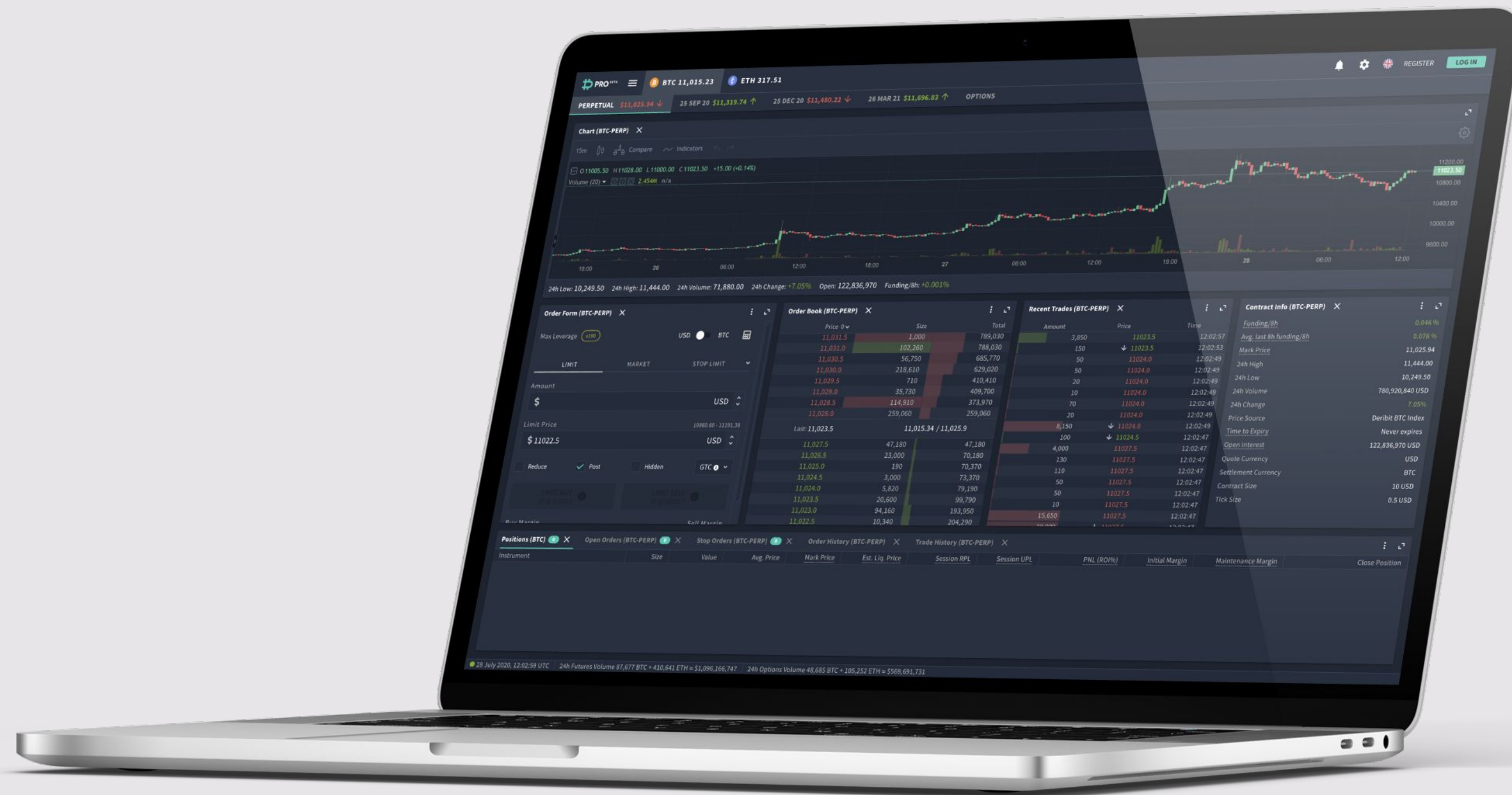




# Portfolio Margin Engine

## PME Model Explained



Institutional-Grade Crypto Derivatives Trading

Jan 2022

# Portfolio Margin Engine

## Parameters

Options Interest Rate:	0%
Price Range:	15%
Volatility Range Up:	45%
Volatility Range Down:	30%
Short Term Vega Power:	0.3
Long Term Vega Power:	0.13
Futures Contingency:	0.6%
Options Contingency:	0
Options Sum Contingency:	0.01
ATM Range:	0.1

Portfolio Margin Engine determines margin requirements based on historical volatility by valuing a specific portfolio over a range of underlying price and volatility moves. This PME model takes into consideration positions in futures and options combined, which may help reduce the margin requirement of the portfolio. Initial Margin for **PME clients will always be 120% of the Portfolio Maintenance Margin.**

## Margin Calculations

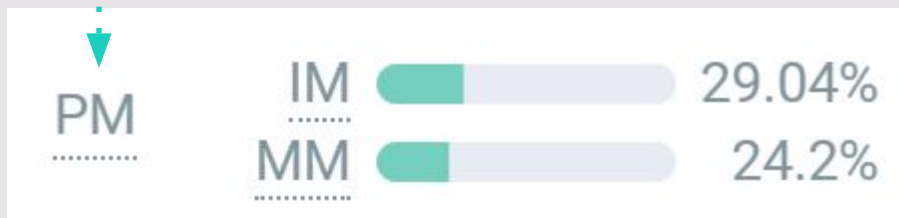
Portfolio maintenance margin is determined by calculating the maximum loss that can occur in a portfolio with the following parameters:

Maximum Price Move	+/-15%	For BTC and ETH
Maximum Implied Volatility	Volatility Range% * (30/# days till expiry) <sup>Vega Power</sup>	If time to expiry is less than 30 days, then Vega Power = Short Term Vega Power, else Vega Power = Long Term Vega Power Volatility Range Up = 45%, Volatility Range Down = 30%
Contingency Component (Option Sum)	Contingency component of 0.01 BTC per option for all net short options per strike is added to PM calculation.	If you have a position in strike X of call +10 and put -20, your net position in strike X is -10. Therefore, 10*0.01 BTC extra margin requirement is added to your portfolio margin.
Contingency Component (Futures)	Contingency component of 0.6% of the underlying value is added for the cumulative absolute futures position.	If you are long 100 BTC in Future A and short 100 BTC in Future B, 0.6% * 200 BTC is added to your portfolio margin.
Contingency Multiplier (Option Sum)	Contingency multiplier is reduced, if the net long strikes can be coupled with further OTM net short strikes.	If you have a +10 call position with a 10,000 USD strike price, and -25 call position with a 12,000 USD strike price - your contingency factor (0.01) will only be applied to the total net position of -15, rather than -25.

Parameter settings can be changed by Deribit Risk Management Team without prior notice.

# Portfolio Margin Engine

Click PM in header for the Portfolio Margin settings



!! These settings are determined by Deribit Risk Management per account basis.

## Your Portfolio Margin Limits:

Maximum number of all open orders:	30
Maximum number of open futures orders:	30
Maximum number of open options orders:	30
The total maximum value of futures open orders in USD:	10000000
The total maximum number of contracts in open orders for options:	50

!! When Portfolio Margin is activated, the account holder will see "PM" in the header bar and an additional tab in the menu.

## My Account

Account Settings

Interface Settings

Security

Verification

Subaccounts

Transaction Log

Stats and Reports

Affiliate

API

Portfolio Margin

If these settings are too restrictive for your trading needs, please contact us by writing an email at [support@deribit.com](mailto:support@deribit.com)

### IMPORTANT

!! PME calculates margin required per (sub)account. In order to benefit from margin offset, futures and options contracts should be traded on the same (sub)account. When two different strategies are traded via two sub-accounts, each subaccount is margined separately.

### IMPORTANT

!! PM is activated by Deribit per subaccount or main account. It is not automatically inherited from the main to a sub-account.

### IMPORTANT

!! The PME is calculated per account, therefore, it considers all instruments, but not all collaterals. ETH and BTC are separate accounts and their margin requirements are always isolated. ETH equity will not be considered when calculating BTC portfolio margin and vice versa. This applies for standard margin and portfolio margin.

# Portfolio Margin Data

Snapshot taken at 19 Jan 2022, 19:17:18 UTC



Futures Contingency  
0.2217 (0.2217)



Options Contingency  
0.1317 (0.1317)



Maintenance Margin  
-16.5117 (-16.5117)



Worst Case Scenario  
15%, Vol Down

Worst case scenario + contingency margin

Scenario used for PM calculation

Additional margin based on contingency parameters

## PNL

Sum of all individual positions

% Price move in the underlying asset

	-15%	-12%	-9%	-6%	-3%	0%	3%	6%	9%	12%	15%
Total	17.8748	13.4099	9.2451	5.3388	1.6581	-1.8138	-5.0813	-8.1456	-11.0096	-13.6786	-16.1583
Futures	5.9641	4.6086	3.3425	2.1572	1.0453	0.0000	-0.9844	-1.9130	-2.7905	-3.6211	-4.4083
Options	11.9106	8.8012	5.9026	3.1815	0.6128	-1.8138	-4.0970	-6.2326	-8.2191	-10.0575	-11.7500

## Futures PNL

Your position in each futures contract

Sum of all individual futures positions

	Size	-15%	-12%	-9%	-6%	-3%	0%	3%	6%	9%	12%	15%
BTC-24JUN22 (42867.79)	0	-0.2727	-0.2107	-0.1528	-0.0986	-0.0478	0.0000	0.0450	0.0875	0.1276	0.1656	0.2016
BTC-PERPETUAL (41798.65)	-30	5.6966	4.4019	3.1926	2.0605	0.9984	0.0000	-0.9402	-1.8272	-2.6654	-3.4586	-4.2105
BTC-25MAR22 (42137.62)	0	0.5402	0.4175	0.3028	0.1954	0.0947	0.0000	-0.0892	-0.1733	-0.2528	-0.3280	-0.3993

## Options PNL

Show All

Your position in each options contract can be seen by expanding the expiry

Sum of all individual options positions

Worst case scenario shown in red

Instrument	Size	-15%	-12%	-9%	-6%	-3%	0%	3%	6%	9%	12%	15%
> BTC-25MAR22 (42137.09)	58.5	0.9784 0.9414 1.1284	0.7636 0.7251 0.9491	0.5543 0.5231 0.7895	0.3497 0.3349 0.6484	0.1499 0.1604 0.5248	-0.0441 -0.0004 0.4177	-0.2310 -0.1472 0.3264	-0.4090 -0.2800 0.2499	-0.5762 -0.3984 0.1876	-0.7306 -0.5024 0.1387	-0.8707 -0.5919 0.1025
> BTC-28JAN22 (41812.12)	114.5	8.1203 8.1053 8.2761	6.3148 6.2866 6.5274	4.6158 4.5758 4.9122	2.9996 2.9613 3.4232	1.4489 1.4358 2.0546	-0.0402 -0.0038 0.8021	-1.4615 -1.3572 -0.3375	-2.8067 -2.6222 -1.3671	-4.0710 -3.7960 -2.2892	-5.2524 -4.8752 -3.1064	-6.3503 -5.8572 -3.8214
> BTC-30SEP22 (43849.45)	23.6	1.4440 1.1276 0.7758	1.1919 0.8793 0.5397	0.9502 0.6433 0.3168	0.7182 0.4186 0.1062	0.4952 0.2045 -0.0932	0.2806 0.0001 -0.2823	0.0739 -0.1952 -0.4619	-0.1253 -0.3820 -0.6327	-0.3173 -0.5608 -0.7954	-0.5026 -0.7322 -0.9504	-0.6813 -0.8965 -1.0983

# Portfolio Margin Engine - Options

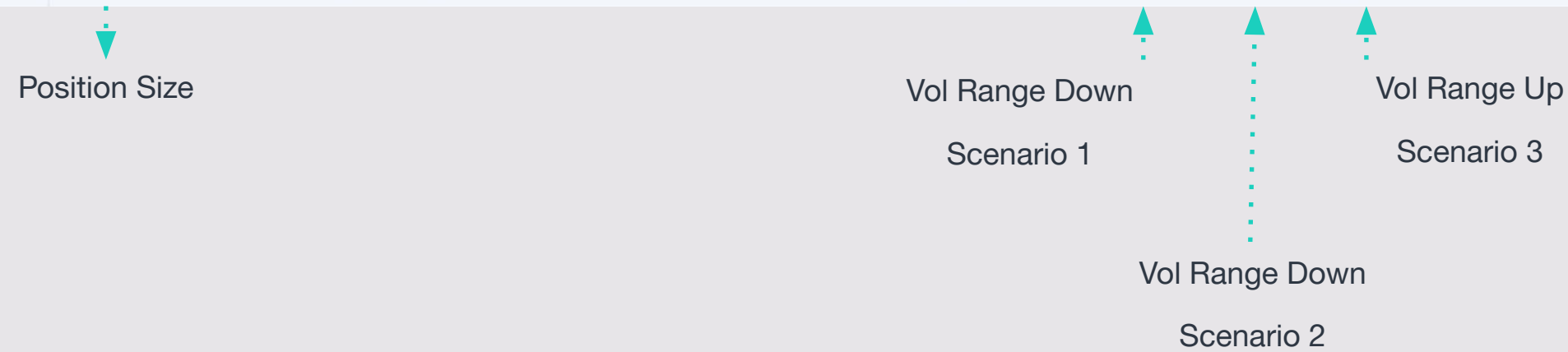
## Options PNL

Show All Tick box to show the 3 volatility simulations (vol down, vol same, vol up) per underlying simulation

Instrument	Size	-15%			-12%			-9%			-6%			-3%			0%		
▼ BTC-25MAR22 (36693.38)	58.5	1.0605	1.0807	1.1590	0.8354	0.8379	0.9240	0.6255	0.6101	0.7081	0.4268	0.3953	0.5100	0.2361	0.1922	0.3285	0.0509	-0.0001	0.1628
50000-C	3.0	-0.0474	-0.0365	0.0118	-0.0465	-0.0319	0.0240	-0.0452	-0.0261	0.0377	-0.0431	-0.0189	0.0527	-0.0401	-0.0103	0.0690	-0.0360	-0.0000	0.0867
60000-C	11.8	-0.0425	-0.0350	0.0433	-0.0423	-0.0313	0.0642	-0.0420	-0.0263	0.0883	-0.0414	-0.0196	0.1158	-0.0404	-0.0110	0.1469	-0.0388	-0.0001	0.1816
80000-C	0.4	-0.0009	-0.0007	0.0023	-0.0009	-0.0006	0.0029	-0.0009	-0.0005	0.0036	-0.0009	-0.0003	0.0043	-0.0009	-0.0002	0.0051	-0.0008	-0.0000	0.0059
35000-P	7.0	0.5260	0.7120	1.0076	0.3309	0.5264	0.8273	0.1642	0.3649	0.6672	0.0233	0.2247	0.5253	-0.0944	0.1038	0.3996	-0.1917	-0.0003	0.2881
30000-C	-2.9	0.3405	0.2534	0.1229	0.2866	0.2038	0.0777	0.2306	0.1532	0.0325	0.1733	0.1022	-0.0126	0.1155	0.0510	-0.0573	0.0578	0.0000	-0.1015
70000-P	5.5	1.8394	1.8418	1.8749	1.4187	1.4221	1.4618	1.0256	1.0304	1.0775	0.6578	0.6643	0.7193	0.3127	0.3214	0.3850	-0.0116	-0.0002	0.0727
150000-C	10.8	-0.0008	-0.0006	0.0140	-0.0008	-0.0005	0.0168	-0.0008	-0.0004	0.0200	-0.0008	-0.0003	0.0235	-0.0008	-0.0002	0.0274	-0.0008	-0.0000	0.0318
30000-P	3.8	0.1020	0.2162	0.3872	0.0480	0.1566	0.3218	0.0050	0.1064	0.2647	-0.0289	0.0643	0.2147	-0.0553	0.0292	0.1711	-0.0758	-0.0001	0.1329
60000-P	0.3	0.0855	0.0857	0.0877	0.0658	0.0661	0.0685	0.0474	0.0478	0.0508	0.0303	0.0308	0.0342	0.0141	0.0149	0.0189	-0.0010	-0.0000	0.0046
40000-P	-13.0	-1.7414	-1.9555	-2.3926	-1.2241	-1.4727	-1.9410	-0.7587	-1.0394	-1.5340	-0.3430	-0.6519	-1.1673	0.0256	-0.3063	-0.8372	0.3496	0.0006	-0.5400
▼ BTC-28JAN22 (36376.91)	114.5	9.1388	9.1386	9.1147	7.0693	7.0685	7.0321	5.1363	5.1338	5.0816	3.3266	3.3201	3.2498	1.6289	1.6136	1.5254	0.0330	0.0015	-0.1012
50000-P	7.2	1.7467	1.7467	1.7476	1.3498	1.3498	1.3515	0.9790	0.9790	0.9823	0.6320	0.6320	0.6376	0.3063	0.3063	0.3158	0.0003	0.0003	0.0155
60000-C	33.0	-0.0000	-0.0000	0.0001	-0.0000	-0.0000	0.0001	-0.0000	-0.0000	0.0003	-0.0000	-0.0000	0.0007	-0.0000	-0.0000	0.0014	-0.0000	-0.0000	0.0027
40000-P	-5.0	-0.9387	-0.9389	-0.9638	-0.7182	-0.7190	-0.7574	-0.5122	-0.5147	-0.5708	-0.3194	-0.3260	-0.4034	-0.1385	-0.1539	-0.2544	0.0314	-0.0001	-0.1232

% change in the underlying (column)

For Options, the risk matrix will also show price impact under 3 volatility scenarios - down, the same, and up. In **scenario 1** (first column from left) - **volatility decreases**, in **scenario 2** (middle column) - **volatility remains the same**, **scenario 3** - **volatility increases**. The value at the top will show the sum of all the values for the same % move.



**IMPORTANT**

VOL moves are relative, therefore volatility of 60 with 45% vol up = 87%

# Contingency Explained

## ATM Range Adjustment Factor

Positions in the ATM Range (currently at 10%) are adjusted, so that the contingency factor is better estimated considering the current market situation.

IF

$\text{Underlying Price} * (1 - \text{ATM Range}) < \text{Strike} < \text{Underlying Price} * (1 + \text{ATM Range})$

THEN

$\text{Adjusted Strike Position} = \text{Strike Position} * \text{abs}(\text{Underlying Price} - \text{Strike}) / (\text{Underlying Price} * \text{ATM Range})$

Otherwise -  $\text{Adjusted Strike Position} = \text{Strike Position}$

Contingency Factor will always be calculated based on the [net position per strike](#), therefore you should start by adding your call position to your put position:

$\text{Strike Position} = \text{Call Position} + \text{Put Position (Per Strike)}$

**IMPORTANT** !! Underlying price is not the Index, rather the Forward/Synthetic/Future for that expiry.

**IMPORTANT** !! After adjusting the strike positions, they can be paired with further OTM net short strikes. To see how positions are rolled over, look at the example in the next page.

**IMPORTANT** !! For contingency calculation, 1 calculation involves rolling **up** from ATM and the other calculation involves rolling **down** from ATM

# Contingency Explained

Underlying Price: 10,000

!! ATM Range: 10%

Call Position	Strike	Put Position	Strike Position	Adj. Strike Position	Net Position	Notes
	9750					
	10000					
40	10500	160	200	100	100	Is in 10% ATM range, therefore adjusted strike position is used.
	11000					
	11500					
-90	12000	40	-50	-50	50	10500 strike was rolled over, resulting in a net long of 50 contracts at 12000 strike.
	13000					
	14000	-60	-60	-60	-10	12000 strike was rolled over, resulting in a net short of 10 contracts at 14000 strike.
-200	15000		-200	-200	-200	No longs to roll over.
100	16000		100	100	100	
-10	18000		-10	-10	90	16000 strike was rolled over leading to a net long of 10 contracts at 18000 strike.

Contingency factor positions:  $-10-200 = -210$

After determining the positions required to have an additional contingency factor, they are summed and multiplied by the contingency factor =  $210 * 0.01 = 2.1 \text{ BTC}$

2.1 BTC is the additional contingency component added to the Portfolio Margin

This example only shows rolling up from ATM. Rolling down from ATM should also be calculated



# Settlement Explained

## Delta

During the settlement, on the book level, the Delta will linearly decay to 0.

Example: A call with Delta 0.5 will be Delta 0.25 after 15 min into the settlement period.

### Outside of settlement:

Net Transaction Delta Position = Position Deltas - Option Position Mark Prices (same as always)

### During settlement, for the expiring expiry:

The Net Transaction Delta Position = Position Deltas - Decayed Option Mark Prices

Please be aware that you will be getting a different Delta through API, for example, an in the money call option would have a Delta close to 0 near 8:00 UTC.

### Example

You are long one contract of the 7000 C in the current expiry. This call has a delta of 1.0 and a Mark Price of 0.3.

After 15 min into the settlement period, the Call Delta will be 0.5.

The new Net Delta for the call: New Delta - Decayed Mark Price, or  $0.5 - 0.3 * (1 - 15/30) = 0.35$ .

Delta Total = Net Delta \* Positions

OR

Delta Total = Position's Delta - Position's Value of the  
Decayed Option Expiring - Rest of the Options Positions  
Values



# Settlement Explained

## Risk Matrix

To calculate the total maintenance margin for the PME, the most negative value in your risk matrix is added to your contingency. Currently, during the settlement period, this margin is linearly moved to your Projected Maintenance Margin. This will no longer be the case.

For the expiry in process, the underlying value used in the risk matrix, will converge to the EDP (Estimated Delivery Price).

So that the **-10%** scenario **15 min** into expiry will actually use the underlying value if the index were to **move -5%**, and thus the resulting value of what the EDP would be.

**IMPORTANT** !! Spreadsheet to understand the effects of the new Delta and Risk Matrix [HERE](#)

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