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Capacitive Charge Reversion

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Mean Reversion (Adaptive)	H1 (recommended)	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

Capacitive Charge Reversion is a self-adapting mean-reversion Expert Advisor built from an original first-principles hypothesis — not derived from any published indicator, price-action, Smart-Money-Concept, or Wyckoff method.

The core idea borrows a metaphor from electronics. The EA treats the displacement of price from its local equilibrium as a **voltage**, and models the market's stored "reversion potential" as **charge** accumulating on a *leaky capacitor*. A brief, isolated excursion barely charges the capacitor before it leaks away as noise or genuine repricing. But price that stays **persistently** on one side of its baseline keeps pumping charge in faster than it can leak out — storing energy that is primed to discharge back through equilibrium.

When that stored charge exceeds a threshold derived from its own recent volatility, the EA fades the move: it sells an over-charged upward drift and buys an over-charged downward drift, expecting price to relax back toward its baseline. Because every component — baseline, scale, and threshold — is recomputed each bar, the strategy self-calibrates to each symbol and timeframe with no fixed price levels.

> **Why "capacitive"?** Unlike a simple distance-from-average filter that reacts to any single spike, the leaky integrator weights *both* the magnitude and the *duration* of displacement. A lone spike hardly moves the charge; a sustained one-sided drift charges it up steadily. This is what separates transient noise from a genuine, mean-reverting stretch.

How It Works

On each newly-closed bar of the primary timeframe, the EA runs a compact signal-processing pipeline. It never acts intrabar, so signals do not repaint.

1. Local equilibrium and robust scale

Over the last `Window` closed bars the EA computes the mean close (the local equilibrium, `μ`) and the mean absolute deviation (`MAD`) — a robust measure of dispersion that is less sensitive to outliers than a standard deviation.

```
baseline  μ_t = mean(close, W)
scale     s_t  = mean|close − μ| over W          (MAD)
```

2. Voltage — normalized displacement

The just-closed bar's distance from the baseline is normalized by the robust scale to produce a unit-free "voltage":

```
voltage   x_t = (close_t − μ_t) / s_t
```

3. Charge — the leaky integrator

The voltage feeds a leaky integrator whose decay factor `Decay` (λ) controls how long past displacement is retained. This is the capacitor:

```
charge    Q_t = λ · Q_{t−1} + x_t
```

A single spike barely moves `Q`; a sustained drift charges it up; and it naturally decays toward zero whenever displacement relaxes.

4. Self-calibrating threshold

Rather than a fixed trigger level, the entry band is derived from the charge's *own* recent volatility over `ChargeWindow` bars:

```
trigger   θ_t = k · std(Q, Wq)          (k = ThresholdMult)
```

Because θ scales with the charge's standard deviation, the system adapts automatically to each symbol and timeframe with no hand-tuned price levels.

5. Entry logic

The EA fades accumulated charge back toward equilibrium:

- **Q ≥ +θ** → over-charged upward → **SELL** (fade toward baseline)
- **Q ≤ −θ** → over-charged downward → **BUY** (fade toward baseline)

Only one position is held at a time; a new entry is only considered when no position is open.

6. Exit logic

An open position is closed when the capacitor discharges — the charge relaxes back inside an exit band of `ExitFraction · θ` around zero — or when the charge flips all the way to the opposite extreme:

- **Long (opened on Q ≤ −θ):** exit when `Q ≥ −ExitFraction·θ` or `Q ≥ +θ`
- **Short (opened on Q ≥ +θ):** exit when `Q ≤ +ExitFraction·θ` or `Q ≤ −θ`

7. Risk bounds (ATR stop / take)

Every trade is protected by an ATR-based stop-loss and take-profit, sized from the Average True Range over `AtrPeriod` bars:

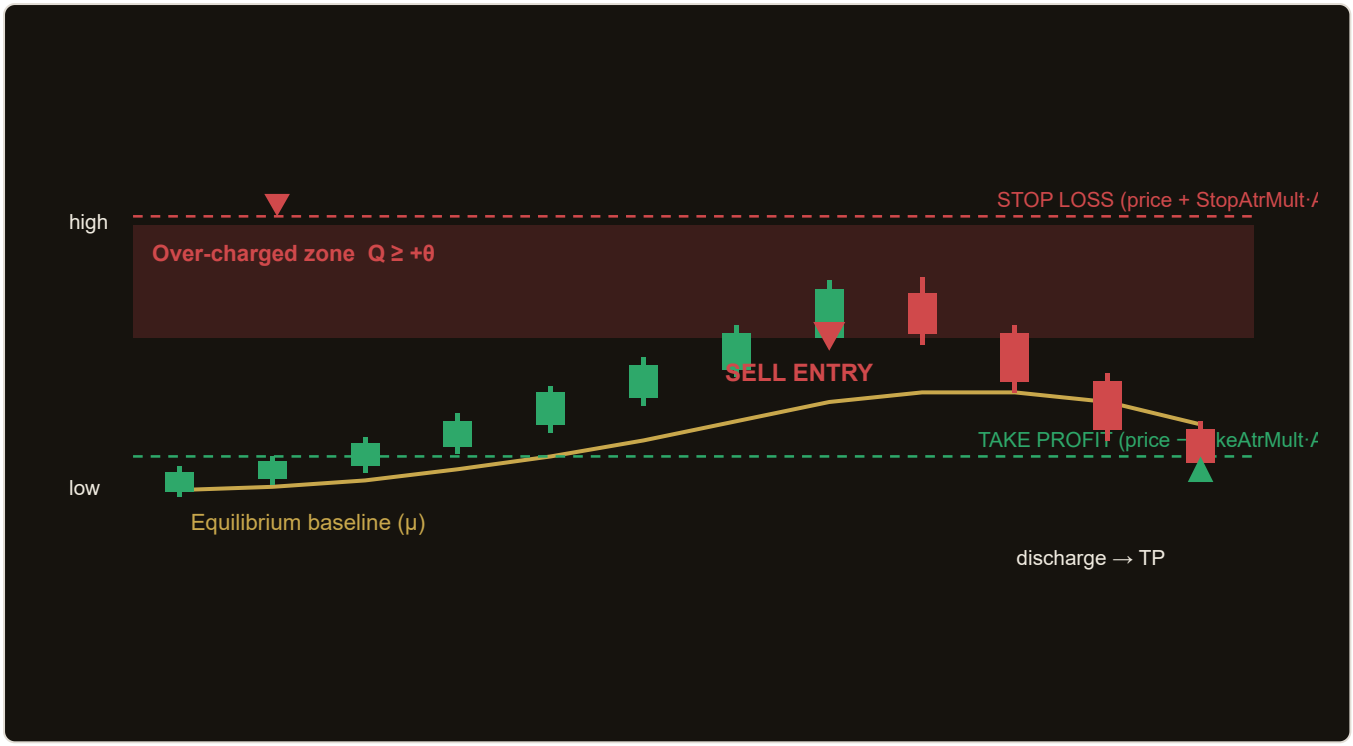
```
SELL:  SL = price + StopAtrMult · ATR    TP = price − TakeAtrMult · ATR
BUY:   SL = price − StopAtrMult · ATR    TP = price + TakeAtrMult · ATR
```

Worked example

Price drifts persistently above its 20-bar baseline for several bars. Each bar adds positive voltage, and the leaky integrator charges up until `Q` crosses `+θ`. The EA opens a **SELL**, placing its stop above and its take-profit below (toward the baseline). As price relaxes back, the charge discharges toward zero; once it re-enters the exit band the position is closed — or the ATR take-profit is hit first.

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
Window	`20`	Number of closed bars (W) used to compute the local equilibrium mean and the robust MAD scale. Range 8–60, step 2. Larger values give a smoother, slower-reacting baseline.
Decay	`0.80`	Leaky-integrator decay factor (λ) for the charge. Range 0.50–0.97, step 0.01. Higher values retain past displacement longer (more persistence weighting); lower values leak charge away faster.
ChargeWindow	`100`	Number of charge samples (Wq) used to compute the standard deviation behind the self-calibrating threshold. Range 30–300, step 10.
ThresholdMult	`2.0`	Multiplier k on the charge's own standard deviation that sets the entry threshold θ = k · std(Q). Range 1.0–4.0, step 0.1. Higher values demand a more extreme charge before entering.
ExitFraction	`0.30`	Fraction of θ defining the discharge exit band. Range 0.0–0.80, step 0.05. The position closes once the charge relaxes back inside ExitFraction · θ of zero.
AtrPeriod	`14`	Average True Range lookback period used to size the stop-loss and take-profit. Range 7–30, step 1.
StopAtrMult	`2.0`	Stop-loss distance as a multiple of ATR. Range 0.5–5.0, step 0.1.
TakeAtrMult	`3.0`	Take-profit distance as a multiple of ATR. Range 0.5–8.0, step 0.1.
Lots	`0.10`	Fixed trade volume in lots. Range 0.01–1.0, step 0.01.
Magic	`700123`	Magic number identifying this EA's positions so it manages only its own trades.

Recommended Settings

The EA is designed to self-calibrate, so the defaults are a sound starting point on most symbols. The suggestions below are practical guidance, not guarantees.

- **Symbol:** Liquid, mean-reverting instruments — major FX pairs (e.g. EUR/USD, GBP/USD) or indices that tend to oscillate rather than trend strongly.
- **Timeframe:** H1 as a starting point. The `ChargeWindow` of 100 bars gives the threshold ample data to calibrate on this timeframe.
- **Charge persistence:** Raise `Decay` toward 0.90 to require longer, more sustained drifts before charging up; lower it toward 0.60 for a faster, more responsive integrator.

- **Selectivity:** Increase `ThresholdMult` for fewer, higher-conviction entries; decrease it to trade more frequently.
- **Risk sizing:** Keep the `TakeAtrMult` / `StopAtrMult` ratio above 1 to favour a positive reward-to-risk profile, and always validate on a demo account first.

> **Tip:** Because the threshold θ is derived from the charge's own recent volatility, you rarely need to hand-tune fixed levels when switching symbols or timeframes. Focus your optimization on `Window`, `Decay`, and `ThresholdMult` first.

How to Install on MetaTrader 5

1. Copy `CapacitiveChargeReversion.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:** The EA acts once per newly-closed bar and never intrabar, so its signals do not repaint. Allow it to run continuously on the chart so the leaky-integrator charge and self-calibrating threshold can build their history.

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.