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# Adaptive Efficiency Trend Rider

Expert Advisor Documentation

| PLATFORM | TYPE | TIMEFRAME | WEBSITE |
|---|---|---|---|
| MetaTrader 5 (MT5) | Adaptive Trend Following | M15 – H4 | 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

**Adaptive Efficiency Trend Rider** is an adaptive trend-following pullback Expert Advisor built around **Kaufman's Adaptive Moving Average (KAMA)**. Unlike a fixed-period moving average, KAMA continuously adjusts its own smoothing speed based on how *efficiently* price is travelling. When price marches cleanly in one direction, the line speeds up and rides the move; when price chops sideways, the line slows down and flattens, quietly muting the false signals that ordinary moving-average systems generate in ranges.

A single adaptive line does two jobs at once. Its **slope** acts as the trend filter, while the line itself becomes the **dynamic pullback level** — the price the EA wants to see reclaimed. The strategy only takes a trade when an efficient trend pulls back to this adaptive line and then closes back through it, with momentum still pointing the right way. Risk is managed symmetrically using the Average True Range (ATR), giving a fixed reward-to-risk profile on every position.

> **Design intent.** The efficiency filter is the heart of this system. By requiring the trend to be genuinely *efficient* (not merely drifting) before acting, Adaptive Efficiency Trend Rider aims to cut the low-quality entries that plain MA-cross systems take in noisy, going-nowhere markets.

## How It Works

### The Adaptive Line (KAMA)

Every completed bar, the EA measures the **efficiency ratio (ER)** — the net directional move divided by the total path travelled over the lookback window:

```
ER = |close[now] - close[N ago]|  /  Sum |close[i] - close[i-1]|   (over N bars)

  ER near 1  ->  clean, one-directional trend  ->  KAMA reacts FAST (rides it)
  ER near 0  ->  choppy, going-nowhere noise    ->  KAMA reacts SLOW (ignores it)

SC   = ( ER * (fastSC - slowSC) + slowSC )^2
KAMA = KAMA_prev + SC * (close - KAMA_prev)
```

The fast and slow smoothing constants are derived from the `FastPeriod` and `SlowPeriod` inputs (`SC = 2 / (period + 1)`). The squared blend means the line accelerates sharply as efficiency rises and stalls almost completely as it falls.

### Long Entry Conditions

A **long** position is opened only when *all* of the following are true on the just-closed bar, and no position for this Magic is already open:

- **Adaptive uptrend** — KAMA is rising over the last `SlopeLookback` bars.
- **Efficient trend** — the efficiency ratio is at least `MinEfficiency` (the move is directional, not just drifting).
- **Pullback & reclaim** — the bar dipped to or through KAMA (`Low ≤ KAMA`) yet closed back above it (`Close > KAMA`).
- **Momentum agreement** — RSI is above the `RsiMid` midline.

### Short Entry Conditions

A **short** position is the exact mirror image:

- **Adaptive downtrend** — KAMA is falling over the last `SlopeLookback` bars.
- **Efficient trend** — the efficiency ratio is at least `MinEfficiency`.
- **Pullback & reclaim** — the bar spiked to or through KAMA (`High ≥ KAMA`) yet closed back below it (`Close < KAMA`).
- **Momentum agreement** — RSI is below the `RsiMid` midline.

### Stop Loss & Take Profit

Risk is ATR-based and symmetric. On entry, both stops are placed at a fixed multiple of the current ATR and never move afterward:

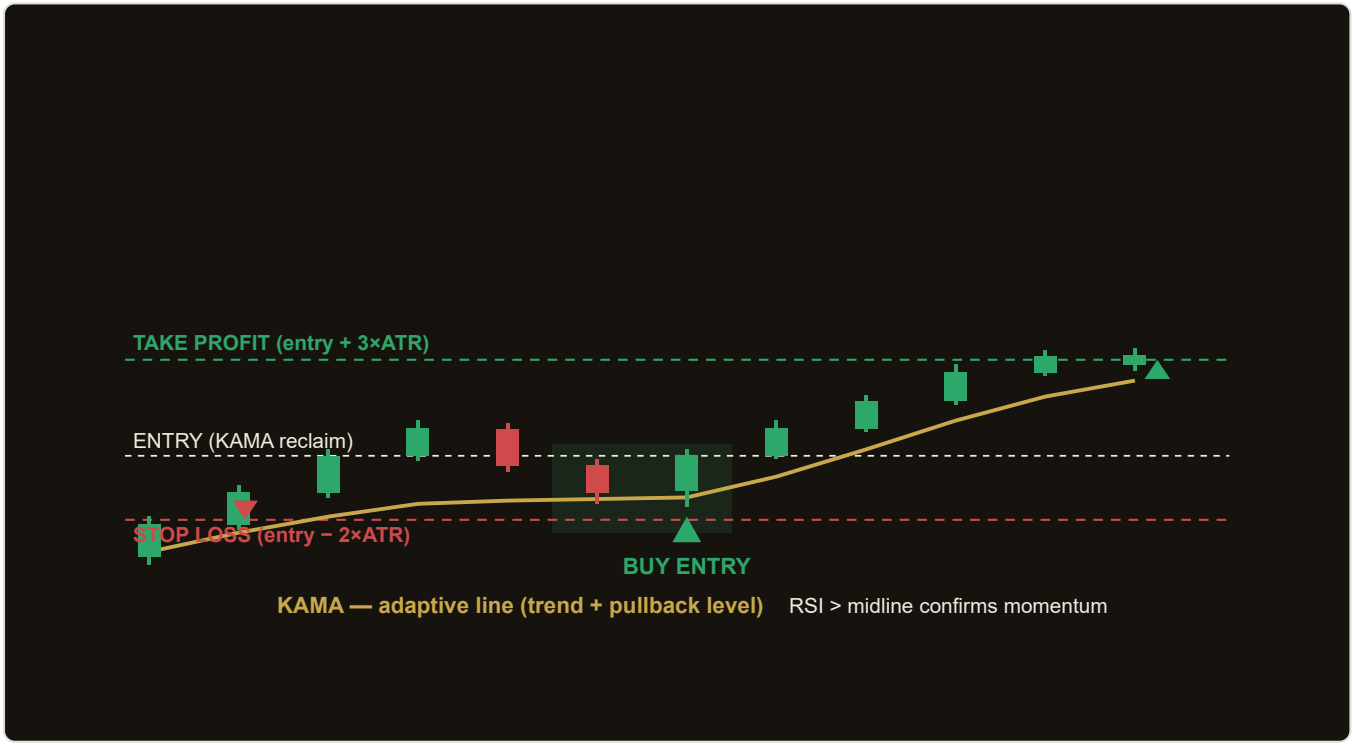
```
LONG :  SL = entry - AtrSlMult * ATR ,   TP = entry + AtrTpMult * ATR
SHORT:  SL = entry + AtrSlMult * ATR ,   TP = entry - AtrTpMult * ATR
```

With the defaults (SL = 2×ATR, TP = 3×ATR) the reward-to-risk ratio is **1.5 : 1**. If the computed stop distance is degenerate (zero or negative), the trade is skipped.

> **Position management.** The EA evaluates signals only once per completed bar (new-bar detection) and holds **at most one position per Magic number** at any time. There is no averaging, grid, or martingale layering — each trade stands on its own SL/TP.

## 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 |
|---|---|---|
| **ErPeriod** | `10` | Efficiency-ratio / KAMA lookback window, in bars (range 5–20, step 1). |
| **FastPeriod** | `2` | KAMA fast smoothing-constant period — fastest reaction in an efficient market (range 2–6, step 1). |
| **SlowPeriod** | `30` | KAMA slow smoothing-constant period — slowest reaction in a noisy market (range 15–50, step 5). |
| **SlopeLookback** | `3` | How many bars back the KAMA slope is measured over to judge trend direction (range 1–8, step 1). |
| **MinEfficiency** | `0.30` | Minimum efficiency ratio (0–1) required to call the trend tradeable (range 0.10–0.70, step 0.05). |
| **RsiPeriod** | `14` | RSI period used for momentum confirmation (range 7–21, step 1). |
| **RsiMid** | `50` | RSI midline; longs need RSI above it, shorts below it (range 40–60, step 1). |
| **AtrPeriod** | `14` | ATR period used to size the stop-loss and take-profit distances (range 7–28, step 1). |
| **AtrSlMult** | `2.0` | Stop-loss distance as a multiple of ATR (range 1.0–4.0, step 0.25). |
| **AtrTpMult** | `3.0` | Take-profit distance as a multiple of ATR (range 1.0–6.0, step 0.25). |
| **Lots** | `0.10` | Fixed lot size per trade (range 0.01–1.0, step 0.05). |
| **Magic** | `7310` | Magic number identifying this EA's positions; one open position is allowed per Magic. |

## Recommended Settings

Adaptive Efficiency Trend Rider was conceived for **trending FX pairs, stock indices, and metals** on intermediate timeframes. The adaptive line and efficiency filter do their best work where trends persist long enough to pull back and resume.

- **Markets:** major/minor FX pairs, index CFDs, and metals (e.g. XAUUSD) that produce sustained directional moves.
- **Timeframe:** M15 to H4. The strategy uses a single timeframe throughout — whichever chart the EA is attached to (or the backtest selects) is the one it trades; nothing is hardcoded.

- **Defaults:** the shipped values (ER 10, Fast 2 / Slow 30, MinEfficiency 0.30, SL 2×ATR / TP 3×ATR) are a balanced 1.5 : 1 starting point.

**Tuning example**

Raising `MinEfficiency` toward 0.45–0.55 makes the EA more selective — it trades less often but demands cleaner trends. Lowering it toward 0.15–0.20 admits weaker trends and more signals. Adjust `AtrSlMult` / `AtrTpMult` together to keep a reward-to-risk profile you are comfortable with, and always re-validate on out-of-sample data before going live.

**Optimization tip.** Every parameter exposes a sensible Min / Max / Step range (shown in the Parameters table), so the built-in MT5 Strategy Tester optimizer can sweep them directly. Optimize on one period, then confirm the chosen values hold up on a separate, unseen period.

## How to Install on MetaTrader 5

1. Copy `AdaptiveEfficiencyTrendRider.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.