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# Trend Detection Index Emergence

Expert Advisor Documentation

| PLATFORM | TYPE | TIMEFRAME | WEBSITE |
|---|---|---|---|
| MetaTrader 5 (MT5) | Trend Following (Momentum) | H1 (Hourly) | www.algobot.live |

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## Overview

**Trend Detection Index Emergence** is a trend-following Expert Advisor built on the **Trend Detection Index (TDI)**, a classic but rarely-used momentum indicator by M. H. Pee. Most momentum tools fire on any directional push; the TDI is more demanding. It asks a single, sharper question: *is the recent directional push right now bigger than the market's own recent noise?* In other words — is this a genuine trend emerging, or just another oscillation inside chop?

The strategy computes the TDI purely from closing prices. It sums the net displacement of recent bars into a Direction Indicator (DI), then measures the accumulated absolute movement of an older window as a proxy for background noise. Only when the net directional push *outgrows* that noise band is a trend confirmed. Because the same detector also signals when a trend dies, the EA rides the ignition of a fresh trend and exits the instant the edge that justified the trade evaporates.

All risk is volatility-scaled through the Average True Range (ATR), so the EA is symbol- and timeframe-agnostic. It is designed for a liquid trending instrument such as **EURUSD**, **GBPUSD** or **XAUUSD** on the **H1** timeframe, in a swing trend-following style.

> **Core idea.** By requiring summed directional momentum to beat the market's own accumulated noise, the strategy filters out the mid-range whipsaws where naive momentum crossovers bleed capital. It commits only when order flow has genuinely committed to a one-way leg.

## How It Works

### Building the Trend Detection Index

Working from closing prices only, the EA constructs the TDI from raw momentum values over two adjacent windows of length `Period`:

- **Raw momentum:** `mom(k) = Close − Close[k bars ago]`
- **DI (Direction Indicator):** the sum of `mom` over the most recent `Period` bars — the net directional push.
- **absTail (noise band):** the sum of `|mom|` over the older `Period`… `2×Period` bars — a proxy for the market's recent background noise.
- **TDI:** `|DI| − absTail`

```
mom(k)   = Close - Close[k]
DI       = Σ mom   over the recent  Period  bars     (direction)
absTail  = Σ |mom| over the older   Period..2*Period bars (noise)
TDI      = |DI| - absTail
```

The reading is intuitive:

- **TDI > 0** → the recent net displacement has outgrown the older noise band → a trend is present. `DI > 0` means up-trend; `DI < 0` means down-trend.
- **TDI ≤ 0** → no trend (range / chop) → stand aside.

### The decisiveness gate (TrendMargin)

Rather than accepting a bare crossing of zero, the EA can require the TDI to clear zero by a margin. A trend is confirmed only when:

```
|DI| - absTail  >  TrendMargin * absTail
```

With `TrendMargin = 0` (the default) this reduces to the textbook `TDI > 0` rule. Raising it demands the directional push beat the noise band by an extra fraction, producing fewer but higher-conviction trend confirmations.

### Entry — trading the emergence

The EA trades the *transition* into a trend, not a trend that is already mature. It evaluates the TDI on the just-closed bar and the bar before it, and acts only on a fresh confirmation:

- **Long:** the TDI confirms an up-trend (`TDI` positive with `DI > 0`) for the *first time* — the previous bar was not a confirmed up-trend. A fresh up-trend is emerging out of the noise.
- **Short:** the TDI confirms a down-trend (`TDI` positive with `DI < 0`) for the first time — the previous bar was not a confirmed down-trend.

Because only the ignition bar is traded, the EA buys the birth of a trend rather than chasing one that has already run.

### Exit — the detector also tells you when the trend dies

An open position is actively managed on every newly-closed bar. The EA closes it the moment the detector reports the trend edge is gone — either the TDI has fallen back below the confirmation threshold (chop has returned) or the direction has flipped (`DI` crossed zero). It does not wait for the protective stop when the very reason for the trade has evaporated.

### Risk management

On entry the EA places a volatility-scaled protective stop and take-profit derived from the ATR of completed bars:

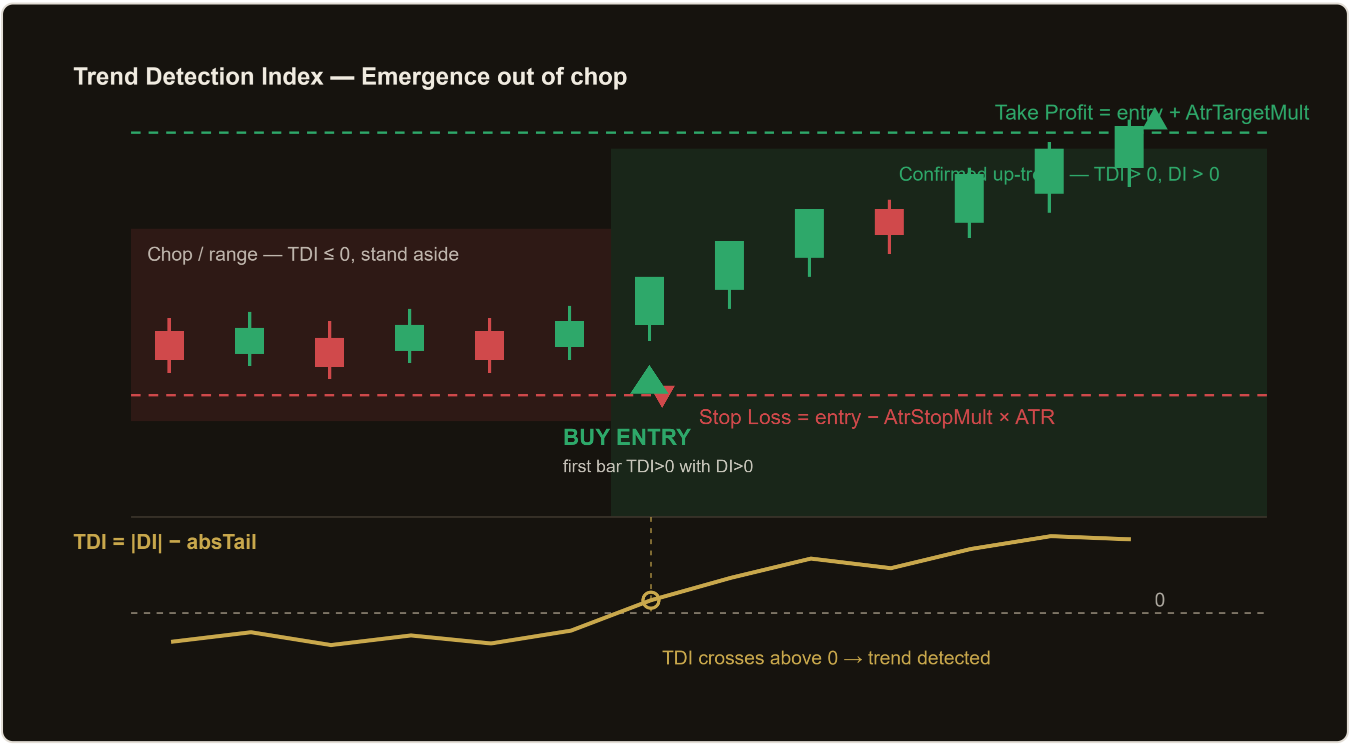
- **Stop loss:** `AtrStopMult × ATR` away from entry.
- **Take profit:** `AtrTargetMult × ATR` away from entry — the default `2.5 / 4.0` pairing targets a positive-expectancy reward-to-risk multiple.

Only one position per `Magic` number is held at a time; the EA never stacks or reverses in the same bar it manages a position. Entries are also skipped whenever the current spread exceeds `MaxSpreadPoints`, protecting against poor fills in thin conditions.

> **Why closes only?** The TDI ignores wicks entirely, comparing settled closing prices across two adjacent windows. This makes it far less sensitive to intrabar spikes and stop-hunts than range- or high/low-based momentum measures.

## 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 |
|---|---|---|
| **Period** | `20` | Momentum lookback for the TDI (the direction window). The noise window is 2× this. Range 8–40, step 2. *(In the MQL5 EA this input is named `MomPeriod`.)* |
| **AtrPeriod** | `14` | ATR period used to size the protective stop and take-profit. Range 7–30, step 1. |
| **AtrStopMult** | `2.50` | Protective stop distance as a multiple of ATR. Range 1.00–5.00, step 0.25. |
| **AtrTargetMult** | `4.00` | Take-profit distance as a multiple of ATR. Range 1.00–8.00, step 0.50. |
| **TrendMargin** | `0.00` | Decisiveness gate: requires `\|DI\| − absTail > TrendMargin × absTail`, i.e. a margin above bare zero. 0.00 reduces to the textbook `TDI > 0` rule. Range 0.00–0.50, step 0.05. |
| **MaxSpreadPoints** | `30` | Skip the entry if the current spread (in points) is wider than this. Range 1–200, step 1. |
| **Lots** | `0.10` | Order volume in lots. Range 0.01–1.00, step 0.05. |
| **Magic** | `8137` | Magic number identifying this EA's positions. One position per Magic at a time. Range 0–9,999,999, step 1. |

> **Tuning tip.** `Period` is the single most impactful setting. A shorter period reacts to trends faster but confirms more marginal moves; a longer period demands a broader, more established directional push. Adjust `TrendMargin` upward if you want to suppress borderline confirmations in noisier instruments.

## Recommended Settings

The defaults are tuned for a liquid, trending instrument on the hourly chart in a swing trend-following style.

| Setting | Recommendation | Notes |
|---|---|---|
| **Symbols** | `EURUSD, GBPUSD, XAUUSD` | Liquid trenders with clean directional legs. |
| **Timeframe** | `H1` | The design target — swing-length trend detection. |
| **Period** | `20` | Balanced default; try 16–24 per instrument. |
| **ATR stop / target** | `2.50 / 4.00` | Positive-expectancy reward-to-risk profile. |
| **TrendMargin** | `0.00 – 0.10` | Raise to demand more decisive confirmations. |
| **Risk per trade** | `Conservative lots` | Size so a full ATR-stop loss is a small fraction of equity. |

**Example configuration — EURUSD H1**

Period = 20, AtrPeriod = 14, AtrStopMult = 2.50, AtrTargetMult = 4.00, TrendMargin = 0.00, MaxSpreadPoints = 30, Lots = 0.10, Magic = 8137. The EA waits for the TDI to confirm a fresh trend, enters in the DI direction, and rides it until the detector reports the trend has died or the ATR-scaled target/stop is hit.

> **Always validate first.** Backtest on quality history and run on a demo account before committing real capital. Optimise `Period` and the ATR multiples on your specific broker, symbol and spread conditions.

## How to Install on MetaTrader 5

1. Copy `TrendDetectionIndexEmergence.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.