PSEDYS | TECHNICAL REFERENCE MANUAL V3.0

CCI — Commodity Channel Index

Technical Reference Manual v1.0

PSEDYS | Complete Edition

Typical Price · SMA_TP · Mean Deviation · Constant 0.015 · OB/OS · Zero Cross · Divergence · CCI vs RSI · MTF · Bot vs TradingView

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1. What is CCI? Concept and Origin

CCI (Commodity Channel Index) was created by Donald Lambert and published in 1980 in Commodities magazine. Although designed for futures markets (commodities), it is applied to any market. CCI measures **the deviation of the Typical Price from its SMA**, normalized by average variability.

Lambert's Philosophy: Price cycles tend to revert to the mean after extreme deviations. CCI quantifies how far the price is from its statistical mean.

CCI vs RSI:
- RSI: compares close vs previous close (momentum)
- CCI: compares Typical Price against its mean (statistical deviation)
- CCI has no theoretical limits (can exceed ±300 in extreme trends)
- RSI is limited to 0–100

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2. Calculation Formula — Complete

2.1 Step 1 — Typical Price (TP)

```
TP[i] = (High[i] + Low[i] + Close[i]) / 3
```

TP includes High and Low — capturing the entire bar range, not just the close. This makes CCI more sensitive to spikes than RSI.

2.2 Step 2 — SMA of Typical Price

```
SMA_TP[i] = sum(TP[i-period+1 .. i]) / period    ← mean TP over N bars
```

2.3 Step 3 — Mean Deviation (Mean Absolute Deviation)

```
MeanDev[i] = sum(|TP[j] − SMA_TP[i]|) / period    for j = i−period+1 .. i
```

Critical Note: CCI uses **Mean Absolute Deviation (MAD)**, NOT standard deviation (StdDev). MAD is the average of absolute distances from the mean, not the square root of variance. If implementation uses StdDev → CCI will differ from TradingView.

2.4 Step 4 — Final CCI

```
CCI[i] = (TP[i] − SMA_TP[i]) / (0.015 × MeanDev[i])
```

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2.5 Constant 0.015 — Origin

Lambert empirically chose 0.015 so that **approximately 70–80% of CCI values fall within the range [−100, +100]** on a normal price distribution. This means:
- CCI > 100: price is more than 2.24 mean deviations above the mean → bullish signal
- CCI < −100: price is more than 2.24 mean deviations below the mean → bearish signal

If the constant were 0.0150: level ±100 corresponds to ~2.24× MeanDev from SMA.

2.6 Complete Numeric Example — period=20, 50 bars

Manual verification bar 20 (first CCI value):

```
TP[1..20] = calculated from H, L, C of bars 1–20
SMA_TP    = 105.8163
Mean Dev  = Σ|TP[j] − 105.8163| / 20 = 3.1367

TP[20]    = (High[20]+Low[20]+Close[20])/3 = 111.44
CCI       = (111.44 − 105.8163) / (0.015 × 3.1367)
          = 5.6237 / 0.0471
          = 119.53  ✓ (overbought)
```

Selection table bars 20–50:

Bar	Close	TP	CCI	Zone
20	111.73	111.44	**+119.53**	OB
22	111.80	111.85	+105.72	OB
28	109.30	109.43	+4.18	BULL
30	108.61	108.72	−50.83	BEAR
32	107.54	107.61	**−131.95**	OS
34	107.80	107.66	−119.60	OS
40	110.88	110.72	+66.43	BULL
42	112.30	112.05	**+140.07**	OB
46	114.73	114.44	+164.55	OB
50	117.44	117.15	**+136.68**	OB

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2.7 Alternative Parameters

Variant	Period	Warm-up	Characteristic
Standard	**20**	**20**	**PSEDYS default**
Fast	14	14	More reactive
Slow	40	40	Macro filter
Lambert original	20	20	Identical to standard

3. CCI Range — Unlimited, not 0–100

CCI **has no theoretical limits** — it can exceed ±300 or even ±500 in extreme or volatile trends.

```
Typical CCI in normal trading: −200 to +200
Extreme CCI in active trending: +150 to +400
Extreme CCI in crash: −150 to −500
```

Implication: Thresholds ±100 are not absolute OB/OS — they are signaling thresholds. CCI > +200 does not automatically mean reversal; it can be confirmation of a strong trend.

4. Lag and Warm-up

```
First CCI value: bar period = bar 20
Warm-up: period bars (no seed cascade)
Lag: (period-1)/2 = 9.5 bars (SMA of period bars)
Production: 50+ bars
```

No Wilder smoothing — CCI is based on simple SMA and MAD.

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5. CCI Levels — Complete Interpretation

CCI Level	Interpretation	Possible Action
> +200	Extreme bullish trend	Riding trend, tight trailing
+100 to +200	**Overbought** — strong bullish	Caution, possible correction
0 to +100	Bullish zone	Bullish bias, trend present
0	**Zero line**	TP = SMA_TP → equilibrium
−100 to 0	Bearish zone	Bearish bias
−100 to −200	**Oversold** — strong bearish	Caution, possible bounce
< −200	Extreme bearish trend	Riding short, tight trailing

6. Trading Signals

6.1 OB/OS (±100, ±200)

```
CCI > +100 = overbought warning
CCI > +200 = extreme bullish trend (or immediate peak)
CCI < -100 = oversold warning
CCI < -200 = extreme bearish trend (or immediate bottom)
```

Correct usage: Like RSI, CCI > 100 in active bullish trend is NOT an automatic Short signal.

6.2 Zero Line Cross

```
CCI cross zero bullish (from negative to positive):
  TP exceeds SMA_TP → price returns above mean → bullish signal

CCI cross zero bearish (from positive to negative):
  TP falls below SMA_TP → bearish signal
```

Zero cross = slower but more reliable signal than ±100 crossing.

6.3 Divergence

Identical to RSI:

```
Price HH + CCI LH → bearish divergence (TP no longer exceeds mean as much)
Price LL + CCI HL → bullish divergence
```

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6.4 Combined Filters

```
entry_long = (
    ema_stack_bullish and      # direction
    adx > 18 and               # strength
    cci > -50 and              # not in deep OS relative to mean
    cci_slope > 0              # CCI rising
)
```

7. CCI vs RSI — Comparison

Aspect	CCI	RSI
Basis	TP vs SMA(TP)	Close vs Previous Close
Normalization	Mean Deviation (MAD)	Avg Gain/Avg Loss
Range	Unlimited (−∞ to +∞)	0–100
OB/OS	±100, ±200	70/30
Spike Sensitive	Yes (TP includes H/L)	No (only Close)
Smoothing	None (SMA+MAD)	Wilder RMA
Zero line	TP = SMA (equilibrium)	RSI = 50 (Gain=Loss)

8. CCI in Sideways Market

In a sideways market, CCI oscillates around 0, frequently crossing ±100:

```
CCI < -100 → bounce at lower range support → possible Long
CCI > +100 → rejection at upper resistance → possible Short
```

CCI is useful in range trading — a natural indicator of range extremes.

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9. MTF

Level	Timeframe	Long Condition
Macro	4H	CCI > 0 (TP above macro SMA_TP)
Meso	1H	CCI > -50 and rising
Entry	5M	CCI exit OS (-100→-50) or cross zero

10–11. PSEDYS and Bot vs TradingView Validation

Main sources of divergence:

```
1. StdDev instead of MAD (Mean Absolute Deviation) → cause #1
2. Close instead of TP (Typical Price) as basis → cause #2
3. Constant 0.015 incorrectly implemented → minor
```

Checklist:

```
□ TP = (H + L + C) / 3
□ MeanDev = SUM(|TP[j] - SMA_TP|) / period  ← MAD, not StdDev
□ CCI = (TP - SMA_TP) / (0.015 × MeanDev)
□ Window: period elements including current bar
□ Tolerance: < 0.5 CCI points
```

Python Script:

```
def cci(highs, lows, closes, period=20):
    n = len(closes)
    tp = [(highs[i]+lows[i]+closes[i])/3 for i in range(n)]
    cci_v = [None] * n
    for i in range(period-1, n):
        window = tp[i-period+1:i+1]
        sma = sum(window) / period
        mad = sum(abs(v - sma) for v in window) / period
        cci_v[i] = (tp[i] - sma) / (0.015 * mad) if mad != 0 else 0
    return cci_v
```

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12. Practical Exercises

Exercise 1: CCI > +200 — exit Long?

Situation: On 4H, CCI = +215. EMA stack bullish. ADX = 38.

Answer: Do not exit immediately. CCI > 200 = active extreme trend. Tighten trailing SL (PSAR or SuperTrend) for security, but do not exit confirmed trend. Exit when CCI falls below +150 with declining ADX.

Exercise 2: CCI zero cross bearish with EMA bullish

Situation: On 1H, CCI crosses from +40 to −10 (zero cross bearish). EMA 200 4H below price. ADX = 22.

Answer: Skip Short. Zero cross bearish on 1H in macro bullish context = temporary pullback. TP has fallen below SMA_TP on 1H — normal in consolidation. Wait for CCI to return > 0 on 1H for Long continuation or enter Short ONLY if EMA 200 4H confirms bearish.

Indicator manual: CCI — Commodity Channel Index Part 2 of 2.

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13. Cheat Sheet — Rapid Summary

Concept	Value / Rule
TP	`(H + L + C) / 3`
SMA_TP	`SMA(TP, period)`
Mean Dev	`Σ|TP[j] − SMA_TP| / period` — MAD, NOT StdDev
CCI	`(TP − SMA_TP) / (0.015 × MeanDev)`
Constant 0.015	Calibrated for 70-80% values in [−100, +100]
Standard period	20
Range	Unlimited (−∞, +∞)
OB	> +100 (warning), > +200 (extreme)
OS	< −100 (warning), < −200 (extreme)
Zero cross bull	TP crosses above SMA_TP → bullish bias
Zero cross bear	TP crosses below SMA_TP → bearish bias
Lag	(period−1)/2 = 9.5 bars
Warm-up	period = 20 bars
Bearish divergence	Price HH + CCI LH
CCI vs RSI	CCI = TP vs average; RSI = close/close momentum
Range trading	CCI < −100 → Long; CCI > +100 → Short (in range)
Cause #1 divergence	StdDev instead of MAD (Mean Absolute Deviation)
Cause #2 divergence	Close instead of TP = (H+L+C)/3

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