634737 RECALL KIT - HTS DIAGNOSTIC PROCEDURES

**WARNING!** Do NOT disconnect or bypass the HTS when servicing! Refrigerators can cause a fire resulting in property damage, injury or death if this HTS safety device is disabled.

**WARNING!** Information provided is ONLY intended for professional technicians, trained and qualified in the safe repair practices and operation of AC (110V), DC electrical, and LP gas components. Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage!

**Purpose:**
This service bulletin is intended to provide safe procedures and troubleshooting steps that provide diagnostic procedures to aide service personnel in identifying the root cause of:

- A BLANK DISPLAY (Refrigerator will not turn on) on 1200 model refrigerators fitted with a 634737 RECALL KIT - HTS.
- A LI oP error code on a 1200 model refrigerator fitted with a controls adapter kit and a 634737 RECALL KIT - HTS.
- A LI oP error code on 1210 model refrigerators fitted with a 634737 RECALL KIT - HTS and/or a factory installed kit.

**Models Affected:**
1200 and/or 1210 model refrigerators fitted with a field or factory installed HTS (High Temperature Sensor).

**Tools Needed**
- Nut Driver Set
- Long Blade Razor Knife
- Volt Meter
- Litmus paper

**Procedures:**
- **1200 Model Refrigerators With Blank Display**
  Follow the 1200 Blank Display - Refrigerator Will Not Turn On Diagnostic Flowchart procedure. Refer to Fig. 1 for configuration.

- **1200 Model Refrigerators - With LI oP Display**
  Follow the LI oP Error Code Diagnostic Flowchart procedure. Refer to Fig. 2 for configuration.
  **NOTE:** If a 1200 model refrigerator displays the LI oP error, it is because the refrigerator has been retrofitted with a controls adapter kit.

- **1210 Model Refrigerators**
  Follow the LI oP Error Code Diagnostic Flowchart procedure. Refer to Fig. 2 for configuration.

**Acronyms and Terms**
- **HTS (High Temperature Sensor):**
  Refers to the 634737 RECALL KIT - HTS and/or factory installed kit.

- **TMC (Temperature Monitoring Control):**
  Refers to the electronic control box ("black-box") that is a part of the 634677 RECALL KIT - HTS and/or factory installed kit.

- **Thermocouple:**
  Refers to the temperature sensor (with muffler clamp) that is mounted to the boiler tube.

---

### Fig. 1

1200 Models With Original Controls

- Green; Clips to gas valve bracket
- Red; 12V from coach battery / converter
- Brown; Thermocouple mounted to boiler tube
- Blue; To 12 volt input of power board

### Fig. 2

1210 or 1200 Models Fitted with Controls Adapter Kit

- Green; Clips to gas valve bracket
- Red; From Limit_Out terminal of power board
- Brown; Thermocouple mounted to boiler tube
- Blue; To Limit_IN terminal of power board
1200 Blank Display - Refrigerator Will Not Turn On Diagnostic Flowchart

Refrigerator will not turn ON

BEGIN

Is TMC red light on solid?

Yes

Go to TMC RED LIGHT FLASHING page

No

Is TMC red light flashing?

Yes

Go to TMC RED LIGHT ON SOLID page

No

Is HTS wired according to the installation instructions? Refer to Fig. 1 & 3

No

Is there 12 VDC between the GND and +12V terminals of the TMC?

Yes

Is there 12 VDC between the GND terminal of TMC and 12V input terminal of power board?

No

Is there 12 VDC between the gas valve bracket and +12V terminal of TMC?

Yes

1. Connect or repair connections as needed.
2. If refrigerator is able to turn ON, the repair is complete.
3. If refrigerator will NOT TURN ON, return to BEGIN process on this flowchart.

Yes

1. Repair blue 12V OUT wire and/or connections as needed.
2. If refrigerator is able to turn ON, the repair is complete.
3. If refrigerator will NOT TURN ON, return to BEGIN process on this flowchart.

No

Is a DC source of 10.5 to 15.4 VDC connected to the red +12V IN wire?

No

Connect DC source of 10.5 to 15.4 VDC to red +12V IN wire.

Yes

1. Repair red +12V IN wire and/or connections as needed.
2. If refrigerator is able to turn ON, the repair is complete.
3. If refrigerator will NOT TURN ON, return to BEGIN process on this flowchart.

Problem is NOT related to HTS. Refer to service manual.

Replace 634737 HTS kit
LI oP Error Code Diagnostic Flowchart

LI oP error code is displayed on front of refrigerator.

BEGIN

Is HTS wired according to the installation instructions? Refer to Fig. 2 & 3

Yes

Is TMC red light flashing?

Yes

1. Connect or repair connections as needed.
2. If LI oP code clears, the repair is complete.
3. If LI oP code remains return to BEGIN process on this flowchart.

No

Is TMC red light on solid?

Yes

Go to TMC RED LIGHT FLASHING page

No

Is there 12 VDC between the GND terminal and power board LIMIT_IN terminal?

Yes

Replace Power board

No

1. Repair blue limit in wire and/or connections as needed.
2. If LI oP code clears, the repair is complete.
3. If LI oP code remains return to BEGIN process on this flowchart.

Is there 12 VDC between the gas valve bracket and +12V terminal of TMC?

Yes

Remove power board cover. Is there 12 VDC between the TMC GND terminal and power board LIMIT_OUT terminal?

Yes

Replace Power board

No

1. Repair red limit out wire and/or connections as needed.
2. If LI oP code clears, the repair is complete.
3. If LI oP code remains, return to BEGIN process on this flowchart.

No

Is there 12 VDC between the GND and +12V OUT terminals of the TMC?

Yes

Replace 634737 HTS kit

No

Is there 12 VDC between the gas valve bracket and +12V OUT terminals of the TMC?

Yes

1. Repair green ground wire and/or connections as needed.
2. If LI oP code clears, the repair is complete.
3. If LI oP code remains, return to BEGIN process on this flowchart.

No

Is TMC red light on solid?

Go to TMC RED LIGHT ON SOLID page

1. Repair blue limit in wire and/or connections as needed.
2. If LI oP code clears, the repair is complete.
3. If LI oP code remains return to BEGIN process on this flowchart.

B

Go to TMC RED LIGHT ON SOLID page

A

Go to TMC RED LIGHT FLASHING page

1. Connect or repair connections as needed.
2. If LI oP code clears, the repair is complete.
3. If LI oP code remains return to BEGIN process on this flowchart.
Ensure input voltage to TMC +12V terminal is between 10.5 – 15.4 VDC. Once input voltage is above 10.0 VDC, TMC will self-recover and refrigeration will be able to be turned ON.

If the red light is flashing FAST or SLOW:

**FAST**
- On/Off 2 to 3 times per second

- **TMC has sensed the input voltage to be below 9.5 VDC**
- **TMC has sensed an open circuit in the thermocouple circuit**

- Is thermocouple plugged into T/C connector of TMC?
  - **Yes**
    - Replace 634737 HTS kit
  - **No**
    - Plug in thermocouple. Once plugged in, TMC will self-recover and refrigeration will be able to be turned ON.

- **1200**
  - Plug in thermocouple. Once plugged in, TMC will self-recover and LI oP error will be cleared.

**SLOW**
- On/Off once per second

- **TMC has sensed the input voltage to be below 9.5 VDC**
- **Is red light flashing FAST or SLOW?**

- **FAST**
  - Once plugged in, TMC will self-recover and refrigeration will be able to be turned ON.

- **SLOW**
  - Once plugged in, TMC will self-recover and LI oP error code will be cleared.

- **1210**
  - Plug in thermocouple. Once plugged in, TMC will self-recover and refrigeration will be able to be turned ON.

- **1200**
  - Ensure input voltage to TMC +12V terminal is between 10.5 – 15.4 VDC. Once input voltage is above 10.0 VDC, TMC will self-recover and refrigeration will be able to be turned ON.
Red Light on Solid

1. Remove - the system insulation (A) or remove the insulation plug.

2. Inspect for powdery, yellow residue (B).

   - Is yellow, powdery residue visible?
     - Yes
       - Replace Cooling Unit
     - No
       - Can you smell ammonia?
         - Yes
           - Replace Cooling Unit
         - No
           - Using litmus paper, inspect boiler area for leaks. Refer to LITMUS PAPER TEST
             - Did litmus paper indicate a leak?
               - Yes
                 - Replace Cooling Unit
               - No
                 - Go to HTS Validation Page

Example Chromate Leaking

- Red arrows pointing to yellow, powdery residue - indicates chromate leak.

Removing Insulation

1. Remove - the system insulation (A) or remove the insulation plug.

2. Inspect for powdery, yellow residue (B).
1. Apply a light spray of water to the litmus paper (A).
2. Ensure that the litmus paper remains wet throughout test procedure.

3. Dab, press, wipe the litmus paper onto entire surface area of exposed boiler (B) to include:
   • boiler tube to flue tube welds
   • boiler tube to heater tube welds
   • weld between heater tubes
4. Closely examine the litmus paper.

5. ANY reddish / purplish color (C) appearing on the litmus paper indicates the presence of ammonia - the cooling unit is leaking and must be replaced!
Clear the TMC Lockout State

Clear the TMC lockout state (Red light ON solid) described below to validate TMC functionality. The TMC is the black box control portion of the HTS kit.

**Note:** In order to clear the TMC lockout state (Red light ON solid), the conditions listed below must be met. **DO NOT** remove the TMC’s plastic cover!!

1. RED light of TMC is ON (Solid)
2. The boiler area of cooling unit (where thermocouple is mounted) has cooled to less than 250°F.
3. A magnet has been positioned as shown to the right, for 5 seconds.

**NOTE:** Use a magnet equal to or greater than 1300G (Flux Density) with continuous contact. If lockout state does not clear after 5 seconds with magnet in place, try using a stronger magnet.

**WARNING!** **DO NOT** attempt this HTS Validation unless you have **ALREADY FOLLOWED** Page 5 instructions and determined that the cooling unit **DOES NOT HAVE A LEAK. OTHERWISE, THERE IS A SERIOUS RISK OF FIRE** that can result in property damage, personal injury or death.

Once the lockout state has been cleared, the RED light on the TMC will turn off.

If the refrigerator is not on, turn it on to further validate the HTS configuration.