

# Recurrence Range Reversion

Expert Advisor Documentation

## PLATFORM

MetaTrader 5 (MT5)

## TYPE

Mean Reversion

## TIMEFRAME

M15 – H1

## WEBSITE

[www.algobot.live](http://www.algobot.live)

**⚠ Important Disclaimer** This document is for educational and informational purposes only. It does not constitute financial or investment advice. Trading forex, CFDs, and other leveraged instruments involves substantial risk of loss and is not suitable for all investors. Past backtest performance does not guarantee future results. Never trade with capital you cannot afford to lose.

## Overview

**Recurrence Range Reversion** is a mean-reversion Expert Advisor whose distinctive edge is a nonlinear-dynamics regime filter borrowed from **Recurrence Quantification Analysis (RQA)** — the *recurrence rate* of a time-delay-embedded phase space. It fades volatility-scaled stretches of price back toward a rolling fair-value mean, but only while a statistical test confirms the market is genuinely stationary and revisiting the same value region.

Mean reversion only pays when the market is actually range-bound (repeatedly returning to the same prices) and it is destroyed when a range resolves into a trend. Conventional "flat-regime" filters — ADX, flat moving-average slope, low volatility — cannot tell the difference. RQA measures it directly: it asks how often the recent price *trajectory* comes back close to states it has already visited. High recurrence means the market keeps looping through familiar territory (fade it); low recurrence means the trajectory is escaping into a trend (stand aside, and cut any open fade).

**What makes it different:** No standard oscillator or volatility band answers the question "is this range about to hold or break?" The recurrence rate does. By gating every entry — and every exit — on a confirmed recurring regime, the EA aims to take reversion trades only where the statistical premise still holds, and to step aside the moment it stops holding.

## How It Works

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Once per completed bar the EA rebuilds three regime measures from raw closing prices, then checks whether a fade setup is present. All calculations are scale-free (z-scored), so the same settings behave consistently across symbols and timeframes.

### The Recurrence Rate (the regime gate)

Using the last `RecurWindow` closes:

1. **Z-score the window** — subtract the mean and divide by the standard deviation, making the measure unit-independent.
2. **Time-delay embed into a 2-D phase space** — each state vector is  $V[k] = (z[k], z[k-\tau])$ , where  $\tau$  is `EmbedDelay`. An oscillating market traces loops that revisit the same neighbourhood; a trending market drifts monotonically along the diagonal and never returns.
3. **Compute the Recurrence Rate (RR)** — the fraction of all state-vector pairs whose Euclidean separation is below a radius `RecurEps`. RR ranges from 0 to 1.

HIGH RR → the trajectory keeps recurring → stationary, range-bound regime → FADE  
LOW RR → the trajectory is escaping → trend / breakout regime → STAND ASIDE

A regime is treated as tradeable only when `RR >= RecurRateMin`.

### Entry Logic

Trades are considered only inside a confirmed recurring regime, and only one fade is held at a time. The rules are fully symmetric for long and short:

- **Long (fade a dip):** the just-closed bar's close sits at least `StretchAtr × ATR` below the window mean, and that bar is a bullish reaction candle (close > open). Entry at the Ask.
- **Short (fade a spike):** the just-closed bar's close sits at least `StretchAtr × ATR` above the window mean, and that bar is a bearish reaction candle (close < open). Entry at the Bid.

#### Example — long fade

With  $ATR \approx 0.0010$  and `StretchAtr = 1.6`, the close must be at least 16 pips below the rolling mean. If price has stretched that far and the closing candle turns up (green), the EA buys, expecting the recurring range to pull price back toward its mean.

### Exit Logic, Stop Loss & Take Profit

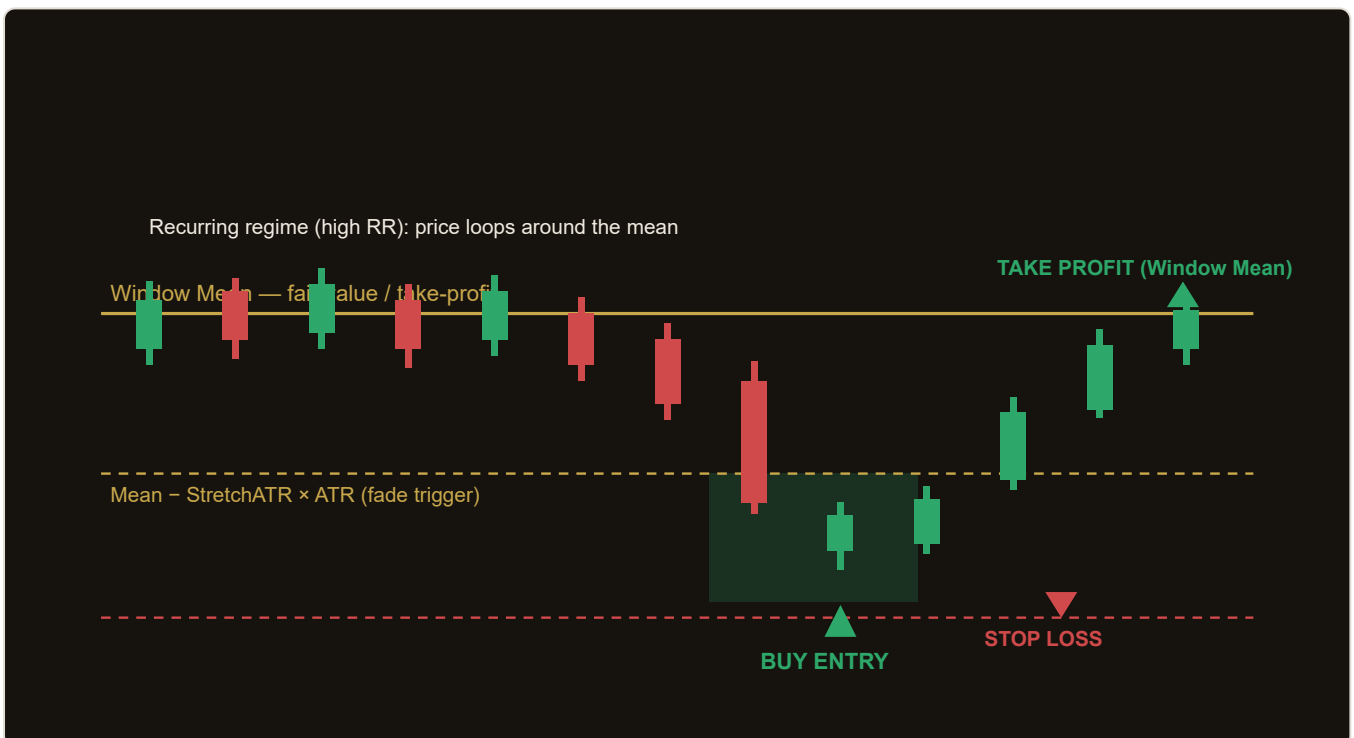
- **Take profit — the window mean.** The target is exactly the value the recurring regime keeps returning to, so profit is booked as price reverts to fair value.

- **Stop loss — structural, ATR-scaled.** For longs the stop hides  $\text{StopAtr} \times \text{ATR}$  below the reaction bar's low; for shorts, the same distance above its high. This keeps per-trade risk tight and just beyond the stretch extreme.
- **Break-even lock.** Once price advances  $\text{BreakevenAtr} \times \text{ATR}$  in favour, the stop is pulled to the entry price so a winner can no longer turn into a loser. This is checked on every tick.
- **Regime guard (drawdown control).** If recurrence collapses below  $\text{RecurRateMin}$  while a fade is live, the position is closed at market immediately — the range has broken, so the EA exits before a trend move can develop.

**Minimal-drawdown design:** three independent safeguards stack together — a statistically confirmed regime is required to enter, a tight structural stop caps each trade, break-even protects open profit, and the regime guard flattens fades the instant the range breaks.

## 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                                                                                                                     |
|--------------|---------|---------------------------------------------------------------------------------------------------------------------------------|
| RecurWindow  | 48      | Number of completed closes used to build the phase space and the reversion mean. Range 20–120, step 4.                          |
| EmbedDelay   | 2       | Embedding delay $\tau$ (in bars) for the 2-D state vectors. Range 1–6, step 1.                                                  |
| RecurEps     | 0.35    | Recurrence radius $\varepsilon$ in z-score units — two states "recur" if they are closer than this. Range 0.10–1.00, step 0.05. |
| RecurRateMin | 0.15    | Minimum recurrence rate (0–1) required to treat the regime as range-bound and permit fading. Range 0.03–0.60, step 0.01.        |
| AtrPeriod    | 14      | ATR period used to scale the stretch distance, the stop, and the break-even trigger. Range 5–40, step 1.                        |
| StretchAtr   | 1.6     | How far ( $\times$ ATR) the close must sit from the mean before a fade is taken. Range 0.5–4.0, step 0.1.                       |
| StopAtr      | 1.0     | Stop-loss distance ( $\times$ ATR) placed beyond the reaction bar's extreme. Range 0.3–3.0, step 0.1.                           |
| BreakevenAtr | 0.8     | Advance ( $\times$ ATR) in your favour before the stop is pulled to break-even. Range 0.2–3.0, step 0.1.                        |
| Lots         | 0.10    | Trade volume in lots. Range 0.01–1.00, step 0.05.                                                                               |
| Magic        | 5271    | Magic number identifying this EA's positions. Range 0–9,999,999, step 1.                                                        |

## Recommended Settings

The strategy is designed for range-prone instruments where mean reversion has an edge. Nothing is hardcoded — it runs on whatever symbol and timeframe you attach it to — but the following are sensible starting points.

- **Symbols:** range-prone FX majors such as EUR/USD and AUD/USD.
- **Timeframe:** M15 to H1, where intraday ranges tend to be well defined.
- **Defaults:** the shipped parameter values (48-bar window,  $\tau = 2$ ,  $\varepsilon = 0.35$ ,  $RR \geq 0.15$ , ATR 14,  $1.6\times$  stretch) form a balanced baseline.

**Tuning tips:** raise `RecurRateMin` to demand a stronger, more clearly recurring range before trading (fewer but higher-conviction fades); increase `StretchAtr` to wait for deeper stretches; and adjust `RecurEps` to control how strictly two states must match to count as a recurrence. Always validate any change with a walk-forward backtest on your broker's data before going live.

**Position sizing:** the `Lots` value is a fixed volume and is not scaled to account equity. Choose a size appropriate to your balance and risk tolerance, and test thoroughly on a demo account first.

## How to Install on MetaTrader 5

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- 1 Copy `RecurrenceRangeReversion.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

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