

Pearson Correlation Trend Shift

Expert Advisor Documentation

PLATFORM

MetaTrader 5 (MT5)

TYPE

Trend Emergence / Following

TIMEFRAME

H1 – H4

WEBSITE

www.algobot.live

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Overview

Pearson Correlation Trend Shift is a trend-emergence Expert Advisor built on the Pearson correlation coefficient between price and time — the statistic behind John Ehlers' *Correlation Trend Indicator* (CTI). For the last `N` closes it computes `r = corr(close, timeRamp)`, where the ramp is the simple sequence `0, 1, 2, ..., N-1` running from the oldest bar to the newest.

Because correlation is covariance divided by the product of the two standard deviations, `r` always lives in the range `[-1, +1]` and is completely **scale-free**:

- `r → +1` — price is climbing along a near-perfect straight line (a clean, orderly uptrend).
- `r → -1` — price is falling along a near-perfect straight line (a clean, orderly downtrend).
- `r ≈ 0` — price wanders with no linear direction (chop, range, or cycle).

This is fundamentally different from a regression *slope*. Slope measures how **fast** price moves and grows with volatility; `r` measures how **consistent** and linear the move is, regardless of magnitude. A slow-but-orderly drift and a fast-but-orderly run both read near ± 1 , while a violent but choppy market reads near 0. That makes `r` a natural "is a real trend forming?" gate that behaves the same across symbols and timeframes with no per-market tuning.

Why correlation, not slope? Two markets can rise at the same angle but with wildly different tidiness. The EA only wants the tidy one — the move where nearly every bar advances the trend. By reading *linearity* instead of *speed*, the same threshold that works on EURUSD H1 also works on Gold H4 without re-optimisation.

How It Works

On every completed bar the EA maintains a rolling buffer of closes, computes the price-vs-time correlation over `CorrPeriod` bars, and compares the reading against symmetric entry and exit bands. Trades are triggered by a **fresh threshold cross** rather than by the level itself, so entries fire once — discretely — instead of re-triggering on every tick while the level holds.

Entry Logic

- **Long** — when `r` *freshly* crosses **up** through `+EntryThreshold`. An orderly uptrend is establishing itself out of noise.
- **Short** — when `r` *freshly* crosses **down** through `-EntryThreshold`. An orderly downtrend is forming.

A "fresh" cross means the previous bar's `r` was on one side of the band and the current bar's `r` is on the other. Requiring the transition — not merely a value above the level — gates out low-`|r|` chop and prevents repeated firing inside an already-confirmed trend.

```
longSignal = prev < EntryThreshold && corr >= EntryThreshold
shortSignal = prev > -EntryThreshold && corr <= -EntryThreshold
```

Exit Logic

- **Exit-and-reverse** — if the opposite fresh cross appears while a position is open, the EA closes the current trade and immediately opens one in the new direction.
- **Consistency-decay exit** — while long, the trade is closed if `r` falls back below `+ExitThreshold` (symmetric for shorts: closed if `r` rises above `-ExitThreshold`). The linear structure that justified the trade has broken down, so the position is retired even if neither stop nor target was hit.

Guard rail: at initialisation the exit band is forced to sit strictly inside the entry band. If `ExitThreshold ≥ EntryThreshold`, the EA silently sets `ExitThreshold = EntryThreshold × 0.5` so a trade can never open and instantly fail its own decay test on the same bar.

Stop Loss & Take Profit

Every position carries a volatility-scaled protective stop and target derived from the Average True Range (ATR) of the entry bar:

- **Long:** $SL = \text{entry} - SL_{\text{AtrMult}} \times ATR$, $TP = \text{entry} + TP_{\text{AtrMult}} \times ATR$
- **Short:** $SL = \text{entry} + SL_{\text{AtrMult}} \times ATR$, $TP = \text{entry} - TP_{\text{AtrMult}} \times ATR$

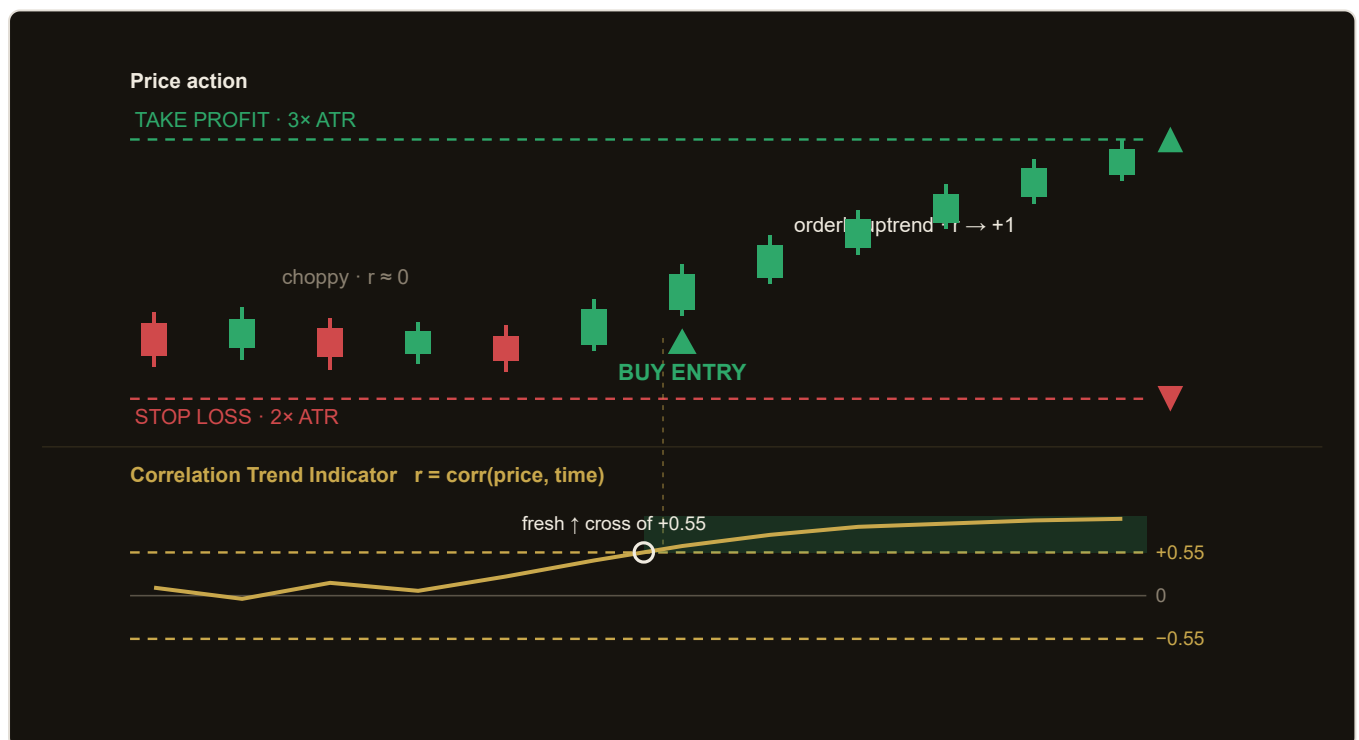
With the defaults ($SL_{\text{AtrMult}} = 2.0$, $TP_{\text{AtrMult}} = 3.0$) the target is 1.5× the stop distance, giving a positive reward-to-risk profile that suits a trend follower where a minority of clean runs pays for many small stop-outs.

Execution Notes

- The EA acts **once per completed bar** — signals are evaluated only when a new bar opens, never intrabar.
- A flat window (zero price variance) returns $r = 0$ rather than a spurious ± 1 , so a dead market never produces a false trend reading.
- Only one position per symbol/magic is held at a time; the ATR stop and target manage the trade once open, subject to the decay and reverse rules above.

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.

During the choppy opening bars the correlation oscillator hovers near zero — no linear structure, no trade. As price organises into an orderly climb, r rises and **freshly crosses up through +0.55**, firing the long entry. The ATR-based stop sits below and the take-profit above; the position rides the tidy uptrend until it reaches target, an opposite cross reverses it, or the correlation decays back below $+ExitThreshold$.

Parameters

Parameter	Default	Description
CorrPeriod	20	Number of closes in the Pearson correlation window. Shorter reacts faster to emerging trends but is noisier; longer is smoother and slower. Range 8–60, step 2.
EntryThreshold	0.55	Correlation level a fresh cross must clear to open a trade ($\pm$). Higher demands a cleaner, more established trend; lower fires earlier on weaker structure. Range 0.30–0.90, step 0.05.
ExitThreshold	0.20	Consistency-decay level ($\pm$). While long, if <code>r</code> falls below <code>+ExitThreshold</code> the trade is closed (symmetric for shorts). Forced below EntryThreshold at init. Range 0.00–0.60, step 0.05.
AtrPeriod	14	Averaging period for the ATR used to size the protective stop and target. Range 7–30, step 1.
SlAtrMult	2.0	Stop-loss distance as a multiple of ATR from entry. Larger gives the trade more room; smaller tightens risk. Range 1.0–4.0, step 0.5.
TpAtrMult	3.0	Take-profit distance as a multiple of ATR from entry. With the default SL this yields a 1.5:1 reward-to-risk. Range 1.0–6.0, step 0.5.
Lots	0.10	Fixed trade volume in lots. Rounded to 2 decimals and floored at 0.01. Range 0.01–1.0, step 0.01.
Magic	7311	Magic number identifying this EA's positions so it manages only its own trades on the symbol.

Recommended Settings

The correlation reading is scale-free, so a single set of thresholds transfers across instruments. Use these as sensible starting points and always validate on the Strategy Tester with quality tick data before going live.

BALANCED (DEFAULT)

Trending majors — EURUSD, GBPUSD, USDJPY · H1

`CorrPeriod = 20` , `EntryThreshold = 0.55` , `ExitThreshold = 0.20` , `AtrPeriod = 14` , `SlAtrMult = 2.0` , `TpAtrMult = 3.0` . A good all-round profile that waits for a clearly established trend before committing.

FASTER / MORE TRADES

Responsive on smoother instruments · H1

`CorrPeriod = 14` , `EntryThreshold = 0.45` , `ExitThreshold = 0.15` . Enters earlier as structure forms and exits sooner. Expect more signals and more false starts — pair with disciplined risk.

CONSERVATIVE / HIGHER TIMEFRAME

Selective swing trading — indices, Gold · H4

`CorrPeriod = 30` , `EntryThreshold = 0.65` , `ExitThreshold = 0.25` , `SLAtrMult = 2.5` , `TpAtrMult = 4.0` . Demands a very clean, mature trend; fewer but higher-conviction trades.

Tuning tip: keep `ExitThreshold` comfortably below `EntryThreshold` . Too close and trades are stopped out by ordinary correlation wobble; too low and a decaying, choppy trend is held long after its linear structure is gone.

How to Install on MetaTrader 5

- 1 Copy `PearsonCorrelationTrendShift.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

Before going live: run the EA in the Strategy Tester on high-quality tick data across several market regimes, and forward-test on a demo account. Because the correlation gate is symbol-agnostic, the same configuration is a reasonable baseline to test on any liquid trending instrument.

Risk Warning

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