the ▶ and ▲▼ buttons.
- “**FrEE**” or “**OCC**” appears on the main display.

Press the **MEM** button again for 2 seconds to clear the contents:

- The small display indicates the **OBJ : TEST** number.
- The main display indicates “**FrEE**."

2.6.9 Communication Rate (USB Port)

- In **SET-UP,** press the **PRINT** button.
- The main display indicates the Communication Rate (e.g. 300, 600, 1200, 2400, 4800, 9600, or Parallel).
- “**bAUd**” appears on the small display. The value can be changed using the ▲ and ▼ buttons. For the USB link to operate, the baud rate must be 9600.
- “**Parallel”** is not available for use.

2.6.10 Default Device Configuration

In **SET-UP,** press the ☼ button three times:

- “**SEt**” appears in the small display.
- “**DFLt**” (flashing) appears in the main display.

Press **START** to select the default configuration settings (see the previous table).

2.6.11 Voltage Disturbance Limit

In **SET-UP**, press the ☀ button five times:

- "**dISt**" appears in the small display.
- "**003U**" (flashing) appears in the main display.
- Modify this value if necessary using the ▲▼ button (possible choice between: 0.10 - 0.20 - 0.03).

NOTE: This adjustment provides the best compromise between the measurement build-up time and the presence of external interference voltages (§ 3.2).

If no interference voltage is present, choose 0.03 to obtain a rapid measurement build-up time.

Example: If an insulation measurement is performed at a test voltage of 5000 V and the limit is set to 0.10, it will be possible to perform a correct measurement with the presence of an external interference voltage ≤ 500 V to the detriment of a longer measurement build-up time.

2.6.12 Automatic Measuring Range

In **SET-UP**, press the ☀ button six times:

- "**rAnG**" appears in the small display.
- "**Auto**" appears in the main display.

Use the ▲▼ button to choose a fixed (1, 2, or 3 on the main display) or automatic (Auto on the main display) measurement range.

NOTE: The fixed measurement ranges correspond to the current ranges of the following measurements:

1. 50p A to 200 nA (>500 GΩ).
2. 150 nA to 50 µA (500 KΩ to 500 GΩ).
3. 30 µA to 3 mA (<500 KΩ).

The choice of a fixed measurement range optimizes the measurement build-up time for a known value of insulation resistance.

Example: Choice of range 1 for a measurement greater than 500 GΩ.

In most cases, "**Auto**" should be selected.

2.6.13 Blocking (Disabling) Test Voltages

This function prevents insulation measurements from being carried out at selected test voltages. This makes it possible to use the instrument for specific applications and avoid improper voltages.

To set the maximum variable test voltage:

- Turn the rotary switch to **SET-UP**.
- Press the ☀ button seven times.
  - "**1000 V**" appears in the small display.
  - "**OFF**" appears (flashing) in the main display.
- Press the ► button to toggle to the maximum test voltage.
  - "1000 V" will now be flashing.
- To increase the voltage, press the ▲ button.
- To decrease the voltage, press the yellow **2nd** button and then the ▼ button.
- After setting the maximum test voltage, toggle back to "**OFF**" by pressing the ► button.
- Press the ▲ button to turn "**ON**."

Example: By choosing **ON** and a test voltage limit of 750 V, the measurement will be performed at 500 V for the 500 V switch position on the rotary switch, and at 750 V for all the other positions on the rotary switch (LIM will appear for 3 seconds on the main display).

3. MEASUREMENT FUNCTIONS

3.1 AC/DC VOLTAGE

- Select any measurement position with the rotary selector switch.
- The instrument is automatically in AC/DC voltage measurement mode.
- The voltage is continuously measured and is shown on the small display.

Measurement is prohibited if an external voltage is present at the terminals before pressing **START/STOP**. Similarly, if an interference voltage is detected during measurement, the measurement is stopped, and the voltage is indicated.

3.2 INSULATION MEASUREMENT

As soon as one of the MΩ positions has been selected, the main display shows "- - - - MΩ", and the small display indicates the voltage present at the device's "+" and "–" terminals.

WARNING: If the external voltage present at the device's terminals exceeds the threshold shown below, pressing the yellow START/STOP button does not bring about insulation measurement but will trigger an audible signal instead.

The ⚠ symbol will flash for 2 seconds. Then, the device will return to automatic voltage measurement.

Threshold: V peak ≥ dISt x Vn

- Vpeak: External peak voltage or DC present at unit terminals.
- dISt: Coefficient defined in the set-up menu (adjustable to 0.03 - 0.10 - 0.20 - default value: 0.03).
- Vn: Test voltage chosen for insulation measurement.

If the external voltage present at the device terminals is less than the value defined previously, then insulation measurement can proceed:

Pressing **START** begins the measurement immediately. The measurement value is displayed on the main digital display and on the bargraph. An audible beep is given out every 10 seconds to indicate that a measurement is in progress.

WARNING: If the test voltage is considered to be dangerous (>120 V), the ⚠ symbol is displayed. If an external voltage higher than the value defined by the following threshold is detected during insulation measurement, the measurement is stopped while the voltage is applied to the instrument.

The ⚠ symbol will flash, and the voltage value will be indicated on the small digital display.

Threshold: V peak > (dISt + 1.05) Vn

A dISt factor adjustment optimizes the measurement build-up time. If there is no interference voltage present, the dISt factor may be adjusted to the minimum value to obtain a build-up time for the minimum measurement.

WARNING: If a significant interference voltage is present, the dISt factor may be increased so that the measurement is not interrupted by the appearance of a negative alternation during the generation of the test voltage, which is the same as optimizing the measurement build-up time in the presence of the interference voltage.

If the measurements are unstable, the **SMOOTH** function can be enabled.

By pressing the **V/TIME** button during measurement, you can alternate between displaying the duration of the voltage measurement and the exact voltage generated on the small display.

Pressing the **STOP** button stops the measurement. After the measurement has been stopped, the result remains displayed.

It is possible to scroll through all the other results available on the main display using the **R-DAR-PI-DD** button. This button can also be used before the measurement begins.

If the “time-controlled test - ” mode has been selected, the **R(t)** button makes it possible to access all the saved interval measurements automatically.

If the **ALARM** function is activated, a buzzer is triggered as soon as the measurement crosses the threshold programmed in the **SET-UP** configuration menu.

Display of values after measurement

R-DAR-PI-DD Button		V-TIME Button
Main Display	Small display	Small display if the MR button is pressed (Model 5060)
Resistance DAR PI DD* Current	duration (min. sec) duration (min. sec) duration (min. sec) duration (min. sec) duration (min. sec)	date, time, test voltage, OBJ : TEST date, time, test voltage, OBJ : TEST date, time, test voltage, OBJ : TEST date, time, test voltage, OBJ : TEST
Capacitance** R(t)	duration (min. sec)	last test voltage

** The value of DD is displayed only one minute after the measurement stops.*

***Capacitance (µF) measurement is only displayed after the measurement is finished and the circuit has been discharged.*

4. OPERATION

NOTE: Charge the instrument fully before use.

4.1 MEASUREMENT PROCEDURE

- Start the instrument by turning the switch to the corresponding position. All the segments on the LCD screen are displayed. Then, the battery voltage is displayed.
- Connect the leads to the “+” and “-” leads to the measurement points.
- The voltage is continuously measured and displayed on the small display.
- Press the START/STOP button to start the measurement.
- Press START/STOP again to stop the measurement. The last result remains on the display until the next measurement is started, or the selector switch is turned.

WARNING: If an external voltage is present that is greater than the thresholds described in § 3.2, the instrument indicates this voltage on the small display, the warning symbol flashes, and the measurement is stopped.

There are several special functions that can be used (see § 2.6).

4.2 INSULATION MEASUREMENT

This function allows the instrument to measure insulation between 10 kΩ and 10 TΩ at a test voltage of 500 V, 1000 V, 2500 V, and 5000 V or programmed voltage between 40 V and 5100 V.

- Use the rotary switch to select the required test voltage (MΩ-500 V, or MΩ-1000 V, or MΩ-2500 V, MΩ-5000 V, or Var. MΩ-50-5000 V).
- Connect the instrument to the insulator to be tested.
- Start the measurement using the START/STOP button and read the results.

WARNING: If an external voltage is present that is greater than the thresholds described in § 3.2, then measurement is prohibited.

Scroll through the results on the main display with the **R-DAR-PI-DD** button or on the small display with the **V/TIME** button.

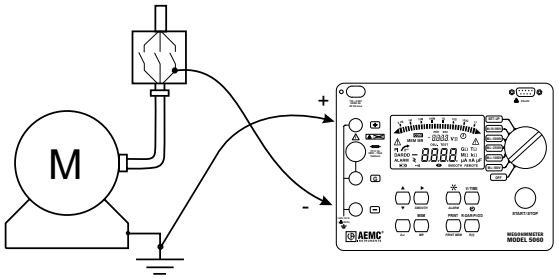
Use **R(t)** when carrying out a ‘time-controlled test’ to scroll through the interval measurement values saved at the sampling rate specified in **SET-UP**. These values are available until another measurement is taken or the selector switch is turned.

When measuring high levels of insulation (> 1 GΩ), it is advised that the “G” guard terminal be used to eliminate the influenc e of surface leakage currents. The guard is connected between the two measurement contact points, and the surface susceptible to surface currents, (e.g. dusty, damp cable or transformer insulation). In this case, alligator clips are preferable to test-probes held in the hand.

As soon as insulation measurement is stopped, the test circuit is automatically discharged using the instrument’s internal resistance.

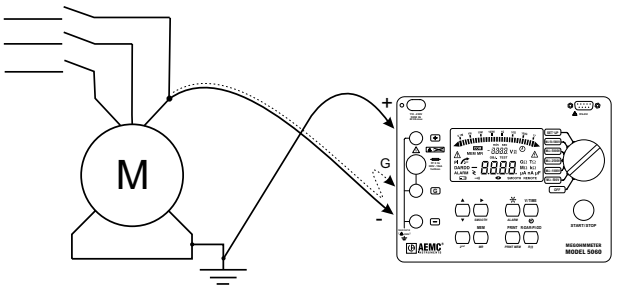
4.3 OPERATION EXAMPLES

Connection diagram for measurement of low insulation (e.g. motor):

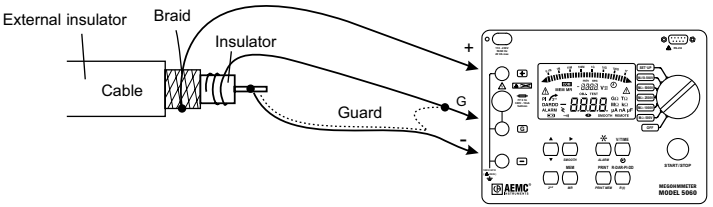


Connection diagram for measurement of strong insulation:

a) Example of a motor (reduction of capacitive effects).



b) Example of a cable (reduction of superficial leak effects).



4.4 CAPACITANCE MEASUREMENT

Capacitance measurement is automatically carried out during insulation measurement. It is displayed after the measurement is stopped and the circuit is discharged by using the R-DAR-PI-DD button.

4.5 RESIDUAL AND LEAKAGE CURRENT MEASUREMENT

The instrument automatically measures the residual current circulating in the installation during an insulation measurement. It is displayed at the end of the measurement with the R-DAR-PI-DD button.

5. MEMORY / USB PORT (5060)

5.1 USB PORT SPECIFICATIONS

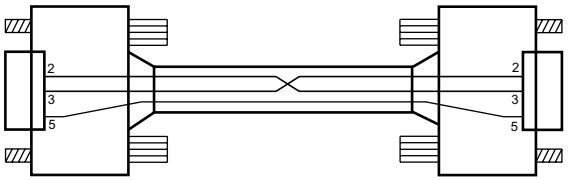
The Baud Rate must be set to 9600. “Parallel” is not available.

This setting is carried out in the **SET-UP** menu (see § 2.6.7).

Data format: 8 data bits, 1 stop bit, no parity, Xon / Xoff protocol.

RS-232: Connection to a PC or to a Parallel Printer (for meters without a USB port)

Cable, PC RS-232, DB9 F/F 6ft Null Modem Cable
(for meters without USB port).....**Cat. #2119.45**



9-pin female connector to Model 5060

9-pin female connector to serial printer

5.2 SAVING / RECALLING VALUES (MEM/MR BUTTON)

NOTE: After replacing or completely discharging the battery, the message “**Memory OFF**” appears when you try to save a measurement in memory.

To be able to save your measurements, you will need to do the following:

1. Set the instrument to **SET-UP**.
2. Press the **MEM** button (the display shows “MEM All clr”).
3. Press the **MEM** button for 2 s (the display shows “MEM ALL FrEE”).
4. Measurements are now ready to be saved.

First Function - MEM (Save)

Results can be recorded in the instrument’s memory and stored along with addresses defined by an object number (OBJ) and a test number (TEST).

An object represents a "box" where we can place 99 tests. Thus, an object can represent a machine or an installation upon which a certain number of measurements (insulation, resistance and continuity) are carried out.

1. When the button is pressed, the **MEM** symbol flashes and the small display indicates the first free **OBJ : TEST** number (e.g. 02 : 01). The main display indicates “**FrEE**.”
   - The **OBJ** number is the same as that of the last saved measurement, and the **TEST** number goes up in increments of 1.

- It is always possible to modify **OBJ : TEST** with ► and ▲▼.
- If the user happens to select a memory address that is already occupied, **OCC** will appear on the main screen.
- If a new **OBJ** is selected, the **TEST** goes back to 01.

2. By pressing **MEM** once again, the present measurement results will be recorded in the selected memory address (occupied or otherwise). The **MEM** symbol stops flashing and remains displayed. The time and the date of this recording are stored with the available data (R, V, t).

   If a button other than MEM is pressed or the selector switch is moved before pressing MEM a second time, the instrument exits from MEM mode without saving the results.

3. If a time-controlled test has been initiated, interval values (samples) are available. They are automatically saved under the same **OBJ : TEST** number as the final measurement.

Memory Capacity

- Total memory space: 128 kb.
- Data management: 8 kb.
- Free memory space: 120 kb.

An insulation measurement requires 80 bytes. A “time-controlled test” sample requires 10 additional bytes. Therefore, it is possible to record about 1500 insulation measurements.

Free Memory Space

This function is automatically activated when a result is saved.

Press **MEM** once to get the following free **OBJ : TEST** number; the displayed bargraph corresponds to the available free memory space.

- If the entire memory is free, all of the bargraph segments will appear.
- If the entire memory is full, the arrow to the left of the bargraph will flash.
- As soon as the storage is complete, the bargraph will disappear.

Each segment of the bargraph equals approximately 50 recordings.

Second Function - MR

The **MR** function allows a recall of any saved data from memory, regardless of the position of the rotary selector switch.

- When the button is pressed, the **MR** symbol is displayed. The small display indicates the last **OBJ : TEST** number to be assigned (e.g. 02 :11).
- 02 “11” flashes opposite the **TEST** symbol. Use the ► and ▲▼ buttons to select the desired **OBJ : TEST** number.

- If a new **OBJ** is selected, **TEST** is automatically set to the maximum stored number. At this stage, it is possible to review the entire memory with the ► and ▲▼ buttons since the measurement values corresponding to the selected **OBJ : TEST** number are displayed on the main display. Use the **R-DAR-PI-DD button** to scroll through them.
- The **V/TIME** button gives access to the date/time/V/**OBJ-TEST** number for each result.
- If the recording selected by the **OBJ : TEST** number corresponds to a time-controlled test, the R(t) values can be accessed by pressing the **R(t)** button. The small display changes and indicates min:sec (time of 1st sample) and the ⏲ symbol flashes on the screen. You can scroll through the other samples with the ▲▼ button.

To exit from **R(t)** mode and return to the normal memory recall mode **(OBJ : TEST**), press **R(t)** or **R-DAR-PI-DD** again.

To exit the MR function, press the **MR** button again or turn the selector switch.

5.3 PRINTING MEASURED VALUES
(Not Available for Model 5060 with USB Port)

If you use a serial printer, choose the appropriate communication speed (baud rate) in the **SET-UP** menu between 300 - 9600 baud. Then, program the printer to the format run by the instrument (see § 5.1).

There are two printing modes possible:

- Instantaneous printing of measurement (PRINT).
- Printing of recorded data (PRINT memory).

NOTE: If the data transmission to the printer is successful, the COM symbol will flash once on the screen. If a problem has occurred, the COM symbol will remain on the LCD screen without flashing.

5.4 INSTANTANEOUS PRINTING OF MEASUREMENTS
(Not Available for Model 5060 with USB Port)

Following a measurement or after accessing values in **MR** mode, use the **PRINT** function to print the measurement results.

NOTE: PRINT only works when the test is stopped by pressing the **START/STOP** button and the value is displayed on the LCD.

Press the **PRINT** button to print the following:

- 1 set of measurements (V/R/DAR/PI/DD/date/time) for normal tests.
- The R(t) values if the “time-controlled test” has been used.

To stop printing, move the position of the selector switch.

5.5 PRINTING DATA IN MEMORY (PRINT MEM BUTTON)

(Not Available for Model 5060 with USB Port)

Prints out the contents of the instrument's read-write memory.

The small display indicates 01 : 01 for the **OBJ : TEST** number (starting address of printing).

The main display indicates the last recording in memory (the end address of printing) e.g. 12 : 06.

01 flashes opposite the **OBJ** position (use the ► and ▲▼ buttons to define the start/end addresses of the printout).

- **To exit without printing**, alter the position of the selector switch.
- **To proceed with printing**, press the PRINT button once more.
- **To stop printing**, alter the position of the selector switch.

Only the main results are printed out.

Example: AEMC® Instruments Model 5060

Instrument number: 000 001

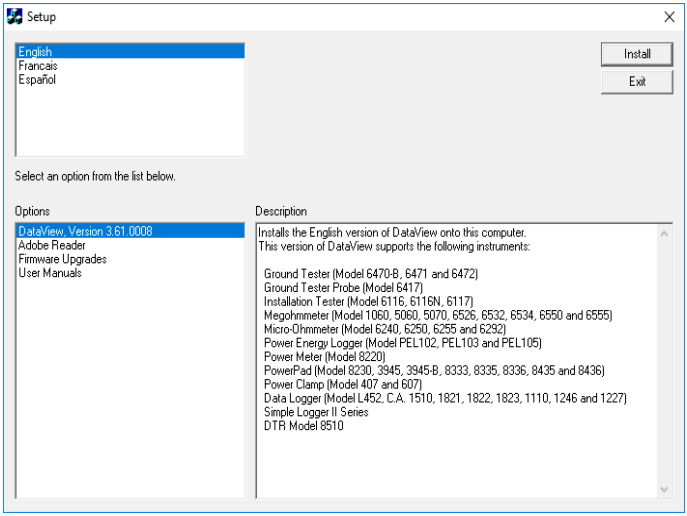
6. DATAVIEW®

6.1 INSTALLING DATAVIEW®

NOTE: DO NOT CONNECT THE INSTRUMENT TO THE PC BEFORE INSTALLING THE SOFTWARE AND DRIVERS.

NOTE: When installing, the user must have Administrative access rights during the installation. The users access rights can be changed after the installation is complete. DataView® must be reinstalled for each user in a multi-user system.

1. Insert the DataView® thumb drive into an available USB port on your computer. If Autorun is enabled, an AutoPlay window will appear on your screen. Click “Open folder to view files” to display the DataView® folder. If Autorun is not enabled or allowed, use Windows Explorer to locate and open the USB drive labeled “DataView.”
2. When the DataView® folder is open, find the file Setup.exe located in the root directory of the USB drive and double-click it to run the installation program.
3. The DataView® setup screen will appear.

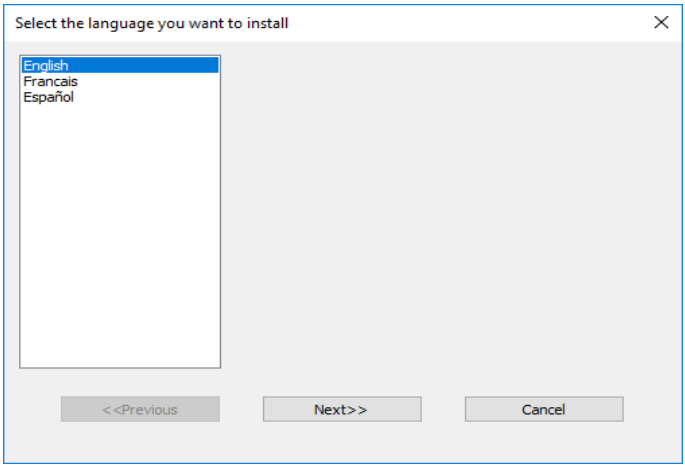


In the upper left corner of the screen, choose the language version of the Setup interface. All Setup screens and dialogs will immediately appear in the selected language.

In the lower left corner are the available installation options. In addition to the DataView® software, you can select “Adobe Reader.” This links to the Adobe website where you can download the latest version of Adobe Reader. This program is required to view DataView® .pdf documents. The option Firmware Upgrades links to the website where you can check for new firmware updates for the instrument. Finally, User Manuals displays a list of .pdf files contained in the USB drive that accompanies DataView®. DataView® also comes with a Help system that is installed with the program files.

To install DataView®, select DataView® in the Options list and click Install.

4. Select the language version of DataView® you want to install (English, French, or Spanish). Then, click Next. By default, the language selected in step 3 is highlighted



5. You will be prompted to select the software you want to install. Each AEMC® Instruments product family has its own specially designed Control Panel. If you are performing a Complete install, all available Control Panels are selected by default (a check mark next to the Control Panel indicates it is selected). Control Panels take up disk space on the computer; so, we recommend that you select Megohmmeter and deselect the rest unless you have other types of AEMC® instruments. You should also check the option DataView® Core, which is a requirement if you plan to create DataView® reports.

   After you finish selecting and deselecting Control Panels and/or DataView® Core, click Next.

6. The Setup program will inform you that it is ready to install DataView®. If you want to review any of your previous selections, click the Previous button to return to earlier screens. Otherwise, click Install to begin installation.

7. The InstallShield program will install the selected software. If an earlier version of the software is already installed on your computer, for each selected program the InstallShield program will:

   a) Ask you to confirm the installation of the program. Click Next.

   b) Display a status bar indicating the progress of the installation.

   c) Inform you when the program is installed.

   Click Finish to install the next selected program.

   If the software is not installed (or if the installed software is the same version as the selected software), the software is installed without requesting confirmation.

   When all programs are installed, a message will appear and inform you of the completed installation. Click Finish to return to the Setup screen

8. You can now select additional Setup options to install (see step 3 above). When finished, click Exit.
9. The DataView® folder will appears on your computer desktop. The DataView folder contains the Megohmmeter icon and the icon(s) for any other Control Panel(s) you have installed.

6.2 MEGOHMMETER CONTROL PANEL

Clicking the DataView® icon in the DataView® folder on your desktop opens the core DataView® program. Clicking the Megohmmeter Control Panel icon opens the Megohmmeter Control Panel.

In general, core DataView® features are for creating, viewing, editing, and storing DataView® reports; while the Control Panel is for connecting to, configuring, viewing measurements on, and downloading data from the instrument. You can access all DataView® features through either the DataView® icon or the Control Panel icon. For users who interact with megohmmeter instruments, we recommend primarily using the Control Panel. However, there are situations where using the core DataView® icon may be more convenient for some users, such as viewing multiple archived reports from different AEMC® Instruments product families.

For further information about using the Megohmmeter Control Panel, consult the Help system that comes with the product. Access this Help by clicking the option Help in the Control Panel's menu bar at the top of the screen.

7. SPECIFICATIONS

7.1 REFERENCE CONDITIONS

Influence Quantity	Reference Values
Temperature	23 ° C ± 3 ° K
Relative Humidity	(45 to 55) %
Supply Voltage	(9 to 12) V
Frequency Range	DC and (15.3 to 65) Hz
Capacitance in parallel with the input resistance	0 µF
Electric Field	nil
Magnetic Field	< 40 A/m

7.2 VOLTAGE

Measurement Range	1.0 to 99.9 V	100 to 999 V	1000 to 2500 V	2500 to 4000 V
Frequency Range*	DC and (15 to 500) Hz			DC
Resolution	0.1 V	1 V	2 V	2 V
Accuracy	1 % of Reading ± 5 cts	1 % of Reading ± 3 cts		
Input Impedance	750 kΩ at 3 MΩ depending on measure voltage			

**Over 500 Hz, the small display indicates "- - - -" and the main display gives only an assessment of the peak value of the measured voltage.*

Measurement Category: 1000 V CAT III (transients ≤ 2.5 kV).

7.3 INSULATION RESISTANCE

Method: Voltage-current method according to EN 61557-2 (ed. 02/97).

Nominal Output Voltage:
500 VDC, 1000 VDC, 2500 VDC, 5000 VDC (or adjustable from 40 V to 5100 V).

Adjustments Available in Variable Mode:
10 V from (40 to 1000) V.
100 V from (1000 to 5100) V.

Open-circuit Voltage: ≤ 1.02 x Vn ± 2 % (Vn ± 2 % in variable mode).

Max. Overload of Voltage Vn:
Vpeak = (1.1 + dISt) Vn + 60 V.
with dISt = 0.03 - 0.10 or 0.20.

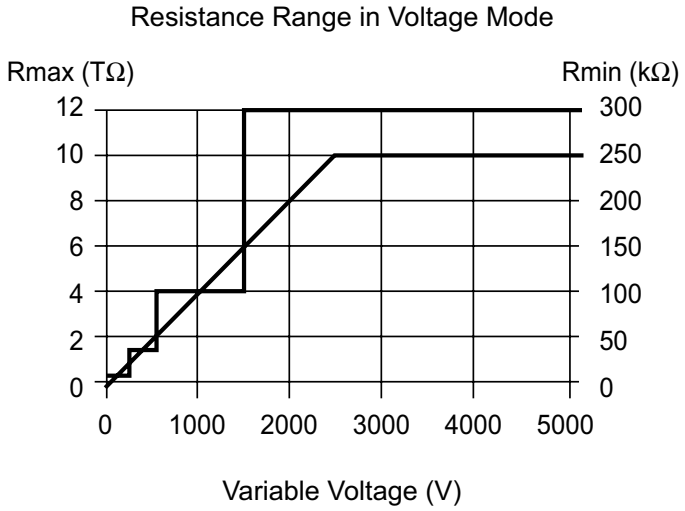
Nominal Current: >1 mADC.

Short-circuit Current: <1.6 mA ± 5 %.

Load Current: 3 mADC approx when starting measurement.

Measurement Ranges:
500 V: 30 kΩ to 1.999 TΩ. 2500 V: 300 kΩ to 9.99 TΩ.
1000 V: 100 kΩ to 3.999 TΩ. 5000 V: 300 kΩ to 9.99 TΩ.

Variable: (40 to 5100) V (see graph below)



Resolution and Accuracy Chart (see curves - pages 26 and 27)**:**

Test Voltage	500 V	500 V - 1000 V	500 V - 1000 V - 2500 V - 5000 V			
Range	30 to 99 kΩ	100 to 299 kΩ	300 to 999 kΩ	1MΩ to 3.999 kΩ	4.00 to 39.99 MΩ	40.0 to 399.9 MΩ
Resolution	1 kΩ				10 kΩ	100 kΩ
Accuracy	± 5 % of Reading + 3 cts					

Test Voltage	500 V - 1000 V - 2500 V - 5000 V				1000 V - 2500 V 5000 V	2500 V 5000 V
Range	400M Ω to 3.999 GΩ	4.00 to 39.99 GΩ	40.0 to 399.9 GΩ	400 GΩ to 1.999 TΩ	2.000 to 3.999 TΩ	4.00 to 9.99 TΩ
Resolution	1 MΩ	10 MΩ	100 MΩ	1 GΩ		10.00 GΩ
Accuracy	± 5% of Reading + 3 cts		± 15 % of Reading + 10 cts			

DC Voltage Measurement (during insulation test)**:**

Range	Resolution	Accuracy
(40.0 to 99.9) V	0.1 V	1 % of Reading ± 1 ct
(100 to 1500) V	1 V	
(1501 to 5100) V	2 V	

DC Voltage Measurement (after insulation test)**:**

Range	Resolution	Accuracy
(25 to 5100) V	0.2 % Vn	5 % of Reading ± 3 cts

Typical build-up time for the measurement according to components tested (Vdist = 0.03 Vn).

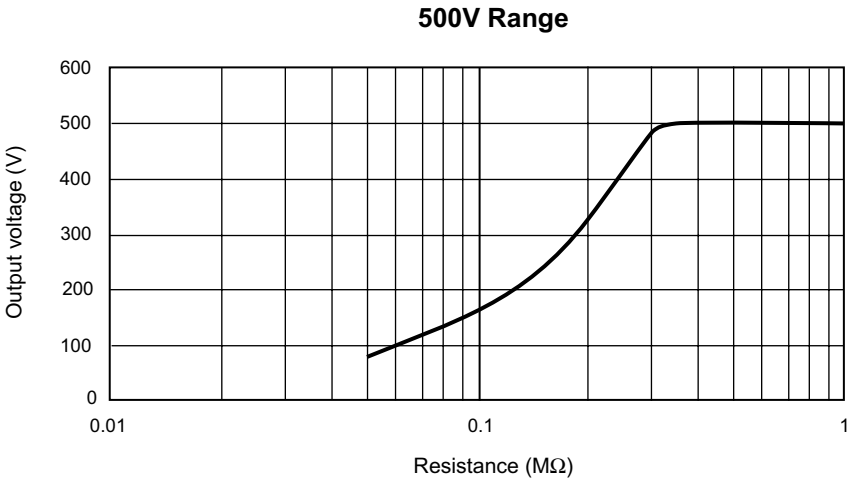
These values include the influences caused by the charge of the capacitive component, by the automatic range system, and to the test voltage control.

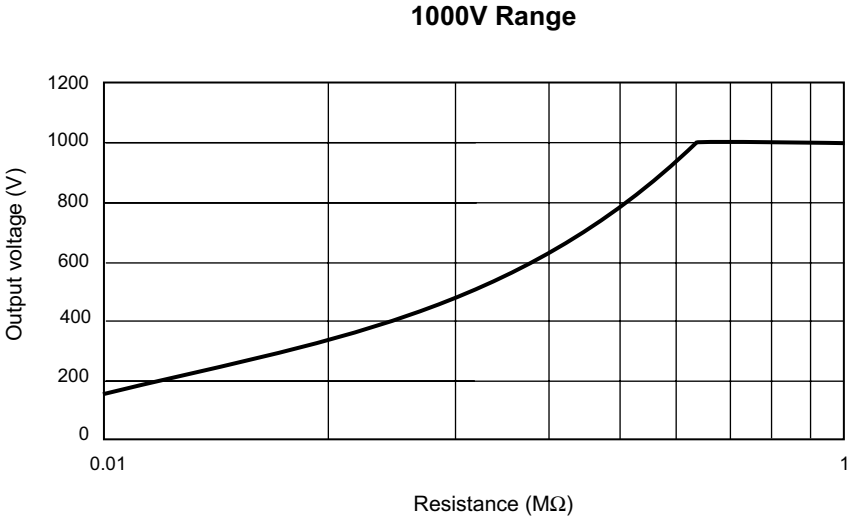
Test Voltage	Load	Non-capacitive (unsmoothed measurement)	With capacitance of 1 µF (smoothed measurement)
500 V	1 MΩ	3 s	4 s
	100 GΩ	8 s	40 s
1000 V	1 MΩ	3 s	4 s
	100 GΩ	8 s	80 s
2500 V	3 MΩ	3 s	4 s
	100 GΩ	8 s	90 s
5000 V	5 MΩ	4 s	16 s
	100 GΩ	8 s	120 s

Typical discharge time for a capacitive component to reach 25 VDC.

Initial Voltage	500 V	1000 V	2500 V	5000 V
Discharge time (C in µF)	C x 3 s	C x 4 s	C x 4 s	C x 7 s

Typical changes in test voltages as a function of the load:

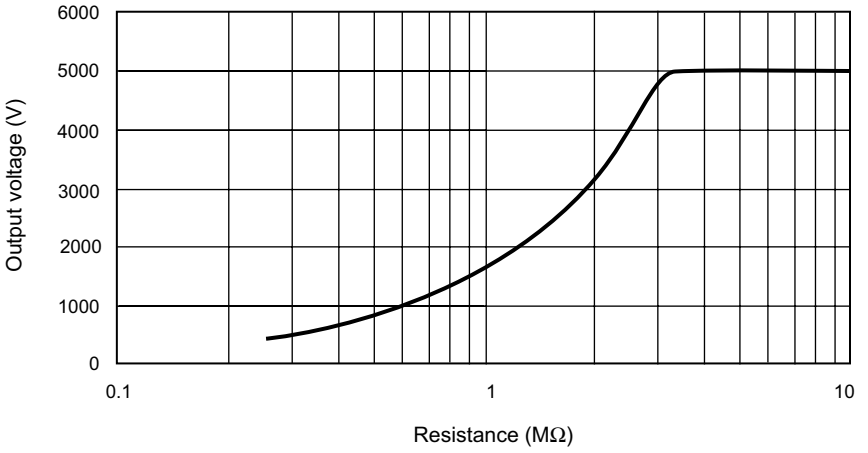




Typical changes in test voltages as a function of the load (cont.):

2500V Range

5000V Range



Capacitance Measurement (after discharge of tested component)**:**

Range	Resolution	Accuracy
(0.005 to 9.999) µF	1 nF	10 % of Reading ± 1 ct
(10.00 to 49.99) µF	10 nF	

Leakage Current Measurement:

Range	Resolution	Accuracy
(0.000 to 0.250) nA	1 pA	15 % of Reading ± 10 cts
(0.251 to 9.999) nA		10 % of Reading
(10.00 to 99.99) nA	10 pA	5 % of Reading
(100.0 to 999.9) nA	100 pA	
(1.000 to 9.999) µA	1 nA	
(10.00 to 99.99) µA	10 nA	
(100.0 to 999.9) µA	100 nA	
(1000 to 3000) µA	1 µA	10 % of Reading

Calculation of Terms DAR and PI:

Range	Resolution	Accuracy
0.02 to 50.00	0.01	5 % of Reading ± 1 ct

Calculation of Term DD:

Range	Resolution	Accuracy
0.02 to 50.00	0.01	10 % of Reading ± 1 ct

7.4 POWER SUPPLY

- Rechargeable battery NiMh (8 x 1.2 V / 3.5 A·h).
- Recharge: (85 to 256) V / 50-60 Hz.

Minimum Battery Charge Life (per NF EN 61557-2):

Test Voltage	Nominal Charge	Number of Measurements 5 s on nominal charge (with 25 s pause between each measurement)
500 V	500 kΩ	6500
1000 V	1 MΩ	5500
2500 V	2.5 MΩ	4000
5000 V	5 MΩ	1500

Average Battery Life:
The operating time will be 15 days or 3 weeks, based on a 10-minute PI measurement.

Charge Time:
6 h for 100 % capacity (10 h if the battery is completely drained).
0.5 h for 10 % capacity (charge life: 2 days approximately).

NOTE: It is possible to charge the batteries while performing insulation measurements provided that the values measured are higher than 20 MΩ. In this case, the charging time is higher than 6 h and depends on the frequency of the measurements.

7.5 ENVIRONMENTAL SPECIFICATIONS

Operating Range:
(14 to 104) °F (-10 to 40) °C during charging of batteries.
(14 to 131) °F (-10 to 55) °C during measurement.
(10 to 80) % RH.

Storage: (-40 to 158) °F (-40 to 70) °C; (10 to 90) % RH.

Altitude: < 2000 m.

7.6 MECHANICAL SPECIFICATIONS

Case Dimensions:
(10.63 x 9.84 x 7.09) in (270 x 250 x 180) mm

Weight: 9.5 lbs (4.3 kg) approx.

Mechanical Protection:
IP 53 per NF EN 60529 (Ed. 92).
IK 04 per NF EN 50102 (Ed. 95).

7.7 SAFETY SPECIFICATIONS

Electrical safety as per IEC/EN 61010-2-030 or BS EN 61010-2-030, IEC 61557.

CE

1000 V CAT III, Pollution Degree 2.

Electromagnetic Compatibility: IEC/EN 61326-1.

7.8 VARIATIONS IN OPERATING RANGE

Influential Quantity	Range of Influence	Quantity Influenced*	Influence	
			Typical	Max.
Battery Voltage	(9 to 12) V	V MΩ	< 1 ct < 1 ct	2 cts 3 cts
Temperature	(14 to 155) °F (-10 to +55) °C	V MΩ	0.15 % / 10 °C 0.20 % / 10 °C	0.3 % / 10 °C ± 1 ct 1 % / 10 °C ± 1 ct
Humidity	(10 to 80) % RH	V MΩ (10 kΩ to 40 GΩ) MΩ (40 GΩ to 10 TΩ)	0.2 % R 0.2 % R 3 % R	1 % R ± 2 cts 1 % R ± 5 cts 15 % R ± 5 cts
Frequency	(15 to 100) Hz (100 to 500) Hz	V	-	0.3 % R + 1 ct 6 % R + 15 cts
AC voltage superimposed on test voltage	(0 to 20) % Vn	MΩ	0.1 % R / % Vn	0.5 % / % Vn + 5 ct

**The terms DAR, PI, DD and the capacity and current leak measurements are included in the quantity "MΩ."*

8. MAINTENANCE

Use only factory specified replacement parts. AEMC® Instruments will not be held responsible for any accident, incident, or malfunction following a repair completed other than by its service center or by an approved repair center.

8.1 CHARGING THE BATTERY

If the [– +] symbol is flashing, the battery needs to be charged.

Connect the instrument to the 120 VAC power cord via the connector (charging starts automatically).

- **bAt** on the small display and CHrG or chAr on the main display signifies fast charging in progress.
- **bAt** on the small display and CHrG flashing on the main display signifies slow charging (starts off with fast charge, temperature conditions permitting).
- **bAt** on the small display and FULL on the main display signifies that charging is over.

If the instrument is started up and the battery voltage is > 8 V, then the normal use of the device is permitted.

NOTE: The battery should only be changed by an authorized repair facility recognized by AEMC® Instruments.

Changing the battery causes data to be lost from the memory.

Press the **MEM/MR** button ("**OFF**" is displayed).

Proceed with a total clearing of memory in SET-UP (see § 2.6.7), so the MEM/MR functions can be used again.

8.2 FUSE REPLACEMENT

If **FUSE -G-** flashes on the display, the fuse must be replaced. Take all necessary precautions when opening up the instrument.

WARNING: Make sure that none of the terminals are connected and that the selector switch is set to OFF before opening up the case.

Only use the type of fuse shown on label inside the unit's cover:

0.1 A - Fast Acting - 380 V, 5 x 20 mm, 10 kA.

8.3 CLEANING

WARNING: Disconnect the instrument from any source of electricity.

Use a soft cloth lightly dampened with soapy water. Rinse with a wet cloth and then dry with a dry cloth. Do not use alcohol, solvents, or hydrocarbons.

8.4 STORAGE

If the instrument is not used for an extended period of time, it is recommended to charge the instrument every two or three months.

8.5 REPAIR AND CALIBRATION

To ensure that your instrument meets factory specifications, we recommend that it be sent back to our factory Service Center at one-year intervals for recalibration or as required by other standards or internal procedures.

For instrument repair and calibration:

You must contact our Service Center for a Customer Service Authorization Number (CSA#). Send an email to repair@aemc.com requesting a CSA#, you will be provided a CSA Form and other required paperwork along with the next steps to complete the request. Then return the instrument along with the signed CSA Form. This will ensure that when your instrument arrives, it will be tracked and processed promptly. Please write the CSA# on the outside of the shipping container. If the instrument is returned for calibration, we need to know if you want a standard calibration or a calibration traceable to N.I.S.T. (includes calibration certificate plus recorded calibration data).

Ship To: Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
15 Faraday Drive ▪ Dover, NH 03820 USA
Phone: (800) 945-2362 (Ext. 360) / (603) 749-6434 (Ext. 360)
Fax: (603) 742-2346
E-mail: repair@aemc.com

(Or contact your authorized distributor.)

Contact us for the costs for repair, standard calibration, and calibration traceable to N.I.S.T.

NOTE: You must obtain a CSA# before returning any instrument.

8.6 TECHNICAL ASSISTANCE

If you are experiencing any technical problems or require any assistance with the proper operation or application of your instrument, please call, e-mail or fax our technical support team:

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
Phone: (800) 343-1391 (Ext. 351)
Fax: (603) 742-2346
E-mail: techsupport@aemc.com
www.aemc.com

8.7 LIMITED WARRANTY

The instrument is warrantied to the owner for a period of two years from the date of original purchase against defects in manufacture. This limited warranty is given by AEMC® Instruments, not by the distributor from whom it was purchased. This warranty is void if the unit has been tampered with, abused, or if the defect is related to service not performed by AEMC® Instruments.

Full warranty coverage and product registration is available on our website at www.aemc.com/warranty.html

Please print the online Warranty Coverage Information for your records.

What AEMC® Instruments will do:

If a malfunction occurs within the warranty period, you may return the instrument to us for repair, provided we have your warranty registration information on file or a proof of purchase. AEMC® Instruments will repair or replace the faulty material at their discretion.

REGISTER ONLINE AT: www.aemc.com/warranty.html

8.7.1 Warranty Repairs

What you must do to return an Instrument for Warranty Repair:

First, send an email to repair@aemc.com requesting a Customer Service Authorization Number (CSA#) from our Service Department. You will be provided a CSA Form and other required paperwork along with the next steps to complete the request. Then return the instrument along with the signed CSA Form. Please write the CSA# on the outside of the shipping container. Return the instrument, postage or shipment pre-paid to:

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
15 Faraday Drive, Dover, NH 03820 USA
Phone: (800) 945-2362 (Ext. 360)
(603) 749-6434 (Ext. 360)
Fax: (603) 742-2346
E-mail: repair@aemc.com

Caution: To protect yourself against in-transit loss, we recommend that you insure your returned material.

NOTE: You must obtain a CSA# before returning any instrument.

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CHAUVIN ARNOUX GROUP

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