Reptile Thermostat Buying Guide

On/Off vs Pulse Proportional vs Dimming • Matching heat sources to thermostats • Buying recommendations by budget

Safety note

- This guide is practical advice, not electrical or veterinary advice. When in doubt, follow manufacturer instructions and local electrical safety practices.
- Use a thermostat on every heat source. Consider a smoke alarm in the reptile room.
- No thermostat is "fail-proof." The goal is layered risk reduction: quality thermostat + safe probe placement + independent verification (thermometers/laser gun temp checks). All thermostats can fail in different ways either providing no heat at all or in full power mode hence the importance of always making sure your heat source is not too high of a wattage to begin with (I.e. no reason to use a 250w CHE just because you have it on hand if a 100/150W CHE properly heats up your enclosure to temps, in the event of a failure it will take longer to overheat and cause harm to your snake/enclosure with a lower wattage heat source than a larger one).

Quick takeaways

- A thermostat is a safety device first and a comfort device second.
- On/Off thermostats are simple and cheap; they work well for non-light heaters but usually give the widest temperature swings.
- Pulse proportional and dimming proportional thermostats regulate more smoothly by varying the power delivered to the heater.
- Multi-zone (2/4/6 output) thermostats are multiple independent thermostats sharing one box. One probe per zone is the normal design.
- If you can budget for it, the hobby's "gold standard" and #1 recommendation is typically a Herpstat because it combines proportional control with layered safety features (alarms, internal error detection, safety relay, and per-output protection on multi-output models). Most cheaper thermostats do not offer these safety features.

1) Thermostat types

On/Off control

The thermostat behaves like a switch: below the setpoint it turns power ON; above the setpoint (often plus a small differential) it turns power OFF. **On/Off can be used with: Heat mats, CHE's, DHP, some RHP's(some manufacturers recommend their RHP be used on pulse/dimming settings only).**

- Pros: cheapest; works with most non-light heaters (heat mats, CHE, DHP, some RHP setups).
- Cons: wider temperature swings; cycling can be frequent; Cant use with basking bulbs.

Pulse proportional control

Instead of staying fully ON for a long time and then fully OFF for a long time, the thermostat turns the heat on and off in short bursts. By changing how long those bursts last, it can control the heat sources average power and keep temperatures steadier than a basic on/off thermostat. **Pulse can be used with: Heat mats, Che, DHP's, RHP's.**

- Pros: more consistent temperatures than on/off thermostats.
- Cons: None really, not as precise as dimming control.

Dimming proportional (voltage) control

Dimming control adjusts the voltage (power level) delivered to the heat source instead of switching fully on and off. This typically provides the most stable heat output and extends the life span of devices. **Dimming can be used with: Heat mats, Che, DHP's, RHP's, and all lighted basking bulbs.**

- Pros: very stable temperature control; preferred for basking bulbs and other light-based heat sources.
- Often the best-performing general-purpose mode when available (per Herpstat documentation).

Summary

Dimming proportional control is generally the best all-around thermostat type because it modulates power smoothly, producing the most stable temperatures and works well with both light-based heat sources(halogen/incandescent basking bulbs—no flicker and less bulb stress) and non-light heat sources (RHP/CHE/DHP/mats). Pulse proportional is typically the next-best option when you're running non-light heat sources and want steadier temps than on/off but don't need dimming. On/off is the good enough choice for heat mats/tape and CHE/DHP/some RHP setups where small swings are acceptable, but it tends to create wider temperature swings(this may or may not be as noticeable in the real world depending on your very specific setup/ambient temp/enclosure type/heat source etc). Most off the shelf generic thermostats are On/Off types unless noted specifically otherwise.

2) One probe vs 2/4/6 probe outputs (zones)

Think in terms of zones. A zone is one probe controlling one output (one heat source or one enclosure). Multi-output/zone units (2/4/6) are multiple independent thermostats in one housing.

- Single-zone: best for one enclosure with one primary heat source.
- Two-zone: good for two separate enclosures, or one enclosure with two heat sources (I.e. separate day and night sources) Or for example with a herpstat you can control one heat source and one light source on timers. (i.e. one of my herpstat 2 controls my rhp 24/7 and turns on/off my arcadia UVB/LED chained setup on a timer every day on the second output that I don't hook the temp probe up to since I only use one heat source in that specific enclosure). An outlet timer can of course achieve the same thing for much cheaper regarding the light setup above, but its always an option if you happen to have an empty zone sitting free.
- Four/six-zone: best for multi-enclosure keepers; keeps control, alarms, and logs in one place and saves money over buying multiple thermostats.

Multi-zone thermostats are designed so each outlet has a corresponding probe input next to it (one probe per outlet/zone).

3) Recommendations by budget (with key specs)

Gold standard: Spyder Robotics Herpstat series – Do it all full automation thermostats

If you can save up for it, a Herpstat thermostat is widely treated as the gold standard because it combines both control options (dimming or pulse) with the most safety protections as well as having tons of additional automation features. It is without a doubt the best thermostat on the market for reptile keepers. All herpstat models share the same features, though the spiderweb wifi versions can be accessed via your phone/computer for much easier setup/ device changes, email you temperature/power outage alerts, and they have a nicer display. I personally think they are worth it for the small extra cost over the non wifi model. Herpstat model #'s relate to the number of probes/zones they come with.

Herpstat 1 $150($135 on sale)($165 wifi), Herpstat 2 $225($249 wifi), Herpstat 4 $399($439 wifi), Herpstat 6 $519($539 wifi),

- Proportional control with multiple modes: runs heat sources using dimming or pulse, plus supports cooling, lighting systems automation, and humidity functions(misting systems) (depending on sensors/setup). Can configure Max power output % settings as well (i.e. only run your heat source at say max 60-80% power if you are using an oversized heat source).
- Day/Night scheduling + ramping: separate integrated day/night timers(2 on normal models per outlet, 4 timer periods on wifi version per outlet) for each probe for full automation of your heat sources. (i.e. herpstat 2 can have basking bulb run 8am to 11pm, turn off said bulb until 8 am again, while automatically turning on your night heat source to run from 11pm then turning it off at 8am etc). Can ramp up/down heat sources for smooth morning/night temp rises/drops.
- Monitoring live power output %, precise temps, high/low tracking.
- Fails safe on probe problems: detects probe failure/invalid readings and can shut down heat instead of continuing blindly on.
- Safety relay: can cut power to one output or all outputs depending on your safety settings.
- High/low alarms: user-set thresholds with loud audible/visual alerts; can be configured to trigger shutdown behavior. Wifi version can also be configured to email alerts as often as every 15 minutes.
- Electrical safety: replaceable fuse protection + clearly defined wattage limits so you can stay within limits.

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Midrange value: Vivarium Electronics VE line

A common midrange thermostat with multiple different models/options decent safety features. A step up from the cheaper thermostats since they have built in safety relays but imho not worth buying since herpstats offer better features with a similar price range. They are, however, a commonly looked at thermostat in comparison to the herpstats so worth mentioning in the guide and still a better option than the cheaper options due to having some similar safety features as a herpstat. Lower models(100/200) do not come with a built in night cycle timer feature, but it can be added on for an additional cost via separate module($25).

- VE-100 ($100) 1 probe on/off. built in safety shut off relay, no audible alarm.
- VE-200 ($130) 1 probe on/off, pulse, or dimming. built in safety shut off relay, no audible alarm.
- VE-300 ($150) 1 probe on/off, pulse, or dimming. built in safety shut off relay, audible alarm.
- VE-300x2 ($224) 2 probe on/off, pulse. built in safety shut off relay, yes audible alarm.
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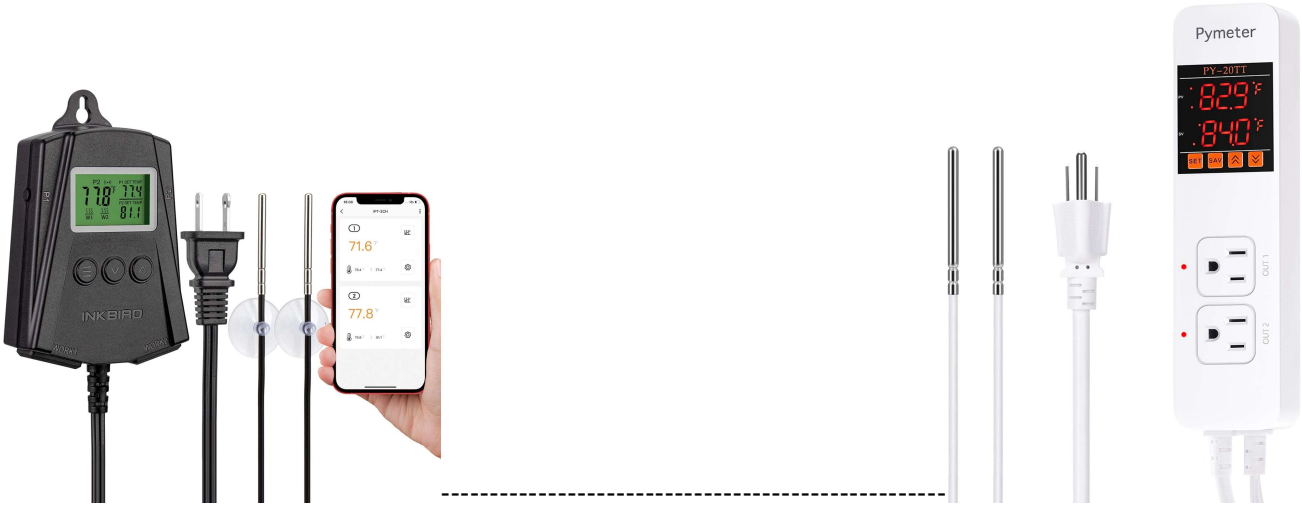
Cheaper 2 zone on/off: Inkbird IPT-2CH(wifi) ($35) or Pymeter dual-probe thermostat($30)

two probe on/off thermostats, ipt-2ch specifically has a wifi app. Cannot say one thermostat is better than the other personally. Audible high/low temp alarms.

I will always recommend a herpstat over these cheaper options for reasons stated above, but any thermostat is better than no thermostat.



Cheaper 1 zone dimming: ReptiZoo TC02 dimming thermostat ($28)

Budget dimming thermostat that can be used with all heat sources, including basking bulbs. No audible high/low alarms, alarm is on the display only.

I will always recommend a herpstat over this cheaper option for reasons stated above, but a any thermostat is better than no thermostat.

Quick decision tree

1) Are you running a visible basking bulb as a heat source?
   - Yes -> Choose DIMMING thermostat
   - No -> Continue.

2) Do you want tighter regulation / smoother gradients?
   - Yes -> Proportional control (DIMMING or PULSE).
   - Budget-limited -> ON/OFF can be acceptable for many non-light heaters.

3) How many zones(plugs/outputs/probes) do you need?
   - 1 -> Single-output unit.
   - 2+ -> Multi-output unit; one probe per zone.

4) If safety and features are priority and budget allows - Herpstat.
   Otherwise -> VE-200 (midrange) > Inkbird/Pymeter/ReptiZoo.

Guide Credit: DarkCelbii