

Annie® II A2-12 and A2-12x

Hermetic

Compressor/Component

Analyzer

Owner's Manual

WARNING: Because of the nature of this instrument it is very important that you read and fully understand this manual before using the unit!



Congratulations!

You have just purchased a high quality handcrafted test instrument. Your new Annie II Analyzer has been re-designed for convenience of operation, and is now covered by a full one year warranty.

We strongly suggest you take the time to familiarize yourself with the instrument while completely reading these operating instructions. **Please pay particular attention to the cautions and warnings.**

Cautions In Using:

Electricity can be hazardous when not understood or respected. This instrument is intended for use by qualified service personnel who fully understand the electrical operation of the equipment they are servicing. **Make sure that all power is disconnected from the equipment you are testing and that power to**

this instrument is not energized until all connections are made in accordance with these instructions.

Never make a guess as to whether or not a wire is "live." **Any** wire should be checked for voltage between itself and ground before working on it. Never work on wires that are "live." A tool such as the Annie II A-101VD Connectionless Voltage Detector is ideal for quickly identifying energized circuits.

Whenever possible, remove the unit's fuses or turn off the main safety switches or circuit breaker before working on the unit's wiring. If power shut off is not in the area you are in, lock it off or tag it with a note to prevent unauthorized restoration of power.

For the chassis of this instrument to be grounded it **must** be plugged into a line voltage receptacle wired according to NEC standards. When using the cord adaptor, its black clip should be connected to the hot (for

120 VAC) or first hot leg (for 220 VAC). The green clip should be connected to the proper ground. Failure to connect the ground clip of the cord adapter, use of the power cord with an ungrounded receptacle, or defeating the ground plug may lead to hazardous voltage on the chassis and will automatically void the warranty. This instrument is protected with a master switch that has an ON/OFF switching capability. After final testing at the factory, this switch is placed in the "OFF" position. Connect the test leads, position the switches and hook up power according to instructions before placing this switch to the "ON" position. It is recommended, for safety, that this switch be kept in the "OFF" position whenever the instrument is not in use.

Ratings:

This unit is designed for temporary testing purposes only. This analyzer is designed for use on units up to 25 Amps, 110-240 VAC. Maximum test

period is 2 minutes. Exceeding or ignoring these electrical ratings could be dangerous and will automatically void the warranty.

Care & Handling of your Instrument:

Unlike any of the mechanical tools you may own or work with, an electrical testing instrument must be treated with care and respect in order for it to provide accurate and reliable service. Dirt, grease and moisture can easily contaminate the switches, controls and meters - making them perform erratically. Common sense will tell you to keep your instrument clean and dry so as to avoid these problems. Prevent solvents and chemicals from coming into contact with the case, chassis or meter lens. Clean only with a damp cloth and mild detergent. Your instrument should be transported and handled with care, as bouncing, vibration and

shock can damage meter movements or other more sensitive parts. Keep your "ANNIE" in a protected place where it will be out of harm's way. Periodically check the external condition of the wiring.

Applications:

- To check for continuity, shorts and grounds of compressor windings.
- To identify start, run and common terminals.
- To start unit without relay, control or capacitor.
- To free a stuck or frozen compressor.
- To check capacitors for shorts, leaks, grounds or open.
- To read capacitor in microfarads.
- To check compressor relay and identify pick-up and drop-out voltages.
- To measure amperage, voltage, and resistance.
- To replace start capacitor temporarily.
- To check and test all types of electrical appliances.

A2-12 and A2-12x

This manual contains instructions for both units, 12 and 12x. The A2-12 is for 60 Hz **only**, 110-240v; the A2-12x is for 50 Hz **only**, 220-240v. Operational instructions are the same for both units, except where noted in the text.

Operation:

Note: Model A2-12 contains a neon power indicator lamp that will identify 110 volt power by a low glow and 220 volt power by a bright glow. Whenever model A2-12 is connected to any power source the indicator lamp comes on automatically if ohmmeter switch is in **power** position. To connect model A2-12 to 220 volt power, connect adaptor to power cord and clip onto the power source. If standard 220 volt plug is desired, clips can be removed and plug installed.

I METER OPERATION

A. OHMMETER

1. The ohmmeter is powered by a self-contained "D" cell battery. To insert or replace battery, remove the two screws holding down the cover; the battery is mounted on the underside.
2. Make sure analyzer is unplugged and the ammeter switch is **OFF**.
3. Move ohmmeter switch to **OHMS** position.
4. Clip red and black leads together, turn master switch **ON**, adjust to zero ohms with adjust knob. If the meter will not zero, replace battery.
5. Use red and black leads to identify winding terminals: Highest resistance is from the start to the run terminal; remaining terminal is common. Reading from common, the highest resistance is to the start terminal. The remaining terminal is the run.

B. VOLTMETER

1. Disconnect the analyzer from external power source.
2. Put ammeter switch in **HI** position, put ohmmeter switch in **POWER** position, put voltmeter switch in 350v range (A2-12x: set to "line"). Turn master switch **OFF**.
3. Isolate black, red, white and green leads from each other and ground.
4. Connect power supply cord of analyzer to voltage source that is to be read. Use the adaptor cord for any supply other than standard 110v.
5. The voltage indicated on the voltmeter is the line voltage supplied to the analyzer (A2-12: If the reading is below 175, switch to the 175v position for a more accurate reading).

C. AMMETER

1. Disconnect the analyzer from

external power source.

2. Put ohmmeter switch in **POWER** position, put ammeter switch in **OFF** position, put master switch in **ON** position.
3. Connect the apparatus under test to the red and black leads. Isolate the green and white leads from each other and ground.
4. Connect the analyzer to a power supply of the correct voltage for the apparatus being tested; use adaptor if needed.
5. Put ammeter switch to **HI** position to read up to 25 amps, switch to **LO** position if the current is under 5 amps. Note: If line voltage reading is desired while measuring amperage, place the voltmeter switch in the proper range. (A2-12x: put voltmeter switch in "line" position).

II TO CHECK A HERMETICALLY SEALED UNIT

1. Remove all external wiring from the terminals of the compressor.
2. Disconnect analyzer from external power source.
3. Connect the red lead to the run terminal, white lead to the start terminal, black lead to the common terminal, and the green lead solidly to the frame.
4. Make certain master switch, ammeter switch, and voltmeter switch are **OFF**.
DO NOT CONNECT TO EXTERNAL POWER.
5. Put ohmmeter switch in **OHMS** position and press start button. If resistance is indicated, the windings are shorted to the frame. **Replace unit** if this condition exists.
6. Put master switch in **ON** position to check resistance of run winding; **REVERSE** position checks resistance of start windings. Replace unit if windings are open or grounded.

III TO START A HERMETICALLY SEALED UNIT

1. Follow steps 1 and 2 from section II above.
2. Connect the red lead to the run terminal, white lead to the start terminal and the black lead to the common terminal. Isolate green lead from the frame and ground.
3. Put ammeter switch in **HI** position. Put ohmmeter switch in **POWER** position. Put master switch in **OFF** position. Put capacitor selection switch in proper range (see section VII).
4. Connect analyzer to power supply of correct voltage for the compressor, use adaptor if necessary. Check power light, if not lit, check breaker or hook-up for power and ground.
5. Holding start button **IN**, put master switch in **ON** position. Release button when unit starts. If unit fails to start within two seconds, turn master switch **OFF** (see section

IV). If unit operates satisfactorily, the trouble is with the capacitor, relay, control, overload or other external wiring. Use ammeter and voltmeter for further tests such as for low voltage or high current draws. Disregard capacitor and relay lamps while making this test.

IV TO REVERSE AND ROCK A STUCK OR FROZEN UNIT

1. Proceed as outlined in section III steps one through four.
2. Holding start button **IN**, move master switch quickly to **ON** and back to **OFF**. Then move master switch quickly to **REVERSE** and back to **OFF**. Repeat three times. If unit starts, release start button and allow unit to run for a minute.
3. Now try to start the unit as outlined in section III, step 5. If unit now fails to start it must be replaced. If circuit breaker trips wait five minutes, remove power and press reset button.

V TO TEST CAPACITORS

1. Make sure master switch and ammeter switch are **OFF**. Put ohmmeter switch in **POWER** position.
2. Disconnect capacitor from all external wiring including bleed resistors. **Discharge capacitor.**
3. Connect black and green leads to capacitor. Isolate all other leads from each other and ground.
4. Connect analyzer to **120 volt power only** regardless of capacitors rated volted. Do not connect to capacitors rated below 120 VAC.
5. Place ammeter switch to **HI** position and note reaction of red light.
 - a. If light goes on and out, the capacitor has taken a charge. New capacitors may keep the light glowing for a few minutes.
 - b. If no light, the capacitor is open.
 - c. If light stays on, the capacitor is shorted.
 - d. If light decreases, but does not go out, the capacitor is leaking.

Do not press the start/capacity button if lamp remains on.

6. If light goes out, press capacity button for microfarad reading. For small capacitors, switch ammeter to **LO** range. Discard capacitors that vary more than 20% from their rating.
7. If a replacement capacitor is needed but not available, the analyzer can be used as an emergency substitute to run the unit until a replacement can be obtained.

DO NOT PLUG THE ANALYZER IN.

- a. Connect the green and white test leads to the wires that normally go from the system wiring to the capacitor.
- b. Put the master switch to **"ON"** and set capacitor switch to the range needed. All other switches should be **OFF** or in the center position.

VI TO TEST POTENTIAL RELAYS

1. Make sure master switch, ammeter switch, and voltmeter switch are **OFF**.

Put ohmmeter switch in **RELAY** position. Turn volts control fully counterclockwise.

2. Connect white, black and red leads to relay. The black and red leads should be across the relay coil and the white lead should connect to the switched contact. Connect analyzer to power source (A2-12: Connect to 120v **ONLY**; A2-12x: connect to 240v **ONLY**).

3. Turn master switch **ON** and set voltmeter switch to low range. (A2-12x: set to "relay").

4. Slowly increase volts by rotating volts control clockwise. Relay light must come on as voltage is increased; if it does not, the points are open and the relay should be replaced. Continue to increase voltage until the relay "picks-up." Note the voltage just before "pick-up"; this is the "pick-up" voltage. If the light remains on, the points are frozen and the relay should be replaced. If the relay does not "pick-up" at maximum rated volts, the coil is bad and relay should be replaced.

5. If okay in step 4, decrease the voltage by rotating knob counter-

clockwise, until relay "drops-out." Note the voltage just before "drop-out"; this is the "drop-out" voltage. The light must come back on when the relay "drops-out"; if the light remains on, the points are frozen or sticky and the relay should be replaced. Compare "pick-up" and "drop-out" voltages with the information supplied by the relay manufacturer.

VII CAPACITOR INFORMATION

1. A2-12

- A. 110 volt units up to 1/4 HP, use 75-155 MFD range.
- B. 110 volt units of 1/3 - 1/2 HP, use 160-240 MFD range.
- C. 110 volt units over 1/2 HP, use 250-380 MFD range.
- D. 220 volt units, use label rating.

2. A2-12x

- A. 220 volt units up to 1/3 HP, use 25-80 MFD range.
- B. 220 volt units between 1/3 and 1 HP, use 85-145 MFD range.
- C. 220 volt units over 1 HP, use 150-200 MFD range.

VIII RELAY WIRING INFORMATION

- G.E. RELAY - Lead from post #1 goes to start.
Lead from post #3 goes to run.
Other post is common.
- DELCO RELAY - Lead from post #S goes to start.
Lead from post #M goes to run.
Other post is common.

Limited Warranty and Repair Policy

This instrument is designed and produced to provide unlimited service. Should it become inoperative after the user has performed the recommended maintenance, a no-charge repair or replacement will be made to the original owner within one year of the date of purchase. This applies to all repairable instruments which have not been tampered with or damaged. This warranty does not cover consumable items such as batteries, tips and fuses, nor physical damage and wear to components such as probes, sensors and adaptors. For repair or customer service send your tool to:

IMPERIAL EASTMAN
Imperial Division
Annie II Service Center
3360 NW 110 St.
Miami, FL 33167
or call 1-800-848-6010

Repaired tools will carry a 90-day warranty.