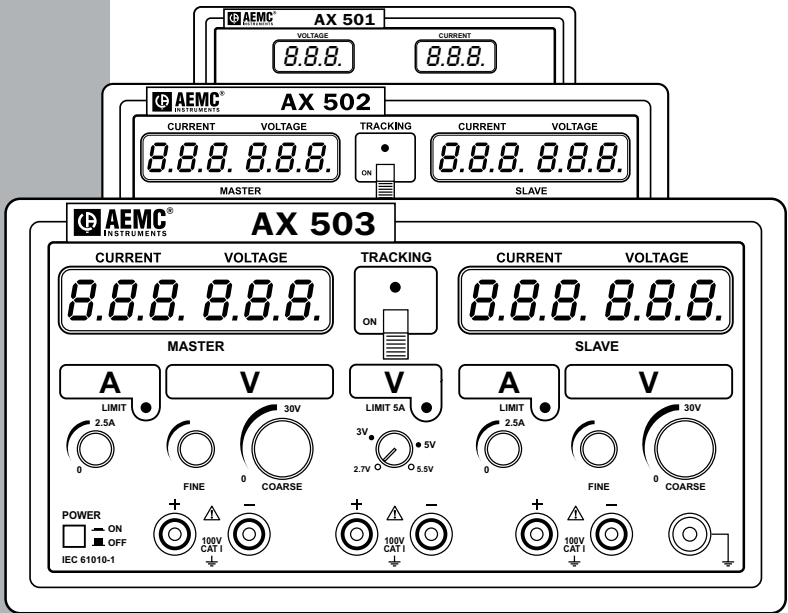


■ DC POWER SUPPLY

AX501

AX502

AX503



Statement of Compliance

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments certifies that this instrument has been calibrated using standards and instruments traceable to international standards.

We guarantee that at the time of shipping your instrument has met its 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.

Serial #: _____

Catalog #: 2130.05 / 2130.06 / 2130.07

Model #: AX501 / AX502 / AX503

Please fill in the appropriate date as indicated:

Date Received: _____

Date Calibration Due: _____



AEMC®
INSTRUMENTS

Chauvin Arnoux®, Inc.
d.b.a AEMC® Instruments
www.aemc.com

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INTRODUCTION



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

- Read this user manual completely and follow all the safety information before attempting to use or service this instrument.
- Use caution on any circuit: Potentially high voltages and currents may be present and may pose a shock hazard.
- Only use leads with the proper rating. Always inspect the instrument and lead prior to use. Replace any defective parts immediately.
- Safety is the responsibility of the operator!
- Any defective lead insulation, inside or outside of the instrument, or disconnection of the protective earth/ground terminal may make the instrument dangerous.
- The plug should only be inserted into a socket equipped with a grounding contact. The safety connection must not be broken by use of an extension lead without protective insulation.
- Before connecting the power supply, make sure the distribution network is 115VAC $\pm 10\%$.

1.1 International Electrical Symbols



This symbol signifies that the instrument is protected by double or reinforced insulation. Use only specified replacement parts when servicing the instrument.



This symbol on the instrument indicates a **WARNING** and that the operator must refer to the user manual for instructions before operating the instrument. In this manual, the symbol preceding instructions indicates that if the instructions are not followed, bodily injury, installation/sample and product damage may result.



Risk of electric shock. The voltage at the parts marked with this symbol may be dangerous.



Earth/Ground

1.2 Definition of Measurement Categories

- CAT I:** For measurements on circuits not directly connected to the AC supply wall outlet such as protected secondaries, signal level, and limited energy circuits.
- CAT II:** For measurements performed on circuits directly connected to the electrical distribution system. Examples are measurements on household appliances or portable tools.
- CAT III:** For measurements performed in the building installation at the distribution level such as on hardwired equipment in fixed installation and circuit breakers.
- CAT IV:** For measurements performed at the primary electrical supply (<1000V) such as on primary overcurrent protection devices, ripple control units, or meters.

1.3 Receiving Your Shipment

Upon receiving your shipment, make sure that the contents are consistent with the packing list. 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, giving a detailed description of any damage. Save the damaged packing container to substantiate your claim.

1.4 Ordering Information

- DC Power Supply Model AX501..... **Cat. #2130.05**
(Single output, 0 to 2.5A; 0 to 30VDC)
- DC Power Supply Model AX502..... **Cat. #2130.06**
(Dual output, 0 to 2.5A; 0 to 30VDC)
- DC Power Supply Model AX503..... **Cat. #2130.07**
(Triple output, two 0 to 2.5A; 0 to 30VDC; 5A; 2.7 to 5.5VDC)

1.4.1 Accessories

- Lead Set (2 color-coded leads, 1 ground lead,
2 alligator clips and 2 grip probes)..... **Cat. #2117.78**
- Set of 5 Fuses 10A/250V, 5x20mm Slow Blow **Cat. #2118.83**

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

PRODUCT FEATURES

2.1 Description

This comprehensive range of linear power supplies with digital displays is designed to meet the requirements of educational establishments, laboratories, production tests and maintenance departments.

It offers a high level of operating safety by guaranteed insulation of the outputs from the mains when used at an extra low safety voltage, a comprehensive protection system and excellent ergonomics.

The quality of the signal delivered, the precision of the display and the robustness of the housing make them top-level laboratory instruments.

The AX501 offers:

- Single output
- Simultaneous display of the output voltage and current
- Voltage adjustable from 0 to 30V for a variable current of 0 to 2.5A (75W)

The AX502 offers:

- Dual output
- Simultaneous display of the output voltage and current for each output
- Two 0 to 30V, 0 to 2.5A (150W max) outputs; connected in series, parallel or coupled, (tracking function) $\pm 30V$

The AX503 offers:

- Triple power supply
- Simultaneous display of the output voltage and current for each 0-30V output
- Two 0 to 30V, 0 to 2.5A (150W max) outputs; connected in series, parallel or coupled, (tracking function) $\pm 30V$
- An adjustable 2.7 to 5.5V, 5A fixed output for supplying logic circuits at 3V or 5V

2.2 Control Features

2.2.1 Model AX501

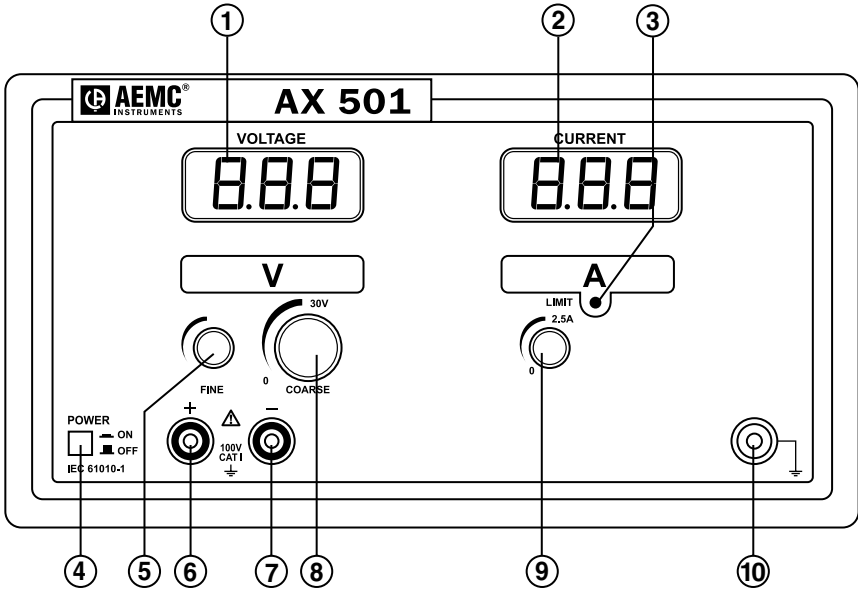


Figure 1

1. Voltage display (green)
2. Current display (red)
3. Current limit LED
4. Power On/Off button
5. Fine voltage adjustment potentiometer
6. Output terminal (+)
7. Output terminal (-)
8. Coarse voltage adjustment potentiometer
9. Current limit adjustment potentiometer
10. Ground terminal (\perp)

2.2.2 Model AX502

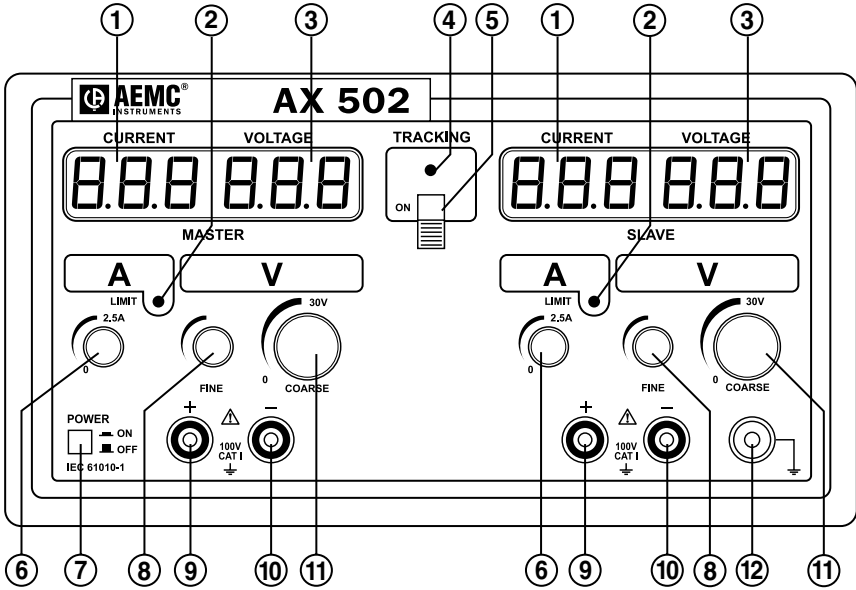


Figure 2

1. Current display (red)
2. Current limit LED
3. Voltage display (green)
4. Tracking function LED
5. Tracking On/Off switch
6. Current limit adjustment potentiometer
7. Power On/Off button
8. Fine voltage adjustment potentiometer
9. Output terminals (+)
10. Output terminals (-)
11. Coarse voltage adjustment potentiometer
12. Ground terminal (\perp)

2.2.3 Model AX503

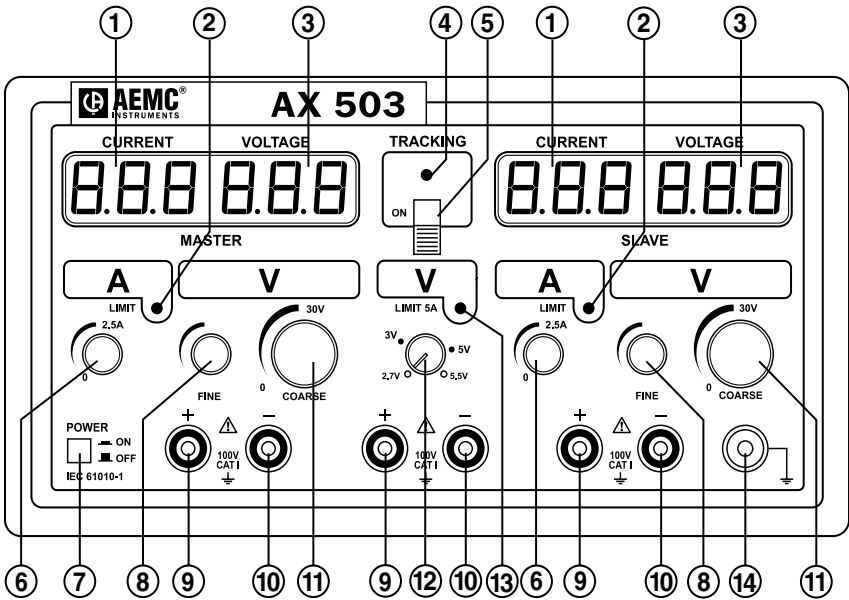


Figure 3

1. Current display (red)
2. Current limit LED
3. Voltage display (green)
4. Tracking function LED
5. Tracking On/Off switch
6. Current limit adjustment potentiometer
7. Power On/Off button
8. Fine voltage adjustment potentiometer
9. Output terminals (+)
10. Output terminals (-)
11. Coarse voltage adjustment potentiometer
12. Voltage adjustment potentiometer
13. 5A current limit LED
14. Ground terminal (\perp)

2.3 Control Descriptions

2.3.1 Power On/Off Button

Used to turn the power ON and OFF.

2.3.2 Voltage and Current Adjustments

- **Voltage Adjustment:**
 - Sets the regulated voltage output by turning the large knob (COARSE adjustment) to the right (increases output) or left (decreases output).
 - Sets the regulated voltage output by turning the small knob (FINE adjustment) to the right (increases output) or left (decreases output). The FINE adjustment range represents approximately 10% of the main range.
 - The value of the voltage output is displayed in real time on the green display.
- **Current Adjustment:**
 - Adjust the value of the current limit by turning the knob to the right (increases output) or left (decreases output).
 - The current value displayed is the value of the output current on the red display.

2.3.3 Current “LIMIT” LED

The AX Series Power Supplies provides the ability to limit the current output. When the “limit” is reached, the power supply will switch to “current” regulation to ensure the current output and drops the voltage regulation.

Setting a Current Limit:

- Short the output terminals, and adjust the current to the desired limit (you may need to have a little voltage for the current to flow). The value of current flow will be displayed on the appropriate display.
- Turn the voltage output off and connect to the sample. As the voltage is increased, if the current reaches the set limit, the “LIMIT” LED will turn on, and the current will no longer increase.
- The current limit may be overridden simply by increasing the current output manually.

2.3.4 “TRACKING” Switch (Models AX502 and AX503)

- **“TRACKING” Mode**
 - This control enables two “0 to 30V” sources to be controlled in series mode.
 - When the “TRACKING” button is switched to ON, it sets up a series connection between the “-” terminal of the MASTER power supply and the “+” terminal of the SLAVE power supply. The external terminals are used to connect the points in the circuit to be powered.
 - Only the voltage settings of the MASTER module cause the voltages of the MASTER and SLAVE to vary proportionally.
- **“TRACKING” LED**
 - When this LED is on, the “TRACKING” function has been activated.

2.3.5 Setting “TRACKING”

The SLAVE tracks as a % of the MASTER output. You need to set this % before turning on the Tracking.

To set-up the Tracking, first set the MASTER voltage output, then set the SLAVE output %. To set this %, simply adjust the SLAVE output voltage.



NOTE: Think of the SLAVE display as a % (10.0 = 100%, 5.0 = 50%, 20.0 = 200%). Once the SLAVE % is set, switching the Tracking ON will cause the SLAVE to track the MASTER at the inputted %.

Example:

We want the SLAVE to Track the MASTER @ 30% of the MASTER output voltage, and we want to Track starting @ 10.0V out of the MASTER.

- Make sure the Tracking is OFF
- Set the MASTER Voltage to 10.0V
- Set the SLAVE to 30% (3.0V)
- Turn the Tracking switch to ON
- The MASTER will display 10.0V and the SLAVE will display 3.0V
- As the MASTER is increased or decreased, the SLAVE will track @ 30%
- During Tracking, the SLAVE LED displays the actual SLAVE output voltage

In the previous setting, if the MASTER is increased to 20.0V, the SLAVE will track and display 6.0V (30% of 20.0V).

If you want the SLAVE to track the MASTER @ 100%, set the SLAVE to 10.0 during the setup.

If you want the SLAVE to track the MASTER @ 200%, set the SLAVE to 20.0 during the setup (the output though is still limited to 30.0V).

2.3.6 Digital “LED” displays

A separate display allows you to view the voltage output (in green) and the current output (in red) simultaneously for each 30V output.

The displays are 3-digit LED indicators with a resolution of 0.1V and 10mA.

2.3.7 Output Terminals

The female two-pin “+” and “-” safety terminals (Ø 4mm) are used to connect the outputs to the points of the circuit to be powered by means of safety leads only.

2.3.8 Ground Terminal

This terminal is directly linked internally to the ground on the AC power plug.

It enables grounding of the circuit to be powered, if necessary.

Its male polarity and “green/yellow” color-coding will prevent any confusion in the connections.



Interruption of the protective ground conductor, inside or outside the power supply, is prohibited.

2.4 Power Supply

The AX Series Power Supplies are factory configured at 115V ±10%; 50/60Hz. Consult the factory for changing to 220V supply.

SPECIFICATIONS

3.1 Specification Chart

Only the values assigned tolerances or the declared limits constitute guaranteed values. Values without tolerances are given as indications and the measurement errors must be considered in the reference temperature conditions, (e.g. 23° C ± 5° C).

4.1. Voltage

	AX 501	AX 502	AX 503	
Range available	0 - 30V	2 x (0 - 30 V) or 1 x (0 - 60 V) + TRACKING	2 x (0 - 30 V) or 1 x (0 - 60 V) + TRACKING	+ output 2.7 V to 5.5 V
Adjustment	coarse and fine by potentiometers			by potentiometer
Display	green LEDs			none
Resolution	0.1 V			-
Accuracy	± 0.5 % of reading ± 1 digit			-
Stability if variation: mains ± 10% of the 0 to 2.5 A load of the 0 to 5 A load	± (0.03 % R + 2 mV) ± (0.02 % R 5 mV) -			± 4 mV - ± (0.2 % R +10 mV)
Residual ripple in load < 1 mVrms	± 1 mVrms			
Common mode voltage	60 V peak			
Protection against short-circuit	current electronic limitation			
Coupling of outputs	-	series or parallel		-
"TRACKING" (master/slave)	-	yes		-

To avoid significant drops in voltage during regulation verification measurements, the contact resistances of the connections must be very low ($\leq 1m\Omega$).

42. Current

	AX 501	AX 502	AX 503	
Range available	0 - 2.5 A	2 x (0 -2.5 A) or 1 x (0 - 5 A)	2 x (0 -2.5 A) or 1 x (0 - 5 A)	+ output 5 A
Adjustment	by potentiometer			none
Display	red LEDs			-
Resolution	10 mA			-
Accuracy	± 0.5 % of reading ± 1 digit			-
Output current limitation	adjustable from 0 to 2.5 A			limited to 5 A ± 5 %
Residual current	< 22.5 mA			
Indication of limitation	LED			
Short-circuit protection	current limitation			
Protection against overheating	yes			

3.2 General Specifications

Power Supply: 115VAC $\pm 10\%$ Consult the factory for changing to 220VAC.

Display: Dual display - "VOLTAGE" in Green and "CURRENT" in Red; 7-segments; 0.56" (14.2mm) digit size.

Operating Temperature Range: 50° to 104°F (10° to 40°C)

Storage Temperature Range: -4° to 158°F (-20° to +70°C)

Temperature Coefficient: <0.1 x accuracy / °C

Operating Relative Humidity: <80% RH up to 104°F (40°C)

Electrical Field: nil

Magnetic Field: <40A/m

Dimensions (without knobs):

10.63 x 8.86 x 4.73" (270 x 225 x 120mm)

Weight: AX501: 8.8 lbs (4kg)

AX502: 9.9 lbs (4.5kg)

AX503: 13.2 lbs (6kg)

3.3 Safety Specifications



IEC 1010-1 (NF EN 61010-1 +A2: 1995) Class 1; Pollution Degree 2

Power supply outputs: Overvoltage Cat. 100V, CAT I

Max. Output Voltage: 30.5VDC in normal mode
61.0VDC in series mode

Power supply inputs: Overvoltage CAT 300V, CAT II

Supply Current: 115V \pm 10%; 50/60Hz

Electromagnetic Compatibility:

EN50081-1 1992; EN50082-2 1998

**Specifications are subject to change without notice*

OPERATION

4.1 Before Using the Instrument

- When the required voltage and current parameter values are not known, start by using the lowest values.
- Before disconnecting the leads of the circuit under test, make sure that the power supply is turned off. This prevents the creation of break or closure extra-currents which may melt the fuse at high currents.
- Never exceed a total output of 60V peak in relation to the ground.
- The instrument must be placed in a ventilated room. Do not obstruct the ventilation holes.
- Before opening the instrument, disconnect it from all sources of electric current and from the measuring circuits; make sure that you are not charged with static electricity, which could irreparably damage the instrument's internal components.



WARNING: When the instrument is open, some of the internal capacitors may be dangerous, even once the instrument has been powered down.

In the event of faults or abnormal constraints, **turn the instrument OFF** and do not use it until it has been checked.

4.2 Operating Instructions

- Check the label at the rear of the power supply to make sure that the instrument is set to the AC line voltage compatible with your setting.
- Connect the AC power cord to the supply.
- No connections should be made before powering up.
- Start up the power supply by pushing the Power On/Off button ON.
- To turn OFF the instrument, unplug the leads and push the Power On/Off button OFF.

4.2.1 Using Independent Outputs

- Connect the AC power cord to the supply.
- Make sure that the voltage adjustment controls and current adjustment controls are turned to the left as far as they will go (minimum voltage and current).
- Make sure that the “TRACKING” switch is in the OFF position.
- If necessary, connect the Earth/Ground terminal to the ground of the circuit to be powered (to provide protection) and the Positive and Negative terminals to the points of the circuit to be powered, using the test cables.
- Check the quality and polarity of the connection to the sample.
- Press the Power On/Off button ON. The “LIMIT” LED should be OFF.
- Set the voltage to be regulated by turning the voltage controls to the right (increasing values). The voltage set point is then displayed.
- Adjust the value of the current limit by turning the current control to the right (increasing values). The current value displayed is the value of the output current. Short the output with a lead to adjust the output current (See § 2.3.3).
- During use, when the output current reaches the limit current value, the power supply automatically switches to “current” regulation mode, the “LIMIT” LED turns ON and the voltage is no longer regulated.

4.2.2 Use of 2 Outputs in Parallel (AX502 and AX503)

To use 2 outputs in parallel (without “TRACKING”) up to 5A at 30V max (see Fig. 4):

- Set the “TRACKING” switch to the OFF position.
- Set the 2 power supplies (MASTER and SLAVE) to the same output voltage value.
- Link the “+” terminals together and the “-” terminals together using short leads.
- Connect one of the two “+” terminals and one of the two “-” terminals to the circuit to be powered.

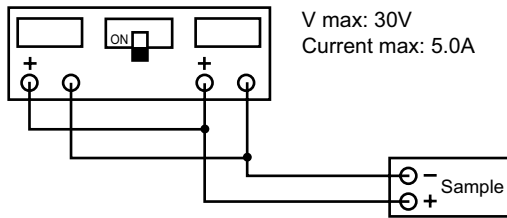


Figure 4

4.2.3 Use of 2 Outputs in Series (AX502 and AX503)

To use 2 outputs in series (without “TRACKING”) up to 60V at 2.5A max (see Fig. 5):

- Set the “TRACKING” switch to the OFF position.
- Set the 2 power supplies (MASTER and SLAVE) to the same current limitation value.
- Use a lead to short the “+” terminal of one power supply to the “-” terminal of the other power supply. Use the two “+” and “-” terminals that remain free to make the connection with the circuit to be powered.

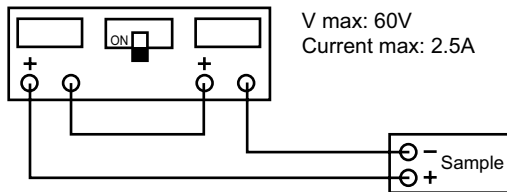


Figure 5

To use 2 outputs in series (with “TRACKING”), symmetrical $\pm 30V$ sources at 2.5A max (see Fig. 6):

Procedure: (for serial number > 105500MAV)

- In sequence (power supply a then b), adjust the "current" potentiometers to define identical limit currents.
- Set the 2 Voltage potentiometers of the slave to the maximum (around 30.5V).
- Press the "TRACKING" button ("ON", LED lit). When set to "ON", a series connection between the "-" terminal of the "MASTER" power supply and the "+" terminal of the "SLAVE" power supply is set.
- The "MASTER" source is on the left (a); set the required initial voltage, adjust it to the desired voltage.
- The "SLAVE" source is on the right (b).

- In this function, only the voltage controls of the "MASTER" source (a) will be used from now on.
- Connect the circuit to be powered (external terminals of the "MASTER" and "SLAVE" power supplies).
- The symmetrical "SLAVE" source (b) reacts to the "MASTER" source (a) voltage variations by proportional "tracking" variations in absolute values ("TRACKING" function).



NOTE: For the use of symmetrical voltages (e.g. $\pm 15V$), one of the 2 terminals (MASTER "–" or SLAVE "+") will be connected to the circuit to be powered ("0" point).

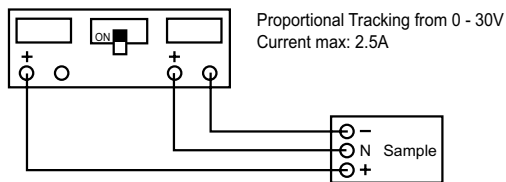


Figure 6



NOTE: If the SLAVE source is taken outside its operating limits (voltage or current) by the MASTER source, the corresponding "LIMIT" LED lights up.

4.2.4 Use of the 2.7V to 5.5V (5A) Power Supply (AX503 Only)

- If necessary, connect the earth/ground terminal to the circuit to be powered.
- Connect the "+" and "–" terminals to the points of the circuit to be powered using the connection leads.
- Set the required voltage between 2.7V and 5.5V using the adjustment control.
- For "FINE" adjustment, connect these terminals to a multimeter (appropriate range).
- If the output current reaches the 5A limit current value, the "LIMIT 5A" LED comes on, the power supply automatically switches to "current" regulation mode and the voltage is no longer regulated.



NOTE: This output is designed to power logic circuits at 3 or 5V with consumption up to 5A.

MAINTENANCE

5.1 **Warning**

- For maintenance use only specified factory replacement parts.
- To avoid electrical shock, do not attempt to perform any servicing unless you are qualified to do so.
- To avoid electrical shock and/or damage, do not get water or other foreign agents into the case. Turn the instrument OFF and disconnect the unit from all the circuits before opening the case.

5.2 Fuse Replacement

- The fuse protects the primary coil of the power supply transformer against line voltage errors.
- Before opening the power supply to change the fuse, you must disconnect the leads and power cord.



Only use a fuse of the following type: T 6.3A/250V for 115V

5.3 Cleaning

- Disconnect the instrument, then clean it with a cloth lightly moistened with soapy water.
- Wipe with a clean dry cloth. Make sure it has completely dried before use.
- Do not use abrasives or solvents.

5.4 Storage

- To ensure proper operation, wait for the instrument to return to normal measuring conditions if it has been stored in extreme environmental conditions for a long period of time.



An abrupt change in the ambient temperature may lead to condensation inside the instrument and cause short circuits.

Let the power supply stabilize in temperature before use.

Repair and Calibration

To ensure that your instrument meets factory specifications, we recommend that it be scheduled 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#). 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 or (603) 749-6309
E-mail: repair@aemc.com

(Or contact your authorized distributor)

Costs for repair, standard calibration, and calibration traceable to N.I.S.T. are available.

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

Technical and Sales Assistance

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

Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments
200 Foxborough Boulevard
Foxborough, MA 02035 USA
Phone: (800) 343-1391
(508) 698-2115
Fax: (508) 698-2118
E-mail: techsupport@aemc.com
www.aemc.com

NOTE: Do not ship Instruments to our Foxborough, MA address.

Limited Warranty

The Model AX501, AX502 and AX503 are warranted to the owner for a period of one year 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 one-year 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, at its option, repair or replace the faulty material.

**REGISTER ONLINE AT:
www.aemc.com**

Warranty Repairs

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

First, request a Customer Service Authorization Number (CSA#) by phone or by fax from our Service Department (see address below), 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:

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 or (603) 749-6309
E-mail: repair@aemc.com

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

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



05/14

99-MAN 100252 v9