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Sequential Record Imbalance

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Statistical Drift / Trend Continuation	H1 (adaptive, any timeframe)	www.algobot.live

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Overview

Sequential Record Imbalance is a first-principles drift detector built on **record statistics** — the classical theory of running maxima and minima — rather than on any indicator, price-action pattern, level, channel, or published methodology. Its goal is to isolate the one thing that most trend systems only measure indirectly: the *sign and strength of directional drift*, cleanly separated from volatility and price level.

Within a rolling window of `Window` completed bars, a bar is an **upper record** when its high exceeds every earlier high in the window, and a **lower record** when its low undercuts every earlier low. Two classical facts about records power the edge:

- **Rényi's theorem.** For independent, identically distributed observations, the probability that the *k*-th point is a new record is exactly `1/k` — completely independent of the underlying distribution. Records are therefore a *distribution-free* way to characterise a sequence.
- **Symmetry under no drift.** For a driftless random walk (prices are integrated returns), upper and lower records are statistically *symmetric*, so the expected imbalance `E[U − L] = 0`. Drift is the only thing that breaks that symmetry: persistent up-drift renews highs far more often than lows, giving `U >> L`; down-drift gives `L >> U`.

The **record imbalance** `U − L` is thus a level-free, volatility-free, distribution-free estimator of drift. The EA normalises it to an O(1) score `s = (U − L) / √Window` and then standardises that score against its *own*

recent history to auto-calibrate to each instrument and regime — no per-symbol tuning required.

> **Why this is different.** Most momentum systems fire on a fixed threshold (a moving-average slope, an RSI level, a breakout distance) that must be re-tuned per market. Because the record imbalance is dimensionless and self-standardised, Sequential Record Imbalance reacts to drift that is *anomalous relative to the instrument's own recent behaviour*, so a single parameter set can travel across symbols and timeframes.

How It Works

1. The record-imbalance score

On every completed bar the EA scans the last `Window` bars from oldest to newest, tracking a running maximum of highs and a running minimum of lows. Each time a new extreme is set, the corresponding record counter (`U` or `L`) increments. The first bar in the window is trivially both an upper and a lower record; that `+1 / +1` cancels in `U − L`, so the imbalance is unbiased by where the window starts.

```
s = (U − L) / √Window        // O(1) drift score, newest bar

U >> L   →  s > 0  →  positive (upward) drift
L >> U   →  s < 0  →  negative (downward) drift
U ≈ L    →  s ≈ 0  →  no meaningful drift
```

2. Self-adapting standardisation (the adaptive component)

A fixed threshold on `s` is fragile across regimes, so the raw score is standardised against its own last `ScoreLookback` scores:

```
z = (s − mean_s) / std_s      // population statistics over ScoreLookback scores
```

This internally-computed **z-score** is what makes the system self-calibrating: the EA fires only when the current drift is statistically extreme *for that instrument's recent record behaviour*. When the score history has no spread (a flat, dead market), the z-score is undefined and no signal is produced.

3. Entry rules (persistence / continuation)

Excess records reflect drift that tends to *persist* over the horizon that produced it, so the system trades continuation, not reversal. A trade requires the statistical signal *and* agreement from the just-closed bar's direction:

- **Long** when `z ≥ EntryZ` *and* `s > 0` *and* the just-closed bar closed up.
- **Short** when `z ≤ −EntryZ` *and* `s < 0` *and* the just-closed bar closed down.

The system is objective, single-timeframe, symmetric long/short, and holds **one position at a time per magic number** to keep the drift bet clean and risk bounded.

4. Exit rules — the renewal-stall exit

A position is closed when the record renewal that justified it stalls, i.e. when drift is no longer clearly in the trade's favour:

- An open **long** is closed once `z ≤ ExitZ` (positive drift has decayed).
- An open **short** is closed once `z ≥ -ExitZ`.

Because `ExitZ` (default 0.30) is well below `EntryZ` (default 1.20), the exit is deliberately tolerant — it lets a healthy trend breathe and only steps out when the imbalance signal fades toward neutral.

5. Dynamic risk management

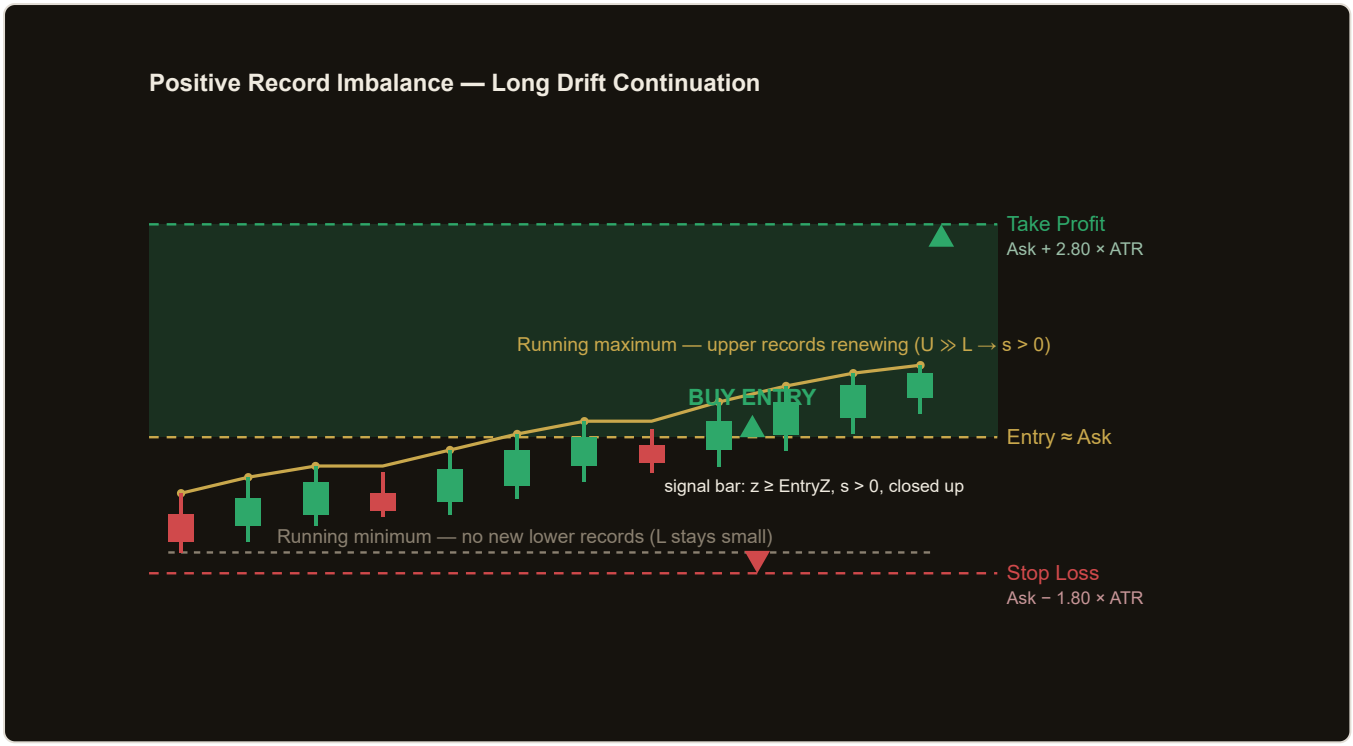
Stops and targets are volatility-scaled using the Average True Range (ATR) measured at the just-closed bar:

- **Stop loss** = entry ∓ `SlAtrMult × ATR`
- **Take profit** = entry ± `TpAtrMult × ATR`
- **Breakeven pull** — once price has travelled `BreakevenAtr × ATR` in the trade's favour, the stop is moved to the entry price, removing initial risk. Set `BreakevenAtr = 0` to disable.

Trade management (the breakeven pull) runs every tick, while signal evaluation runs only once per completed bar so the strategy never repaints.

Strategy in Action

The illustration below shows an example of how the strategy identifies a setup and triggers its entry and exit. This is a simplified, illustrative example for educational purposes — not real market data.



Illustrative example only. Actual market behaviour varies. Upper records renew repeatedly while lower records do not, driving `s > 0` *and a high z-score; the long is taken on the up-close signal bar and rides the drift to the ATR target.*

Parameters

Parameter	Default	Description
Window	`40`	Rolling record window, in completed bars, over which upper/lower records are counted. Larger values measure slower, longer-horizon drift. Range 15–120, step 5.
ScoreLookback	`60`	Number of past drift scores used to standardise the current score into a z-score. This is the self-calibration memory. Range 20–200, step 10.
EntryZ	`1.20`	Entry z-score threshold. A trade fires only when the standardised drift is at least this many standard deviations from its own mean. Higher = fewer, stronger signals. Range 0.50–3.00, step 0.10.
ExitZ	`0.30`	Renewal-stall exit threshold. A long exits when z falls to ≤ ExitZ; a short exits when z rises to ≥ −ExitZ. Lower = holds trends longer. Range 0.00–1.50, step 0.10.
AtrPeriod	`14`	ATR period used to size the volatility-scaled stop, target, and breakeven trigger. Range 7–28, step 1.
SlAtrMult	`1.80`	Stop-loss distance as a multiple of ATR from the entry price. Range 0.50–4.00, step 0.25.
TpAtrMult	`2.80`	Take-profit distance as a multiple of ATR from the entry price. Range 0.50–6.00, step 0.25.
BreakevenAtr	`1.00`	Once price travels this many ATR in profit, the stop is pulled to entry. Set to 0.00 to disable the breakeven pull. Range 0.00–3.00, step 0.25.
Lots	`0.10`	Fixed order volume in lots. Range 0.01–1.00, step 0.05.
Magic	`8317`	Magic number identifying this EA's positions. Use a distinct value per chart so multiple instances do not interfere.

> **Tuning note.** `Window` sets the horizon of drift the model looks for, and `ScoreLookback` sets how quickly it adapts to a changing regime. Keep `EntryZ > ExitZ` so entries are selective while exits stay tolerant. Because the score is self-standardised, the same defaults are a reasonable starting point across most liquid instruments.

Recommended Settings

The strategy is single-timeframe and self-calibrating, so it adapts to whatever chart it is attached to. As a starting point:

- **Timeframe:** H1 is a balanced default — long enough for record statistics to be meaningful, short enough to produce a workable number of signals. H4 and D1 suit slower, higher-conviction drift; M15 increases signal frequency and noise.
- **Instruments:** markets that exhibit persistent directional drift — major FX pairs, stock indices, and metals — play to the model's continuation logic. Choppy, mean-reverting instruments will trip the renewal-stall exit more often.
- **Warm-up:** the EA needs at least `max(Window + 2, AtrPeriod + 2)` completed bars to begin scoring, and a further `ScoreLookback` scores before the z-score is defined. Expect no trades until roughly `Window + ScoreLookback` bars have elapsed.
- **Risk:** keep `Lots` proportionate to account size. The default 1.80 / 2.80 ATR stop-and-target gives a reward-to-risk of about 1.56:1 before the breakeven pull.

Example — a long drift trade

Over the last 40 H1 bars, highs are renewed 9 times while lows are renewed only twice, so `U − L = 7` and `s = 7 / √40 ≈ 1.11`. Standardised against the last 60 scores, that gives `z ≈ 1.4 ≥ EntryZ (1.20)`. The just-closed bar closed up, so the EA buys at the ask with the stop 1.80 × ATR below and the target 2.80 × ATR above. Once price runs 1.00 × ATR in profit, the stop is pulled to breakeven; the trade is later closed early only if z falls back to ≤ 0.30.

How to Install on MetaTrader 5

1. Copy `SequentialRecordImbalance.ex5` to your MT5 `MQL5\Experts\` folder
2. Restart MetaTrader 5 and refresh the Navigator panel
3. Drag the EA onto a chart matching the recommended symbol and timeframe
4. Configure the input parameters and click **OK**
5. Enable **Algo Trading** in the MT5 toolbar

Before going live. Backtest Sequential Record Imbalance in the MT5 Strategy Tester on your chosen symbol and timeframe, then run it on a demo account first. Allow enough history for the warm-up period before expecting the first signals, and verify the ATR-based stop/target sizing suits the instrument's typical range.

Risk Warning

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