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Momentum Diffusion Trend Shift

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Trend Following (Momentum Breadth)	H1 (adaptable)	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

Momentum Diffusion Trend Shift borrows an idea from market-breadth analysis — the *diffusion index* — and applies it to a single instrument's own price history. In classic breadth work, a diffusion index measures what fraction of many members (stocks in an index) are advancing. Here the "members" are the last *N* completed bars, and for each one the EA asks a single yes/no question: *is that bar's K-bar momentum positive?*

Counting the up-votes against the down-votes over the window and normalising produces a signed breadth reading in the range `[-1, +1]`:

```
momo_i = Close[i] - Close[i - MomentumLookback]
DI     = (upVotes - downVotes) / DiffusionWindow
```

A value near `+1` means virtually every recent bar is riding an uptrend — broad, mature directional participation. A value near `-1` is the mirror image. A value near `0` describes a balanced, choppy tape where up and down momentum cancel out. This is deliberately **not** a streak count, a mean-crossing cadence, or the percentile of a single momentum reading: it measures how *widely spread* the directional bias is across the entire lookback.

> **Core idea:** By requiring momentum to be positive across a broad share of the recent window — rather than only on the latest bar — the strategy filters out one-bar head-fakes and demands genuine, distributed follow-through before committing capital. A baseline EMA keeps every entry aligned with the prevailing regime, and a symmetric threshold makes long and short behaviour identical.

How It Works

1. Building the Diffusion Index

On each freshly closed bar the EA computes the raw diffusion index over the last `DiffusionWindow` overlapping momentum votes. Each vote compares a bar's close to the close `MomentumLookback` bars earlier; a positive difference is an up-vote, a negative difference is a down-vote, and a flat reading counts as neither. The signed net vote is divided by the window size to give the breadth fraction.

2. Smoothing

The raw index is passed through an EMA of length `SmoothPeriod` (a period of `1` leaves it untouched). Smoothing suppresses single-bar jitter in the breadth reading so that only sustained shifts in participation trigger a signal.

3. Entry Logic — fresh threshold crossings

Signals fire only on a *fresh* crossing of the smoothed diffusion index through the symmetric threshold, and each entry must also agree with the baseline EMA regime filter:

- **Long:** smoothed DI crosses *up* through `+SignalThreshold` (participation has just become broadly bullish) **and** the last close is *above* the `BaselineEma`.
- **Short:** smoothed DI crosses *down* through `-SignalThreshold` (participation has just become broadly bearish) **and** the last close is *below* the `BaselineEma`.

Because only the crossing bar qualifies, the EA will not re-enter simply because the index remains beyond the threshold — it waits for the next genuine shift.

4. Exit Logic

Every position carries a protective stop and a profit target set at order time, and a fresh *opposite* crossing closes an open position early:

- **Stop loss:** placed `AtrStopMult × ATR` away from the entry price.
- **Take profit:** set at `RewardRisk × stopDistance`, giving a fixed reward-to-risk ratio.
- **Breadth-flip exit:** a long is closed if the smoothed DI crosses down through `-SignalThreshold`; a short is closed if it crosses up through `+SignalThreshold`. Breadth has reversed, so the trade thesis is

abandoned before the stop or target is reached.

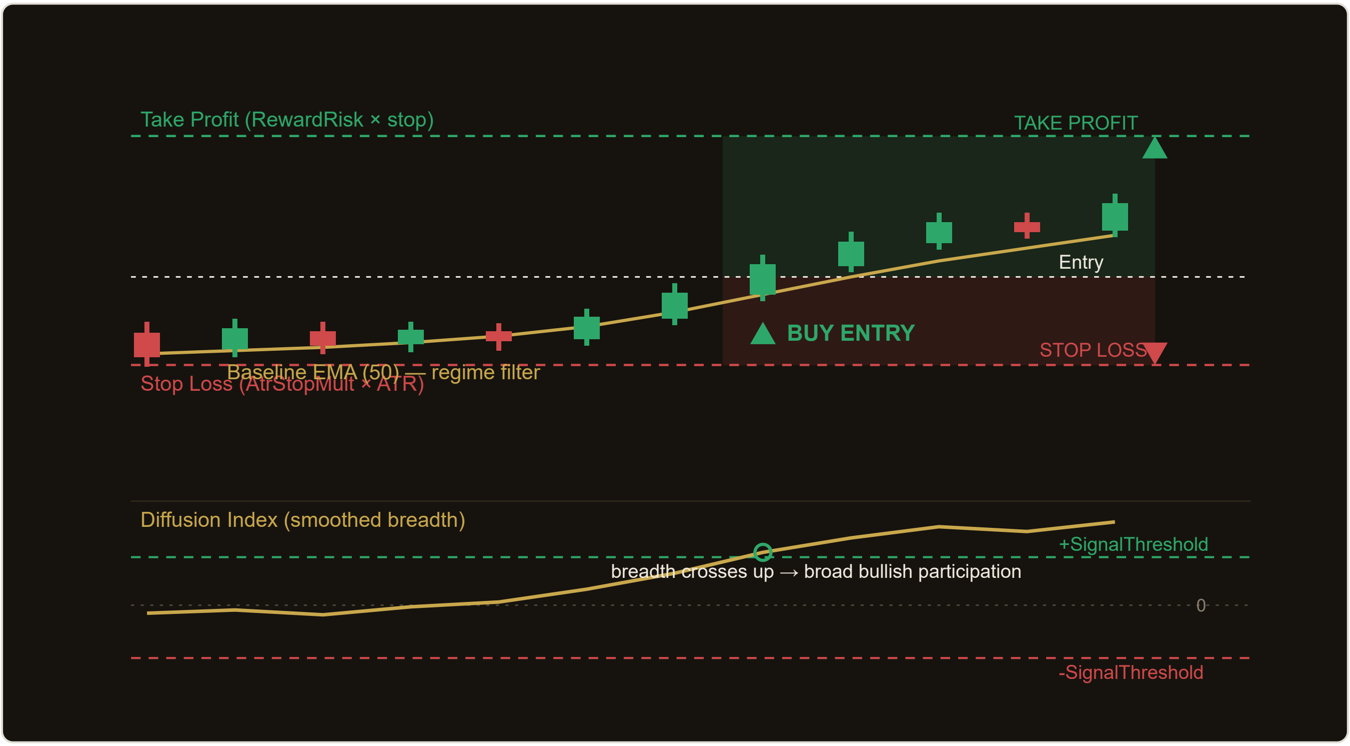
> **One position at a time.** The EA holds at most a single open position (tracked by its magic number). While a trade is live, only the stop, the target, or a breadth flip can close it — no pyramiding or hedging occurs.

5. Trade Filters

- **Spread guard:** if `MaxSpreadPoints > 0`, new entries are skipped whenever the current spread exceeds that many points, avoiding fills in poor conditions.
- **Warm-up:** the EA waits until enough completed bars exist to build one diffusion index plus the EMA and ATR context before it trades.
- **Bar-close driven:** logic runs once per freshly closed bar — the still-forming bar (shift 0) is never used for signals.

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.

In the panel above, the tape chops sideways while the diffusion index hovers near zero — up and down momentum roughly cancel. As price begins to trend, more of the recent bars post positive momentum, lifting the breadth reading. When the smoothed index crosses up through `+SignalThreshold` and price sits above the baseline EMA, a long is opened, protected by an ATR-based stop and a reward-to-risk target.

Parameters

Parameter	Default	Description
DiffusionWindow	`20`	Number of recent completed bars whose momentum "votes" are polled for the diffusion index. Range 8–60, step 2.
MomentumLookback	`3`	Momentum horizon for each vote: `Close[i] - Close[i - MomentumLookback]`. Range 1–15, step 1.
SignalThreshold	`0.30`	The absolute breadth fraction (signed, 0–1) the smoothed index must cross to fire. Range 0.05–0.70, step 0.05.
SmoothPeriod	`3`	EMA smoothing period applied to the raw diffusion index (1 = no smoothing). Range 1–15, step 1.
BaselineEma	`50`	Regime-gate EMA: longs are allowed only above it, shorts only below it. Range 10–200, step 5.
AtrPeriod	`14`	ATR lookback used to size the stop and target distances. Range 5–40, step 1.
AtrStopMult	`2.0`	Stop distance expressed as this many ATRs from the entry price. Range 0.5–5.0, step 0.25.
RewardRisk	`1.6`	Take-profit distance as a reward-to-risk multiple of the stop distance. Range 0.5–4.0, step 0.1.
MaxSpreadPoints	`30`	Skip new entries when the spread exceeds this many points (0 disables the filter). Range 0–200, step 5.
Lots	`0.10`	Fixed trade volume in lots. Range 0.01–1.0, step 0.05.
Magic	`7314`	Magic number used to identify and manage this EA's own positions.

Recommended Settings

The defaults are a balanced starting point for liquid major FX pairs on the H1 timeframe. Adjust deliberately and re-test any change on your own data and broker conditions.

Balanced (default) profile

Diffusion window 20 with a 3-bar momentum horizon, threshold 0.30, and 3-period smoothing on a 50-EMA regime filter. A 2.0× ATR stop with a 1.6 reward-to-risk target aims to capture broad, mature trend legs while cutting losers quickly.

- **More selective / fewer trades:** raise `SignalThreshold` toward 0.40–0.50 and/or increase `DiffusionWindow`, demanding broader participation before entering.
- **More responsive / more trades:** lower `SignalThreshold` toward 0.15–0.20, shorten `SmoothPeriod`, or reduce `MomentumLookback` for a faster read.
- **Trend alignment:** a larger `BaselineEma` (e.g. 100–200) enforces a stronger prevailing-trend filter; a smaller one reacts sooner.
- **Volatility sizing:** widen `AtrStopMult` in noisier markets to avoid premature stop-outs; tune `RewardRisk` to match the instrument's typical follow-through.

Tip: Because the threshold is symmetric, long and short behaviour is identical — you only need to optimise a single set of breadth parameters, not two. Always confirm your chosen settings on out-of-sample data before going live.

How to Install on MetaTrader 5

1. Copy `MomentumDiffusionTrendShift.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

Note: This EA operates on a single timeframe — the chart's own period. Attach it to the timeframe you intend to trade, and make sure the symbol has enough history loaded for the diffusion window, baseline EMA, and ATR to warm up before the first signal.

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.