

YOUR FREE READER'S COMPANION

The HVAC Field Pack

A companion to The DIY HVAC Repair Bible · by Dale Brennan

Thanks for picking up the book. This is the companion you tape inside the furnace closet door: the no-heat / no-cool path that finds the problem instead of guessing, the filter and seasonal schedule that prevents most of the calls in the first place, a plain line between what you fix yourself and what stays with a pro, and a price guide so nobody quotes you a new system for a twenty-dollar part. Print it, fold it, keep it by the unit.

Most of what shuts a house down isn't the furnace or the AC. It was the simplest thing — a dead thermostat battery, a filter choked into a felt blanket, a flame sensor you could clean with a dollar bill. Check the simplest thing first, work cheap to expensive, and you'll fix most of what ever goes wrong. — Dale

The No-Heat / No-Cool Path

When the house won't heat or cool, work the system in order — power, then thermostat, then airflow, then the heat side or cool side, and stop at the sealed refrigerant system. That order isn't random: it's cheapest-and-most-likely first, rare-and-expensive last. Don't pull a furnace panel until you've checked the wall.

1. Power. Is the breaker tripped? Is the furnace door safety switch pushed in? Is the outdoor disconnect seated? Reset a tripped breaker once — if it trips again, stop and investigate, don't keep resetting it.
2. Thermostat. Right mode (heat vs. cool), set point actually calling (above room temp for heat, below for cool), screen alive. Blank or flickering screen = change the batteries first. It's a two-dollar fix and the most common one in the book.
3. Airflow. Pull the filter and hold it to a light. If you can't see light through it, that's likely your whole problem — a clogged filter overheats a furnace (trips the limit) and freezes an AC coil. Change it before you chase anything else.
4. Heat side or cool side. No heat: watch the furnace try to light — does it run a few seconds and quit (flame sensor), never glow (igniter), never start at all? No cool: does the outdoor unit sit dead, or hum without the fan spinning (run capacitor)?
5. Sealed system (refrigerant). Ice on the lines, hissing, warm air with everything else working — that points to refrigerant, and that's where you stop and call a certified tech. Always.

Change one thing at a time and test before you touch the next. The fastest way to chase your tail is to swap the thermostat, clean the sensor, and pull the capacitor all at once — now you don't know what fixed it, or what you just broke.

Symptom to Likely Cause to Cheap Check

Symptom	Likely cause	The cheap check
Nothing happens at all	Dead thermostat battery / tripped breaker / open furnace door switch	Batteries, breaker, push the door switch in
No heat, furnace lights then quits in a few seconds, retries, locks out	Dirty flame sensor	Clean the rod with sandpaper or a dollar bill
No heat, furnace runs the sequence but never lights	Failed hot surface igniter	Test continuity; replace (never touch the element bare-handed)
No heat or no cool, weak airflow, system short-cycles	Clogged filter	Hold filter to a light; change it
No cool, outdoor unit hums but the top fan won't spin	Failed run capacitor	Look for a bulged/domed top (power off, discharge first)
No cool, outdoor unit dead while thermostat calls	Contactors, disconnect, or breaker	Look for pitted/black contacts; reseat disconnect

AC running but coil iced over	Airflow or low refrigerant	Filter first; if it recurs, suspect refrigerant — pro
Whole system "just died," water near the indoor unit	Clogged condensate drain tripped the float switch	Vinegar flush / wet-vac the drain line
Ice on the lines, hissing, warm air	Low refrigerant (a leak)	STOP — certified tech, EPA 608

Filter & Seasonal Maintenance Schedule

The filter prevents more repairs than anything else you can do. A one-to-fifteen-dollar part protects thousands of dollars of equipment. Match the size exactly (printed on the frame) and mind the airflow arrow — it points toward the furnace/blower. For most homes a MERV 8 to 11 filters well without choking the blower.

Task	When	Who	Prevents
Check / change 1-inch filter	Monthly check, change every 1–3 months	You	Overheating, frozen coils, weak airflow, short cycling
Change 4–5 inch media filter	Every 6–12 months	You	Same as above, on cabinet systems
Clean condenser coil (hose, inside-out, no pressure washer)	Spring	You	Weak cooling, hot compressor, high bills
Clear 2 ft around the outdoor unit	Spring + ongoing	You	Airflow starvation, overheating
Flush condensate drain (cup of white vinegar)	Monthly in cooling season	You	Water damage, float-switch shutdown
Test a cooling cycle	Spring, mild day	You	Finding a dead capacitor in May, not July
Clean the flame sensor (light scuff)	Fall	You	"Lights then quits" no-heat all winter
Vacuum furnace cabinet / blower	Fall	You	Choked airflow, limit trips
Check burner flames are crisp blue	Fall, first fire-up	You	Catches combustion / CO warning signs early
Test CO detectors, replace batteries	Fall	You	Carbon monoxide
Fresh thermostat batteries	Spring + fall	You	Dead-furnace / dead-AC false alarms
Combustion / refrigerant / heat-exchanger check	Yearly–biennial	Pro	CO, sealed-system trouble, hidden cracks

Do an hour twice a year — spring for the AC, fall for the furnace — and most of the repairs in this pack become things you read about instead of things you live through.

DIY It vs. Call a Pro

The honest line. Knowing your limit is the professional part, not a weakness.

Yours — air-side and low-voltage, done with the power off:

- Thermostat: batteries, mode/settings, loose 24V wires, swapping a stat
- Filters and airflow: changing filters, clearing blocked registers
- Cleaning the condenser coil and clearing the outdoor unit
- Flushing the condensate drain, resetting the float switch
- Flame sensor: cleaning or replacing (around \$12)
- Hot surface igniter: testing continuity and replacing (never touch the element bare-handed)
- Run/dual-run capacitor: testing and replacing — after killing power at the breaker AND the disconnect AND discharging it
- Contactor, low-voltage fuse, checking the transformer

Theirs — hard stops, every time, no shame in it:

- Refrigerant and the sealed system. Recharging, brazing, leak repair, anything touching the service valves or copper lines. EPA Section 608 certification is legally required to buy or handle refrigerant — venting it is illegal, the system is under pressure, and "just adding a little Freon" is the wrong thinking, because low refrigerant means a leak and a leak doesn't fix itself.
- The gas valve and any gas piping. A pro replacement, full stop. And any smell of gas — get everyone out, don't flip switches, call the gas company from outside.
- A cracked heat exchanger. Soot, a yellow/lazy/rolling-out flame, a CO detector going off — stop, ventilate, call a pro. This is a carbon-monoxide danger, not a project.
- A breaker that trips again right after a reset. Something downstream is drawing too much; resetting it repeatedly turns a warning into a fire.

The capacitor deserves its own warning: it holds a lethal charge after the power is off. Breaker off and disconnect pulled does NOT mean safe — discharge it across the terminals with an insulated screwdriver (or a 20,000-ohm resistor) before your hands or tools go near it. Every single time, even on a hot day when you're tempted to skip it.

Common Part Price Guide

Rough homeowner prices for the part alone — what you'd pay at a supply house or online, not a contractor's installed quote. The point of this table is simple: when someone tells you the fix is a new system, check whether it's really one of these instead.

Part	What it does	Typical part price	DIY?
Thermostat batteries	Powers a battery-type stat	\$2 (two AA)	Yes
Low-voltage fuse (control board)	Protects the 24V circuit	\$0.50–\$2	Yes
Flame sensor	Proves the furnace flame is lit	\$12–\$20	Yes
Hot surface igniter	Lights the gas furnace	\$20–\$50	Yes
Thermocouple (older pilot units)	Proves the standing pilot	\$10–\$20	Yes
Run / dual-run capacitor (e.g. 45/5 μ F, 370–440V)	Kicks and runs the AC motors	\$15–\$30	Yes — discharge first
Contactor	Switches high voltage to the outdoor unit	\$10–\$30	Yes
Condenser fan motor	Spins the outdoor fan	\$80–\$200	Maybe — match the spec carefully
Thermostat (digital or smart)	The system's brain	\$25–\$250	Yes (mind the C-wire)
Fin comb	Straightens flattened coil fins	\$5–\$10	Yes

Match the spec exactly — a capacitor's μ F numbers never change, and you meet or exceed the voltage rating, never go under. Photograph the wiring before you pull anything.

That's the pack. The one habit worth more than any tool in the box: when the house won't heat or cool, check the simplest thing first — power, then thermostat, then airflow — and work cheap to expensive. Change your filter on schedule, clean the coil in spring, scrub the flame sensor in fall, and test your CO detectors every year. And know where the line is: gas, refrigerant, the sealed system, and a charged capacitor are the four places DIY ends. Stopping there is the professional move, not a failure of nerve. When you've brought your own furnace or AC back to life on a cold or hot day without a service call, I'd love to hear about it — and in a couple of emails I'll tell you how a quick word from you helps this book reach the next person standing in a cold house at midnight.

Check the simplest thing first,

Dale Brennan