

# **THERMAL**

## **ENGINEERING COMPANY**

### **MODEL 2001 HERMETI-CHECK OPERATING INSTRUCTIONS**

Model 2001 HERMETI-CHECK tests all single phase compressors up to 5 HP, 110, 220, or 277 volts. The HERMETI-CHECK comes equipped with a built in 200 micro farad start capacitor. Read these instructions carefully before using the instrument.

The HERMETI-CHECK is a precision electrical test instrument. If treated with reasonable care, it should provide a long life of satisfactory service. Keep the instrument free of dirt, grease and moisture and protect it from excessive shock or vibration.

This instrument is intended for use only by qualified air conditioning and refrigeration service technicians. Exercise extreme caution while using this unit. Make sure the system being tested is disconnected from power when making connections to the HERMETI-CHECK.

### **STANDARD ACCESSORIES**

**Compressor Test Clips:** RED, WHITE, BLACK, and GREEN leads wired directly to the instrument which terminates in alligator clips. Used to start and compressors and test windings.

**#2136 220 Volt Adapter Leads:** Standard female receptacle terminating in alligator clips. Adapts the instrument plug to 220 volt power source.

**#2186 Capacitor Test Leads:** White leads with alligator clips terminating into banana plug. Used to test capacitors.

### **SETUP**

Before connecting the HERMETI-CHECK to power, make connections to the compressor as follows:

1. Disconnect all system wiring from compressor terminals.
2. Connect RED test clip to RUN terminal.
3. Connect WHITE test clip to START terminal.
4. Connect BLACK test clip to COMMON terminal.

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5. Connect GREEN test clip to COMPRESSOR CASE.
6. Set COMPRESSOR TYPE switch to proper setting for compressor being tested.
7. Set POWER switch to OFF.
8. Connect HERMETI-CHECK to power supply of correct voltage for the compressor. For 220 V compressors use the 220V Adapter leads.

NOTE: The green lead of the 220 V Adapter Leads must be connected to proper ground.

**DO NOT CONNECT TO COMPRESSOR CASE.**

### **TESTING WINDINGS**

1. Set POWER switch to TEST.
2. OPEN TEST: Set OPEN TEST switch to RUN WINDING. If red lamp glows, circuit is complete and winding is not open. Repeat with switch set to START WINDING.
3. GROUND TEST: DO NOT TOUCH COMPRESSOR DURING GROUND TEST. Push GROUND TEST switch to the right.

If red lamp glows, windings are grounded to the compressor case and the unit must be replaced. If red lamp does not glow the compressor is not grounded and further tests may be performed.

### **STARTING THE COMPRESSOR**

If windings test OK and are not grounded, compressor may be started with the HERMETI-CHECK. Make sure the instrument is connected to the correct voltage for the compressor.

1. Set COMPRESSOR TYPE switch to proper setting.
2. Push START switch to right and hold.
3. Set POWER switch to RUN.

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4. Release START switch when compressor starts. DO NOT REVERSE THIS PROCEDURE. Compressor should start unless it is tied up.
5. Run winding (line) volts, start winding volts and running amperes can be measured while the compressor is operating by setting the slide switch to the proper position. (RUN VOLTS, START VOLTS, AMPS).
6. Normal ranges are 0-600VAC and 0-50 A. If low ranges (150 VAC 10 A) are desired, push LOW RANGES switch.

### **IF COMPRESSOR STARTS**

If the compressor will start and run with the HERMETIC-CHECK and did not run with the regular system connections, the fault lies with the capacitor, relay, overload or other system controls or wiring. Start capacitors and relays can be checked by substitution.

Checking Start Capacitor Substitute the HERMETIC-CHECK start capacitor for the system capacitor.

1. Reconnect all original system wiring to the compressor.
2. Set POWER switch to OFF position. The instrument does not need to be plugged in.
3. Discharge system capacitor and disconnect from system wiring.
4. "Plug one of the WHITE capacitor test leads into the BLACK banana jack labeled INTERNAL START CAPACITOR.
5. Attach the WHITE capacitor test lead to one of the system terminals where the system start capacitor was connected (not to the capacitor itself).
6. Attach the RED test clip (used for run terminal during starting) to the other system terminal where the start capacitor was connected.
7. Set COMPRESSOR TYPE switch to CAP START.
8. Turn on the compressor to see if it will start with the HERMETI-CHECK start capacitor.

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Checking System Relay: If the compressor still does not start, replace the system relay with the HERMETI-CHECK START switch.

1. Reconnect all original system wiring to the compressor.
2. Set POWER switch to OFF. The instrument does not need to be plugged in for this procedure.
3. Reconnect system start capacitor.
4. Connect RED test clip to power terminal of the relay (L terminal of current relay; 1 terminal of potential relay).
5. Disconnect wire from start winding relay terminal (S terminal of current relay; 2 terminal of potential relay) and attach WHITE test clip to wire.
6. Set COMPRESSOR TYPE switch to SPLIT PHASE.
7. Apply power to the system and push START switch to the right to start system.

### **IF COMPRESSOR IS TIED UP**

The following techniques may be used to try to free a stuck compressor. The methods are presented in order of increasing danger to both compressor and operator. Use caution and consider safety first as you perform them.

**Poke Start:** Split phase compressors that start hard may be helped by setting the COMPRESSOR TYPE switch to CAP START. The added poke of the starting capacitor may free up the compressor. A hard start kit should be installed for future starting.

**Reverse Start:** Interchanging run and start windings for starting is often thought to free some stuck compressors. Theory says it's hopeless, but you can try by turning REVERSING SWITCH from REGULAR to REVERSE, then attempting to start the compressor. Follow instructions under "STARTING THE COMPRESSOR". Return switch to REGULAR position after test.

**Jump Start:** 110V compressors may free themselves if they are given a jolt 220 V. Follow starting instructions under "STARTING THE COMPRESSOR" but connect the HERMETI-CHECK to 220 V. If compressor starts, do not run on 220 V for more than a few seconds.

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### **OTHER TESTING FUNCTIONS**

Checking Run Capacitor: Once the system starts properly, the run capacitor can be tested.

1. Disconnect system wiring from run capacitor.
2. Connect Model 2001 to compressor as described in "SET UP".
3. Start compressor (see "STARTING THE COMPRESSOR") and record the run winding amperage without run capacitor.
4. Turn compressor off and disconnect the HERMETI-CHECK from power source.
5. Plug WHITE capacitor test lead into WHITE and RED JACKS labeled "EXTERNAL RUN CAPACITOR".
6. Connect WHITE test lead clips to run capacitor terminals.
7. Reconnect HERMETI-CHECK to power source.
8. Start compressor and record the run winding amperage with run capacitor.

If amperage draw decreases with run capacitor connected, run capacitor is OK.

### **REPAIR RETURN INFORMATION**

Please include a detailed description of the malfunction and proof of purchase. Estimates may be requested in advance.

All repairs must be carefully packaged and returned to place of purchase or shipped prepaid to the factory.

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## **REPLACEMENT PARTS**

2109 Switch CAP START-SPLIT PHASE

2110 Switch: GROUND TEST

2112 Switch: POWER (RUN TEST)

2113 Switch: OPEN TEST

2114 Switch: START

2115 Switch: REVERSING

2116 Start capacitor

2136 220V Adapter Leads

2186 capacitor leads

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