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Adaptive Decay Impulse Breakout

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Adaptive Momentum Breakout	M15 (Intraday)	www.algobot.live

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Overview

Adaptive Decay Impulse Breakout is a self-adapting momentum breakout Expert Advisor built entirely from raw price and volume (OHLCV) — it uses no traditional indicators, no chart patterns, and no published methodology. Its core idea is that each closed bar injects a signed *order-flow impulse* into the market equal to participation multiplied by price change, and that genuine directional conviction shows up not as one large bar but as a *sustained imbalance* that the opposing side has not yet absorbed.

The strategy tracks that imbalance with a **leaky integrator** — an accumulator that continuously "forgets" old order flow. The novel part is that the forgetting rate is not fixed: it *self-adapts* to how fast the market is currently moving. When volatility expands, the accumulator's memory shortens so stale flow decays quickly; when the market is calm, memory lengthens. A trade is taken only when this accumulator escapes its own adaptive statistical envelope while the imbalance is *still accelerating*, which distinguishes a genuine escape from an exhausting push that has already peaked.

Both stop-loss and take-profit distances, as well as position size, are self-computed from a rolling true-range volatility measure — so risk automatically tightens in quiet regimes and widens in volatile ones, while position size scales inversely so quiet regimes get larger clips and volatile regimes get smaller ones. The EA reads its symbol and timeframe from the chart at run time; its intended habitat is a liquid FX major such as EUR/USD on an intraday timeframe like M15.

> **Design note.** This is a pure OHLCV strategy. Every volatility figure — the adaptive decay rate, the z-score envelope, and the stop/target distances — is derived by hand from close-to-close moves and true range. No indicator handles (iATR, iMA, etc.) are created, and the MQL5 build reproduces the C# incremental math bar-for-bar.

How It Works

1. The order-flow impulse

On every newly *closed* bar, the EA measures a signed impulse equal to tick volume multiplied by the close-to-close price change:

```
impulse_t = TickVolume_t × (Close_t − Close_{t−1})
```

A large price move on heavy participation produces a large impulse; the sign carries the direction. Because the strategy only ever samples the bar at shift 1 (the one that has just fully closed), signals never repaint.

2. The self-adapting leaky integrator

Impulses are accumulated into a leaky integrator `I` whose memory fades at a rate `lambda`:

```
I_t = lambda_t × I_{t−1} + impulse_t
```

The decay rate is **not constant**. It is driven by the ratio of short-horizon to long-horizon move volatility, a "speed" figure that describes how quickly the current regime is moving:

```
speed_t  = sigmaShort_t / sigmaLong_t
lambda_t = clamp( DecayBase ^ speed_t , 0.50 , 0.98 )
```

When volatility expands (`speed > 1`) the memory shortens — old flow goes stale quickly. When the market is calm (`speed < 1`) the memory lengthens. The accumulator therefore forgets at a rate the market itself dictates, clamped to a sensible band between 0.50 and 0.98.

3. Entry — an accelerating escape of the adaptive envelope

The accumulator is standardised against its own recent history using a rolling z-score over `ZWindow` bars:

```
z = ( I − mean(I) ) / stddev(I)
```

A trade fires only when **both** conditions are met:

- **Escape:** the accumulator breaks out of its adaptive envelope, `|z| ≥ ZEntry`.
- **Acceleration gate:** the imbalance is still building in the same direction (`accel = I_t − I_{t−1}` pushing the same way as `I`).

A long is taken when `z ≥ +ZEntry` with positive acceleration and `I > 0`; a short is the mirror image. The acceleration gate is what separates a genuine breakout from an exhausting, decelerating push that is merely sitting at an extreme.

> **Worked example**
>
> Suppose `ZEntry = 1.50`. A cluster of heavy up-bars drives the accumulator to `z = +1.9`, and it is still rising (`accel > 0`). Both the escape and acceleration conditions are satisfied, so the EA opens a long. Stop and target are placed at `2.0×` and `3.0×` the current true-range volatility respectively.

4. Exit — absorption or reversal

Only one position is held at a time. An open trade is managed on each new bar:

- **Imbalance absorbed (fade):** a long is closed when the accumulator mean-reverts back through its centre (`z ≤ 0`); a short is closed when `z ≥ 0`.
- **Hard reversal (flip):** if a fresh, accelerating escape appears in the opposite direction, the current position is closed and the EA immediately opens the reverse trade.
- **Protective stops:** if neither exit triggers, the position is left to work against its stop-loss and take-profit.

5. Dynamic risk and position sizing

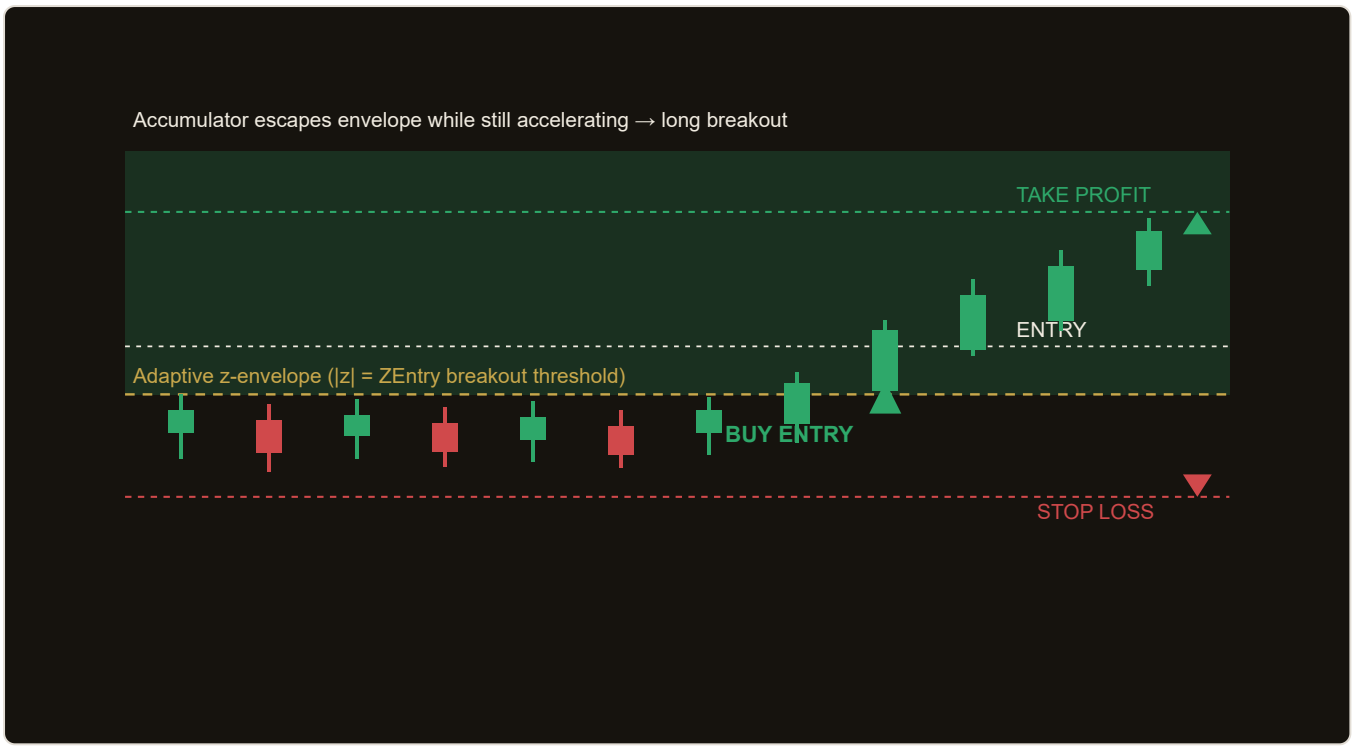
Stops, targets and clip size all scale with a rolling true-range volatility, `sigmaPrice` (a simple mean of true range over `AtrWindow` bars — not a Wilder-smoothed ATR):

```
slDist = SlMult × sigmaPrice
tpDist = TpMult × sigmaPrice
sizeFactor = clamp( sigmaRef / sigmaPrice , 0.5 , 2.0 )
volume     = max( 0.01 , round( Lots × sizeFactor , 2 ) )
```

Position size scales *inversely* with volatility: quiet regimes (low `sigmaPrice` relative to the long-run reference `sigmaRef`) get larger clips, while volatile regimes get smaller ones. In the MQL5 build the resulting volume is snapped to the broker's minimum, maximum and step before the order is sent.

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
DecayBase	`0.90`	Base of the adaptive decay rate. The effective leak `lambda = clamp(DecayBase^speed, 0.50, 0.98)`. Lower values forget order flow faster. Range 0.70–0.97, step 0.01.
ZEntry	`1.50`	Z-score entry threshold. The accumulator must escape its adaptive envelope by this many standard deviations before a trade can fire. Higher = more selective. Range 0.50–3.50, step 0.10.
VolShort	`10`	Short move-volatility window (bars). Numerator of the "speed" ratio that adapts the decay rate. Range 3–30, step 1.
VolLong	`50`	Long move-volatility window (bars). Denominator of the "speed" ratio and the reference window for inverse-volatility sizing. Range 20–150, step 5. Auto-bumped if not larger than VolShort.
ZWindow	`60`	Rolling window (bars) over which the accumulator's mean and standard deviation are computed for the z-score envelope. Range 20–200, step 5.
AtrWindow	`14`	True-range volatility window (bars) used for stop, target and sizing. A simple mean of true range — not a Wilder-smoothed ATR. Range 5–40, step 1.
SlMult	`2.00`	Stop-loss distance as a multiple of the true-range volatility. Range 0.50–5.00, step 0.10.
TpMult	`3.00`	Take-profit distance as a multiple of the true-range volatility. Range 0.50–8.00, step 0.10.
Lots	`0.10`	Base position volume before inverse-volatility scaling (final size = `Lots × sizeFactor`, clamped 0.5×–2.0×). Range 0.01–1.00, step 0.05.

> **Magic number.** The EA also exposes a `Magic` input (default `47010`) used to tag and identify its own positions. Give each instance a unique magic number if you run more than one EA on the same account.

Recommended Settings

The strategy was designed around a liquid FX major on an intraday timeframe. As a sensible starting point:

- **Symbol:** a liquid major such as EUR/USD, with tight spreads.

- **Timeframe:** M15 (the intended intraday habitat). The EA reads the chart's timeframe at run time, so simply attach it to the timeframe you want to trade.
- **Defaults:** the shipped defaults (`DecayBase 0.90` , `ZEntry 1.50` , `SlMult 2.00` , `TpMult 3.00`) provide a balanced 1:1.5 risk/reward profile with moderate selectivity.
- **More selective:** raise `ZEntry` toward 2.0–2.5 to take only stronger breakouts (fewer trades).
- **Faster adaptation:** lower `DecayBase` and/or shorten `VolShort` so the accumulator forgets old flow more aggressively in fast markets.

> **Tip.** Because every stop, target and clip size is derived from live volatility, always backtest and forward-test any parameter change on your specific broker and symbol before trading it. Optimise `ZEntry` , `SlMult` and `TpMult` together rather than in isolation.

How to Install on MetaTrader 5

1. Copy `AdaptiveDecayImpulseBreakout.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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