GREE H5 Error Code: IPM Protection

A field reference handout for HVAC contractors

What the H5 Error Code Means

H5 is displayed on the indoor unit and indicates **IPM (Intelligent Power Module) protection**. The system has detected either an IPM synchronization issue or an overcurrent condition. If the IPM does not provide adequate power to the Drive Chip, the system shuts down to protect itself.

Power Conversion Path

Power flows from the incoming 230 V AC through the bridge rectifier into the Power Factor Correction (PFC) module, which outputs a DC bus typically in the 290–340 V DC range. That DC bus feeds the Intelligent Power Module (IPM), which converts the DC voltage into three separate pulses, one per compressor phase, to drive the compressor.

How the System Detects H5

The outdoor main control board monitors three indicators on the PFC module:

Output Voltage

Monitored on the PFC module output

Output Current

If PFC output current is too high, system reports H5 as an over-current error

PFC Module Temperature

A failure in any monitored indicator tells the system the PFC module is faulty

H5 Root Causes

The H5 error has multiple possible causes that range from installation and refrigerant issues to drive board electrical faults to a failed compressor. **Work the basics first**, most H5 calls do not require a board or compressor replacement once airflow, refrigerant charge, and wiring are verified.

Installation & Airflow

- Inadequate airflow at indoor or outdoor coil
- Service valves not fully open or system not properly evacuated
- Crossed piping between zones (multi-zone systems)
- Restriction or kinked refrigerant line

Refrigerant

- Non-condensibles in the refrigerant system (standing pressure does not match outdoor temperature on the PT chart)
- System overcharge or undercharge

Electrical & Mechanical

- Compressor wiring loss of phase or phase reversal
- Current to the compressor too high (overcurrent)
- Drive board IPM module 15 V power supply below 13.5 V
- Drive board six-line PWM signal or corresponding element faulty
- Drive board compressor current sampling element, or the Drive Chip current sampling AD terminal, faulty
- Faulty thermistors - See the thermistor ohm chart **here**
- Heat-sink paste or board screws not properly seated
- Compressor itself: open winding, shorted to ground, or seized

Step-by-Step Troubleshooting: Steps 1–3

Start with airflow and installation, then refrigerant pressures, then wiring. The same order applies whether the unit was just installed or has been running for years.

1

Verify Airflow and Installation

- Confirm indoor filters, coils, and blower wheels are clean
- Confirm the outdoor coil is clear with proper clearance around the unit
- Verify all service valves are open and the system has been properly evacuated

2

Check Refrigerant Pressure Against the PT Chart

Compare standing pressure to outdoor temperature using the PT (pressure-temperature) chart for the system's refrigerant. If pressures do not match what the chart predicts for the ambient, the system may have non-condensibles, which can directly cause an H5 error. Recover, evacuate, and recharge if non-condensibles are confirmed.

3

Inspect Wiring and the Main Board

Inspect the wiring against the unit's diagram and check the main board for visible damage. All screws on the board must be installed and tightened so heat transfers correctly through the thermal paste to the heat sink. Missing this step is a common reason a newly-replaced board fails on the first run.

All board screws must be installed and tightened. Missing or loose screws prevent heat transfer through the thermal paste and can cause a newly-replaced board to fail on the first run.

Troubleshooting Step 4: Test the Compressor Windings

Power off the system and unplug the leads at the compressor. Set the meter to ohms.

Phase-to-Phase Test

Test the windings phase-to-phase between **U-V, U-W, and V-W**.

- **FLEXX R32 compressors:** 0.3 to 2 ohms
- **Other R32 mini-split compressors:** 3 to 4 ohms
- Readings should be roughly equal or within .01 ohms across all 3 pairs.

> If you're uncertain which range applies to the model in front of you, call GREE technical service at **888-850-7928** before condemning the compressor.

Winding-to-Ground Test

Test each winding to ground.

- Resistance to ground should be **infinite (open line)**
- A measurable ohms reading to ground indicates the compressor is grounded
- A mega-ohm reading to ground does **NOT** indicate a grounded compressor

Troubleshooting Steps 5–6: Amperage & Continued Trips

Step 5: Restart and Check Compressor Amperage

Restore power and restart the system. If the compressor does not start, check amperage on all three legs.

Timing matters when reading amps: the condenser fan runs for about **30 seconds** before the system tries to start the compressor, and the start attempt only lasts a few seconds before the unit drops out. You are only looking for some kind of amp draw on that leg, which can be anywhere from roughly **0.3 or higher**. After the unit drops out, wait for the condenser fan to cycle back on before testing the next wire, and repeat for each leg.

- **Amps present on all legs but compressor will not start:** compressor is likely seized
- **No amps on one or more legs:** the main board has failed

Step 6: Compressor Runs but Still Trips H5

If the compressor runs but the system trips H5 once it ramps up, the cause is most likely one of:

- System overcharge
- Refrigerant restriction
- Kinked refrigerant line
- Inadequate airflow
- Crossed piping (multi-zone systems)
- Faulty thermistor

Verify each before assuming a drive-section electrical fault.

Drive Section Board Tests

Drive-section testing on the main board has four parts. All four tests together confirm the bridge rectifier, PFC module, and IPM are good. Use the board diagrams in the unit's service manual to locate test points.

1

K-Ohms Resistance Test (Power Off)

Set meter to K-ohms. Measure resistance between **P-U, P-V, P-W, N-U, N-V, and N-W**. All six readings should be **above 10 K-ohms** with no large differences between them.

2

Diode Test (Power Off)

Set meter to diode test mode. Place black lead on P, red lead on each of U, V, and W in turn. Place red lead on N, black lead on each of U, V, and W in turn. All six readings should be between **0.3 V and 0.7 V**.

3

Powered DC Voltage Test (P to N)

Restore power. Set meter to DC volts. Test discharge points **P (positive) and N (negative)** on the board. Voltage should be between **290 and 340 volts DC**.

4

Powered AC Voltage Test (L to N)

Set meter to AC volts. Test **L (live) and N (neutral)** terminals on the PCB. Expected: **187 to 253 V AC** for a 230 V unit; **103 to 126 V AC** for a 115 V unit.

Wiring note: In the U.S., L1 = 115 V and N = L2 (the other side of 230 V). Outside the U.S., 230 V is sent straight to L1. If any reading is out of range, that section of the board is the fault and the board needs to be replaced.

Quick Reference: Healthy H5 Test Values

Use this table to verify readings at each test point.

Test	Meter Setting	Test Points	Healthy Reading
Compressor windings (phase-to-phase)	Ohms	U-V, U-W, V-W	FLEXX R32: 0.3–2 Ω. Other R32 mini-split: 3–4 Ω. Equal or within .01 ohms from one to the other.
Compressor windings to ground	Ohms	U, V, W to ground	Infinite (open line)
Drive section resistance	K-ohms	P-U, P-V, P-W, N-U, N-V, N-W	Above 10 KΩ, no large differences
Drive section diode	Diode	P-U, P-V, P-W, N-U, N-V, N-W	0.3 V to 0.7 V at all six points
Bus DC voltage (powered)	DC volts	P (+) and N (−) on board	290–340 V DC
Power supply AC (powered)	AC volts	L and N on PCB	187–253 V AC (230 V unit) / 103–126 V AC (115 V unit)

If you're uncertain which range applies to the model in front of you, **call GREE technical service at 888-850-7928**.

Always Identify the Root Cause Before Replacing the Compressor

When replacing a compressor on a system that threw H5, always identify the underlying cause: overcharge, undercharge, restriction, or airflow problem. Otherwise it is only a matter of time before the new compressor fails the same way.

Overcharge

Undercharge

Restriction

Airflow Problem

The compressor is rarely the actual root cause of an H5, it is most often the casualty of a refrigerant or airflow condition that is still present after the swap.

Frequently Asked Questions (1 of 2)

What does H5 mean on a GREE mini-split?

H5 indicates IPM (Intelligent Power Module) protection. The system has detected either an IPM synchronization issue or an overcurrent condition and shuts down to protect itself. The error displays on the indoor unit.

What is the most common cause of a GREE H5 error?

Most H5 calls trace back to airflow, refrigerant charge, or refrigerant pressure issues — not a failed board or compressor. Always check indoor and outdoor airflow, service valves, and standing pressure against the PT chart before assuming an electrical fault.

What should the compressor windings read on a healthy GREE mini-split?

Phase-to-phase (U-V, U-W, V-W) should read approximately 0.3 to 2 ohms on FLEXX R32 compressors, and 3 to 4 ohms on other R32 mini-split compressors. Equal or within .01 ohms across all 3 pairs. If you're uncertain which range applies, call GREE technical service at 888-850-7928.

Does a mega-ohm reading to ground mean the compressor is grounded?

No. A mega-ohm reading to ground does not indicate a grounded compressor. Only a measurable ohms reading from the windings to ground confirms the compressor is grounded.

What DC voltage should the P and N bus terminals read on a healthy board?

290 to 340 volts DC, measured with the meter on DC volts between P (positive) and N (negative) with the system powered. A reading outside this range indicates the bridge rectifier or PFC section of the board is faulty.

What can cause a newly-replaced board to fail?

Heat-sink paste and screw torque. All board screws must be installed and tightened so heat transfers through the thermal paste to the heat sink. Missing or loose screws prevent heat transfer and the new board can fail quickly.

Can refrigerant problems cause a GREE H5 error?

Yes. Non-condensibles, overcharge, undercharge, restriction, or a kinked refrigerant line can all trigger H5 once the compressor ramps up. Check standing pressure against outdoor temperature using a PT chart before assuming a drive-section fault.

Should I replace the compressor when I get an H5 error?

Not until you identify the root cause. Most H5 errors are not actually caused by a failed compressor. Always identify whether the underlying problem is overcharge, undercharge, restriction, or airflow before swapping the compressor — otherwise the new compressor will fail.

How does the system actually detect an H5 condition?

The outdoor main control board monitors three things on the PFC module: output voltage, output current, and module temperature. If the PFC output current is too high, the system reports H5 as an over-current error. A failure in any of the three monitored indicators tells the system the PFC module needs to be replaced.

H5 Troubleshooting Summary

Follow all six steps in order before condemning any component. Skipping steps leads to repeat failures and unnecessary parts.

01

Airflow & Installation

Filters, coils, blower wheel, service valves

02

Refrigerant Pressure

Compare standing pressure to PT chart

03

Wiring & Main Board

All screws tight; thermal paste contact intact

04

Compressor Windings

Phase-to-phase and to-ground tests

05

Restart & Amperage

30-second fan cycle; 0.5–6 A on each leg

06

Drive Section Tests

K-ohms, diode, DC bus, AC supply

Always identify the root cause before replacing the compressor. **When in doubt, call GREE technical support: 888-850-7928**