Algobot
Maximize Your Profits

Runs Test Regime Switch

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Adaptive Regime Switch (Momentum / Mean Reversion)	Any (H1 default)	www.algobot.live

Overview

Runs Test Regime Switch is an adaptive Expert Advisor that refuses to commit to a single market model. Instead of assuming the market is always trending or always mean-reverting, it measures the market's *character* on every completed bar and then chooses the playbook that matches what it finds.

The measurement tool is the classic **Wald–Wolfowitz runs test**. The EA takes the sign (+/−) of each bar-to-bar close change over a rolling window, counts how many "runs" of same-sign changes occur, and compares that count against what pure chance would produce. The result is standardised into a *z-score* that tells the EA whether price is behaving persistently (trend), anti-persistently (choppy range), or indistinguishably from a coin flip (undecided).

- **z ≪ 0** — *fewer* runs than chance = long same-sign streaks = **persistent / trending**. The EA trades *with* the drift (momentum book).
- **z ≫ 0** — *more* runs than chance = rapid sign-alternation = **anti-persistent / ranging**. The EA *fades* stretch away from the mean (reversion book).
- **|z| small** — statistically indistinguishable from a random walk. The EA stands aside.

The same statistic therefore flips the engine between two opposite, internally consistent strategies rather than forcing one behaviour onto every market state. Both books generate distinct long *and* short entries, and all risk is sized from the Average True Range (ATR).

> **Why the runs test?** A runs test needs no fitted parameters and makes no assumption about the size of the moves — only about the *order* of their signs. That makes it a robust, self-scaling way to detect whether recent price action is streaky (trend) or alternating (chop), independent of volatility or instrument.

How It Works

The Regime Statistic

Over the last `WindowN` close-to-close changes the EA counts `n1` up-changes, `n2` down-changes, and the number of runs `R` (maximal blocks of identical sign). Under a random walk the run count has a known mean and variance, so the observed count is converted to a z-score:

```
N   = n1 + n2
mu  = 2·n1·n2 / N + 1
var = 2·n1·n2·(2·n1·n2 − N) / (N² · (N − 1))
z   = (R − mu) / sqrt(var)
```

Flat (zero) changes carry no sign and are skipped. If fewer than 10 usable changes remain, the regime is treated as undetermined and no trade is taken. A single unbroken streak (all up or all down) is treated as maximally persistent (`z = −10`).

Entry Logic — Persistent Regime (Momentum Book)

When `z ≤ −ZThreshold` the market is trending. The EA measures the net move over the window (`close[now] − close[WindowN bars ago]`) and trades in that direction:

- **Net move up** → open a **long** ("TrendUp"), take-profit set `TpAtrMult × ATR` above the Ask.
- **Net move down** → open a **short** ("TrendDown"), take-profit set `TpAtrMult × ATR` below the Bid.

Entry Logic — Anti-Persistent Regime (Reversion Book)

When `z ≥ +ZThreshold` the market is choppy and mean-reverting. The EA compares the last close to a rolling simple moving average (`RevPeriod`) and fades meaningful stretch, requiring the deviation to exceed `MinStretchAtr × ATR`:

- **Price stretched above the mean** → open a **short** ("RangeFadeDown"); the target aims back toward the mean (or an ATR fallback if the mean is unfavourable).
- **Price stretched below the mean** → open a **long** ("RangeFadeUp"); the target aims back up toward the mean.

When `|z| < ZThreshold` the market looks random and the EA takes no position.

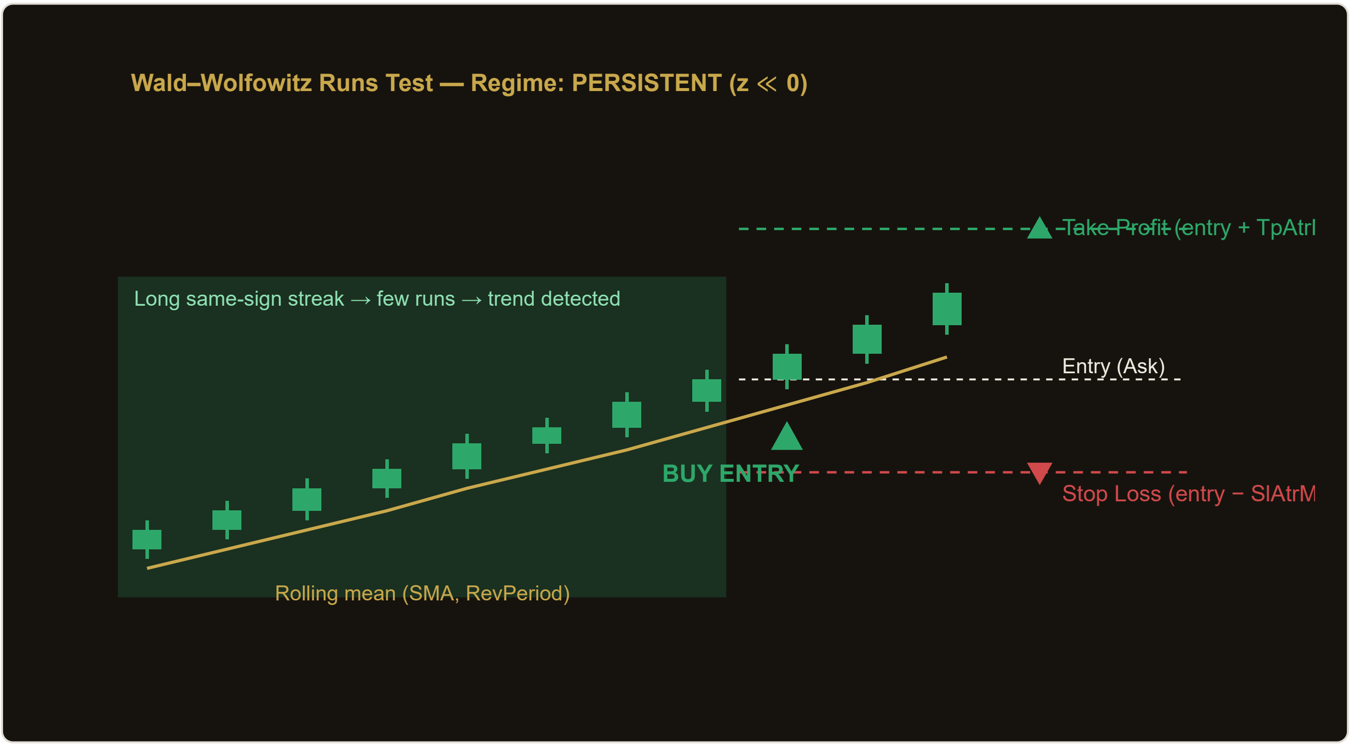
Exit Logic, Stops & Targets

- **Stop loss** — always `SlAtrMult × ATR` away from entry (below Ask for longs, above Bid for shorts), for both books.
- **Take profit** — momentum trades target a fixed `TpAtrMult × ATR`; reversion trades target the rolling mean, falling back to the ATR-multiple target when the mean sits the wrong side of entry.
- **Guarding** — every entry is rejected if the computed TP or SL is on the wrong side of the entry price, preventing malformed orders.

> **Execution discipline.** The EA acts *once per freshly completed bar* (a new-bar detector gates `OnTick`), and it allows **only one open position per magic number** at a time — the SL/TP manage the exit before another signal can fire. ATR is read from the last completed bar, so decisions never depend on the still-forming candle.

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. It depicts the **persistent (momentum) regime**: a long same-sign streak yields *few* runs, the runs-test z-score drops well below zero, and the EA joins the drift.



Illustrative example only. Actual market behaviour varies.

Walk-through

Across the window the closes rise almost without interruption, so the runs test counts very few runs — far fewer than a coin flip would give. The z-score falls well below `-ZThreshold`, flagging a persistent (trending) regime. Because the net move over the window is positive, the EA opens a long at the Ask, places its stop `SlAtrMult × ATR` below entry, and targets `TpAtrMult × ATR` above. Had the same low-run streak been downward, it would have sold instead.

Parameters

Parameter	Default	Description
WindowN	`20`	Number of close-to-close changes fed into the runs test. Larger values smooth the regime read but react slower. Range 10–60, step 2.
ZThreshold	`1.5`	The |z| beyond which a regime is deemed non-random (trend below −threshold, range above +threshold). Higher = more selective. Range 0.5–3.0, step 0.1.
RevPeriod	`12`	Rolling simple-moving-average period used as the fair value for the mean-reversion (range) book. Range 5–40, step 1.
MinStretchAtr	`0.8`	Minimum stretch from the mean, in ATR multiples, required before a range fade is taken. Higher demands a larger dislocation. Range 0.0–3.0, step 0.1.
AtrPeriod	`14`	ATR period used for stops, targets and the stretch measure. Range 5–40, step 1.
SlAtrMult	`2.0`	Stop-loss distance in ATR multiples, applied in both books. Range 0.5–6.0, step 0.5.
TpAtrMult	`3.0`	Take-profit distance in ATR multiples (momentum book, and reversion fallback when the mean is unfavourable). Range 0.5–8.0, step 0.5.
Lots	`0.10`	Fixed order volume in lots. Range 0.01–1.0, step 0.05.
Magic	`3271`	Magic number identifying this EA's positions; enables the one-position-per-magic rule.

Recommended Settings

The EA runs on a single, self-selected timeframe: every calculation uses the chart's period, so it adapts to whatever timeframe you attach it to.

- **Timeframe:** H1 is a balanced starting point; the ATR- and runs-based logic works from M15 up to H4.

- **Instruments:** Liquid FX majors (e.g. EUR/USD, GBP/USD) and major indices where ATR scaling behaves predictably.
- **Window / threshold:** keep `WindowN` at 20 and `ZThreshold` at 1.5 initially; raise the threshold to trade only clearer regimes, lower it for more frequent signals.
- **Risk sizing:** tune `SlAtrMult` / `TpAtrMult` to the instrument's volatility, and set `Lots` to respect your account's per-trade risk budget.

> **Tip:** Because the EA acts once per completed bar and holds only one position at a time, backtest on "Every tick based on real ticks" for realistic ATR and fill behaviour, then optimise `WindowN` and `ZThreshold` together — they jointly control how often the regime flips.

How to Install on MetaTrader 5

1. Copy `RunsTestRegimeSwitch.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

Risk Warning

> Trading foreign exchange, CFDs, and other leveraged financial instruments involves substantial risk of loss and is not suitable for all investors. The strategies and tools described in this document are provided for **educational purposes only** and do not constitute financial advice, investment recommendations, or solicitation to trade. Always consult a qualified financial adviser before making trading decisions. Past backtest performance is not indicative of future results.