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Maximize Your Profits

Variance Ratio Trend Regime

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Regime-Gated Momentum	M15 – H1	www.algobot.live

Overview

Variance Ratio Trend Regime is a momentum strategy with a statistical gatekeeper. Before it will consider any trade, it asks one precise question about the market: "*Is this really trending, or is it just noise?*" The answer comes not from a moving-average slope but from the **Lo & MacKinlay variance ratio** — a classic academic test of the random-walk hypothesis.

The intuition is first-principles. For a pure random walk, the variance of returns grows *linearly* with the holding horizon, so the variance of `q`-period returns equals `q` times the variance of 1-period returns. The variance ratio measures how far reality departs from that:

```
VR(q) = Var( q-period returns ) / ( q × Var( 1-period returns ) )
```

- **VR ≈ 1** — random walk: no exploitable structure. The EA stands aside.
- **VR > 1** — shocks *persist* (positive serial correlation): a **trending** regime where momentum works.
- **VR < 1** — shocks *reverse* (mean reversion / chop): momentum gets chopped up, so nothing is taken.

Because $VR(q) = 1 + 2\cdot\Sigma(1-k/q)\cdot\rho_k$ over lags `k = 1 … q-1`, it is really a horizon-weighted sum of autocorrelations — a far more robust trend gauge than any single indicator reading. Only when the regime is *provably* trending does the strategy look for a direction and pull the trigger.

> **The core edge:** naive momentum bleeds capital during choppy, mean-reverting markets. Variance Ratio Trend Regime refuses to trade in exactly those conditions, restricting entries to statistically confirmed trending regimes.

How It Works

The EA processes logic **once per newly closed bar** on its chart timeframe. On each new bar it re-estimates the variance ratio over a rolling window of log returns, then applies a three-part filter before any order is sent.

Entry Logic

An entry requires all three conditions to align on the just-closed bar:

1. **Regime gate — trending.** The variance ratio over the last `VrWindow + 1` closes must satisfy `VR − 1 ≥ VrThreshold`. If the market is a random walk or mean-reverting, the EA stands aside entirely.
2. **Direction — drift.** Direction is set by recent drift: the close now versus the close `MomentumBars` ago. Positive drift favours longs; negative drift favours shorts.
3. **Confirmation — continuation candle.** The just-closed bar must agree with the drift — a continuation candle, not an exhaustion spike.

The two symmetric rules are:

- **LONG** — trending regime *and* drift up *and* the closed bar is bullish (`Close > Open`).
- **SHORT** — trending regime *and* drift down *and* the closed bar is bearish (`Close < Open`).

Exit Logic (Stop-Loss & Take-Profit)

Every position ships with a fixed ATR-based bracket set at entry; there is no trailing or scaling. The Average True Range over `AtrPeriod` bars sets both distances:

```
LONG:   SL = entry − AtrSlMult × ATR      TP = entry + AtrTpMult × ATR
SHORT:  SL = entry + AtrSlMult × ATR      TP = entry − AtrTpMult × ATR
```

With the defaults (`AtrSlMult = 2.0`, `AtrTpMult = 3.0`) each trade targets a **1.5 : 1 reward-to-risk** ratio. The stop and target are the only exit mechanism — whichever is hit first closes the trade.

Trade & Risk Management

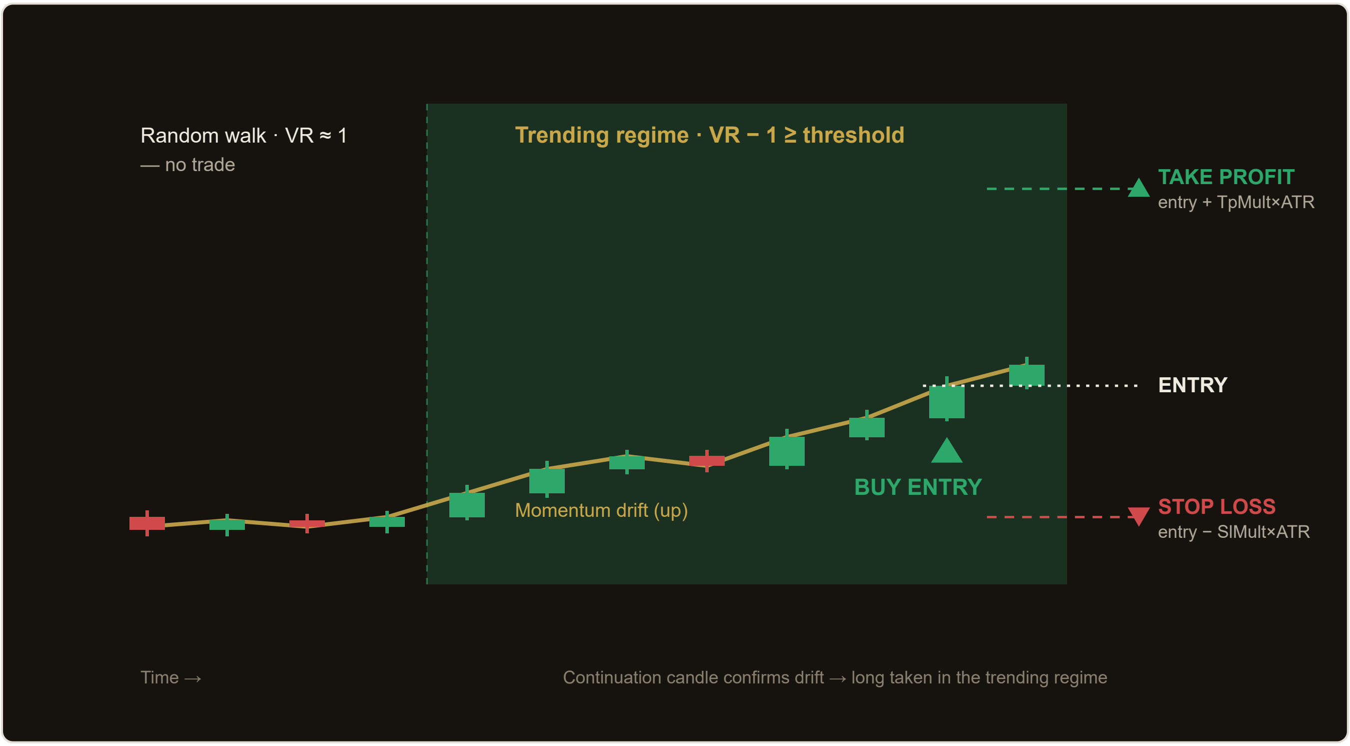
- **One position per magic.** While a position tagged with the EA's magic number is open, no new entries are taken — the ATR bracket manages the exit.

- **Spread filter.** New entries are skipped whenever the current spread exceeds `MaxSpreadPoints`, avoiding execution during illiquid or news-driven conditions.
- **Fixed-lot sizing.** Every trade uses the fixed `Lots` volume — no compounding or martingale.
- **Single timeframe.** Every calculation uses the chart's own timeframe, so the EA runs on whatever timeframe you attach it to.

> **Note:** because logic runs on bar close, entry direction and the continuation check use the most recently *completed* candle. This makes the strategy's behaviour reproducible and free of intrabar noise.

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.

Parameters

Parameter	Default	Description
VrWindow	`80`	Rolling sample of 1-period log returns used to estimate the variances. Range 40–200, step 10.
VrLag	`5`	Horizon `q` of the variance ratio — how many bars a "shock" is measured over. Range 2–15, step 1.
VrThreshold	`0.15`	Minimum `(VR − 1)` required to call the regime "trending" and allow trades. Range 0.0–1.0, step 0.05.
MomentumBars	`10`	Lookback in bars for the drift that sets trade direction. Range 3–40, step 1.
AtrPeriod	`14`	ATR length used for the stop and target distances. Range 7–30, step 1.
AtrSlMult	`2.0`	Stop-loss distance in ATR multiples: `SL = entry −/+ AtrSlMult × ATR`. Range 1.0–4.0, step 0.5.
AtrTpMult	`3.0`	Take-profit distance in ATR multiples: `TP = entry +/− AtrTpMult × ATR`. Range 1.0–6.0, step 0.5.
MaxSpreadPoints	`80`	Skip new entries when the current spread (points) is wider than this. Range 5–300, step 5.
Lots	`0.10`	Fixed lot size for every trade. Range 0.01–1.0, step 0.05.
Magic	`8317`	Magic number identifying this EA's positions. Range 0–9,999,999, step 1.

Recommended Settings

The strategy is designed for a single, self-contained timeframe and a few broadly ranged parameters. Its natural home is a liquid instrument where trends persist long enough for the variance ratio to detect them.

INSTRUMENTS & TIMEFRAME

- **Symbols:** liquid FX majors (EURUSD, GBPUSD, USDJPY), major indices, or metals (XAUUSD).
- **Timeframe:** M15 to H1. Lower timeframes carry more microstructure noise; higher timeframes give fewer but cleaner signals.

TUNING GUIDANCE

- **VrThreshold** is the sensitivity dial. Raising it (e.g. 0.25–0.40) demands stronger statistical evidence of trending and reduces trade frequency; lowering it toward 0 trades more often but re-admits marginal regimes.

- **VrWindow / VrLag** set the estimation. A larger window is more stable but slower to react; a larger lag measures persistence over longer horizons.
- **AtrSlMult / AtrTpMult** shape the risk-reward. The defaults (2.0 / 3.0) target 1.5:1; widen the stop for volatile instruments.
- **MaxSpreadPoints** should reflect your broker's typical spread on the chosen symbol.

Example starting point — EURUSD M30

Keep `VrWindow = 80`, `VrLag = 5`, and `VrThreshold = 0.15` as the baseline gate. Use `MomentumBars = 10` for direction and the default ATR bracket (`2.0 / 3.0`). Set `MaxSpreadPoints` to roughly double your broker's average EURUSD spread, then optimise `VrThreshold` and `MomentumBars` on out-of-sample data.

Tip: always run a walk-forward or out-of-sample backtest before going live. Because the variance ratio adapts to each symbol's character, parameters that work on one instrument or timeframe will not automatically transfer to another.

How to Install on MetaTrader 5

1. Copy `VarianceRatioTrendRegime.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.