Contract Specifications

Thalex Digital Trading Platform Ltd

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thalex

Better products.
Better execution.
Better trading.

Abbreviations

BTC: Bitcoin

ETH: Ethereum

USDt: Tether

USDC: USD Coin

Perpetual

Contract Specifications

Underlying	Bitcoin	Ethereum
Ticker	BTC–PERPETUAL	ETH–PERPETUAL
Index	Thalex BTCUSD	Thalex ETHUSD
Contract Size	1 BTC valued at 1 USD per Index Point	1 ETH valued at 1 USD per Index Point
Quotation	USD	USD
Minimum Order Size	0.001 BTC	0.01 ETH
Volume Tick Size	0.001 BTC	0.01 ETH
Price Tick Size	1 USD	0.1 USD
Collateral	BTC, ETH, USDt, USDC	BTC, ETH, USDt, USDC
Settlement Coin	USDt	USDt
Daily Settlement	At 08:00 UTC	At 08:00 UTC
Daily Settlement Procedure	Futures-style settlement at the Mark Price	Futures-style settlement at the Mark Price

Mark Price

The Mark Price consists of the Index and a 30 second exponential moving average of the Premium, which is updated approximately every second. The Premium is the difference between the Index and the bid/ask constrained mid price, which is based on 1 BTC or 20 ETH of perp contracts.

$$Mark\ Price = Index + EMA_{30}[Premium]$$

$$Premium = \left\{ \begin{array}{ccc} bid - Index & if & bid > Mid\ Price \\ ask - Index & if & ask < Mid\ Price \\ Mid\ Price - Index & otherwise & \end{array} \right\}$$

$$Mid\ Price = \frac{(FairDepthBid + FairDepthAsk)}{2}$$

Mid Price is calculated as the average of FairDepthBid and FairDepthAsk, where FairDepthBid and FairDepthAsk are the average price to buy/sell 1 BTC or 20 ETH perpetual contracts

The EMA30 is a smooth exponential time-based decay, where each additional second contributes 2/31, so that the center of mass is equal to that of a standard moving average over 30 seconds.

In case of insufficient liquidity, mark price will simply target the index.

Funding Payments

For any interval of T hours, a position of one contract long will pay:

$$Funding = (Mark - Index\ Price) \times \frac{T}{8\ hours}$$

During the same interval, a position of one contract short will receive this amount of funding. For example, assume a constant BTC-Perpetual Mark Price of $50,100 and BTC Index of $50,000. A participant who is long four perpetual contracts for a period of three hours would pay $150:

$$4 \times (\$50{,}100 - \$50{,}000) \times \frac{3}{8} = \$150$$

Note that the spread between Index and Mark Price will change continuously. Hence, funding is implemented as an integral over time:

$$Funding = \int_{T_0}^{T_1} \big(Mark\ Price(t) - Index(t)\big) \times position(t) \times \frac{dt}{8\ hours}$$

Funding is accumulated approximately every second into Unsettled P&L (See Portfolio Margin). Although funding rates are calculated for 8-hour intervals and exchanged every second, the actual settlement of funding payments occurs every 24 hours. This means that the accumulated funding is booked and settled into your asset balances every morning at 8 AM UTC.

Futures

Contract Specifications

Underlying	Bitcoin	Ethereum
Ticker	BTC–DDMMMYY	ETH–DDMMMYY
Index	Thalex BTCUSD	Thalex ETHUSD
Contract Size	1 BTC valued at 1 USD per Index Point	1 ETH valued at 1 USD per Index Point
Quotation	USD	USD
Minimum Order Size	0.001 BTC	0.01 ETH
Volume Tick Size	0.001 BTC	0.01 ETH
Price Tick Size	1 USD	0.1 USD
Collateral	BTC, ETH, USDt, USDC	BTC, ETH, USDt, USDC
Settlement Coin	USDt	USDt
Daily Settlement	At 08:00 UTC	At 08:00 UTC
Daily Settlement Procedure	Futures-style settlement at the Mark Price	Futures-style settlement at the Mark Price
Final Settlement	At 08:00 UTC on the day of expiration	At 08:00 UTC on the day of expiration
Exchange Delivery Settlement Price ('EDSP')	Time-weighted average BTC Index between 07:30 and 08:00 UTC on the day of expiration	Time-weighted average ETH Index between 07:30 and 08:00 UTC on the day of expiration
Final Settlement Procedure	Cash settlement in the Settlement Coin based on the EDSP	Cash settlement in the Settlement Coin based on the EDSP

Examples of tickers:

- BTC–25MAR22 is a Bitcoin future that expires at 08:00 UTC on 25 March 2022
- ETH–28OCT22 is an Ethereum future that expires at 08:00 UTC on 28 October 2022

Mark Price

The Mark Price consists of the Index and a 30 second exponential moving average of the Premium, which is updated approximately every second. The Premium is the difference between the Index and the constrained Mark Price.

$$Mark\ Price = Index + EMA_{30}[Premium]$$

$$Premium = \begin{Bmatrix} bid - Index & if & bid > Mark\ Price \\ ask - Index & if & ask < Mark\ Price \\ Mark\ Price - Index & otherwise & \end{Bmatrix}$$

The EMA30 is a smooth exponential time-based decay, where each additional second contributes 2/31, so that the center of mass is equal to that of a standard moving average over 30 seconds.

Expiration Introduction

Futures are introduced at 08:00 UTC on the day of introduction.

Maturity	Lifetime	Introduction
Daily	48 hours	Daily
Weekly	3 weeks	Friday
Monthly	2 months	Last Friday of the month
Quarterly	7 months	Last Friday of February, May, August and November

Examples:

Instrument	Maturity	Introduced at 08:00 UTC on	Expires at 08:00 UTC on
BTC–19MAY22	Daily	Tuesday May 17th, 2022	Thursday May 19th, 2022
BTC–20MAY22	Weekly	Friday May 6th, 2022	Friday May 20th, 2022
BTC–27MAY22	Monthly	Friday March 25th, 2022	Friday May 27th, 2022
BTC–30DEC22	Quarterly	Friday May 27th, 2022	Friday December 30th, 2022

Rolls

Contract Specifications

Underlying	Bitcoin	Ethereum
Ticker	BTC–DDMMMYY–PERPETUAL or BTC–DDMMMYY–DDMMMYY	ETH–DDMMMYY–PERPETUAL or ETH–DDMMMYY–DDMMMYY
Contract Size	1 BTC valued at 1 USD per Index Point	1 ETH valued at 1 USD per Index Point
Quotation	USD	USD
Minimum Order Size	0.1 BTC	1.0 ETH
Volume Tick Size	0.001 BTC	0.01 ETH
Price Tick Size	1 USD	0.1 USD

Thalex offers order books in roll instruments. Roll instruments are tradable combinations to simultaneously buy and sell a perpetual and a future or two futures with the same underlying.

A buy order in a roll instrument is an order to buy the longer maturity contract and sell the earlier maturity. For example:

- A participant buys one roll instrument BTC-28JAN22-PERPETUAL. The resulting position change is +1 BTC-28JAN22 and -1 BTC-PERPETUAL.
- A participant sells one roll instrument ETH-25FEB22-28JAN22. The resulting position change is -1 ETH-25FEB22 and +1 ETH-28JAN22.

A roll order fill results in two trades. The trade prices of the legs are given suitable (arbitrary) reference prices.

For instance, a limit buy order of size 0.5 in BTC-28JAN22-PERPETUAL at $45 may lead to the following trade history when filled:

- 0.5 BTC-28JAN22 bought at $50,945, and
- 0.5 BTC-PERPETUAL sold at $50,900.

Implied Matching

Thalex supports implied matching. This means that orders in a roll instrument and one of its outright contracts imply orders in the other outright contract.

Implied orders compete with outright orders for price/time priority. The time priority of an implied order is taken to be the later time of its constituents.

The next example shows implied orders in a future derived from liquidity in the roll and perpetual. For illustrative purposes, implied orders are marked with “i”.

BTC–28JAN22–PERPETUAL			
Bid Size	Bid Price	Ask Price	Ask Size
		$350	1.000
2.000	$300		

BTC–PERPETUAL			
Bid Size	Bid Price	Ask Price	Ask Size
		$50,105	1.000
		$50,100	0.100
0.100	$50,000		
1.000	$49,995		

BTC–28JAN22			
Bid Size	Bid Price	Ask Price	Ask Size
		$50,455	0.900 i
		$50,450	0.100 if
0.100 i	$50,300		
1.000 i	$50,295		

A market sell order in BTC-28JAN22 of size 0.200 BTC would trigger the following order fills:

Instrument	Fill Levels	Description
BTC–28JAN22	0.1 at $50,300 0.1 at $50,295	Incoming aggressive sell order
BTC–28JAN22–PERPETUAL	0.2 at $300	Limit buy order in the roll book, translates to: buy 0.2 28JAN22 and sell 0.2 PERPETUAL
BTC–PERPETUAL	0.1 at $50,000 0.1 at $49,995	Passive bids in the PERPETUAL book

Options

Contract Specifications

Underlying	Bitcoin	Ethereum
Ticker Call	BTC–DDMMMYY–STRIKE–C	ETH–DDMMMYY–STRIKE–C
Ticker Put	BTC–DDMMMYY–STRIKE–P	ETH–DDMMMYY–STRIKE–P
Index	Thalex BTCUSD	Thalex ETHUSD
Contract Size	1 BTC valued at 1 USD per Index Point	1 ETH valued at 1 USD per Index Point
Quotation	USD	USD
Type	European style	European style
Minimum Order Size	0.1 BTC	1 ETH
Volume Tick Size	0.1 BTC	1 ETH
Price Tick Size	5 USD	1 USD
Collateral	BTC, ETH, USDt, USDC	BTC, ETH, USDt, USDC
Settlement Coin	USDt	USDt
Daily Settlement	At 08:00 UTC	At 08:00 UTC
Daily Settlement Procedure	Futures-style settlement at the Mark Price	Futures-style settlement at the Mark Price
Final Settlement	At 08:00 UTC on the day of expiration	At 08:00 UTC on the day of expiration
Exchange Delivery Settlement Price ('EDSP')	Time-weighted average BTC Index between 07:30 and 08:00 UTC on the day of expiration	Time-weighted average ETH Index between 07:30 and 08:00 UTC on the day of expiration
Final Settlement Procedure	Automatic exercise and cash settlement in the Settlement Coin based on the EDSP	Automatic exercise and cash settlement in the Settlement Coin based on the EDSP

Examples of option tickers:

- BTC–14OCT22–55000–C: Bitcoin call with $55K strike expiring on 14 October 2022 at 08:00 UTC
- BTC–14OCT22–55000–P: Bitcoin put with $55K strike expiring on 14 October 2022 at 08:00 UTC
- ETH–25NOV22–4000–P: Ethereum put with $4K strike expiring on 25 November 2022 at 08:00 UTC

Mark Price

Option mark prices are calculated using Black-Scholes with a zero risk-free interest rate, the relevant future mark price, and mark volatility as inputs. Mark volatility is determined by Thalex on a per strike and maturity basis and tracks the active order book.

Expiration Introduction

Options are introduced at 08:00 UTC on the day of introduction.

Every option expiration will have a corresponding future expiration.

Maturity	Lifetime	Introduction
Daily	48 hours	Daily
Weekly	3 weeks	Friday
Monthly	2 months	Last Friday of the month
Quarterly	7 months	Last Friday of February, May, August and November

Examples:

Instrument	Maturity	Introduced at 08:00 UTC on	Expires at 08:00 UTC on
BTC–19MAY22–55000–C	Daily	Tuesday May 17th, 2022	Thursday May 19th, 2022
BTC–20MAY22–55000–C	Weekly	Friday May 6th, 2022	Friday May 27th, 2022
BTC–27MAY22–55000–C	Monthly	Friday March 25th, 2022	Friday May 27th, 2022
BTC–30DEC22–55000–C	Quarterly	Friday May 27th, 2022	Friday December 30th, 2022

Strike Introduction

Strikes are introduced based on an extension - densification algorithm. The algorithm extends the strike range until the deltas of the lowest and highest strike meet a target range. It then densifies by introducing a strike in between adjacent strikes whose deltas are too far apart. For options with time to expiry shorter than two weeks, the introduced strikes have wider and denser delta intervals.

General

Index Methodology

This section focuses on index calculation for underlying assets, referenced in the contract specifications as 'Thalex BTCUSD' and 'Thalex ETHUSD'. In what follows we will refer to either as "Index".

Each Index is computed based on order book data for spot markets from a number of exchanges. The calculation has four steps:

1. Obtain a list of prices from constituent exchanges. The price of an exchange is calculated as the average of best bid and ask in the order book.
2. Calculate the median of available prices.
3. Cap each price to deviate at most 0.5% from the median.
4. Calculate the simple average of capped values to obtain the Index.

Shown as a formula with available exchange prices denoted as $P_1, P_2, \ldots, P_n$:

$$M = Median\{P_1, P_2, \ldots P_n\}$$

$$P_i^* = \begin{Bmatrix} 0.995 \times M & if & P_i < 0.995 \times M \\ 1.005 \times M & if & P_i > 1.005 \times M \\ P_i & otherwise & \end{Bmatrix}$$

$$Index = \frac{1}{n} \times (P_1^* + P_2^* + \ldots + P_n^*)$$

Expiration

On the day of expiration, the Exchange Delivery Settlement Price ('EDSP') is calculated as the time-weighted average of the Index between 07:30 UTC and 08:00 UTC.

During the expiration window, Thalex broadcasts:

- Current Expiration Average: time-weighted average of the Index since the start of the expiration window, accompanied by a timestamp to track expiration progress.
- Expected EDSP: average of the Current Expiration Average and the Index, weighted by time elapsed and time remaining relative to the expiration window.

An expiring future will have its Mark Price calculated based on the Expected EDSP.

Settlement Procedure

USDt is the Settlement Coin. Thalex, in its sole discretion, can select a different Settlement Coin.

Unsettled P&L, either realized or unrealized, is not available for withdrawal. Settlement credits / debits the Settlement Coin balance with the Unsettled P&L. This process uses a market-based USDt/USD rate to convert P&L, which is USD-denominated, into a USDt amount.

Participants should ensure they have sufficient balance in the Settlement Coin.

Portfolio Margin

Collateral, Asset and Margin Balance

Thalex accepts BTC, ETH, USDt and USDC as collateral assets. BTC and ETH contracts are collateralized by the same asset pool. The Asset Balance is defined as the total value of collateral, translated to USD.

- USDt and USDC are translated at a value determined by Thalex. No haircuts are applied.
- BTC and ETH are translated at their respective Index values. These assets are treated as positions for the calculation of margin requirements.

Asset Balance and Unsettled P&L together make up Margin Balance. Unsettled P&L is the profit and loss expressed in USD from open and closed positions in contracts since last settlement, updated in real-time.

$$Margin\ Balance\ =\ Asset\ Balance\ +\ Unsettled\ P\&L$$

Margin Balance is compared to margin required to determine the ability to change or maintain positions.

Portfolio Margin Methodology

Margin Requirements are calculated per underlying.

The total Initial Margin Requirement (IMR) is equal to the sum of Initial Margin Requirements.

$$IMR\ =\ IMR(BTC) + IMR(ETH)$$

The Maintenance Margin Requirement (MMR) is 70% of the Initial Margin Requirement.

$$MMR\ =\ IMR \times 0.7$$

The Initial Margin Requirement for an underlying asset consists of:

$$IMR(u) =\ Maximum\ Loss\ Coverage(u) +\ Roll\ Contingency(u) +\ Option\ Contingency(u)$$

Maximum Loss Coverage

Maximum loss is calculated by simulating scenarios constructed by relative changes in the price of the underlying (as measured by the Index) and absolute changes in implied volatility. In each scenario the potential loss is multiplied with a corresponding coverage factor. Thalex includes extreme scenarios for which only partial coverage is required (coverage factor < 1).

In total about 50 different scenarios are run. Extreme scenarios are construed in such a way that they do not impact portfolios with no option positions, while portfolios with large tail risks are most impacted.

The loss coverage for a scenario is loss x coverage factor. The maximum loss coverage is the largest loss coverage across all scenarios.

Scenarios bound by a price change of -/+20% and a volatility change of -30% to +45% require full coverage of any simulated loss. Extreme scenarios with a price change of up to -70% and +100% and, correspondingly, wider ranges of changes in implied volatility require partial coverage.

For options that expire within 30 days, the change in volatility is amplified by a factor equal to $(30/\ max(1, d))^{0.3}$ where d is the number of days to expiration.

Roll Contingency

Thalex adds margin for positions with offsetting price sensitivity (delta) in different maturities.

The roll position is the minimum of the sum of long delta positions on the one hand and the sum of short delta positions on the other hand. For this purpose, the delta position is aggregated by maturity for options and futures positions separately. Collateral in the underlying assets and the perpetual are treated as distinct maturities for this purpose.

The Roll Contingency equals 4% of the Index Roll Position.

Option Contingency

Thalex adds margin for each short strike position.

A strike position is the sum of the call option position and the put option position of a given strike and maturity. The Total Short Option Position is the sum of short strike positions.

The Options Contingency equals 0.25% of Index × Total Short Options Position.

Examples

What follows are three examples illustrating a component of the portfolio margin calculation.

The examples only include BTC contracts. Assume for simplicity that the BTC Index and Future Mark Price are $50,000.

Maximum Loss Coverage

This example shows a portfolio of call options all with a time to maturity of 14 days.

Strike	Position	Mark IV	Delta
BTC–DDMMMYY–50000–C	+ 1	75	0.53
BTC–DDMMMYY–60000–C	– 5	76	0.12
BTC–DDMMMYY–70000–C	+ 1	79	0.02

To clarify the impact of extreme scenarios, the outcome of the calculation is shown twice:

1. Only full coverage scenarios (coverage factor = 1)
2. All scenarios including extreme scenarios (coverage factor <= 1)

Scenarios	Max Range (%Index, %IV)	P&L	Coverage Factor	Max Loss Coverage
Full coverage only	[+ 20%, + 45%]	– $16,823	1.0	$16,823
Partial coverage included	[+ 100%, + 100%]	– $123,956	0.2	$24,791

Roll Contingency

Take the following positions: +3 BTC–PERPETUAL, –4 BTC-25FEB22 and +4 BTC-25MAR22.

This example has a total long delta position of seven and a total short delta position of four. Therefore, the roll position equals four. The Roll Contingency is 4 × 4% × $50,000 = $8,000.

Note that within this example we would end up with the same contingency if, for instance, we replaced the long position of four 25MAR22 futures by a long position of eight delta 50 BTC 25MAR22 calls.

Option Contingency

Take the following portfolio of options with the same maturity:

Strike	Call Position	Put Position
BTC–DDMMMYY–48000–C	– 3	– 7
BTC–DDMMMYY–50000–C	– 5	+ 8
BTC–DDMMMYY–52000–C	+ 2	– 5

This portfolio has a short option position of ten contracts at the 48K strike, zero contracts at the 50K strike, and three contracts at the 52K strike. The Option Contingency is 13 x 0.25% x $50,000 = $1,625.

Mass Quotes

Mass quotes are not counted as open orders and require setting market maker protection. No quote can be larger than the configured mmprot (market maker protection size) and configuring the market maker protection size requires an instant margin room of the mmprot size * Index price.

Treatment of Orders

Open orders are taken into account for all margin calculations.

Initial Margin is the Margin Balance required to open or close positions that would increase portfolio risk.

If the Margin Balance is below the Initial Margin Requirement, only orders which do not increase the margin requirement are accepted and orders increasing the margin requirement are automatically cancelled.

Maintenance Margin is the Margin Balance required to maintain positions.

Upon breach of Maintenance Margin, all open orders are automatically cancelled.

Open Order Limits

1. Maximum Number of Open Orders: Each account is subject to a maximum limit of 200 open orders. This means that you cannot have more than 200 active orders in the order book at any given time.
2. Cash Size Limit of Open Orders: The total cash size of open orders is subject to limitations based on the type of instrument you're trading:

- **Perpetuals and Futures**: For instruments, such as perpetual contracts, futures, or future rolls, there is a maximum total open order cash size of $1 million, per underlying asset, and per book side (buy/sell).
- **Options**: If you're trading options, the maximum total open order cash size is $2 million. This limit applies separately to options trading and is not affected by the other instrument limits mentioned above.

Exceptions

In some cases, such as market maker accounts, higher limits may be applicable. These exceptions are typically handled on a case-by-case basis. If you believe you qualify for higher limits due to your trading strategy or account type, we recommend contacting the Thalex support team to discuss potential limit adjustments. It's important to note that open order limits do not apply to mass quotes.

Liquidation Process

Breach of Maintenance Margin triggers the Liquidation Process. The Liquidation Process has the objective to restore Margin Balance to the Initial Margin Requirement.

Thalex enters portfolio risk reducing orders as immediate-or-cancel limit orders, subject to size constraints and to a liquidation time constraint.