



Biomechanical Metrics

#	Key club position	Shoulder turn† (°)	Hip turn† (°)	Lead-wrist flex / ext‡ (°)	Lead-foot pressure (%)
P1	Address	-5 → +10 open (avg +8) (GOLFTEC)	0 → +5 open	+15–20 ext (neutral-ish) (HackMotion)	50 / 50
P2	Shaft parallel (take-away)	45–55 closed (tour avg 53) (GOLFTEC)	25–30 closed (GOLFTEC)	+5–15 ext	55–65 trail
P3	Lead arm parallel (backswing)	70–80 closed (avg 77) (GOLFTEC)	35–45 closed	0 → +5 ext (moving toward flat)	65–75 trail
P4	Top of backswing	90–100 closed (goal ≈ 90) (GOLFTEC)	40–60 closed	0 → -5 flex (flat/bowed) (HackMotion)	75–85 trail
P5	Lead arm // (early down)	60–70 closed	0–15 open	-5 → -15 flex	55–65 lead
P6	Shaft // (pre-impact)	30–40 closed	25–35 open	-10 → -20 flex	70–80 lead
P7	Impact	0 → 10 open	30–45 open (tour avg ≈ 36) (GolfDigest.com, GolfDigest.com)	-10 → -25 flex → trail wrist +10-15 ext (HackMotion)	80–90 lead
P8	Shaft // (post-impact)	25–40 open	55–65 open	0 → +10 ext	90 +
P9	Lead arm // (follow-through)	55–70 open	75–85 open	+10–20 ext	≈100 lead
P10	Finish	90 + facing target	90 open	Relaxed / neutral	100 lead

#	What to check/feel
P1	Athletic posture, eyes over ball line
P2	Triangle intact; clubhead outside hands
P3	Lead arm across shoulder line; wrists start to hinge
P4	Back facing target; trail leg retains flex
P5	Bump + unwind; maintain wrist lag
P6	Hands in front of trail thigh; club on plane
P7	Forward shaft lean, flat/bowed lead wrist, ball-first strike
P8	Arms straight / fully released
P9	Trail shoulder lowers; chest high
P10	Balanced pose, belt buckle to target



Shaft and Wrist Metrics

P-Position	Shaft Pitch* to Horizontal (°)	Lag Angle(Lead-Arm ↔ Shaft)	Lead-Wrist Radial Deviation (°)	Lead-Wrist Flex / Ext (°)	Key Feel
P1 – Address	≈ 60–65 (upright lie)	145–165	15–20 RD (slight “cup-cock”)	+15–20 ext	Soft grip, club in line with lead arm
P2 – Shaft // (club parallel)	≈ 0	140–155	18–22 RD	+10–15 ext	“One-piece” takeaway; hinge just starting
P3 – Lead-arm //	≈ 45	110–125	20–25 RD	+5 ext → neutral	Club head still outside hands; forearms passive
P4 – Top	≈ 55–60 (steepest)	90–100	22–28 RD	0 → -5 flex	Feel 90° hinge; lead thumb under shaft
P5 – Transition, lead-arm //	≈ 45–50	85–100 (retain lag)	20–25 RD	-5 → -15 flex	“Pump” feel: lower body leads while wrists stay set
P6 – Shaft // (slot)	≈ 25–35	95–110	15–20 RD	-10 → -20 flex	Handle ahead of trail thigh; club shallow
P7 – Impact	≈ 25–30	130–160 (release underway)	5–10 RD	-10 → -25 flex	Bowed/flat wrist, forward shaft lean
P8 – Shaft // (post-impact)	≈ 10–15	165–175	0 → -5 UD (uncock)	0 → +10 ext	Arms extend; shaft chasing lead arm
P9 – Lead-arm //	≈ 25–35 (shallower)	175–180	-10 UD	+10–20 ext	Fully “thrown” club; trail shoulder under
P10 – Finish	≈ 60–65 (mirror of P1)	180 (in-line)	0	neutral	Club wraps behind; wrists relaxed



Misses

Misses	Measured Fault	Fix / Drill
Miss	Measured Fault	Fix / Drill
High weak fade	Lag < 90° by P5 + lead wrist > +10 ext	“Pump to P6” + lead-wrist bow with alignment-stick in glove
Pull-hooks	Shaft pitched ≤ 20° at P6 + lag still > 120°	Max wrist uncock dry swings; feel earlier release
Thin strikes	Lag dumped early (P4–P5 = > 120°)	“Split-hand drill” to delay radial → ulnar
Chunky low blocks	Lag retained, but wrist overly bowed (-25 flex) at impact	Lead-wrist feel snap; neutralize bow post-impact
Slice	Open face to path >5°, path left, lag < 90° by P5	Strengthen grip, right palm 'covers' ball, anti-slice stick drill
Hook	Face closed >5°, path right, excessive lag released late	Weaken grip, feel 'covering' ball, anti-hook band drill
Push	Path >3° right, face square to path, block release	Square stance, focus on hip rotation, alignment rod drill
Pull	Path >3° left, face square to path, OTT move	Stay behind ball, delay upper body, anti-pull gate drill
Push-slice	Path right, open face > path	Fix grip, shallow path, stick under trail arm
Pull-hook	Path left, closed face > path	Hold off release, anti-hook grip, finish drill
Shank	Hosel first contact, too far from ball, early extension	Set up closer, towel outside ball drill, balance stick
Heel strike	Stance too close, weight on toes, path out-to-in	Back off, even weight, 'centeredness' impact stickers
Toe strike	Stance too far, weight on heels, arms too long at impact	Move closer, compact swing, 'centeredness' stickers
Top	Early extension, head lifts, chest up, lag lost	Keep head still, hit down on ball, 'tee drill'
Fat	Weight back, early release, too steep AoA	Forward press, left side lead, 'divot after ball' drill
Skull (bladed)	Shaft lean back, wrists uncock early	Hands ahead at impact, split grip swings
Pop-up	Steep AoA, ball teed too high, reverse tilt	Tee lower, shallow swing, balanced finish
Block	Late release, path too far right, slow arms	Rotate through, left arm lead, 'stop block' wall drill
Snap hook	Severely closed face, flip wrists, fast hands	Hold face square, extend arms, anti-hook grip
Duck hook	Swing out to in with face very closed	Stay behind ball, slow down, feel open face
Double cross	Face closes late, path left, intention mismatch	Stick to target line, consistent finish, slow drill
Whiff	Head up, early extension, ball not centered	Eyes on ball, solid posture, slow-motion swings
Air mail	Center face but over clubbed, fast tempo	Club down, smoother tempo, distance control drill
Short	Decelerated swing, off-center, wrong club	Commit to swing, club up, center contact
Sky ball	Ball teed too high, swing too steep	Lower tee, sweep through, shallow angle drill
Overdraw	Face closed, path right, too much hand action	Control hand rotation, neutral grip
Overfade	Face open, path left, across the ball	Release hands, close face, stronger grip



Junior Biomechanical Metrics

P-#	Key Club Position	Shoulder Turn† (°)	Hip Turn† (°)	Lead-Wrist Flex / Ext‡ (°)	Lead-Foot Pressure (%)	Junior Cue
P1	Address	0 → +5 open	0 ±3	+10–15 ext	50 / 50	Athletic “Y” posture
P2	Shaft // away	40–50 closed	20–25 closed	+5–10 ext	55–60 trail	One-piece takeaway
P3	Lead-arm //	60–70 closed	30–38 closed	0 → +5 ext	60–70 trail	“Thumbs up” set completed
P4	Top	80–90 closed	35–45 closed	–5 → 0 (flat)	70–80 trail	Back to target—don’t overswing
P5	Downswing L-arm //	50–60 closed	0–10 open	–5 → –12 flex	55–65 lead	Small bump, maintain lag
P6	Shaft // (slot)	25–35 closed	20–28 open	–10 → –18 flex	65–75 lead	Hands in front of thigh
P7	Impact	–5 → +5 open	25–35 open	–10 → –20 flex	70–85 lead	Chest down, hips cleared
P8	Shaft // post	20–30 open	50–60 open	0 → +10 ext	90 +	Arms extend toward target
P9	Lead-arm //	45–60 open	70–80 open	+10–15 ext	100 lead	Belt buckle up & left
P10	Finish	80+ facing target	85–90 open	Neutral	100 lead	Hold balanced finish



Junior Shaft and Wrist Metrics

P	Shaft Pitch* (°)	Lag Angle (Arm↔Shaft)	Lead-Wrist Radial Dev. (°)	Lead-Wrist Flex/Ext (°)	Feel for Juniors
P1	60–65	150–165	12–18 RD	+10–15 ext	Light grip pressure
P2	≈ 0	135–150	15–20 RD	+8–12 ext	Clubhead outside hands
P3	40–45	105–120	18–22 RD	0 → +5 ext	“Thumbs up” fully loaded
P4	50–55	90–100	20–25 RD	–5 → 0	¾ backswing feel—no over-hinge
P5	40–45	85–100	18–22 RD	–8 → –15 flex	Retain wrist angle on bump
P6	22–30	95–110	12–18 RD	–12 → –18 flex	Handle ahead, shaft shallow
P7	22–28	120–150	5–8 RD	–12 → –22 flex	Bowed wrist → forward lean
P8	10–15	165–175	0 → –5 UD	0 → +8 ext	Throw clubhead past hands
P9	25–30	175–180	–8 UD	+10–15 ext	Full release, “thumbs down”
P10	60–65	180 (in-line)	0	Neutral	Relaxed wrap-around finish



Flight Fault Metrics

#	Flight / Fault (what you see)	Launch-Monitor Signature (typical)	Common Swing / Setup Cause
1	High, weak fade (push-slice)	Face-to-Path +4 – +6° openClub Path out-to-in +2°Low strike high on face → spin >3200 rpm	Early extension + cupped lead wrist → dynamic loft added, path steeper
2	Low “knuckle” fade	AoA -3 – 0° (down) with driverDynamic Loft <12°Strike low heel	Ball too far back; weight left too soon
3	Pull-hook	Club Path in-to-out 4-6°Face-to-Path -4 – -6° closedSpin axis -700 → -900	Over-rotated forearms + stalled hips
4	Ballooning draw / 3-wood “floater”	Launch >15°Spin >3500 rpmStrike high toe	Adding dynamic loft with early wrist throw
5	Thin push	Smash <1.35 (7-iron)AoA -2° or shallowerLow point behind ball	Early extension, rising chest
6	Fat / heavy hit	AoA -6 – -8° (steep)Dynamic Loft lowDivot starts >2 in. before ball	Reverse pivot; head forward
7	Toe-side “gear-effect” hook driver	Strike 15 mm toeSpin Δ -600Ball speed drop 3-5 mph	Handle too high (stand-up) / swing out-to-in
8	Sky-high pop-ups (driver)	Impact 0-5 mm above crownSpin >4000 rpmCarry loss >30 yds	Tee too low or casting → shaft lean forward
9	Shank (hosel rocket)	Strike >15 mm heelPath often in-to-out too much	Weight moves toward toes; arms disconnect
10	Blow-up slice (severe)	Face-to-Path +8°+Path out-to-in >6°Spin >3800 rpm	Weak grip + open clubface, no forearm rotation

#	Coaching Fix / Drill	Goal Metric
1	• Chair-behind-hips drill to keep depth• Lead-wrist bow rehearsals (HackMotion or club-in-glove)	F2P 0 ± 1°Spin 2400-2700
2	• Tee forward & high ladder• Tilt spine right at address	AoA +2 – +4°Launch 13-15°
3	• Pump-to-P6 then hold (focus on chest rotating through)• Alignment-stick under trail arm	F2P -1 – +1°Hip turn ≥30° open at impact
4	• Split-hand lag drill• Impact bag, shaft lean 10°	Launch 12-14°Spin 2800-3200
5	• Towel 4 in. behind ball – strike ball first• Chest-down rehearsal swings	Smash ≥1.37Low point 1-2 in. after ball
6	• Step-change drill (move pressure trail →lead before downswing)• Stick on lead hip – don’t sway past	AoA -4 – -5°Divot centered post-ball
7	• Lie board to lower handle• Vertical tee drill – strike center	Strike pattern ≤10 mm toe/heelSpin normalized
8	• Tee +½ in. up, ball opposite lead ear• Slow-motion “U-shaped” AoA feels	Vertical strike center to +5 mmSpin 2100-2700
9	• Two-ball shank drill (outer ball target)• Tour-Striker Smart Ball for connection	Strike ±8 mm centerPressure mid-foot at impact
10	• Strong grip change first• Baseball swings horizontal → vertical to feel closure	Path 0 ± 2°Face-to-Path +1 ± 2°



Junior Flight Fault Metrics

#	Flight / Fault (what you see)	Junior-Typical Launch-Monitor Signature	Likely Swing / Setup Cause	Coaching Fix / Drill (junior-friendly)	Goal Metric
1	High, weak fade (glides right)	Face-to-Path +5 – +7 ° Club Path out-to-in +3 ° Spin >3300 rpm	Cupped lead wrist + straightening lead leg (early stand-up)	<ul style="list-style-type: none"> • “Wall-sit swings” – back to wall, keep hips back • Lead-wrist “knuckles-down” drills with foam club 	F2P ≤ +2 ° Spin 2600–3000
2	Low bullet fade	AoA -4 – -2 ° (driver) Dynamic Loft <11 ° Low heel strike	Ball too far back; weight locked on lead side	<ul style="list-style-type: none"> • Move ball 1-ball forward; tee ½ in higher • “Head behind ball” photo check 	AoA 0 – +2 ° Launch 12–14 °
3	Pull-hook	Club Path in-to-out 4-6 ° Face-to-Path -4 – -6 ° Spin axis -600	Over-rotated arms + hips stalling	<ul style="list-style-type: none"> • Feet-together swing → forces body rotation • Alignment-stick across hips, turn through 	F2P –1 – +1 ° Hip open ≥ 25 ° at impact
4	Pop-up / sky mark	Impact > 5 mm above crown Spin >4000 rpm	Tee too low OR casting (shaft lean forward)	<ul style="list-style-type: none"> • Raise tee; “logo-under-chin” at top • “L-to-L” swings 50 % speed first 	Strike center to +5 mm high Spin 2400–3000
5	Thin push	Smash <1.30 (7-iron) Low point behind ball	Early extension, chest lifts	<ul style="list-style-type: none"> • Tee in front (gate) – brush tee after ball • Chair-touch downswing (hips stay back) 	Smash ≥ 1.32 Low point 1 in after ball
6	Chunk / heavy	AoA -6 – -8 ° Divot starts > 1 in before ball	Reverse weight shift	<ul style="list-style-type: none"> • Step-change drill (start feet together, step lead on downswing) • Lead-hip stick – keep head behind 	AoA -3 – -5 ° Divot starts at ball
7	Toe-gear hook (driver)	Strike ≥ 12 mm toe Spin drops -500 rpm	Handle lifts, path left	<ul style="list-style-type: none"> • Marker-dot center strike challenge • Softer grip, relax arms 	Strike ±8 mm Spin normalized
8	Shank (hosel rocket)	Strike ≥ 15 mm heel	Weight moves to toes, arms disconnect	<ul style="list-style-type: none"> • Two-ball drill – outside ball blocks heel • Beach-ball between forearms (connection) 	Strike center ±8 mm Pressure mid-foot