

TECHNICAL WHITE PAPER

Dialing In Trail & Enduro Suspension

A Deep-Dive Setup Guide Across FOX, RockShox, Öhlins, PUSH, DVO, EXT, and Intend

Fork and rear-shock procedures, tuning charts, troubleshooting, and the Dirtlab CP platform

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Summary

Suspension is the highest-leverage, lowest-cost performance upgrade on a trail or enduro bike. **A properly set-up mid-tier fork and shock will out-ride flagship hardware with careless settings, on the same trail, every time.** This paper is a practical, evidence-based reference for setting up modern trail and enduro suspension. It combines the universal method that applies to every system with brand-specific procedures for FOX, RockShox, Öhlins, PUSH, DVO, EXT, and Intend, and deliberately treats the **fork** and the **rear shock** as separate systems throughout because they perform different jobs and are tuned to different targets.

The fork manages the front contact patch: steering precision, braking support, and front-wheel traction. The rear shock manages drive traction, pedaling efficiency, and **the bike's tracking and hit absorption through the rear wheel**, all filtered through the frame's leverage design. The universal sequence is the same for both set spring rate (sag) first, then rebound, then compression, then fine-tune the spring curve, changing one variable at a time on a repeatable trail, but the numbers, and often the hardware, differ front to rear.

Baseline Targets: Fork vs. Rear Shock

Parameter	FORK — Trail	FORK — Enduro	SHOCK — Trail	SHOCK — Enduro
Sag	25–30%	28–33%	28–32%	30–33%
Rebound	Mid, balance to rear	Mid, resist packing	Mid, balance to front	Mid, resist packing
Compression	Neutral / 0	Neutral / 0	Neutral / 0	Neutral / 0
Spring curve	Moderate ramp	More ramp	Frame-dependent	More ramp

Figure ES-1. Fork and rear-shock baselines are related but not identical. Shock sag is especially frame-dependent because the frame's leverage ratio sits between the wheel and the shock; always cross-check the bike maker's guide.

1. Fundamentals: Two Systems, Two Jobs

Every suspension unit pairs a **spring** (air or coil) that sets how deep you sit in the travel with a **damper** (oil through valved circuits) that controls how fast it moves. Nearly every knob belongs to one of these two systems. Before the brand chapters, it is worth being explicit about how those systems play out differently at the front and rear of the bike.

1.1 What the Fork Does vs. What the Rear Shock Does

FORK

- **Owns the front contact patch.** Fork setup directly governs steering precision, front-wheel grip in corners, and the bike's behavior under braking (dive vs. support).
- **Acts on travel directly.** The fork's air pressure or coil rate acts on wheel travel almost 1:1, so its sag chart maps cleanly to rider weight.
- **Tuned for confidence on steep.** Riders generally want the fork to hold high in its travel for a supportive, non-diving platform on descents.

REAR SHOCK

- **Owns rear traction and pedaling.** Shock setup governs drive-wheel grip, anti-squat behavior under power, and comfort/tracking through repeated hits.
- **Works through the frame's leverage ratio.** The linkage sits between the wheel and the shock, so identical shocks behave differently on different frames. This is why shock sag and spring rate are frame-specific and why bike makers publish their own numbers.
- **More sensitive to progression matching.** A frame's leverage curve (linear vs. progressive) determines whether a coil or an air shock—and how much added ramp will feel right.

1.2 Sag: The Foundation (Set Front and Rear Separately)

Sag is the percentage of suspension travel the suspension settles under static riding weight. Set it first on each end; nothing else works until it is right. Measure the **fork** at the stanchion O-ring and the **rear shock** at the shock-shaft O-ring (or by the frame's sag gauge). Forks and shocks do not have to run the same percentage; shocks typically sit slightly deeper for grip, and the exact target is frame-dependent.

1.3 Rebound, Compression, and Spring Curve

Rebound controls extension speed too fast, bucks the rider, too slow "packs down" over repeated hits. It depends on the spring rate, so reset it after any pressure change, and balance the two ends so the fork and shock recover at the same rate. **Compression** resists movement into travel: low-speed (LSC) governs slow shaft movements (braking dive, pedal bob, berms, weight shifts) while high-speed (HSC) governs fast shaft movements (square edges, roots, landings). Note this is **shaft speed, not riding speed**. The **spring curve** sets how force builds to bottom out. How you tune it is the single biggest hardware difference among the brands: FOX/RockShox use volume tokens; Öhlins use a ramp-up chamber; DVO use volume bands plus OTT; and coil systems (PUSH, EXT) rely on hydraulic bottom-out control since a coil's rate is essentially linear.

Symptom	Applies to	Likely cause	First fix
Harsh on small bumps	Fork or shock	Too much pressure, LSC, or rebound	Reduce pressure / open LSC / open rebound

Symptom	Applies to	Likely cause	First fix
Bottoms out harshly	Fork or shock	Spring rate low / not enough ramp	Add pressure, then ramp (tokens/chamber/HBO)
Dives under braking	Fork	LSC too light / pressure low	Add LSC or a little pressure
Squats / wallows under power	Shock	Sag too deep / LSC light	Add pressure or LSC; check frame anti-squat
Packs down in rock gardens	Fork or shock	Rebound too slow	Speed up rebound (open clicks)
Bucks / pogos	Fork or shock	Rebound too fast	Slow rebound (add clicks)

Figure 1. Universal troubleshooting, tagged by end. Some symptoms point to the fork, some to the shock, and some to either—bracket one variable at a time to confirm.

2. The Universal Setup Method

This sequence works for any air fork and shock from any brand in this paper. Coil and custom-tuned systems follow the same logic, with spring-rate selection in place of air-pressure steps. Do the fork and the shock as separate passes, then balance them together.

2.1 Step-by-Step

- 1. Record kitted riding weight.** With gear, pack, and water, this drives every starting number, front and rear.
- 2. Set baseline pressures.** Fork: use the app or lower-leg chart. Shock: use the bike maker's chart (frame-specific) or the shock app. On air units, equalize positive/negative chambers by compressing 3–5 times to ~30–40% travel, then re-check.
- 3. Set sag, fork first, then shock.** Compression open, riding position, settle against a wall, dismount, read the O-ring. Adjust pressure to target. Re-equalize after each change; never read sag with the pump attached.
- 4. Set rebound on each end.** Start fully slow (closed) and open clicks until the unit recovers between hits without bucking. Use the curb-drop test; match front and rear recovery rates.
- 5. Set compression.** Begin neutral/0. Bracket LSC then HSC on a repeatable trail: move several clicks one way to feel it, then back toward the sweet spot.
- 6. Tune the spring curve last.** Still bottoming with correct sag? Add ramp (token / ramp-chamber pressure / OTT / HBO). Never reaching full travel? Remove ramp.
- 7. Re-balance front to rear.** A big fork change alters how hard you ride the rear and vice versa. After a major change on one end, revisit the other and start again.

2.2 Bracketing and Note-Taking

Bracketing is the disciplined heart of tuning: find a baseline, move an adjuster deliberately one way to learn its effect, then converge. Change only one variable at a time, on one trail section, you know. **Write everything down** for the fork and the shock separately: pressure or spring rate, tokens/bands, every click relative to a known reference (usually fully closed), sag %, travel used, and a one-line note on feel and next step. Tire pressure can mask or mimic suspension problems. Verify it before blaming either unit.

3. FOX Factory

FOX (and its Marzocchi sibling) anchors the OEM mainstream with token-based air springs and dampers ranging from simple GRIP to the four-way GRIP X2 platform. FOX's Suspension Program Manager guidance is a widely cited industry baseline.

FORK

Trail/enduro forks are the 34, 36, and 38. FOX's baseline is roughly 20% fork sag, explicitly a starting point. Rebound adjusters are red across FOX/Marzocchi: counter-clockwise ("–") faster, clockwise ("+") slower. Tune end-stroke ramp with volume tokens, add tokens to resist bottom-out, remembering that changing tokens changes the pressure needed for the same sag. On GRIP X2 forks, start LSC/HSC centered and use FOX's per-pressure chart as a grid, then bracket.

REAR SHOCK

Trail/enduro shocks are the Float (light trail), Float X (trail/enduro), and Float X2 (enduro air), plus the DHX coil. FOX suggests ~30% shock sag as a base. On the Float X2, set ~30% sag, record the pressure, then use FOX's chart to set starting HSC, LSC, HSR, and LSR. If the rear feels wallowy and bottoms easily, add ~10 psi at a time until it is supported while still giving full travel. Volume spacers tune air-shock ramp; the DHX coil relies on spring rate plus HSC for bottom-out.

FOX Live Valve Neo (electronic shock)

FOX's NEO platform is an **electronic, wireless rear-shock system** built on the Float X (trail) and DHX (coil, trail/all-mountain) shocks. Rather than a manual climb switch, a controller integrated into the shock opens or firms the compression circuit automatically based on trail data, reading terrain up to 400 times per second and switching state in about 1/70th of a second via a silent magnetic-latch solenoid. Two sensors mount on the front and rear brake calipers; the FOX-proprietary Neo wireless protocol (shared with the Transfer Neo dropper) links them to the shock without wires. Notably, **NEO controls only the shock; the fork is left fully open and normally damped**, so you can pair a NEO shock with any compatible fork and keep the rest of the build.

Setup mechanics start exactly like a normal air or coil shock: set sag, rebound, and the external firm-mode compression the ordinary way, then the electronics are configured in the FOX Bike app: pair the sensors, set battery/service tracking, and download or edit shareable Neo "Tunes" that define how aggressively the system firms up. The shock retains external low-speed compression and low-speed rebound adjustment; a rechargeable battery (shared with the Transfer Neo) lasts ~15–20 hours, and the sensor coin cells last about a year. The Neo Kit (sensors, controller battery, hardware) is required and sold separately from the shock.

- **Set the mechanical baseline first** (sag, rebound, firm-mode LSC) as for any Float X / DHX.
- **Pair and tune in the FOX Bike app**; choose a Neo Tune, then refine firmness bias for your terrain.
- **Keep the fork setup independent**; NEO does not touch it; balance it to the shock per Section 2.

Adjustment	Fork	Rear shock
Spring rate	Air pressure (chart), ~20% sag	Air pressure (chart), ~30% sag
End-stroke ramp	Volume tokens	Volume spacers (air) / spring + HSC (coil)
Rebound (red)	CCW faster, CW slower	HSR + LSR on X2; LSR on simpler units
Compression	LSC/HSC centered, per chart	LSC/HSC per pressure chart

Figure 2. FOX fork vs. shock. FOX publishes per-pressure damping charts for X2-class units; use them as a starting grid on each end, then bracket.

4. RockShox

RockShox is FOX's principal rival. Its defining asset is the Trailhead app: scan the crown QR code or enter the serial with rider weight for a starting pressure and rebound specific to that exact unit, front or rear.

FORK

Trail/enduro forks are the Pike (trail, 120–150 mm), Lyrik (all-mountain, 140–160 mm), and ZEB (enduro, 150–190 mm). Use Trailhead or the lower-leg chart for pressure and an initial rebound click count from fully slow (turtle); max pressure 260 psi. Current forks use the Charger 3/3.1 damper (RC2 with independent HSC/LSC/LSR on Ultimate/Select+). Set any lockout open and HSC/LSC to 0 to start. On repeated impacts, a packed feeling usually means rebound too slow, not low pressure. Note the ZEB runs lower pressure than expected; use its travel row, not Lyrik/Pike numbers. Tune ramp with Bottomless Tokens.

REAR SHOCK

Trail/enduro shocks are the Super Deluxe (air and coil) and the Vivid (enduro/gravity). Add the Trailhead or bike-maker starting pressure, equalize by compressing to ~30–40% travel 3–5 times, then set sag; RockShox's trail/enduro shock target sits around 28–33%. Set rebound from the Trailhead number and use LSC to support braking and body movement, not to mask excessive sag. Tune air-shock ramp with Bottomless Rings; coil versions use spring rate. Note the important service cadence: lower-leg/air-can service near 50 hours, full damper rebuild near 200 hours (sooner in wet or dusty conditions).

Unit	Use	Travel	Damper / spring
Pike (fork)	Trail	120–150 mm	Charger 3 RC2 / air
Lyrik (fork)	Aggressive trail / all-mountain	140–160 mm	Charger 3 RC2 / air
ZEB (fork)	Enduro	150–190 mm	Charger 3 RC2 / air (lower psi)
Super Deluxe (shock)	Trail / enduro	—	Air or coil
Vivid (shock)	Enduro / gravity	—	Air or coil

Figure 3. RockShox trail/enduro line, forks and shocks. Always set from the specific unit and travel row, especially the ZEB, which uses lower pressures.

5. Öhlins MTB

Öhlins brings motorsport damping pedigree to MTB, with a signature three-chamber air spring and TTX twin-tube dampers that tune progression differently from token systems.

FORK

The RXF34 (trail), RXF36 (trail/enduro), and RXF38 (enduro) use a separate ramp-up chamber instead of tokens. The procedure is order-specific: **inflate the ramp-up chamber first, then the main chamber**. More ramp-chamber pressure adds bottom-out resistance while the main chamber stays free for a supple mid-stroke. The RXF36 m.2's TTX18 damper offers ~15 clicks LSR, ~15 clicks LSC, and 3 clicks HSC, including Climb Mode. Öhlins often recommends lower fork sag (~10–15% on the RXF36, reflecting slack head angles); verify the model chart rather than assuming 20–30%.

Official RXF34/RXF36 starting pressures by rider weight (owner's manual):

Rider weight	Main chamber	Ramp-up chamber
50–60 kg (110–132 lb)	80–90 psi	160–170 psi
60–70 kg (132–154 lb)	90–100 psi	170–180 psi
70–80 kg (154–176 lb)	100–110 psi	180–190 psi
80–90 kg (176–198 lb)	110–120 psi	190–200 psi
90–100 kg (198–220 lb)	120–130 psi	200–210 psi
100–110 kg (220–243 lb)	130–140 psi	210–220 psi
110–120 kg (243–265 lb)	140–150 psi	220–230 psi

Figure 4. Öhlins RXF34/RXF36 fork starting pressures (owner's manual). Inflate the ramp-up chamber before the main chamber.

REAR SHOCK

The TTX Air (formerly TTX2 Air) and TTX22 M coil are the trail/enduro shocks. Set the TTX Air by adding pressure to reach Öhlins' recommended sag figure, often expressed in millimeters of shaft travel, then tune LSC and rebound to suit; volume reducers add end-stroke ramp. The coil relies on its spring rate and twin-tube damping. As with all shocks, cross-check the frame maker's recommended sag, since Öhlins' online guide (bike, weight, preferred sag) outputs a per-frame starting point.

6. DVO Suspension

DVO built its identity on OTT "Off The Top," a way to decouple small-bump sensitivity from mid- and end-stroke support, the compromise most air springs force.

FORK

The Diamond (trail/enduro) and inverted Onyx forks pair an air spring with OTT, which externally adjusts preload on a **negative coil spring** via a 5 mm Allen key (range: 14 full rotations, 6 clicks per rotation). More OTT makes the initial ~30 mm suppler; past ~30% travel the OTT spring disengages and the positive air spring governs mid-stroke and bottom-out. The workflow inverts a token system: **set air pressure for the mid-stroke and bottom-out you want, then use OTT to fine-tune small-bump feel off the top**. Set pressure to the chart, check sag, adjust. The AVA volume system adds overall progression control.

REAR SHOCK

The Topaz air shock combines a bladder damper (an air-charged balloon that separates oil from air to prevent cavitation and preserve damping consistency) with tunable positive and negative air volume via included bands, which install in minutes without removing the shock. DVO's recommended shock sag is 25–30%. The Jade coil shock uses a bladder and spring rate with a similar tuning philosophy. DVO stresses taking the time to set OTT (fork) and volume (shock) rather than defaulting to a firm, compromised feel.

DVO feature	Fork or shock	Function	Tool
OTT (Off The Top)	Fork	Small-bump feel off the top	5 mm Allen, neg-spring preload
Air pressure	Both	Mid-stroke + bottom-out (fork); sag (shock)	Shock pump, per chart
AVA / volume bands	Both	Overall progression	Spacers / bands
Bladder damper	Shock	Consistent damping, anti-cavitation	Internal (service-set)

Figure 5. DVO inverts the token workflow: pressure sets the mid/end stroke; OTT independently sets the fork's initial stroke.

7. PUSH Industries

PUSH occupies the bespoke end of the market: Colorado-built, made-to-order, coil-sprung hardware valved to a specific frame and rider. With the NINE.ONE fork alongside the ELEVENSIX shock, PUSH now offers a matched front-and-rear coil system.

FORK

PUSH NINE.ONE (inverted coil fork)

The NINE.ONE is an inverted, coil-sprung trail/enduro fork with **user-adjustable travel from 140–170 mm in 10 mm increments (internal, no extra parts)**, built on a 44 mm upper chassis. Its coil spring sits in a lubricated "Silent Surround" chamber for smooth, quiet action and strong small-bump sensitivity (coil eliminates the air-seal stiction of a telescoping air fork). The current **V2** adds PUSH's patent-pending Sub Chamber and a decoupled HBO system, so the fork retains a true coil feel while delivering air-fork-like progression and end-stroke support at the flip of a switch. Seven coil rates cover riders from ~105–255 lb.

End-stroke support on the V2 comes from **two decoupled bottom-out systems**. The **Sub Chamber** (new for V2, patent-pending) is a small air chamber in the spring-side leg that can be toggled **on or off on the fly with a two-position dial, no shock pump**; closing it traps air to ramp up spring force in roughly the bottom third of travel for instant mid-stroke and bottom-out support, while opening it gives the plushiest, most bottomless coil feel. A separate **decoupled Hydraulic Bottom-Out (HBO)** circuit adds compression damping over the final ~70 mm of travel, engaging only when needed, so a rider can run a lighter spring and softer damping for comfort while retaining big-hit protection. The NINE.ONE damper mirrors an advanced rear-shock damper, pressurized reservoir, internal floating piston (IFP), and a large-volume compression base valve, with **28 clicks of low-speed compression, 28 clicks of high-speed compression, and 18 clicks of low-speed rebound**; the compression base valve, rebound piston, and mid-valve are internally tunable for elite riders.

- Set travel (140–170 mm) internally to match the frame and use case.
- Order the correct coil rate for weight/sag; minimal preload, don't use preload to fake spring rate.
- Toggle the Sub Chamber on/off (no pump) for mid-stroke support; the decoupled HBO handles the final ~70 mm. Bracket LSC/HSC and LSR from closed.

REAR SHOCK

PUSH ELEVENSIX (coil shock)

The ELEVENSIX is a made-to-order coil shock, custom-valved to the frame's kinematics and the rider. Its patented dual-overhead-valve design provides **two independent compression tunes (each with high- and low-speed circuits) that can be toggled on the fly**, e.g., a firm pedaling platform and an open descending tune. S-Series units offer on the order of 24 clicks LSC and 28 clicks HSC. A secondary Hydraulic Bottom-Out (HBO) piston increases compression over the final ~15% of travel to decelerate the shock smoothly, the coil's answer to an air spring's ramp. Coil rate sets sag (25–30% typical) with minimal preload.

Because a shock is filtered through frame leverage, changing it changes the whole bike: independent testing found a bike balanced around a FOX air shock could "stink-bug" (nose-high) or feel unstable when a differently tuned coil was fitted with the same fork settings, so the fork must be re-balanced to the new shock. Both PUSH units are best understood as **system components tuned at the point of purchase**, not generic bolt-ons.

PUSH VT/X and SV EIGHT (universal-fit coil shocks)

Alongside the made-to-order ELEVEN SIX, PUSH offers two **universal-fit** coil shocks that bring its coil technology to a wider range of frames at lower cost. Both are sold as a damper only (spring and hardware separate), use a **travel-chip system to adjust stroke in 2.5 mm increments** (one shock, three strokes), and share the always-on **Hydraulic Bottom-Out (HBO)** piston that firms the final 15% of travel. Rather than being custom-valved per bike, they ship in a small set of base tunes selected by spring rate and bike type.

SV EIGHT is the simpler, more affordable shock (single-valve, **no climb lever**), a set-and-forget performer with 28 clicks each of high- and low-speed compression and 18 clicks of low-speed rebound (all tool-free), plus a bridged-piston design that isolates rider-induced movement. It comes in two damper tunes: A-Tune (300–500 lb/in springs) and B-Tune (525–700 lb/in).

VT/X sits between the SV EIGHT and ELEVEN SIX. Built on PUSH’s 8.9 platform, it adds the patented **Dual Valve technology with an on-the-fly “Ascend” lever**, flip it for a firm, efficient climbing platform, with 20 clicks of external climb-firmness control, then flip back to an open descending tune. It keeps the 28/28/18-click compression/rebound adjustment and HBO and offers four base tunes: A/B for MTB and C/D for e-MTB. This makes it the natural universal-fit choice for riders who want a dual-mode coil without a fully bespoke build.

Setup for both follows the coil workflow: order the correct spring rate for your weight and target sag (25–30%), set minimal preload, then bracket LSC/HSC and rebound from closed, and on the VT/X, dial Ascend firmness to taste. PUSH provides tune-selection support and an optional custom-tuning program.

PUSH unit	Type	Spring / sag	Signature control
NINE.ONE (fork)	Inverted coil	Coil rate; Sub Chamber + HBO	Sub Chamber + HBO; 28/28/18 clicks
ELEVEN SIX (shock)	Coil	Coil rate; 25–30% sag	Dual on-the-fly tunes; HBO; 24 LSC / 28 HSC

Figure 6. PUSH’s coil range: the NINE.ONE fork plus three shocks, SV EIGHT (universal, single-valve), VT/X (universal, dual-mode Ascend), and the made-to-order ELEVEN SIX. The bespoke units are tuned at purchase; the universal shocks are set by spring choice and external clicks.

8. EXT (Extreme Racing Shox)

EXT is an Italian suspension house with automotive-racing roots, known for premium, built-to-order coil shocks and a hybrid coil/air fork. Like PUSH, EXT tunes each unit to the rider and frame from a detailed order sheet.

FORK

EXT ERA (V2.1) hybrid air fork

The ERA is an enduro-oriented fork built around EXT's **HS3 hybrid air spring**: two independently adjustable positive air chambers plus a high-volume negative chamber, giving fine control over initial, mid, and end-stroke feel and a coil-like ride with air-spring adjustability and weight. Set the positive chambers to shape support and ramp, using the large negative chamber for off-the-top suppleness, then tune the damper's low-speed compression and rebound. EXT provides rider-weight starting points and, as with the shock, can tailor the tune to order.

REAR SHOCK

EXT STORIA (LOK V4) — coil shock

The STORIA is a trail/enduro coil shock defined by two features. **HBC (Hydraulic Bottom-out Control)** adds progressive hydraulic force over roughly the last 15–20% of the stroke (developing 50%+ additional force), so a softer, more traction-rich spring can still feel bottomless; this also lets the coil work well on relatively linear frame leverage curves. A 4 mm HBC adjuster is external on the V4. **LOK 2.0** is a genuine climb switch on its own circuit with a threshold bypass that releases under a hard hit to protect the shock. Every STORIA is custom-built: EXT selects the spring and base tune from the rider's weight, style, and frame; sets sag with the correct spring (~30%), then fine-tunes LSC, HSC, HBC, and rebound from closed. A representative published setup: a ~160 lb rider on a progressive frame landed near 9 clicks LSC, 9 HSC, and 9 rebound from closed with a spring giving ~30% sag.

EXT unit	Type	Key tuning tools	Notes
ERA V2.1 (fork)	Hybrid air (HS3)	2 positive + 1 negative chamber; LSC, rebound	Enduro chassis; coil-like feel, air adjustability
STORIA LOK V4 (shock)	Coil	LSC, HSC, rebound, HBC, LOK 2.0	Built to order; HBC suits linear frames

Figure 7. EXT front and rear. HBC on the STORIA is the coil-shock analogue of tokens, end-stroke ramp without a big rubber bumper.

9. Intend

Intend is a small German manufacturer, hand-built in Freiburg by founder Cornelius Kapfinger, known for inverted forks and the unusual Hover shock. Its hallmark is a large negative air chamber that produces a near-linear, coil-like spring curve from an air unit, with independent negative-chamber tuning.

FORK

Intend Edge / Hero (inverted air forks)

The Edge (enduro/DH-oriented, up to 180 mm) and the lighter Hero (trail to light enduro, 140–170 mm) are inverted air forks with adjustable rebound and compression damping and an adjustable air spring with progression control. Travel adjusts easily on the Edge, attaching a shock pump and turning 360° changes stroke by ± 1 mm, and both use a "Travelizer" for larger changes; alternate bottom caps provide additional progression options. Intend's forks are designed for easy service without special tools. Set the air spring for sag and support, choose the progression (cap/spacer) for your terrain, then dial rebound and compression to feel.

REAR SHOCK

Intend Hover (Gamechanger) air shock

The Hover is unlike a conventional air shock: it uses a **series (in-line) layout that separates the air spring from the damper** for better heat dissipation, plus an oversized negative chamber for coil-like linearity. Its defining setup detail is the **Fine Tune Dial**, which independently tunes the negative chamber from the positive. Per Intend's official guide: use a pump rated to 600 psi; always **open the Fine Tune Dial before releasing air** (closing it traps pressure in the negative chamber, which is unsafe to work on). Start with the Dial open, inflate the positive chamber to roughly **4 psi per kg of rider weight** (e.g., 80 kg $\approx$ 320 psi), then close the Dial with the pump attached to set the negative balance. Ramp-up is tuned with quick-change volume reducers; the outer/inner concentric dials set low-speed compression and low-speed rebound, and a Softlock/Gamechanger lever provides a climbing lockout.

- Positive chamber start: ~ 4 psi/kg rider weight; equalize per the guide.
- Fine-tune dial: open before deflating; close (pump attached) to set negative balance.
- Progression via volume reducers; LSC/LSR on concentric dials; lockout via the lever.

10. Cross-Brand Comparison

All seven brands solve the same physics with different hardware. The tables below separate how each handles the fork and the rear shock, focusing on end-stroke ramp and small-bump sensitivity—the two areas riders find most confusing.

Forks

Brand / fork	Spring	Ramp method	Signature
FOX 34/36/38	Air	Volume tokens	Per-pressure X2 charts
RockShox Pike/Lyrik/ZEB	Air	Bottomless Tokens	Trailhead app (serial-specific)
Öhlins RXF34/36/38	3-chamber air / coil	Ramp-up chamber	Ramp-chamber-first setup; TTX
DVO Diamond/Onyx	Air	AVA bands + OTT	OTT negative-spring adjuster
PUSH NINE.ONE	Coil (inverted)	Sub Chamber (toggle) + HBO	Adj. travel; rear-shock-grade damper
EXT ERA	Hybrid air (HS3)	Dual positive chambers	Coil-like feel, air tunability
Intend Edge/Hero	Air (inverted)	Caps / volume + progression	Hand-built; easy travel change

Rear Shocks

Brand / shock	Spring	Ramp method	Signature
FOX Float / Float X / X2	Air (DHX coil)	Volume spacers	Per-pressure X2 charts; NEO electronic
RockShox Super Deluxe / Vivid	Air / coil	Bottomless Rings	Trailhead app
Öhlins TTX Air / TTX22 M	Air / coil	Volume reducers	Twin-tube TTX damper
DVO Topaz / Jade	Air / coil	Volume bands	Bladder damper; OTT philosophy
PUSH ELEVEN SIX	Coil	Hydraulic Bottom-Out (HBO)	Dual on-the-fly tunes; made-to-order (also VT/X, SV8)
EXT STORIA LOK V4	Coil	Hydraulic Bottom-out (HBC)	LOK 2.0 climb switch; built to order
Intend Hover	Air (series layout)	Volume reducers	Independent negative-chamber dial

Figure 8. Fork and shock approaches side by side. There is no single 'best', app-guided mainstream (FOX, RockShox), chamber/OTT tuners (Öhlins, DVO), and bespoke coil houses (PUSH, EXT) with Intend's hand-built air units, each suit different priorities and budgets.

11. Trail vs. Enduro Priorities (Front and Rear)

Trail and enduro bikes reward different emphases, and those differ again between the fork and the shock.

FORK

- **Trail:** slightly firmer sag (25–28%) for a lively, efficient front end that still climbs and steers precisely; moderate ramp.
- **Enduro:** deeper sag (28–33%) for grip and comfort on sustained steepes; more ramp (tokens/ramp chamber / OTT / Sub Chamber) to survive repeated hard hits; rebound tuned to resist packing in long rock gardens.

REAR SHOCK

- **Trail:** sag toward 28–32% with support for pedaling and pop; a usable climb switch/firm mode is valuable; ramp matched to the frame's leverage curve.
- **Enduro:** sag toward 30–33% for traction on rough descents; more ramp (spacers / HBO / HBC) for repeated bottom-out events; HSC set for square-edge control; coil increasingly favored on progressive frames.

Across both ends, the governing principle is balance: fork and shock should sag proportionally, rebound at matched rates, and respond together when the bike is pumped hard from the attack position. A balanced bike puts even rider force onto both tires, which, alongside tire choice and pressure, is where trail traction actually comes from.

12. Setting Up the CP (Concentric Pivot) Platform

The Concentric Pivot (CP) platform is the rear-suspension design used on the Dirtlab (bikelab-inc) **Paratu CP** eMTB and **luhu CP** pedal bike. It places the main pivot concentric with the chainring area to minimize chain growth without an idler, and pairs a deliberately **flat leverage-ratio curve** with a progressive air spring and a hydraulic bottom-out (HBO) damper circuit to generate end-stroke support. Because the frame kinematics, not the shock alone, shape the ride, CP setup layers a frame-specific procedure onto the universal method in Section 2. The guidance below follows Dirtlab's factory setup reference.

12.1 What the CP Platform Provides

- **Adjustable rear travel.** 145, 150, 160, and 165 mm, set via shock stroke.
- **Flat leverage ratio (~2.51–2.57, ~2% variation).** Damping authority at the wheel scales with LR^2 , so a click of compression does nearly the same job deep in the travel as it does near the top; adjusters behave predictably, and peak shaft velocity is bounded for cooler, more consistent damping on long descents.
- **Anti-rise 49.1% at sag (all travel settings).** Keeps the rear composed and planted under hard braking into corners.
- **Anti-squat 97.3% (simulated at 34/28t).** Just below neutral at sag, so the bike climbs efficiently, no lockout needed on technical climbs.
- **Low pedal kickback (3–3.5°) and low working-zone chain growth (~11 mm, sag to +80 mm).** A quiet drivetrain and high-pivot-like feel on rough terrain without an idler.

12.2 Factory Starting Points

Dirtlab's published starting points for the CP platform:

REAR SHOCK (frame-specific)

- **Sag:** 25–28% (the platform targets ~28%, leaving spring travel in reserve for the air + HBO ramp).
- **Rebound:** start at the shock manufacturer's base setting.
- **Compression:** run open for trail riding, then add for support as terrain demands.
- **Air-spring spacers (reference tune):** two positives + one negative volume spacer on the DVO Topaz T3 reference build.

FORK

- **Set the fork independently** using the brand-specific procedure from its section of this paper (Sections 3–9), balanced to the CP rear as described in Section 2. Dirtlab's calculator supports 19 forks and defaults token counts from rider weight; install positive tokens progressively only if you bottom too easily. The DVO Onyx SC is the popular OEM fork spec on the CP-based frames, pairing naturally with the DVO Topaz T3 rear shock for a matched-brand setup.

12.3 Reference Setup: 85 kg Rider, DVO Topaz T3

Dirtlab publishes a fully worked reference configuration for the CP rear shock. The DVO Topaz T3 is the most popular shock spec'd by Dirtlab on the CP-based frames (Paratu CP and Iuhu CP), which is why it serves as the platform's reference tune. For an 85 kg (fully kitted) rider on the DVO Topaz T3:

Parameter	Reference value	Notes
Main chamber	215 psi	Scale ~linearly with rider weight
Piggyback (reservoir)	180 psi	Keep ~15–20% below main pressure
Positive volume spacers	2	Progressive air-spring ramp
Negative volume spacer	1	Off-the-top suppleness
Damping	Baseline per tuning guide	Bracket LSC/HSC, LSR/HSR from closed
Resulting sag	~28%	Air + HBO give a 3.08× wheel-force ratio

Figure 9. Dirtlab CP reference tune (85 kg, DVO Topaz T3). This configuration delivers the platform's 3.08× sag-to-bottom wheel-force ratio about 34% more end-stroke resistance than a ~29%-progressive linkage with a standard air spring, from air spring + HBO rather than from linkage geometry. Scale main pressure with weight for other riders.

12.4 CP Setup Procedure

- **Select rear travel** (145/150/160/165 mm) via shock stroke to suit the build and terrain.
- **Set shock pressure and spacers** from Dirtlab's per-shock table (or the 85 kg reference above, scaled to your weight): main pressure, piggyback ~15–20% lower, and the recommended positive/negative spacer counts.
- **Set sag to ~25–28%** (target 28%), reading the shock O-ring in riding position. Re-check after equalizing.
- **Set rebound** from the shock maker's base setting, then fine-tune so the rear recovers between hits without bucking.
- **Run compression open for trail;** add LSC/HSC only as terrain demands. Because the LR is flat, adjuster clicks behave consistently through the stroke.

- **Set and balance the fork** per its brand section, matching rebound rates and ride height front-to-rear.
- **Verify end-stroke feel.** The HBO circuit is speed-sensitive, plush on slow G-outs, firm on fast square edges. If you still bottom harshly on fast hits, add a positive spacer before adding pressure.

12.5 How CP Interacts with Your Shock Choice

The CP platform's flat leverage curve and HBO-based ramp mean it does not rely on linkage progression to bottom out, so it works with a range of shocks. Dirtlab's reference tune uses the **DVO Topaz T3** (HBO), and the design team notes HBO units from FOX (X2) and Öhlins (TTX2 Air) as equally suitable for the platform's speed-sensitive end-stroke behavior. Boutique twin-tube options, the Intend Rover and EXT Storia, are chosen for large reservoir volume and cleaner compression/rebound separation on long alpine descents. Whatever the shock, keep the CP starting points above and tune with the universal method in Section 2.

TGI Cycling build specs. For CP-platform builds, TGI Cycling LLC tends to spec **FOX Factory 36 or 38 forks paired with FOX Float X or Float X2 shocks** as its standard high-performance configuration, with FOX Live Valve Neo available as an upgrade on the Float X or X2 (the electronic Neo shock automatically firms for climbing and opens for descents). The FOX Factory fork is set and balanced to the CP rear per Section 2. For the full bougee option, TGI Cycling LLC specs **PUSH NINE.ONE forks with PUSH VT/X shocks**, a matched coil front-and-rear package: the inverted NINE.ONE with its toggleable Sub Chamber, and the universal-fit VT/X with its on-the-fly Ascend climb mode. Both TGI configurations follow the same CP starting points and balancing method above.

13. Conclusion

Modern trail and enduro suspensions are extraordinarily capable, but that capability is latent until it is set up separately and deliberately for the fork and the rear shock in front of the rider. The method is universal: **sag, rebound, compression, spring curve, re-balance, one variable at a time, per end, on a trail you know, written down.** What changes across FOX, RockShox, Öhlins, PUSH, DVO, EXT, and Intend is the hardware philosophy: token ramps, ramp chambers, OTT, Sub Chamber, HBO/HBC; app-guided baselines versus bespoke coil tunes versus hand-built air. A rider who understands both the shared method and each brand's fork- and shock-specific tools can walk up to any of these systems and dial it in.

For a retailer or fitter, the takeaway is practical: sell the setup, not just the part. The difference between a bike that feels sharp and one that feels lifeless is usually 20 minutes per end with a shock pump and a notebook, not another thousand dollars' worth of hardware.

Notes on sources & safety. Starting pressures, click counts, and service intervals come from manufacturer manuals, apps, and setup guides, supplemented by reputable independent testing. Figures are baselines that vary by exact model, generation, travel, and—critically for the rear shock—frame kinematics; always confirm against your specific unit's chart, the manufacturer app, and the frame maker's recommendations. Suspension service involves pressurized air and oil; internal work (dampers, air-spring internals, coil swaps, HBO/HBC, Sub Chamber, bladder charge, Fine Tune Dial) should be performed following the maker's guide or by an authorized service center.

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Independent Technical & Editorial

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Note: Charts and click counts reference specific model generations and may differ for your exact unit. Verify on the maker's app or the chart on your fork/shock and follow the frame maker's shock recommendations. This paper is an educational reference and does not replace manufacturer instructions or professional service.