

Gaussian Channel Breakout

Expert Advisor Documentation

PLATFORM

MetaTrader 5 (MT5)

TYPE

Trend-Following Breakout

TIMEFRAME

M15 – H4

WEBSITE

www.algobot.live

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Overview

Gaussian Channel Breakout is a trend-following breakout Expert Advisor built around an Ehlers multi-pole Gaussian filter channel — the "Donovan/Fuller Gaussian Channel" family. Instead of an ordinary moving-average envelope, it wraps price in a channel whose centerline and half-width are both produced by a cascade of low-pass filter stages, giving a far cleaner reading of trend and volatility than a simple EMA or Bollinger midline.

The idea is simple: a genuine directional move does not merely poke the edge of the channel — it **closes decisively beyond the filtered band while the smooth centerline is already tilting the same way**.

Requiring both conditions rejects the mean-reverting pokes that fade inside a flat channel and keeps only breakouts backed by an established drift. The EA is **stop-and-reverse**: an opposite breakout closes the current trade and opens a new one in the fresh direction. Protective stops and targets are sized as ATR multiples, so risk automatically scales with the live symbol and timeframe.

Why a Gaussian filter and not an EMA? A single-pole EMA has a long, lazy tail — it lags and it lets high-frequency chop leak through. Cascading **P** identical single-pole low-pass stages pushes the frequency response toward a Gaussian (central-limit) shape: a much sharper stop-band with far less lag for the same smoothness. Ehlers derives a *pole-corrected* smoothing constant so the cutoff stays consistent no matter how many poles you use.

How It Works

The Gaussian Filter Channel

On every closed bar the EA rebuilds two filtered series from the recent history window:

- **Centerline** — the Gaussian filter applied to *Close*.
- **Band half-width** — the *same* Gaussian filter applied to *True Range*, multiplied by `BandMult`. Because the width is filtered volatility rather than a fixed value, the envelope breathes with the market.

The upper and lower channel lines are simply the centerline plus and minus that filtered half-width. The pole-corrected smoothing constant is computed once at initialization:

```
beta = (1 - cos(2*pi / Length)) / (2^(1/Poles) - 1)
alpha = -beta + sqrt(beta^2 + 2*beta)
```

The filter itself is a cascade of `Poles` identical single-pole low-pass stages, each seeded with its first input sample and run oldest → newest:

```
y[i] = alpha * x[i] + (1 - alpha) * y[i-1]
```

Entry Logic

Signals are evaluated **once per fully closed bar** on the primary timeframe — never on an unfinished bar — which avoids repainting and intrabar noise. Two conditions must line up together:

- **Long** — the centerline is *rising* AND the close crosses up through the upper band: the previous close was at or below the upper band and the current close is above it.
- **Short** — the centerline is *falling* AND the close crosses down through the lower band: the previous close was at or above the lower band and the current close is below it.

The centerline-slope filter is what separates a real breakout from a random poke: a fresh close outside a channel whose midline is drifting the same way is far more likely to continue than one that fires against a flat or opposing filter.

Worked example — long breakout

Price has been coiling just below a gently rising Gaussian centerline. The prior bar closed right at the upper band; the next bar closes clearly above it while the centerline is still tilting up. Both conditions are satisfied, so the EA closes any open short and opens a long at the Ask, placing the stop `SlMult × ATR` below and the target `TpMult × ATR` above the entry.

Exit Logic & Stop-and-Reverse

Each position carries a fixed protective stop and take-profit from the moment it opens:

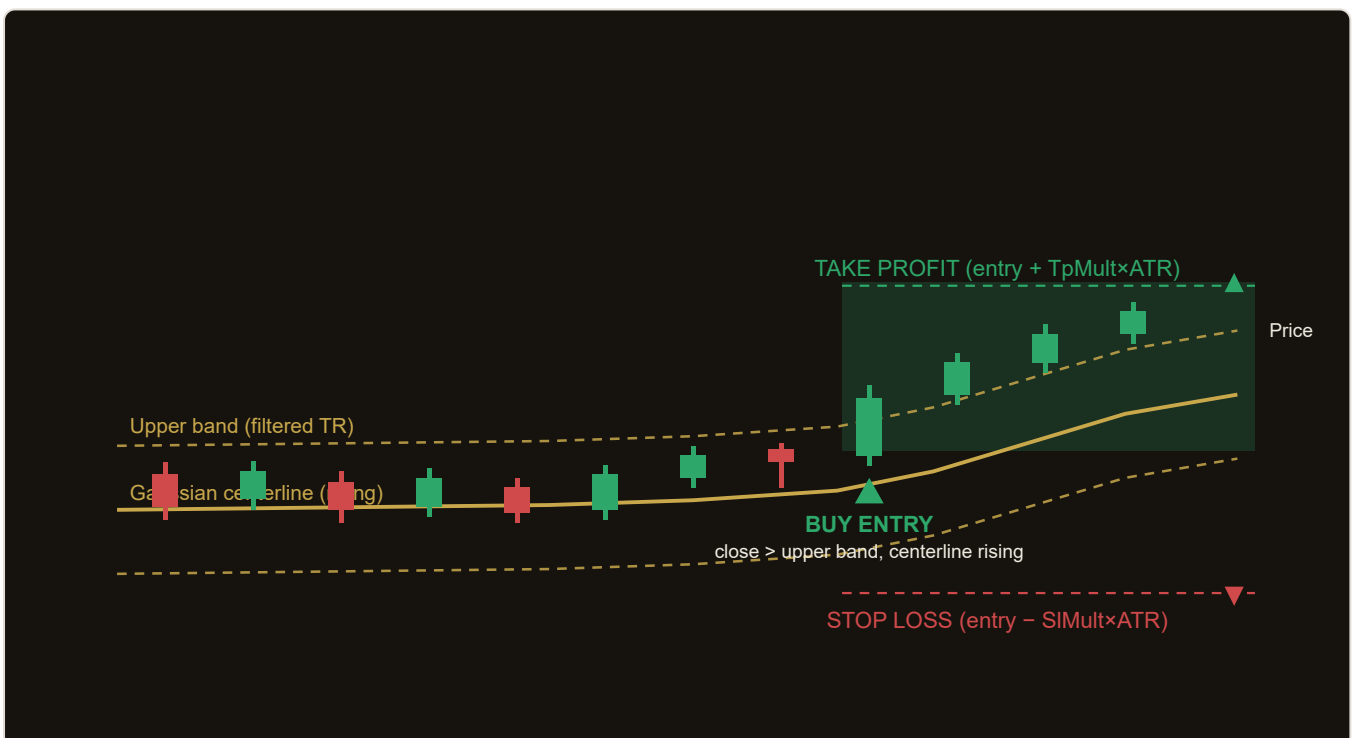
- **Long:** Stop = entry - $SlMult \times ATR$; Target = entry + $TpMult \times ATR$.
- **Short:** Stop = entry + $SlMult \times ATR$; Target = entry - $TpMult \times ATR$.

Beyond those brackets, the system is **stop-and-reverse**: if an opposite-direction breakout fires while a trade is open, the EA closes the existing position and immediately opens a new one the other way. The strategy therefore always holds at most one position per symbol (identified by its **Magic** number) and is either flat or aligned with the most recent confirmed breakout.

ATR-scaled risk. Because both the stop and the target are multiples of the Average True Range (over **AtrPeriod** bars), the same parameter set adapts sensibly across instruments and timeframes — wider brackets on volatile metals, tighter ones on calm majors — without manual re-tuning of pip distances.

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
Length	20	Gaussian filter period (cutoff). Larger values give a smoother, slower centerline. Range 8–80, step 2.
Poles	4	Number of cascaded single-pole stages. More poles produce a sharper, more Gaussian-like cutoff. Range 1–6, step 1.
BandMult	1.40	Channel half-width as a multiple of the Gaussian-filtered True Range. Wider values demand larger breakouts. Range 0.50–3.50, step 0.10.
AtrPeriod	14	ATR window used to size the stop and target distances. Range 5–40, step 1.
SIMult	2.00	Protective stop distance as a multiple of ATR (Stop = entry $\mp$ SIMult $\times$ ATR). Range 0.50–5.00, step 0.25.
TpMult	3.00	Take-profit distance as a multiple of ATR (Target = entry $\pm$ TpMult $\times$ ATR). Range 0.50–8.00, step 0.25.
Lots	0.10	Fixed order volume in lots. Range 0.01–1.00, step 0.05.
Magic	8321	Magic number used to identify and manage this EA's positions. Range 0–9,999,999, step 1.

Reading the defaults. With `Length = 20` and `Poles = 4` the channel is smooth but responsive, and a `BandMult` of 1.40 keeps the bands close enough to fire on meaningful breaks yet wide enough to skip minor noise. The default 2:3 stop-to-target ratio (`SIMult = 2.00` , `TpMult = 3.00`) gives a 1.5R reward-to-risk profile per trade.

Recommended Settings

The strategy is best suited to **trending instruments** — FX majors, metals, and index CFDs — on intraday-to-swing timeframes where clean directional moves develop. Use the defaults as a starting point and adjust to the character of the instrument:

- **Timeframe:** M15 to H4. Lower timeframes fire more often but include more false breaks; higher timeframes give fewer, cleaner signals.
- **Trending majors (EURUSD, GBPUSD):** defaults are a reasonable baseline. Consider `BandMult` 1.30–1.60.
- **Volatile metals / indices (XAUUSD, US30):** widen the channel with `BandMult` 1.60–2.20 and consider a slightly larger `AtrPeriod` to smooth stop sizing.

- **Smoother, slower signals:** raise `Length` toward 30–40 and/or `Poles` to 5–6 for a tighter stop-band and fewer whipsaws.
- **Position sizing:** keep `Lots` conservative relative to account equity; the fixed-lot model does not auto-scale to balance.

Range-bound markets. As a breakout system, this EA is designed to profit from sustained directional moves. In quiet, sideways conditions it can suffer repeated small stop-outs as breakouts fail and reverse. Favour trending instruments and sessions, and always validate any settings on out-of-sample data before live use.

How to Install on MetaTrader 5

- 1 Copy `GaussianChannelBreakout.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 MT5 Strategy Tester across several instruments and market regimes, then forward-test on a demo account. Confirm that spread, commission, and slippage on your broker still leave the ATR-based brackets viable.

Risk Warning

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