



VolLevels Algo (with Market Data Recording)

For the Exegy Metro trading platform

Version 1.74 (06-05-2023)

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Testimonials

“During an active trading session, it is easy to lose track of critical IV and tick levels, IV term structure, and individual skews and curvature, while trying to monitor and trade simultaneously. Especially when volatility and skew are whipping around, it can become a guessing game, leaving me vulnerable to poorly timed or ill-advised trades.

The VolLevels algo neatly organizes the chaos, condensing the most important information in a way that allows me to easily spot and identify potential relative value trading opportunities in each vol curve as well as the overall IV term structure. The VolLevels algo enables me to capitalize on overbought and/or oversold conditions in both intraday/short-term markets, as well as relative value opportunities in ‘big

picture' scenarios. The algo helps prevent me from getting picked off by 'smart paper' on seemingly good trades everyone is doing that end up being losers. It's akin to a live 'cheat sheet' that enables me to quickly spot opportunity while simultaneously avoiding bad trades due to poor pricing by the marketplace."

-Beta tester & collaborator

IV Levels Tracking

When running, the algo monitors the published vol curves of all assigned options expirations. When a change in the published vol curve is detected (a new curve is published), the algo will update all monitored metrics for that expiration accordingly. For maximum utility, it is recommended that the VolLevels algo is run in conjunction with a realtime volatility curve fitter (such as our complimentary Dynamic Skew algo), however this is not a requirement. The algo can also monitor manual curve updates, and of any volatility curve type. The primary disadvantage of manual curve publications is the corresponding reduction in temporal resolution. For example, with relatively infrequent manual curve updates, the tracked intraday highs and lows of various vol-related metrics will be less accurate than the true extrema determined with frequent vol curve publications (the Dynamic Skew algo can publish new vol curves as often as once per second).

The algo allows net changes in IVs to be displayed with respect to two possible reference curves: EOD and Baseline. The user can toggle between these with a button click and can also arbitrarily assign (overwrite) either of these reference curves with another button click.

- **EOD (End-Of-Day):** Defaults to the last curve published prior to the server reboot. The vol curve stored at this slot can also be re-assigned at any time with a button click.
- **Baseline:** The vol curve stored at this slot is user-defined and can be re-assigned at any time with a button click.

The "From" and "From Vol" columns display the date/time of the reference curve currently being used to calculate net changes, and the prior vol from that reference curve, respectively. When a new reference curve is established, the "Net Change" and "Net Change Range" columns will update accordingly. The "Net Change Range" columns are reset at the start of each new trading day; that is, the highs and lows displayed are the intraday highs and lows.

The user can choose to view the "Net Change" and "Net Change Range" columns in two different modes:

- **IV Units:** This option displays the raw difference in IVs: $(IV_{\text{current}} - IV_{\text{reference}})$
- **Tick Units:** This option displays the raw difference in IVs transformed into approximate ATM tick units: $f(IV_{\text{current}} - IV_{\text{reference}})$. The function $f(x)$ is a robust

and uniquely derived normalizing function that works accurately in all products and time-to-expiration horizons. It does *not* suffer from any of the deficiencies that can occur when using simple vega ratios.

Users can toggle between the two display options with the click of a button and the relevant columns will update on the fly.

“Changes By Delta” Grid

The “Changes By Delta” grid allows the user to view IVs, net changes, and net change ranges (from either reference curve) on a delta axis (i.e., perspective). The 9 delta points used are symmetric and user-defined via the “delta_points” Configure screen setting. For example, if this setting is “35,25,15,5”, then the 9 (out of the money) delta points displayed by the algo will be: { -5Δ, -15Δ, -25Δ, -35Δ, 50Δ, 35Δ, 25Δ, 15Δ, 5Δ }. The “Nearest Strike” column will also display the closest strike to each delta point.

Key ▲	Expiry	Delta	Nearest Strike	Current Vol	Current Vol Range	Net Change	Net Change Range	From Vol	From
1 001.LO 2019-07-17	Aug19	-5	48.5	50.37	50.37 / 50.37	5.18	-1.19 / 7.34	45.18	baseline (06/27 05:18 PM)
2 002.LO 2019-07-17	Aug19	-15	53.0	43.58	43.58 / 43.58	3.79	-1.00 / 5.32	39.79	baseline (06/27 05:18 PM)
3 003.LO 2019-07-17	Aug19	-25	55.0	41.33	41.33 / 41.33	3.61	-0.86 / 4.72	37.72	baseline (06/27 05:18 PM)
4 004.LO 2019-07-17	Aug19	-35	56.5	39.69	39.69 / 39.69	3.29	-0.71 / 4.37	36.40	baseline (06/27 05:18 PM)
5 005.IO 2019-07-17	Aug19	50	58.5	38.08	38.08 / 38.08	2.79	-0.66 / 3.79	35.29	baseline (06/27 05:18 PM)
6 006.LO 2019-07-17	Aug19	35	60.5	36.95	36.95 / 36.95	2.48	-0.55 / 3.48	34.47	baseline (06/27 05:18 PM)
7 007.LO 2019-07-17	Aug19	25	62.0	36.31	36.31 / 36.31	2.12	-0.47 / 3.18	34.19	baseline (06/27 05:18 PM)
8 008.LO 2019-07-17	Aug19	15	63.5	36.09	36.09 / 36.09	1.45	-0.67 / 2.38	34.64	baseline (06/27 05:18 PM)
9 009.IO 2019-07-17	Aug19	5	67.5	37.71	37.71 / 37.71	0.57	-1.61 / 1.83	37.14	baseline (06/27 05:18 PM)
10 010.									
11 011.LO 2019-08-15	Sep19	-5	44.5	45.50	45.50 / 45.50	2.71	-0.63 / 4.16	42.79	baseline (06/27 05:18 PM)
12 012.LO 2019-08-15	Sep19	-15	50.0	40.38	40.38 / 40.38	2.24	-0.75 / 3.29	38.12	baseline (06/27 05:18 PM)
13 013.LO 2019-08-15	Sep19	-25	53.5	37.94	37.94 / 37.94	2.08	-0.53 / 2.97	35.85	baseline (06/27 05:18 PM)
14 014.LO 2019-08-15	Sep19	-35	55.5	36.20	36.20 / 36.20	1.90	-0.47 / 2.74	34.30	baseline (06/27 05:18 PM)
15 015.LO 2019-08-15	Sep19	50	58.5	34.32	34.32 / 34.32	1.59	-0.31 / 2.35	32.73	baseline (06/27 05:18 PM)
16 016.LO 2019-08-15	Sep19	35	61.0	33.00	33.00 / 33.00	1.38	-0.23 / 2.11	31.62	baseline (06/27 05:18 PM)
17 017.LO 2019-08-15	Sep19	25	63.0	32.21	32.21 / 32.21	1.10	-0.25 / 1.87	31.11	baseline (06/27 05:18 PM)
18 018.LO 2019-08-15	Sep19	15	66.0	31.58	31.58 / 31.58	0.74	-0.43 / 1.57	30.84	baseline (06/27 05:18 PM)
19 019.LO 2019-08-15	Sep19	5	71.0	32.04	32.04 / 32.04	-0.13	-0.85 / 1.03	32.18	baseline (06/27 05:18 PM)
20 020.									
21 021.LO 2019-09-17	Oct19	-5	42.0	43.96	43.96 / 43.96	2.36	-0.67 / 2.88	41.60	baseline (06/27 05:18 PM)
22 022.LO 2019-09-17	Oct19	-15	40.5	30.95	30.95 / 30.95	1.95	-0.63 / 2.29	37.00	baseline (06/27 05:18 PM)
23 023.LO 2019-09-17	Oct19	-25	52.5	36.47	36.47 / 36.47	1.88	-0.58 / 2.14	34.59	baseline (06/27 05:18 PM)
24 024.IO 2019-09-17	Oct19	-35	55.0	34.64	34.64 / 34.64	1.71	-0.53 / 1.93	32.93	baseline (06/27 05:18 PM)
25 025.LO 2019-09-17	Oct19	50	58.5	32.60	32.60 / 32.60	1.39	-0.49 / 1.65	31.22	baseline (06/27 05:18 PM)
26 026.LO 2019-09-17	Oct19	35	62.0	31.06	31.06 / 31.06	1.17	-0.49 / 1.43	29.90	baseline (06/27 05:18 PM)
27 027.LO 2019-09-17	Oct19	25	64.5	30.19	30.19 / 30.19	0.93	-0.48 / 1.23	29.25	baseline (06/27 05:18 PM)
28 028.LO 2019-09-17	Oct19	15	67.5	29.52	29.52 / 29.52	0.64	-0.54 / 0.97	28.88	baseline (06/27 05:18 PM)
29 029.LO 2019-09-17	Oct19	5	74.0	29.92	29.92 / 29.92	0.14	-0.73 / 0.64	29.78	baseline (06/27 05:18 PM)
30 030.									
31 031.LO 2019-10-17	Nov19	-5	40.5	42.62	42.62 / 42.62	1.44	-0.57 / 2.15	41.18	baseline (06/27 05:18 PM)
32 032.LO 2019-10-17	Nov19	-15	48.0	37.69	37.69 / 37.69	1.36	-0.58 / 1.93	36.33	baseline (06/27 05:18 PM)
33 033.LO 2019-10-17	Nov19	-25	52.0	35.27	35.27 / 35.27	1.34	-0.55 / 1.82	33.93	baseline (06/27 05:18 PM)
34 034.LO 2019-10-17	Nov19	-35	55.0	33.42	33.42 / 33.42	1.25	-0.51 / 1.70	32.17	baseline (06/27 05:18 PM)
35 035.IO 2019-10-17	Nov19	50	59.0	31.33	31.33 / 31.33	1.07	-0.46 / 1.44	30.27	baseline (06/27 05:18 PM)
36 036.LO 2019-10-17	Nov19	35	63.0	29.65	29.65 / 29.65	0.86	-0.49 / 1.24	28.79	baseline (06/27 05:18 PM)
37 037.LO 2019-10-17	Nov19	25	66.0	20.72	20.72 / 20.72	0.68	-0.50 / 1.07	20.06	baseline (06/27 05:18 PM)
38 038.LO 2019-10-17	Nov19	15	69.5	28.07	28.07 / 28.07	0.48	-0.53 / 0.82	27.61	baseline (06/27 05:18 PM)
39 039.LO 2019-10-17	Nov19	5	77.5	28.99	28.99 / 28.99	0.07	-0.97 / 0.28	28.92	baseline (06/27 05:18 PM)
40 040.									
41 041.LO 2019-11-15	Dec19	-5	39.5	41.13	41.13 / 41.13	1.20	-0.39 / 1.95	39.93	baseline (06/27 05:18 PM)
42 042.LO 2019-11-15	Dec19	-15	47.0	36.57	36.57 / 36.57	1.13	-0.47 / 1.70	35.44	baseline (06/27 05:18 PM)
43 043.LO 2019-11-15	Dec19	-25	51.5	34.39	34.39 / 34.39	1.17	-0.47 / 1.67	33.22	baseline (06/27 05:18 PM)
44 044.LO 2019-11-15	Dec19	-35	55.0	32.65	32.65 / 32.65	1.10	-0.44 / 1.54	31.55	baseline (06/27 05:18 PM)
45 045.LO 2019-11-15	Dec19	50	59.0	30.61	30.61 / 30.61	1.01	0.42 / 1.33	29.60	baseline (06/27 05:18 PM)
46 046.IO 2019-11-15	Dec19	35	63.5	28.81	28.81 / 28.81	0.84	-0.47 / 1.14	27.97	baseline (06/27 05:18 PM)
47 047.LO 2019-11-15	Dec19	25	66.5	27.80	27.80 / 27.80	0.68	-0.48 / 0.98	27.12	baseline (06/27 05:18 PM)
48 048.LO 2019-11-15	Dec19	15	70.5	27.08	27.08 / 27.08	0.54	-0.50 / 0.82	26.54	baseline (06/27 05:18 PM)
49 049.LO 2019-11-15	Dec19	5	79.0	28.14	28.14 / 28.14	0.39	-0.79 / 0.41	27.76	baseline (06/27 05:18 PM)
50 050.									

“Changes By Strike” Grid

The “Changes By Strike” grid allows the user to view IVs, net changes, and net change ranges (from either reference curve) on a strike axis (i.e., perspective). The 9 strikes used are those corresponding to the *current* nearest strikes of the user-defined delta points from the “*delta_points*” Configure screen setting. For example, for the center delta (50Δ) point, let’s imagine strike 1330.0 is currently the nearest strike to 50Δ. Then the net change at this strike will be calculated as: $(IV@1330_{current} - IV@1330_{reference})$, regardless of whether the historical delta at 1330_{reference} was 50 or not. In this sense, the “Changes By Delta” grid and the “Changes By Strike” grid offer complimentary “floating” and “sticky” perspectives into IV, respectively.

Vol Levels Dashboard									
Changes By Strike									
Key ▲	Expiry	Strike	Current Vol	Current Vol Range	Net Chan...	Net Change Range	From Vol	From	
1	001. LO 2019-07-17	Aug19	48.5	50.51	50.51 / 50.51	2.71	-0.96 / 3.59	47.80	baseline (06/27 05:18 PM)
2	002. LO 2019-07-17	Aug19	53.0	43.37	43.37 / 43.37	2.44	-0.89 / 3.17	40.93	baseline (06/27 05:18 PM)
3	003. LO 2019-07-17	Aug19	55.0	41.24	41.24 / 41.24	2.50	-0.83 / 3.13	38.74	baseline (06/27 05:18 PM)
4	004. LO 2019-07-17	Aug19	56.5	39.68	39.68 / 39.68	2.44	-0.72 / 3.08	37.24	baseline (06/27 05:18 PM)
5	005. LO 2019-07-17	Aug19	58.5	38.05	38.05 / 38.05	2.28	-0.67 / 3.07	35.77	baseline (06/27 05:18 PM)
6	006. LO 2019-07-17	Aug19	60.5	36.87	36.87 / 36.87	2.07	-0.54 / 2.95	34.80	baseline (06/27 05:18 PM)
7	007. LO 2019 07 17	Aug19	62.0	36.24	36.24 / 36.24	1.95	0.46 / 2.92	34.29	baseline (06/27 05:18 PM)
8	008. LO 2019-07-17	Aug19	63.5	36.08	36.08 / 36.08	1.82	-0.74 / 2.76	34.26	baseline (06/27 05:18 PM)
9	009. LO 2019-07-17	Aug19	67.5	37.84	37.84 / 37.84	1.66	-1.13 / 2.97	36.18	baseline (06/27 05:18 PM)
10	010.								
11	011. LO 2019-08-15	Sep19	44.5	45.62	45.62 / 45.62	1.18	-0.44 / 2.23	44.45	baseline (06/27 05:18 PM)
12	012. LO 2019-08-15	Sep19	50.0	40.55	40.55 / 40.55	1.04	-0.45 / 1.92	39.51	baseline (06/27 05:18 PM)
13	013. LO 2019-08-15	Sep19	53.5	37.76	37.76 / 37.76	1.00	-0.43 / 1.83	36.76	baseline (06/27 05:18 PM)
14	014. LO 2019 08 15	Sep19	55.5	36.24	36.24 / 36.24	0.97	0.40 / 1.74	35.27	baseline (06/27 05:18 PM)
15	015. LO 2019-08-15	Sep19	58.5	34.25	34.25 / 34.25	0.88	-0.25 / 1.62	33.36	baseline (06/27 05:18 PM)
16	016. LO 2019-08-15	Sep19	61.0	33.06	33.06 / 33.06	0.88	-0.23 / 1.60	32.18	baseline (06/27 05:18 PM)
17	017. LO 2019-08-15	Sep19	63.0	32.26	32.26 / 32.26	0.83	-0.25 / 1.61	31.44	baseline (06/27 05:18 PM)
18	018. LO 2019-08-15	Sep19	66.0	31.55	31.55 / 31.55	0.65	-0.41 / 1.49	30.91	baseline (06/27 05:18 PM)
19	019. LO 2019-08-15	Sep19	71.0	32.09	32.09 / 32.09	0.54	-0.65 / 1.54	31.55	baseline (06/27 05:18 PM)
20	020.								
21	021. LO 2019 09 17	Oct19	42.0	43.89	43.89 / 43.89	1.14	0.43 / 1.55	42.74	baseline (06/27 05:18 PM)
22	022. LO 2019-09-17	Oct19	48.5	39.00	39.00 / 39.00	0.92	-0.45 / 1.21	38.08	baseline (06/27 05:18 PM)
23	023. LO 2019-09-17	Oct19	52.5	36.30	36.30 / 36.30	0.97	-0.40 / 1.20	35.33	baseline (06/27 05:18 PM)
24	024. LO 2019-09-17	Oct19	55.0	34.67	34.67 / 34.67	0.92	-0.38 / 1.13	33.76	baseline (06/27 05:18 PM)
25	025. LO 2019-09-17	Oct19	58.5	32.59	32.59 / 32.59	0.77	-0.34 / 1.02	31.81	baseline (06/27 05:18 PM)
26	026. LO 2019-09-17	Oct19	62.0	31.00	31.00 / 31.00	0.72	-0.40 / 0.99	30.28	baseline (06/27 05:18 PM)
27	027. LO 2019-09-17	Oct19	64.5	30.14	30.14 / 30.14	0.62	-0.45 / 0.92	29.51	baseline (06/27 05:18 PM)
28	028. LO 2019 09 17	Oct19	67.5	29.52	29.52 / 29.52	0.55	0.54 / 0.88	28.97	baseline (06/27 05:18 PM)
29	029. LO 2019-09-17	Oct19	74.0	29.97	29.97 / 29.97	0.54	-0.51 / 0.97	29.43	baseline (06/27 05:18 PM)
30	030.								
31	031. LO 2019-10-17	Nov19	40.5	42.54	42.54 / 42.54	0.79	-0.41 / 1.19	41.75	baseline (06/27 05:18 PM)
32	032. LO 2019-10-17	Nov19	48.0	37.57	37.57 / 37.57	0.76	-0.33 / 1.02	36.81	baseline (06/27 05:18 PM)
33	033. LO 2019-10-17	Nov19	52.0	35.25	35.25 / 35.25	0.85	-0.35 / 1.04	34.40	baseline (06/27 05:18 PM)
34	034. LO 2019-10-17	Nov19	55.0	33.52	33.52 / 33.52	0.77	-0.31 / 0.92	32.75	baseline (06/27 05:18 PM)
35	035. LO 2019 10 17	Nov19	59.0	31.36	31.36 / 31.36	0.72	0.28 / 0.79	30.64	baseline (06/27 05:18 PM)
36	036. LO 2019-10-17	Nov19	63.0	29.03	29.03 / 29.03	0.66	-0.40 / 0.80	28.97	baseline (06/27 05:18 PM)
37	037. LO 2019-10-17	Nov19	66.0	28.67	28.67 / 28.67	0.53	-0.45 / 0.77	28.14	baseline (06/27 05:18 PM)
38	038. LO 2019-10-17	Nov19	69.5	28.07	28.07 / 28.07	0.43	-0.53 / 0.72	27.64	baseline (06/27 05:18 PM)
39	039. LO 2019-10-17	Nov19	77.5	29.03	29.03 / 29.03	0.31	-0.68 / 0.81	28.72	baseline (06/27 05:18 PM)
40	040.								
41	041. LO 2019-11-15	Dec19	39.5	40.97	40.97 / 40.97	0.71	-0.28 / 1.04	40.26	baseline (06/27 05:18 PM)
42	042. LO 2019 11 15	Dec19	47.0	36.59	36.59 / 36.59	0.72	0.27 / 0.89	35.87	baseline (06/27 05:18 PM)
43	043. LO 2019-11-15	Dec19	51.5	34.36	34.36 / 34.36	0.81	-0.25 / 0.93	33.56	baseline (06/27 05:18 PM)
44	044. LO 2019-11-15	Dec19	55.0	32.60	32.60 / 32.60	0.76	-0.22 / 0.83	31.85	baseline (06/27 05:18 PM)
45	045. LO 2019-11-15	Dec19	59.0	30.65	30.65 / 30.65	0.75	-0.21 / 0.75	29.91	baseline (06/27 05:18 PM)
46	046. LO 2019-11-15	Dec19	63.5	28.73	28.73 / 28.73	0.65	-0.35 / 0.70	28.07	baseline (06/27 05:18 PM)
47	047. LO 2019-11-15	Dec19	66.5	27.76	27.76 / 27.76	0.56	-0.40 / 0.67	27.20	baseline (06/27 05:18 PM)
48	048. LO 2019-11-15	Dec19	70.5	27.06	27.06 / 27.06	0.50	-0.49 / 0.71	26.55	baseline (06/27 05:18 PM)
49	049. LO 2019 11 15	Dec19	79.0	28.14	28.14 / 28.14	0.57	0.64 / 0.86	27.57	baseline (06/27 05:18 PM)
50	050.								

“Changes By Sigma” Grid

The “Changes By Sigma” grid allows the user to view IVs, net changes, and net change ranges (from either reference curve) on a sigma axis (i.e., perspective). The term “sigma” here is synonymous with “standard deviation.” The Configure screen setting “*sigma_points_calc*” specifies whether a normal or lognormal calculation is used. The normal distribution is more applicable to Treasuries, rates, and currency products, whereas the lognormal distribution is more applicable to most other commodities that have an intrinsic physical value. The lognormal distribution creates a slight asymmetry where extreme downward moves are somewhat less likely than extreme upward moves; this can be understood as physical commodities having a non-zero intrinsic value which prevents prices from ever reaching values close to zero (but prices may be theoretically unbounded on the upside). The allowed values for the “*sigma_points_calc*” setting are:

- **0 = Normal (standardized simple moneyness)**. The calculation of the sigma points uses the following formula: $((K/S) - 1) / (\sigma\sqrt{T})$
- **1 = Lognormal (standardized log moneyness)**. The calculation of the sigma points uses the following formula: $\ln(K/S) / (\sigma\sqrt{T})$

The 9 sigma points used are symmetric and user-defined via the “*sigma_points*” Configure screen setting. For example, if this setting is “1.0,2.0,2.5,3.0”, then the 9 sigma (or standard deviation) points displayed by the algo will be: { -3.0 σ , -2.5 σ , -2.0 σ , -1.0 σ , 0.0 σ , 1.0 σ , 2.0 σ , 2.5 σ , 3.0 σ }. The “Nearest Strike” column will also display the closest strike to each sigma point.

Key	Expiry	Sigma	Nearest Strike	Current Vols	Current Vol Range	Net Change	Net Change Range	From Vol	From	
001	LO 2019-07-17	Aug19	2.00	49.5	48.46	48.46 / 48.46	3.94	0.95 / 6.98	44.52	baseline (06/27 05:18 PM)
002	LO 2019-07-17	Aug19	-1.50	51.5	45.17	45.17 / 45.17	3.61	-0.93 / 6.11	41.56	baseline (06/27 05:18 PM)
003	LO 2019-07-17	Aug19	-1.00	54.0	42.57	42.57 / 42.57	3.51	-0.93 / 5.21	39.06	baseline (06/27 05:18 PM)
004	LO 2019-07-17	Aug19	0.50	56.0	40.19	40.19 / 40.19	3.31	0.72 / 4.63	36.88	baseline (06/27 05:18 PM)
005	LO 2019-07-17	Aug19	0.00	58.5	38.22	38.22 / 38.22	2.83	-0.00 / 3.85	35.38	baseline (06/27 05:18 PM)
006	LO 2019-07-17	Aug19	0.50	60.5	36.81	36.81 / 36.81	2.44	-0.51 / 3.34	34.37	baseline (06/27 05:18 PM)
007	LO 2019-07-17	Aug19	1.00	63.0	36.09	36.09 / 36.09	1.61	-0.60 / 2.54	34.40	baseline (06/27 05:18 PM)
008	LO 2019-07-17	Aug19	1.50	65.5	36.75	36.75 / 36.75	0.97	-0.87 / 2.49	35.78	baseline (06/27 05:18 PM)
009	LO 2019-07-17	Aug19	2.00	68.5	38.52	38.52 / 38.52	0.62	-1.13 / 2.49	37.91	baseline (06/27 05:18 PM)
010										
011	LO 2019-08-15	Sep19	-2.00	45.5	44.88	44.88 / 44.88	2.38	-0.56 / 4.00	42.32	baseline (06/27 05:18 PM)
012	LO 2019-08-15	Sep19	-1.50	48.5	42.00	42.00 / 42.00	2.14	-0.60 / 3.59	39.86	baseline (06/27 05:18 PM)
013	LO 2019-08-15	Sep19	-1.00	51.5	39.49	39.49 / 39.49	2.08	-0.65 / 3.22	37.41	baseline (06/27 05:18 PM)
014	LO 2019-08-15	Sep19	-0.50	54.5	36.98	36.98 / 36.98	1.98	-0.46 / 2.89	35.00	baseline (06/27 05:18 PM)
015	LO 2019-08-15	Sep19	0.00	58.0	34.55	34.55 / 34.55	1.62	-0.30 / 2.42	32.93	baseline (06/27 05:18 PM)
016	LO 2019-08-15	Sep19	0.50	61.5	32.82	32.82 / 32.82	1.37	-0.21 / 2.05	31.45	baseline (06/27 05:18 PM)
017	LO 2019-08-15	Sep19	1.00	65.5	31.65	31.65 / 31.65	0.80	-0.42 / 1.60	30.85	baseline (06/27 05:18 PM)
018	LO 2019-08-15	Sep19	1.50	69.5	31.73	31.73 / 31.73	0.20	-0.58 / 1.30	31.53	baseline (06/27 05:18 PM)
019	LO 2019-08-15	Sep19	2.00	74.0	33.29	33.29 / 33.29	-0.08	-0.42 / 1.54	33.38	baseline (06/27 05:18 PM)
020										
021	LO 2019-09-17	Oct19	-2.00	42.5	43.33	43.33 / 43.33	2.09	-0.59 / 2.82	41.24	baseline (06/27 05:18 PM)
022	LO 2019-09-17	Oct19	-1.50	46.0	40.78	40.78 / 40.78	1.91	-0.66 / 2.44	38.87	baseline (06/27 05:18 PM)
023	LO 2019-09-17	Oct19	-1.00	49.5	38.19	38.19 / 38.19	1.07	-0.80 / 2.30	36.32	baseline (06/27 05:18 PM)
024	LO 2019-09-17	Oct19	-0.50	53.5	35.59	35.59 / 35.59	1.79	-0.54 / 2.09	33.79	baseline (06/27 05:18 PM)
025	LO 2019-09-17	Oct19	0.00	58.0	32.95	32.95 / 32.95	1.46	-0.49 / 1.70	31.50	baseline (06/27 05:18 PM)
026	LO 2019-09-17	Oct19	0.50	62.5	30.84	30.84 / 30.84	1.12	-0.49 / 1.37	29.72	baseline (06/27 05:18 PM)
027	LO 2019-09-17	Oct19	1.00	67.5	29.55	29.55 / 29.55	0.66	-0.54 / 0.96	28.89	baseline (06/27 05:18 PM)
028	LO 2019-09-17	Oct19	1.50	72.5	29.63	29.63 / 29.63	0.22	-0.67 / 0.76	29.41	baseline (06/27 05:18 PM)
029	LO 2019-09-17	Oct19	2.00	78.5	31.70	31.70 / 31.70	0.18	-0.53 / 0.92	31.52	baseline (06/27 05:18 PM)
030										
031	LO 2019-10-17	Nov19	-2.00	41.5	42.00	42.00 / 42.00	1.28	-0.58 / 2.17	40.74	baseline (06/27 05:18 PM)
032	LO 2019-10-17	Nov19	-1.50	45.0	39.49	39.49 / 39.49	1.22	-0.56 / 2.02	38.26	baseline (06/27 05:18 PM)
033	LO 2019-10-17	Nov19	-1.00	49.0	36.90	36.90 / 36.90	1.23	-0.55 / 1.95	35.68	baseline (06/27 05:18 PM)
034	LO 2019-10-17	Nov19	-0.50	53.5	34.41	34.41 / 34.41	1.22	-0.57 / 1.77	33.19	baseline (06/27 05:18 PM)
035	LO 2019-10-17	Nov19	0.00	58.5	31.73	31.73 / 31.73	1.08	-0.47 / 1.50	30.65	baseline (06/27 05:18 PM)
036	LO 2019-10-17	Nov19	0.50	63.5	29.44	29.44 / 29.44	0.04	-0.50 / 1.19	28.59	baseline (06/27 05:18 PM)
037	LO 2019-10-17	Nov19	1.00	69.0	28.10	28.10 / 28.10	0.48	-0.54 / 0.80	27.82	baseline (06/27 05:18 PM)
038	LO 2019-10-17	Nov19	1.50	75.5	28.49	28.49 / 28.49	0.17	0.69 / 0.49	28.31	baseline (06/27 05:18 PM)
039	LO 2019-10-17	Nov19	2.00	82.5	31.10	31.10 / 31.10	0.36	-0.55 / 0.88	30.74	baseline (06/27 05:18 PM)
040										
041	LO 2019-11-15	Dec19	-2.00	39.5	40.83	40.83 / 40.83	1.17	-0.48 / 1.95	39.66	baseline (06/27 05:18 PM)
042	LO 2019-11-15	Dec19	-1.50	43.5	38.37	38.37 / 38.37	1.07	-0.49 / 1.84	37.30	baseline (06/27 05:18 PM)
043	LO 2019-11-15	Dec19	-1.00	48.0	36.05	36.05 / 36.05	1.09	-0.48 / 1.71	34.95	baseline (06/27 05:18 PM)
044	LO 2019-11-15	Dec19	-0.50	53.0	33.70	33.70 / 33.70	1.11	-0.48 / 1.82	32.58	baseline (06/27 05:18 PM)
045	LO 2019-11-15	Dec19	0.00	58.0	31.05	31.05 / 31.05	1.02	-0.45 / 1.42	30.03	baseline (06/27 05:18 PM)
046	LO 2019-11-15	Dec19	0.50	64.0	28.58	28.58 / 28.58	0.82	-0.49 / 1.09	27.76	baseline (06/27 05:18 PM)
047	LO 2019-11-15	Dec19	1.00	70.5	27.08	27.08 / 27.08	0.54	-0.51 / 0.80	26.54	baseline (06/27 05:18 PM)
048	LO 2019-11-15	Dec19	1.50	77.5	27.63	27.63 / 27.63	0.42	-0.56 / 0.63	27.20	baseline (06/27 05:18 PM)
049	LO 2019-11-15	Dec19	2.00	85.0	30.43	30.43 / 30.43	0.50	-0.58 / 0.74	29.93	baseline (06/27 05:18 PM)
050										

“Current Vols” Grid

The “Current Vols” grid displays the current vols on a delta basis, and some related metrics, for each monitored expiration. This grid does not display net changes and thus does not react to the assigned reference curve. Most of the columns are self-explanatory; more details are provided on some of the columns below:

- The “Cheapest Strike” column displays the strike with the lowest IV on the vol curve, followed by its current IV and delta.
- The “Normalized Skew” column displays a widely used calculation for a vol curve’s skew: $(25\Delta \text{ Call IV} - 25\Delta \text{ Put IV}) / 50\Delta \text{ IV}$. Note that dividing by the $50\Delta \text{ IV}$ allows the user to measure all skews in the term structure on a standardized basis, independent of the level of volatility in any single expiration.

This grid is very similar to the dashboard found in the Dynamic Skew algo. One difference is that the IV differentials of the 25Δ and 5Δ points in this grid can also be displayed in ATM “Tick Units”, which shows the current premium or discount in ATM equivalent ticks at the respective delta points.

Key	Expiry	ATM Vol	ATM L	ATM High	Cheapest Strike	25d Call	25d Ca	25d Ca	25d Put	25d P	25d P	Normalized Skew	NG Low	NG High	Sd Call	Sd Cal	Sd Cal	Sd Put	Sd Put L	Sd Put H	Underlying
1	LO 2019 07 17	Aug19	36.70	38.22	64 / 35.04 / 18.88	1.57	1.76	1.16	2.57	2.46	3.25	11.28	13.18	9.80	0.63	0.37	2.28	10.08	9.71	12.20	58.475
2	LO 2019-08-15	Sep19	33.29	34.55	67.8 / 30.64 / 14.36	-0.00	-2.11	-1.74	3.15	3.07	3.62	-15.56	-16.70	-14.63	-1.41	-2.28	-0.30	10.24	10.16	11.16	59.515
3	LO 2019-09-17	Oct19	31.81	32.95	70 / 29.04 / 13.03	-2.03	-2.41	-1.98	3.50	3.54	3.87	-17.72	-19.27	-17.42	-1.21	-2.09	-0.84	10.72	10.72	11.36	59.260
4	LO 2019-10-17	Nov19	30.95	30.95	70.5 / 27.71 / 11.55	-2.35	-2.51	-2.33	3.76	3.76	3.93	-20.00	-20.90	-19.07	-1.53	-2.35	-1.23	10.92	10.92	11.20	59.215
5	LO 2019-11-15	Dec19	30.33	30.33	71.5 / 26.67 / 14.28	-2.61	-2.80	-2.61	3.73	3.73	3.78	-21.20	-21.51	-21.12	-1.68	-2.46	-1.50	10.31	10.31	10.52	58.975
6	LO 2019-12-18	Jan20	31.54	31.54	74 / 26.14 / 10.14	-1.53	-1.83	-1.83	4.07	4.07	4.07	-24.55	-24.55	-24.55	-4.45	-4.45	-4.45	11.00	11.00	11.00	58.75
7	LO 2020 02 14	Mar20	29.77	29.77	75.5 / 24.33 / 8.08	3.75	3.75	3.75	3.98	3.98	3.98	26.42	26.42	26.42	4.11	4.11	4.11	9.70	9.70	9.70	56.165
8	LO 2020-05-14	Jun20	28.06	28.06	77.8 / 22.78 / 5.85	-3.72	-3.72	-3.72	3.01	3.01	3.01	-23.65	-23.65	-23.65	-5.60	-5.60	-5.60	8.30	8.30	8.30	53.675

Relative Value Grids

The two relative value grids (“Relative Value By Delta” and “Relative Value By Sigma”) display scaled IVs (IV ratios) across the term structure in standardized terms. Scaled IVs adjust for the often significant differences in the ATM IVs of each expiration and are expressed as a percentage (%) premium or discount to the 50Δ (“By Delta”) or ATM (“By Sigma”) point. This methodology is also effective when comparing skews between multiple, similar exchange-traded products. For example, at the time of writing, the ATM IV of the October 2019 expiration in WTI crude oil is 36.32%, whereas Brent crude oil at the same expiration has an ATM IV of 34.67%.

The expirations are listed in chronological order within these two grids. A maximum of 7 expirations will be displayed; these will be the nearest expirations in time. Note that monthly and weekly expirations will be grouped separately; this scheme prevents any monitored weekly options from taking too many expiration slots away from the monthly options. The same delta points and sigma points are used as in the “Changes By Delta” and “Changes By Sigma” grids.

Key	Delta	Expiry 1	Expiry 2	Expiry 3	Expiry 4	Expiry 5	Expiry 6	Expiry 7
1	001. "LO"	LO Aug19	LO Sep19	LO Oct19	LO Nov19	LO Dec19	LO Jan20	LO Mar20
2	002. "LO"	2019-07-17	2019-08-15	2019-09-17	2019-10-17	2019-11-15	2019-12-16	2020-02-14
3	003. "LO"	-5	28.90%	31.95%	33.72%	34.18%	33.57%	32.81%
4	004. "LO"	-15	13.80%	17.16%	19.39%	19.63%	19.42%	19.29%
5	005. "LO"	-25	7.84%	9.95%	11.64%	12.03%	12.24%	12.56%
6	006. "LO"	-35	4.00%	5.21%	6.13%	6.47%	6.92%	6.90%
7	007. "LO"	-50	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
8	008. "LO"	35	-2.56%	-4.05%	-4.80%	-5.73%	-5.95%	-6.51%
9	009. "LO"	25	-3.21%	-5.83%	-7.28%	-8.63%	-9.11%	-9.73%
10	010. "LO"	15	-1.02%	-6.65%	-8.57%	-10.09%	-10.88%	-11.67%
11	011. "LO"	5	5.57%	-1.38%	-5.29%	-6.51%	-7.43%	-8.53%

Vol Levels Dashboard

Relative Value By Sigma

Key	Sigma	Expiry 1	Expiry 2	Expiry 3	Expiry 4	Expiry 5	Expiry 6	Expiry 7
1 001. "LO"		LO Aug19	LO Sep19	LO Oct19	LO Nov19	LO Dec19	LO Jan20	LO Mar20
2 002. "LO"		2019-07-17	2019-08-15	2019-09-17	2019-10-17	2019-11-15	2019-12-16	2020-02-14
3 003. "LO"	-2.00	25.81%	29.00%	31.03%	31.38%	30.88%	30.89%	29.73%
4 004. "LO"	-1.50	17.77%	21.15%	23.20%	23.84%	23.40%	23.37%	22.10%
5 005. "LO"	-1.00	11.18%	13.89%	15.89%	16.14%	16.01%	16.24%	15.18%
6 006. "LO"	-0.50	4.99%	6.59%	7.82%	8.15%	8.44%	8.76%	8.49%
7 007. "LO"	0.00	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
8 008. "LO"	0.50	-2.98%	-5.21%	-6.54%	-7.76%	-8.21%	-8.92%	-10.00%
9 009. "LO"	1.00	-2.54%	-7.29%	-9.52%	-11.24%	-12.27%	-13.13%	-15.12%
10 010. "LO"	1.50	1.05%	-4.32%	-7.59%	-9.05%	-10.15%	-11.18%	-13.57%
11 011. "LO"	2.00	8.09%	2.33%	-0.23%	-0.86%	-1.55%	-2.33%	-5.43%

Buttons: IV Units, Tick Units, From EOD, From Baseline, Display, Set

Navigation: Changes By Delta, Changes By Strike, Changes By Sigma, Current Vols, Relative Value By Delta, Relative Value By Sigma, Skew & Kurtosis

"Skew & Kurtosis" Grid

This grid displays other sophisticated, but widely used, metrics that quantify IV skew and kurtosis. These metrics help capture the dynamics and nuances of the IV surface.

- **SK10 Skew:** $[(100\% \text{ ATM Strike IV}) - (90\% \text{ Strike IV})] * \sqrt{T}$
 - The square root of time factor normalizes same strike skews across a term structure.
 - Very applicable to equity option IV curves given their similar steep downside slopes.
- **Moneyness Skew:** $(110\% \text{ Strike IV}) - (90\% \text{ Strike IV})$
 - Popular for fixed strike skews exhibited by stock and equity index IV curves.
 - Sensitive to IV at lower levels of IV, showing strong correlation to levels of volatility.
- **OTM Kurtosis:** $(90\% \text{ IV} + 110\% \text{ IV}) / (2 * 100\% \text{ ATM Strike IV})$
 - This ratio compares strikes 10% OTM with the ATM strike.
- **25d Butterfly:** $(25\Delta \text{ Call IV} + 25\Delta \text{ Put IV}) / (2 * 50\Delta \text{ IV})$
 - The inner curve butterfly ratio.
- **1 Sigma Butterfly:** $(1.0\sigma \text{ Call IV} + 1.0\sigma \text{ Put IV}) / (2 * 0.0\sigma \text{ ATM Strike IV})$
 - Butterfly ratio at the 1σ (i.e., 1 standard deviation) point away from ATM.
 - 1.0σ may approximate the area on the curve near $\approx 16\Delta$.
- **5d Wing Kurtosis:** $(5\Delta \text{ Call IV} + 5\Delta \text{ Put IV}) / (2 * 50\Delta \text{ IV})$
 - Widely used data points to measure kurtosis of a vol curve.
 - Often close proximity to the $\approx |2\sigma|$ points.

Vol Levels Dashboard

Skew & Kurtosis

Key A	Expiry	SK10 Skew	SK10 Skew Range	Moneyness	Moneyness Skew Range	OTM Kurt...	OTM Kurtosis Range	25d Butt...	25d Butterfly Range	1 Sigma B...	1 Sigma Butterfly Range	5d Wing	5d Wing Kurtosis...	From
1 001 "LO"	Sep19	-1.47	-1.51 / -1.38	-10.01	-11.24 / -9.79	1.150	1.133 / 1.155	1.025	1.019 / 1.028	1.033	1.025 / 1.035	1.164	1.148 / 1.172	baseline (08/07 08:17 PM)
2 002 "LO"	Oct19	1.36	1.40 / 1.33	6.60	6.75 / 6.41	1.024	1.022 / 1.027	1.018	1.015 / 1.021	1.026	1.024 / 1.029	1.122	1.121 / 1.128	baseline (08/07 08:17 PM)
3 003 "LO"	Nov19	-1.27	-1.28 / -1.18	-5.08	-5.13 / -4.87	1.011	1.009 / 1.012	1.013	1.012 / 1.015	1.023	1.019 / 1.023	1.103	1.100 / 1.104	baseline (08/07 08:17 PM)
4 004 "LO"	Dec19	-1.23	-1.26 / -1.17	-4.43	-4.52 / -4.24	1.005	1.003 / 1.007	1.011	1.009 / 1.012	1.017	1.015 / 1.018	1.096	1.091 / 1.096	baseline (08/07 08:17 PM)
5 005 "LO"	Jan20	-1.27	-1.30 / -1.21	-4.32	-4.33 / -4.13	0.999	0.990 / 1.001	1.008	1.004 / 1.009	1.008	1.004 / 1.009	1.079	1.072 / 1.080	baseline (08/07 08:17 PM)
6 006 "LO"	Feb20	1.27	1.31 / 1.23	4.02	4.13 / 3.96	0.997	0.995 / 0.997	0.999	0.998 / 1.002	0.993	0.992 / 0.995	1.054	1.051 / 1.057	baseline (08/07 08:17 PM)
7 007 "LO"	Mar20	-1.34	-1.41 / -1.25	-3.91	-4.14 / -3.76	0.997	0.995 / 0.997	0.998	0.995 / 1.003	0.990	0.987 / 0.991	1.046	1.041 / 1.052	baseline (08/07 08:17 PM)
8 008 "LO"	Jun20	-1.23	-1.28 / -1.21	-3.26	-3.32 / -3.22	0.992	0.992 / 0.994	0.987	0.987 / 0.989	0.972	0.972 / 0.974	1.031	1.031 / 1.035	baseline (08/07 08:17 PM)

Buttons: IV Link, Tick Link, From EU, From Baseline, Apply Changes

Filters: Changes By Delta, Changes By Strike, Changes By Sigma, Current Vols, Relative Value By Delta, Relative Value By Sigma, Skew & Kurtosis

"Butterflies" Grid

This grid displays detailed information on ten butterflies (5 put side, 5 call side) across the term structure. For convenience, the nearest strikes to each butterfly leg are also displayed. The butterfly vols are displayed in ratio format; e.g. the 10/20/30 Put butterfly vol is calculated as: $(10\Delta \text{ Put IV} + 30\Delta \text{ Put IV}) / (2 * 20\Delta \text{ Put IV})$. The vols are displayed in the cells with the following format: "current IV (low IV / high IV)", where the low and high IVs are tracked intraday.

Butterflies

	Expiry 1	Expiry 2	Expiry 3	Expiry 4	Expiry 5	Expiry 6	Expiry 7
001. "LO"	LO Jul21	LO Aug21	LO Sep21	LO Oct21	LO Nov21	LO Dec21	LO Jan22
002. "LO"	2021-06-17	2021-07-15	2021-08-17	2021-09-16	2021-10-15	2021-11-16	2021-12-15
003. "LO" 10/20/30 Put	1.020 (1.010 / 1.055)	1.024 (1.019 / 1.029)	1.024 (1.018 / 1.025)	1.022 (1.017 / 1.025)	1.018 (1.013 / 1.020)	1.014 (1.009 / 1.016)	1.009 (1.006 / 1.015)
004. "LO" 10/25/40 Put	1.036 (1.020 / 1.082)	1.041 (1.031 / 1.043)	1.037 (1.028 / 1.037)	1.035 (1.028 / 1.038)	1.030 (1.023 / 1.032)	1.025 (1.018 / 1.026)	1.016 (1.012 / 1.022)
005. "LO" 10/30/50 Put	1.058 (1.034 / 1.103)	1.059 (1.042 / 1.059)	1.049 (1.036 / 1.049)	1.048 (1.037 / 1.049)	1.043 (1.033 / 1.044)	1.037 (1.027 / 1.039)	1.026 (1.019 / 1.030)
006. "LO" 20/35/50 Put	1.032 (1.014 / 1.049)	1.023 (1.013 / 1.025)	1.016 (1.010 / 1.018)	1.017 (1.011 / 1.018)	1.017 (1.011 / 1.018)	1.018 (1.011 / 1.018)	1.013 (1.008 / 1.014)
007. "LO" 30/40/50 Put	1.015 (1.003 / 1.023)	1.008 (1.005 / 1.008)	1.006 (1.004 / 1.006)	1.006 (1.004 / 1.006)	1.006 (1.004 / 1.006)	1.006 (1.004 / 1.006)	1.005 (1.004 / 1.006)
008. "LO" 50/40/30 Call	1.012 (1.002 / 1.027)	1.006 (1.005 / 1.008)	1.006 (1.005 / 1.007)	1.006 (1.005 / 1.007)	1.006 (1.005 / 1.007)	1.007 (1.005 / 1.007)	1.007 (1.006 / 1.007)
009. "LO" 50/35/20 Call	1.030 (1.009 / 1.052)	1.020 (1.016 / 1.024)	1.019 (1.016 / 1.021)	1.019 (1.016 / 1.021)	1.020 (1.016 / 1.021)	1.020 (1.017 / 1.022)	1.022 (1.018 / 1.024)
010. "LO" 50/30/10 Call	1.084 (1.062 / 1.167)	1.072 (1.065 / 1.081)	1.059 (1.054 / 1.065)	1.059 (1.054 / 1.065)	1.060 (1.054 / 1.063)	1.064 (1.057 / 1.066)	1.067 (1.054 / 1.070)
011. "LO" 40/25/10 Call	1.062 (1.048 / 1.131)	1.058 (1.052 / 1.065)	1.045 (1.041 / 1.052)	1.045 (1.041 / 1.051)	1.046 (1.042 / 1.050)	1.049 (1.044 / 1.051)	1.051 (1.039 / 1.057)
012. "LO" 30/20/10 Call	1.034 (1.025 / 1.091)	1.043 (1.036 / 1.048)	1.030 (1.027 / 1.037)	1.030 (1.025 / 1.035)	1.030 (1.027 / 1.034)	1.032 (1.029 / 1.035)	1.034 (1.023 / 1.042)
013. "LO" 10/20/30 Put Strikes	70 / 71 / 71	62 / 66 / 68	57 / 62.5 / 66	54 / 60.5 / 64.5	51 / 58.5 / 63	48.5 / 56.5 / 61.5	46.5 / 54.5 / 60
014. "LO" 10/25/40 Put Strikes	70 / 71 / 71.5	62 / 67 / 70	57 / 64.5 / 68.5	54 / 62.5 / 67.5	51 / 60.5 / 66.5	48.5 / 59 / 65.5	46.5 / 57.5 / 64.5
015. "LO" 10/30/50 Put Strikes	70 / 71 / 72	62 / 68 / 71.5	57 / 66 / 71	54 / 64.5 / 70	51 / 63 / 69.5	48.5 / 61.5 / 68.5	46.5 / 60 / 68
016. "LO" 20/35/50 Put Strikes	71 / 71.5 / 72	66 / 69 / 71.5	62.5 / 67.5 / 71	60.5 / 66 / 70	58.5 / 64.5 / 69.5	56.5 / 63.5 / 68.5	54.5 / 62.5 / 68
017. "LO" 30/40/50 Put Strikes	71 / 71.5 / 72	68 / 70 / 71.5	66 / 68.5 / 71	64.5 / 67.5 / 70	63 / 66.5 / 69.5	61.5 / 65.5 / 68.5	60 / 64.5 / 68
018. "LO" 50/40/30 Call Strikes	72 / 72 / 72.5	71.5 / 73 / 75	71 / 73 / 75.5	70 / 72.5 / 75.5	69.5 / 72.5 / 75.5	60.5 / 72 / 75.5	60 / 71.5 / 75.5
019. "LO" 50/35/20 Call Strikes	72 / 72.5 / 73	71.5 / 74 / 77	71 / 74.5 / 78.5	70 / 74 / 79	69.5 / 74 / 79.5	68.5 / 74 / 80	68 / 73.5 / 80.5
020. "LO" 50/30/10 Call Strikes	72 / 72.5 / 73.5	71.5 / 75 / 80.5	71 / 75.5 / 83	70 / 75.5 / 84.5	69.5 / 75.5 / 86	68.5 / 75.5 / 87.5	68 / 75.5 / 88.5
021. "LO" 40/25/10 Call Strikes	72 / 72.5 / 73.5	73 / 76 / 80.5	73 / 77 / 83	72.5 / 77 / 84.5	72.5 / 77.5 / 86	72 / 77.5 / 87.5	71.5 / 78 / 88.5
022. "LO" 30/20/10 Call Strikes	72.5 / 73 / 73.5	75 / 77 / 80.5	75.5 / 78.5 / 83	75.5 / 79 / 84.5	75.5 / 79.5 / 86	75.5 / 80 / 87.5	75.5 / 80.5 / 88.5
023.							

Buttons: Discard Changes, Apply Changes

Filters: Changes By Delta, Changes By Strike, Changes By Sigma, Relative Value By Delta, Relative Value By Sigma, Butterflies

"Trade Performance" Grid

This grid allows the trader to track the intraday performance of individual trades for options or options strategies. Some of the information is redundant with that displayed in Metro's "Fills" window, however, other information is novel and also the "Trade

Performance” grid displays information on a trade basis (a trade may aggregate multiple fills). The “Init IV” and “Init Edge” columns show the initial IV and initial edge locked in at the time of the trade. The Live columns update periodically, however, displaying current values for each trade:

- “Live Price”: the current price of the traded instrument
- “Live IV”: the current IV of the traded instrument (and the change from “Init IV” is displayed after in parentheses)
- “Live C PL”: the current per-contract (single contract) P/L dollar value. A delta-neutral hedge against the underlying at the time of the opening trade is assumed.
- “Live T PL”: the current trade’s P/L dollar value (“Live C PL” x traded qty)
- “Closing Edge”: the current closing edge for the traded instrument

All columns are sortable, allowing different perspectives into the displayed data. Note that, for strategies, an alternative IV metric is displayed in the IV columns; this metric approximates the difference in the long legs’ average IV and the short legs’ average IV. Also note that information displayed in this grid is affected by the following nine Configure screen settings (see below for details):

- “tp_update_freq”
- “tp_last_n_trades”
- “tp_min_trade_qty”
- “tp_live_PL_calc”
- “tp_min_hedging_res”
- “tp_filter_trader”
- “tp_filter_account”
- “tp_underlying_tick_\$_vals”
- “tp_options_tick_\$_vals”

	Time	Instrument	Qty	Init Price	Init IV	Init Edge	Live Price	Live IV	Live C PL	Live T PL	Closing Edge	UPrice	Trader
001	02:40:29 PM	LO-Sep21 77C	2	1.46	28.44	0.499	1.46	28.40 (-0.04)	(\$-5)	(\$-9)	-1.678	72.625	RCD
002	02:40:29 PM	LO-Sep21 77C	4	1.46	28.44	0.499	1.46	28.40 (-0.04)	(\$-5)	(\$-19)	-1.678	72.625	RCD
003	02:40:29 PM	LO-Sep21 77C	4	1.46	28.44	0.499	1.46	28.40 (-0.04)	(\$-5)	(\$-19)	-1.678	72.625	RCD
004	02:40:18 PM	LO-Sep21 77C	4	1.46	28.46	0.857	1.46	28.40 (-0.06)	(\$-6)	(\$-25)	-1.678	72.62	RCD
005	02:02:41 PM	LO-Sep21 80C	11	0.81	29.29	0.819	0.78	28.62 (-0.67)	(\$-49)	(\$-537)	-1.672	72.545	RCD
006	01:33:57 PM	LO-Sep21 68P	-1	1.71	31.85	0.433	1.67	31.42 (-0.43)	\$47	\$47	-1.760	72.66	RCD
007	01:27:08 PM	LO-STRG Oct21 69 P :1 74.5 C :1	1	5.98		1.027	5.82		(\$-163)	(\$-163)	-2.689	71.75	RCD
008	01:27:07 PM	LO-STRG Oct21 69 P :1 74.5 C :1	1	5.98		1.027	5.82		(\$-163)	(\$-163)	-2.689	71.75	RCD
009	01:26:55 PM	LO-Aug21 67.5P	-12	0.56	34.08	0.249	0.53	33.62 (-0.46)	\$25	\$296	-1.152	73.255	RCD
010	01:08:26 PM	LO-Sep21 77.5C	-11	1.4	29.77	0.425	1.31	28.37 (-1.40)	\$129	\$1420	-1.668	72.475	RCD
011	12:46:43 PM	LO-Aug21 76.5C	-1	0.78	28.44	0.205	0.7	26.58 (-1.86)	\$111	\$111	-0.776	73.165	RCD
012	12:46:42 PM	LO-Aug21 76.5C	-1	0.78	28.44	0.205	0.7	26.58 (-1.86)	\$111	\$111	-0.776	73.165	RCD
013	12:46:42 PM	LO-Aug21 76.5C	-1	0.78	28.44	0.205	0.7	26.58 (-1.86)	\$111	\$111	-0.776	73.165	RCD
014	12:36:49 PM	LO-Aug21 80C	-2	0.27	30.58	0.204	0.22	28.45 (-2.13)	\$70	\$139	-1.201	73.125	RCD
015	12:01:08 PM	LO-Aug21 86C	-1	0.09	39.55	0.066	0.08	38.15 (-1.40)	\$20	\$20	-1.057	73.015	RCD
016	11:55:33 AM	LO-Aug21 64P	-1	0.28	37.91	0.164	0.24	37.34 (-0.56)	\$21	\$21	-0.700	73.115	RCD
017	11:21:52 AM	LO-Aug21 82C	-1	0.17	33.40	0.033	0.14	31.42 (-1.98)	\$48	\$48	-0.740	72.975	RCD
018	11:00:11 AM	LO-Aug21 62P	-1	0.18	39.87	0.182	0.16	39.66 (-0.21)	\$12	\$12	-0.767	73.195	RCD
019	10:50:15 AM	LO-Aug21 69P	5	0.88	33.08	0.233	0.75	32.14 (-0.94)	(\$-63)	(\$-317)	-0.924	73.025	RCD
020	10:28:34 AM	LO-Sep21 65P	-1	1.14	33.50	0.371	1.04	32.71 (-0.79)	\$72	\$72	-2.072	72.495	RCD

Market Data Recording (MDR) Component

The optional add-on “Market Data Recording” (MDR) component also allows the Vol Levels algo to track and record options IV information, as well as the underlying instruments’ price and volume information, on a regular 10-minute basis. IVs are recorded for 21 symmetric delta sample points, as well as six constant maturities ranging from 30 days to 180 days (subject to the user-defined tracked options expirations specified in the “options” Configure setting). Median processing removes outlier sub-samples and ensures that the recorded data is of the highest fidelity. This longer-term recorded data allows the display of various grids in the MDR dashboard that calculate metrics on longer time bases than are displayed in the standard Vol Levels grids. Note that the recorded IV data is dependent upon a regularly updating vol curve (i.e., regular new publications). For this reason, the optional MDR component usually requires the Dynamic Skew algo (realtime curve fitter) as an implied prerequisite.

MDR – “IV By Constant Maturity” Grid

This grid shows the most recent IV values (sub-samples) taken at the 21 symmetric delta sample points across the six interpolated constant maturities. The “Nearest Strike” columns also display the nearest strike to each sampled delta point, for each constant maturity.

	Delta	30 days IV	30 days Nearest Strike	60 days IV	60 days Nearest Strike	90 days IV	90 days Nearest Strike	120 days IV	120 days Nearest Strike	150 days IV	150 days Nearest Strike	180 days IV	180 days Nearest Strike
... -1		55.50	52.0	55.44	44.5	55.91	39.5	56.43	36.0	57.15	32.5	57.28	30.0
... -5		41.94	61.0	43.17	55.5	43.70	52.0	44.05	49.0	44.37	47.0	44.65	45.0
... -10		38.55	64.0	39.70	80.0	40.22	57.5	40.70	55.0	41.09	53.0	41.40	51.5
... -15		37.04	66.0	38.03	63.0	38.65	60.5	38.65	59.0	39.45	57.0	39.75	55.5
... -20		36.02	67.5	36.95	65.0	37.47	63.0	37.98	61.5	38.33	60.5	38.62	59.0
... -25		35.29	69.0	36.14	67.0	36.65	65.5	37.11	64.0	37.45	63.0	37.71	62.0
... -30		34.70	70.0	35.49	68.5	35.96	67.5	36.39	66.5	36.69	65.5	36.90	65.0
... -35		34.20	71.0	34.91	70.0	35.36	69.0	35.73	68.5	35.99	68.0	36.14	67.5
... -40		33.76	71.5	34.39	71.0	34.79	71.0	35.12	70.5	35.34	70.0	35.43	69.5
... -45		33.37	72.5	33.90	72.5	34.25	72.5	34.55	72.0	34.78	72.0	34.88	71.5
... -50		33.02	73.5	33.48	73.5	33.83	73.5	34.12	73.5	34.31	73.5	34.35	73.0
... -45		32.67	74.0	33.03	75.0	33.31	75.0	33.57	75.5	33.72	75.5	33.73	75.5
... -40		32.34	75.0	32.58	76.0	32.81	76.5	33.04	77.0	33.16	77.5	33.14	77.5
... -35		32.03	76.0	32.15	77.5	32.34	78.5	32.55	79.0	32.65	79.5	32.61	80.0
... -30		31.74	77.0	31.75	78.5	31.80	80.0	32.10	81.0	32.20	81.5	32.14	82.5
... -25		31.49	78.0	31.39	80.0	31.52	82.0	31.72	83.0	31.82	84.0	31.75	85.0
... -20		31.29	79.0	31.08	82.0	31.19	84.0	31.41	85.5	31.54	87.0	31.46	88.0
... -15		31.20	80.0	30.86	84.0	30.96	86.5	31.21	88.5	31.40	90.5	31.32	92.0
... -10		31.39	82.0	30.83	86.5	30.95	90.0	31.26	92.5	31.54	95.0	31.48	97.5
... -5		32.56	85.0	31.60	91.0	31.60	95.5	32.14	100.0	32.56	104.0	32.57	107.0
... 1		43.30	96.0	39.09	107.0	39.76	116.5	39.74	127.0	39.90	135.5	39.67	143.0

MDR – “Z-scores By Delta” Grid

This grid displays the current IV Z-scores for each sampled constant maturity and delta point. The Z-score represents a statistical mean reversion signal. When the Z-score exceeds some threshold (e.g. +2.5 or +3.0, for example), it signifies an increased statistical likelihood that the IV should revert lower in the future. Similarly, if the Z-score exceeded some negative threshold (e.g. -2.5 or -3.0, for example), it signifies that IV is statistically likely to revert higher in the future. The various look-back periods (6 hours to 20 trading days [one calendar month]) allow the trader to follow these signals over multiple time scales.

Constant Maturity	Delta	Nearest Strike	Current IV	Prev Day Change	Today's Range	Zsco (6 hours)	Zsco (1 day)	Zsco (2 days)	Zsco (5 days)	Zsco (10 days)	Zsco (20 days)
... 30 days	-1	52.5	55.28	-1.58	54.49 - 57.22	-0.202	-1.377	-1.316	-1.259	-1.930	-2.445
... 30 days	-5	61.0	41.82	-2.81	41.49 - 42.53	0.235	-1.142	-1.190	-1.342	-1.949	-2.190
... 30 days	-10	64.0	38.49	-2.21	38.21 - 39.21	-0.051	-1.249	-1.228	-1.355	-1.877	-1.985
... 30 days	-15	66.0	36.91	-2.07	36.67 - 37.67	-0.217	-1.332	-1.273	-1.377	-1.046	-1.001
... 30 days	-20	67.5	35.92	-2.00	35.69 - 36.68	-0.252	-1.317	-1.289	-1.390	-1.823	-1.810
... 30 days	-25	69.0	35.19	-1.94	34.97 - 35.99	-0.234	-1.339	-1.291	-1.397	-1.801	-1.752
... 30 days	-30	70.0	34.62	-1.88	34.40 - 35.43	-0.197	-1.324	-1.285	-1.398	-1.771	-1.693
... 30 days	-35	71.0	34.14	-1.83	33.92 - 34.94	-0.169	-1.312	-1.277	-1.392	-1.731	-1.630
... 30 days	-40	72.0	33.72	-1.78	33.49 - 34.49	-0.149	-1.302	-1.268	-1.381	-1.686	-1.565
... 30 days	-45	72.5	33.33	-1.74	33.09 - 34.07	-0.146	-1.297	-1.260	-1.374	-1.639	-1.501
... 30 days	50	73.5	32.99	-1.69	32.75 - 33.71	-0.168	-1.302	-1.254	-1.365	-1.595	-1.444
... 30 days	45	74.5	32.63	-1.64	32.39 - 33.35	-0.215	-1.316	-1.252	-1.357	-1.553	-1.389
... 30 days	40	75.0	32.30	-1.59	32.06 - 33.01	-0.272	-1.335	-1.252	-1.349	-1.513	-1.341
... 30 days	35	76.0	31.98	-1.54	31.74 - 32.70	-0.332	-1.358	-1.254	-1.340	-1.476	-1.300
... 30 days	30	77.0	31.69	-1.49	31.45 - 32.41	-0.389	-1.389	-1.261	-1.331	-1.444	-1.268
... 30 days	25	78.0	31.45	-1.43	31.20 - 32.17	-0.436	-1.429	-1.276	-1.319	-1.417	-1.249
... 30 days	20	79.0	31.26	-1.37	31.00 - 31.99	-0.485	-1.483	-1.301	-1.305	-1.396	-1.245
... 30 days	15	80.5	31.17	-1.33	30.91 - 31.95	-0.561	-1.567	-1.347	-1.288	-1.385	-1.264
... 30 days	10	82.0	31.33	-1.33	31.07 - 32.26	-0.696	-1.704	-1.430	-1.263	-1.391	-1.327
... 30 days	5	85.0	32.44	-1.52	32.13 - 33.62	-0.840	-1.852	-1.551	-1.215	-1.439	-1.484
... 30 days	1	96.5	43.08	-0.95	41.91 - 44.87	-0.857	-0.769	-1.255	-0.845	-1.289	-1.297
...											
... 60 days	-1	44.5	55.31	-1.20	54.41 - 56.26	-0.450	-1.109	-1.306	-1.430	-2.132	-2.526
... 60 days	-5	55.5	43.09	-1.57	42.86 - 43.86	-0.368	-1.598	-1.386	-1.459	-2.079	-2.336
... 60 days	-10	60.0	39.60	-1.35	39.41 - 40.40	-0.571	-1.801	-1.485	-1.452	-2.013	-2.228
... 60 days	-15	63.0	37.95	-1.27	37.74 - 38.71	-0.561	-1.787	-1.507	-1.458	-1.983	-2.170
... 60 days	-20	65.0	36.88	-1.24	36.68 - 37.62	-0.540	-1.751	-1.506	-1.473	-1.970	-2.132
... 60 days	-25	67.0	36.08	-1.23	35.88 - 36.81	-0.526	-1.722	-1.498	-1.488	-1.960	-2.101
... 60 days	-30	68.5	35.44	-1.22	35.24 - 36.16	-0.515	-1.703	-1.492	-1.500	-1.945	-2.067
... 60 days	-35	70.0	34.88	-1.20	34.67 - 35.58	-0.505	-1.693	-1.487	-1.508	-1.921	-2.029
... 60 days	-40	71.5	34.37	-1.18	34.16 - 35.05	-0.508	-1.694	-1.485	-1.513	-1.894	-1.988
... 60 days	-45	72.5	33.99	-1.17	33.67 - 34.55	-0.509	-1.693	-1.480	-1.515	-1.065	-1.946
... 60 days	50	73.5	33.48	-1.15	33.26 - 34.13	-0.560	-1.724	-1.485	-1.522	-1.846	-1.918
... 60 days	45	75.0	33.01	-1.15	32.80 - 33.65	-0.615	-1.755	-1.489	-1.527	-1.824	-1.890
... 60 days	40	76.0	32.55	-1.15	32.35 - 33.18	-0.675	-1.789	-1.494	-1.531	-1.805	-1.870
... 60 days	35	77.5	32.11	-1.16	31.92 - 32.75	-0.727	-1.810	-1.499	-1.533	-1.787	-1.056
... 60 days	30	79.0	31.71	-1.16	31.52 - 32.34	-0.767	-1.833	-1.504	-1.533	-1.771	-1.819
... 60 days	25	80.0	31.35	-1.17	31.16 - 31.98	-0.763	-1.834	-1.508	-1.529	-1.756	-1.851
... 60 days	20	82.0	31.05	-1.19	30.85 - 31.67	-0.749	-1.821	-1.515	-1.519	-1.744	-1.865
... 60 days	15	84.0	30.83	-1.21	30.62 - 31.45	-0.744	-1.809	-1.520	-1.503	-1.737	-1.900
... 60 days	10	86.5	30.79	-1.24	30.57 - 31.45	-0.783	-1.825	-1.561	-1.477	-1.744	-2.007
... 60 days	5	91.0	31.52	-1.37	31.30 - 32.25	-0.853	-1.830	-1.603	-1.439	-1.788	-2.233
... 60 days	1	107.0	38.90	-1.40	38.71 - 40.25	-1.039	-1.806	-1.697	-1.510	-2.019	-2.681
...											
... 90 days	-1	39.5	55.56	0.65	54.83 - 56.94	-0.130	-0.818	-1.257	-1.286	-1.957	-2.255
... 90 days	-5	52.0	43.65	-0.94	43.51 - 44.39	-0.773	-1.927	-1.587	-1.430	-2.046	-2.344
... 90 days	-10	57.5	40.16	-0.98	40.03 - 40.89	-0.756	-1.994	-1.622	-1.441	-2.033	-2.371
... 90 days	-15	60.5	38.51	-0.97	38.36 - 39.21	-0.709	-1.969	-1.617	-1.452	-2.028	-2.377
... 90 days	-20	63.5	37.44	-0.96	37.28 - 38.11	-0.694	-1.949	-1.612	-1.471	-2.031	-2.379
... 90 days	-25	65.5	36.62	-0.96	36.47 - 37.28	-0.703	-1.945	-1.612	-1.492	-2.035	-2.378
... 90 days	-30	67.5	35.95	-0.95	35.79 - 36.59	-0.730	-1.960	-1.619	-1.510	-2.032	-2.373
... 90 days	-35	69.0	35.35	-0.94	35.19 - 35.99	-0.769	-1.992	-1.632	-1.524	-2.024	-2.363
... 90 days	-40	71.0	34.79	-0.93	34.63 - 35.43	-0.816	-2.033	-1.647	-1.535	-2.012	-2.352
... 90 days	-45	72.5	34.26	-0.90	34.10 - 34.91	-0.860	-2.068	-1.665	-1.546	-2.000	-2.342
... 90 days	50	73.5	33.84	-0.93	33.69 - 34.46	-0.895	-2.095	-1.664	-1.549	-1.987	-2.332
... 90 days	45	75.0	33.32	-0.94	33.18 - 33.92	-0.936	-2.125	-1.667	-1.554	-1.973	-2.325
... 90 days	40	76.5	32.82	-0.94	32.68 - 33.41	-0.971	-2.149	-1.667	-1.557	-1.960	-2.323
... 90 days	35	78.5	32.34	-0.95	32.21 - 32.93	-1.000	-2.168	-1.666	-1.557	-1.948	-2.324
... 90 days	30	80.0	31.91	-0.96	31.78 - 32.49	-1.021	-2.183	-1.663	-1.556	-1.938	-2.329
... 90 days	25	82.0	31.53	-0.96	31.39 - 32.09	-1.029	-2.185	-1.660	-1.552	-1.928	-2.337
... 90 days	20	84.0	31.21	-0.97	31.06 - 31.75	-1.022	-2.174	-1.657	-1.544	-1.918	-2.352
... 90 days	15	86.5	30.98	-0.98	30.83 - 31.52	-1.002	-2.145	-1.655	-1.526	-1.907	-2.379
... 90 days	10	90.0	30.95	-1.01	30.79 - 31.49	-0.995	-2.127	-1.662	-1.492	-1.892	-2.434
... 90 days	5	95.5	31.63	-1.00	31.40 - 32.21	-1.039	-2.146	-1.690	-1.441	-1.905	-2.556
... 90 days	1	116.5	38.60	0.45	38.33 - 39.47	-1.144	-1.702	-1.721	-1.394	-1.926	-2.632

MDR – “RSI By Delta” Grid

This grid displays the current Relative Strength Index (for IV) for each sampled constant maturity and delta point. Similar to Z-scores, the RSI values are a trend reversal (mean reversion) signal. RSI values range from 0-100; values above 80 generally indicate an overbought state and values below 20 generally indicate an oversold state. The various look-back periods (6 hours to 20 trading days [one calendar month]) allow the trader to follow these signals over multiple time scales.

Vol Levels MDR Dashboard												
RSI By Delta												
Constant Maturity	Delta	Nearest Strike	Current IV	Prev Day Ch...	Today's Range	RSI (6 hours)	RSI (1 day)	RSI (2 days)	RSI (5 days)	RSI (10 days)	RSI (20 days)	
30 days	-1	52.0	55.31	-1.68	54.19 - 57.22	51.7	46.9	43.7	41.8	41.8	41.0	
30 days	-5	61.0	42.01	-2.81	41.49 - 42.53	61.6	48.1	41.2	38.1	40.3	40.8	
30 days	-10	64.0	38.04	-2.21	38.21 - 39.21	59.5	47.3	41.5	38.9	41.2	41.4	
30 days	-15	66.0	37.10	-2.07	36.67 - 37.67	60.0	47.4	41.6	39.3	41.7	41.9	
30 days	-20	67.5	36.11	-2.00	35.69 - 36.68	60.1	47.4	41.6	39.5	41.8	42.1	
30 days	-25	68.5	35.37	-1.94	34.97 - 35.99	60.0	47.2	41.4	39.5	41.9	42.2	
30 days	-30	70.0	34.78	-1.88	34.40 - 35.43	59.9	47.0	41.4	39.6	41.9	42.3	
30 days	-35	71.0	34.27	-1.83	33.92 - 34.94	59.8	46.8	41.2	39.6	41.9	42.4	
30 days	-40	71.5	33.84	-1.78	33.49 - 34.49	59.0	46.7	41.3	39.5	42.0	42.5	
30 days	-45	72.5	33.44	-1.74	33.09 - 34.07	58.4	46.7	41.4	39.5	42.1	42.7	
30 days	50	73.5	33.09	-1.69	32.75 - 33.71	57.7	46.7	41.5	39.5	42.2	42.9	
30 days	45	74.0	32.74	-1.64	32.39 - 33.35	57.5	46.8	41.7	39.6	42.3	43.1	
30 days	40	75.0	32.41	-1.59	32.06 - 33.01	57.1	47.1	42.1	39.7	42.4	43.3	
30 days	35	76.0	32.11	-1.54	31.74 - 32.70	56.9	47.2	42.3	39.8	42.5	43.6	
30 days	30	77.0	31.83	-1.49	31.45 - 32.41	56.6	47.3	42.4	39.9	42.6	43.8	
30 days	25	78.0	31.59	-1.43	31.20 - 32.17	56.3	47.2	42.3	40.0	42.7	43.9	
30 days	20	79.0	31.40	-1.37	31.00 - 31.99	55.7	47.0	42.1	39.9	42.8	44.1	
30 days	15	80.0	31.32	-1.33	30.91 - 31.95	54.8	46.6	41.8	39.9	42.8	44.2	
30 days	10	82.0	31.48	-1.33	31.07 - 32.26	53.0	45.7	41.6	39.9	42.7	44.2	
30 days	5	85.0	32.56	-1.52	32.13 - 33.62	49.5	44.2	41.5	40.0	42.4	43.9	
30 days	1	96.0	43.27	-0.95	41.91 - 44.87	50.8	48.8	48.1	46.4	46.1	46.4	
60 days	-1	44.5	55.35	-1.20	54.41 - 56.26	49.5	46.0	43.8	41.4	41.7	40.0	
60 days	-5	55.5	43.19	-1.57	42.86 - 43.86	54.8	45.3	40.6	39.0	40.2	39.6	
60 days	-10	60.0	39.72	-1.35	39.41 - 40.40	53.5	44.6	40.6	39.6	41.0	40.5	
60 days	-15	63.0	38.06	-1.27	37.74 - 38.71	54.3	44.7	40.6	39.8	41.3	40.9	
60 days	-20	65.0	36.99	-1.24	36.68 - 37.62	54.7	44.7	40.5	39.7	41.4	41.1	
60 days	-25	67.0	36.18	-1.23	35.88 - 36.81	54.4	44.5	40.3	39.6	41.4	41.2	
60 days	-30	68.5	35.52	-1.22	35.24 - 36.16	53.7	44.2	40.0	39.5	41.4	41.2	
60 days	-35	70.0	34.94	-1.20	34.67 - 35.58	52.8	43.8	39.7	39.2	41.3	41.4	
60 days	-40	71.0	34.42	-1.18	34.16 - 35.05	51.8	43.4	39.3	39.0	41.2	41.5	
60 days	-45	72.5	33.92	-1.17	33.67 - 34.55	51.1	43.2	39.0	38.8	41.1	41.6	
60 days	50	73.5	33.52	-1.15	33.26 - 34.13	50.7	43.1	38.9	38.8	41.1	41.7	
60 days	45	75.0	33.05	-1.15	32.80 - 33.65	50.8	43.3	39.0	38.8	41.2	41.8	
60 days	40	76.0	32.61	-1.15	32.35 - 33.18	51.0	43.6	39.2	38.9	41.2	42.0	
60 days	35	77.5	32.19	-1.16	31.92 - 32.75	51.2	44.0	39.5	39.0	41.3	42.1	
60 days	30	78.5	31.79	-1.16	31.52 - 32.34	51.4	44.3	39.8	39.0	41.3	42.2	
60 days	25	80.0	31.44	-1.17	31.16 - 31.98	51.4	44.5	39.9	39.0	41.3	42.3	
60 days	20	82.0	31.14	-1.19	30.85 - 31.67	51.4	44.5	39.8	38.9	41.2	42.4	
60 days	15	83.5	30.92	-1.21	30.62 - 31.45	51.6	44.6	39.9	38.9	41.1	42.4	
60 days	10	86.5	30.91	-1.24	30.57 - 31.45	52.4	44.7	40.1	38.8	40.9	42.3	
60 days	5	91.0	31.69	-1.37	31.30 - 32.25	53.6	45.1	40.6	39.3	41.0	41.9	
60 days	1	107.0	39.04	-1.40	38.71 - 40.25	47.0	44.8	42.7	41.7	43.1	44.0	
90 days	-1	39.5	55.82	0.65	54.83 - 56.94	57.1	49.7	48.0	45.2	44.3	42.6	
90 days	-5	52.0	43.71	-0.94	43.51 - 44.39	46.9	43.0	40.4	39.6	40.3	39.7	
90 days	-10	57.5	40.22	-0.98	40.03 - 40.89	46.5	42.6	39.6	39.6	40.6	40.2	
90 days	-15	60.5	38.57	-0.97	38.36 - 39.21	48.6	42.7	39.5	39.7	40.7	40.4	
90 days	-20	63.0	37.50	-0.96	37.28 - 38.11	49.6	42.9	39.5	39.6	40.7	40.3	
90 days	-25	65.5	36.68	-0.96	36.47 - 37.28	49.4	42.7	39.3	39.4	40.7	40.4	
90 days	-30	67.5	35.99	-0.95	35.79 - 36.59	48.6	42.3	39.0	39.1	40.6	40.4	
90 days	-35	69.0	35.38	-0.94	35.19 - 35.99	47.1	41.8	38.6	38.9	40.5	40.5	
90 days	-40	70.5	34.82	-0.93	34.63 - 35.43	46.2	41.3	38.2	38.7	40.3	40.6	
90 days	-45	72.5	34.28	-0.90	34.10 - 34.91	45.4	41.1	38.0	38.7	40.2	40.7	
90 days	50	73.5	33.87	-0.93	33.69 - 34.46	45.2	40.9	37.8	38.5	40.2	40.7	
90 days	45	75.0	33.36	-0.94	33.18 - 33.92	45.4	41.1	38.1	38.5	40.2	40.8	
90 days	40	76.5	32.86	-0.94	32.66 - 33.41	45.9	41.7	38.5	38.5	40.2	40.9	
90 days	35	78.5	32.40	-0.95	32.21 - 32.93	46.5	42.3	38.8	38.6	40.2	41.0	
90 days	30	80.0	31.97	-0.96	31.78 - 32.49	46.7	42.7	38.9	38.7	40.2	41.0	
90 days	25	82.0	31.58	-0.96	31.39 - 32.09	46.6	42.8	38.9	38.7	40.1	41.1	
90 days	20	84.0	31.26	-0.97	31.06 - 31.75	46.3	42.9	38.7	38.6	40.1	41.2	
90 days	15	86.5	31.03	-0.98	30.83 - 31.52	46.3	42.9	38.6	38.5	40.0	41.2	
90 days	10	89.5	31.01	-1.01	30.79 - 31.49	47.0	42.8	38.5	38.3	39.8	41.2	
90 days	5	95.5	31.73	-1.08	31.48 - 32.21	49.3	43.1	39.5	38.4	39.8	40.9	
90 days	1	116.5	38.70	0.45	38.33 - 39.47	44.9	43.8	42.7	43.2	44.1	45.2	

MDR – “RSI By Delta Spread” Grid

This grid displays the same type of information as just described for the “RSI By Delta” grid, except here it is for delta spreads (instead of individual delta points). The delta spreads are a variety of predefined risk reversals, verticals, and butterflies. The strikes composing the spread are listed in the “Nearest Strikes” column next to each delta spread. In the “Delta Spread” name column, “d” means “delta”, “p” means “put”, and “c” means “call.”

Vol Levels MDR Dashboard												
RSI By Delta Spread												
Constant Maturity	Delta Spread	Nearest Strikes	Current	Prev Day Change	Today's Range	RSI (8 hours)	RSI (1 day)	RSI (2 days)	RSI (5 days)	RSI (10 days)	RSI (20 days)	
... 30 days	25d RR	68.5 / 73.5 / 77.5	0.116	0.0087	0.117 - 0.106	38.1	47.8	49.7	50.2	52.4	53.7	
... 30 days	10d RR	64.0 / 73.5 / 82.0	-0.218	0.0153	-0.220 - -0.199	37.6	45.9	48.6	50.4	52.4	53.5	
... 30 days	5p/50 Ratio	61.0 / 73.5	1.272	0.0192	1.255 - 1.272	64.1	53.8	50.8	47.6	45.2	44.2	
... 30 days	10p/50 Ratio	64.0 / 73.5	1.170	-0.0089	1.160 - 1.173	63.1	53.4	51.4	49.0	46.6	45.2	
... 30 days	15p/50 Ratio	66.0 / 73.5	1.122	-0.0049	1.114 - 1.125	59.0	52.0	50.7	49.4	47.2	45.7	
... 30 days	20p/50 Ratio	67.5 / 73.5	1.092	-0.0044	1.085 - 1.093	58.9	51.7	50.5	49.6	47.3	45.8	
... 30 days	25p/50 Ratio	68.5 / 73.5	1.070	-0.0036	1.063 - 1.070	59.5	51.9	50.7	49.8	47.5	45.8	
... 30 days	35p/50 Ratio	71.0 / 73.5	1.037	-0.0023	1.033 - 1.037	61.2	52.3	50.8	49.9	47.7	45.9	
... 30 days	35c/50 Ratio	73.5 / 78.0	0.089	0.0027	0.089 - 0.072	42.7	49.7	51.0	50.5	52.2	53.4	
... 30 days	25c/50 Ratio	73.5 / 77.5	0.953	0.0051	0.952 - 0.958	42.9	48.8	50.4	50.1	51.8	52.6	
... 30 days	20c/50 Ratio	73.5 / 79.0	0.947	0.0066	0.946 - 0.953	43.9	48.2	49.9	49.9	51.4	52.1	
... 30 days	15c/50 Ratio	73.5 / 80.0	0.945	0.0079	0.943 - 0.953	45.8	47.9	49.5	49.7	51.0	51.5	
... 30 days	10c/50 Ratio	73.5 / 82.0	0.952	0.0084	0.947 - 0.961	48.4	47.9	49.4	49.7	50.6	51.0	
... 30 days	5c/50 Ratio	73.5 / 85.0	0.987	0.0046	0.979 - 1.000	49.6	48.1	49.3	49.3	49.6	49.9	
... 30 days	25d ATM Fly	68.5 / 73.5 / 77.5	1.011	0.0008	1.010 - 1.013	54.2	50.9	50.8	49.9	49.0	47.8	
... 30 days	15d ATM Fly	66.0 / 73.5 / 80.0	1.034	0.0015	1.031 - 1.038	53.6	50.2	50.2	49.4	48.1	46.8	
... 30 days	5d ATM Fly	61.0 / 73.5 / 85.0	1.130	-0.0073	1.124 - 1.133	60.0	51.5	50.2	47.5	45.7	44.8	
... 60 days	25d RR	67.0 / 73.5 / 80.0	-0.143	-0.0030	-0.144 - -0.135	35.2	46.0	47.0	47.0	49.1	51.5	
... 60 days	10d RR	60.0 / 73.5 / 86.5	-0.268	-0.0053	-0.268 - -0.252	35.1	44.0	45.5	46.7	48.8	51.1	
... 60 days	5p/50 Ratio	55.5 / 73.5	1.291	-0.0025	1.279 - 1.292	67.2	56.0	53.4	50.6	48.2	45.6	
... 60 days	10p/50 Ratio	60.0 / 73.5	1.188	0.0003	1.179 - 1.190	62.7	55.1	54.1	52.2	49.7	46.8	
... 60 days	15p/50 Ratio	63.0 / 73.5	1.137	0.0010	1.130 - 1.139	62.7	54.5	53.6	52.5	50.1	47.2	
... 60 days	20p/50 Ratio	65.0 / 73.5	1.104	0.0000	1.099 - 1.105	62.0	54.1	53.3	52.6	50.2	47.2	
... 60 days	25p/50 Ratio	67.0 / 73.5	1.080	0.0004	1.075 - 1.080	62.8	54.2	53.2	52.4	50.3	47.2	
... 60 days	35p/50 Ratio	70.0 / 73.5	1.043	0.0001	1.040 - 1.043	62.0	53.5	52.8	52.1	50.3	47.4	
... 60 days	35c/50 Ratio	73.5 / 77.5	0.960	-0.0014	0.959 - 0.962	46.1	49.8	49.5	48.0	49.1	50.6	
... 60 days	25c/50 Ratio	73.5 / 80.0	0.937	-0.0026	0.936 - 0.940	43.4	48.5	48.3	47.2	48.4	49.8	
... 60 days	20c/50 Ratio	73.5 / 81.5	0.927	-0.0033	0.925 - 0.932	41.9	47.5	47.5	46.7	48.1	49.3	
... 60 days	15c/50 Ratio	73.5 / 83.5	0.920	0.0041	0.919 - 0.926	42.1	46.9	46.9	46.4	47.8	48.8	
... 60 days	10c/50 Ratio	73.5 / 86.5	0.920	-0.0050	0.918 - 0.927	43.8	46.7	46.8	46.4	47.6	48.1	
... 60 days	5c/50 Ratio	73.5 / 91.0	0.943	-0.0000	0.940 - 0.950	50.0	40.3	47.6	46.7	47.2	47.2	
... 60 days	25d ATM Fly	67.0 / 73.5 / 80.0	1.008	-0.0011	1.007 - 1.009	56.6	52.5	52.0	49.7	48.6	46.3	
... 60 days	15d ATM Fly	63.0 / 73.5 / 83.5	1.029	-0.0015	1.026 - 1.031	55.3	51.6	51.1	49.2	47.9	45.6	
... 60 days	5d ATM Fly	55.5 / 73.5 / 91.0	1.117	-0.0052	1.112 - 1.119	62.1	53.7	51.6	48.0	45.8	43.2	
... 90 days	25d RR	65.5 / 73.5 / 81.5	-0.152	-0.0042	-0.152 - -0.145	33.9	45.6	46.0	46.2	48.1	50.5	
... 90 days	10d RR	57.5 / 73.5 / 89.5	-0.277	-0.0081	-0.277 - -0.264	30.8	42.8	44.1	45.6	47.8	50.2	
... 90 days	5p/50 Ratio	52.0 / 73.5	1.295	0.0071	1.283 - 1.294	68.4	58.2	56.2	53.3	50.8	47.4	
... 90 days	10p/50 Ratio	57.5 / 73.5	1.191	0.0035	1.183 - 1.193	69.5	56.9	55.6	53.5	51.1	47.9	
... 90 days	15p/50 Ratio	60.5 / 73.5	1.140	0.0024	1.134 - 1.142	69.7	56.4	55.2	53.5	51.0	47.9	
... 90 days	20p/50 Ratio	63.0 / 73.5	1.108	0.0018	1.103 - 1.109	68.5	56.0	54.9	53.2	50.8	47.9	
... 90 days	25p/50 Ratio	65.5 / 73.5	1.083	0.0013	1.079 - 1.084	67.4	54.8	54.3	52.9	50.7	47.9	
... 90 days	35p/50 Ratio	69.0 / 73.5	1.045	0.0008	1.043 - 1.045	64.1	53.8	53.4	52.8	50.9	48.3	
... 90 days	35c/50 Ratio	73.5 / 78.0	0.956	-0.0020	0.955 - 0.958	45.2	49.1	48.3	47.0	47.4	48.7	
... 90 days	25c/50 Ratio	73.5 / 81.5	0.932	-0.0029	0.930 - 0.935	44.4	48.8	47.8	46.5	47.3	48.5	
... 90 days	20c/50 Ratio	73.5 / 84.0	0.922	-0.0033	0.921 - 0.926	43.8	48.5	47.6	46.3	47.1	48.1	
... 90 days	15c/50 Ratio	73.5 / 86.5	0.915	-0.0037	0.914 - 0.920	43.8	48.2	47.3	46.2	47.3	48.2	
... 90 days	10c/50 Ratio	73.5 / 89.5	0.914	0.0047	0.913 - 0.919	43.4	47.7	47.2	46.1	47.0	47.6	
... 90 days	5c/50 Ratio	73.5 / 95.5	0.935	-0.0083	0.933 - 0.941	45.5	48.2	47.5	46.3	46.6	46.6	
... 90 days	25d ATM Fly	65.5 / 73.5 / 81.5	1.000	-0.0000	1.008 - 1.000	60.1	53.2	52.4	49.6	40.3	45.7	
... 90 days	15d ATM Fly	60.5 / 73.5 / 86.5	1.028	-0.0006	1.025 - 1.029	60.9	53.7	52.8	50.1	48.6	46.1	
... 90 days	5d ATM Fly	52.0 / 73.5 / 95.5	1.115	0.0004	1.109 - 1.115	61.7	55.2	53.8	50.2	48.4	45.0	
... 120 days	25d RR	64.0 / 73.5 / 83.0	-0.158	-0.0069	-0.158 - -0.152	39.5	45.8	45.5	45.9	47.3	49.6	
... 120 days	10d RR	55.0 / 73.5 / 92.5	-0.279	-0.0074	-0.278 - -0.267	23.3	40.6	42.5	45.0	47.3	49.8	
... 120 days	5p/50 Ratio	49.0 / 73.5	1.295	0.0092	1.280 - 1.294	78.3	61.4	58.4	54.5	52.2	48.8	
... 120 days	10p/50 Ratio	55.0 / 73.5	1.195	0.0051	1.184 - 1.194	74.3	60.2	58.6	55.2	52.3	49.0	
... 120 days	15p/50 Ratio	59.0 / 73.5	1.145	0.0039	1.130 - 1.145	69.9	57.7	57.0	54.7	52.0	49.9	
... 120 days	20p/50 Ratio	61.5 / 73.5	1.112	0.0043	1.107 - 1.112	63.8	55.9	56.0	54.0	51.8	49.0	
... 120 days	25p/50 Ratio	64.0 / 73.5	1.088	0.0046	1.083 - 1.088	62.3	55.2	55.2	53.0	51.7	49.2	
... 120 days	35p/50 Ratio	68.5 / 73.5	1.047	0.0032	1.045 - 1.047	60.8	54.2	54.1	52.9	52.0	49.8	
... 120 days	35c/50 Ratio	73.5 / 79.0	0.954	-0.0019	0.953 - 0.956	47.4	49.1	48.2	46.7	46.9	47.7	
... 120 days	25c/50 Ratio	73.5 / 83.0	0.930	-0.0023	0.928 - 0.932	47.3	49.6	48.4	46.7	47.1	48.1	
... 120 days	20c/50 Ratio	73.5 / 85.5	0.921	-0.0022	0.919 - 0.923	47.3	49.8	48.6	46.8	47.5	48.3	
... 120 days	15c/50 Ratio	73.5 / 88.5	0.915	-0.0021	0.913 - 0.918	47.7	50.0	48.7	47.0	47.8	48.5	
... 120 days	10c/50 Ratio	73.5 / 92.5	0.916	-0.0023	0.914 - 0.919	40.3	50.0	40.7	47.4	47.9	40.2	
... 120 days	5c/50 Ratio	73.5 / 99.5	0.911	-0.0000	0.938 - 0.945	50.8	50.6	49.5	48.3	48.3	48.0	
... 120 days	25d ATM Fly	64.0 / 73.5 / 83.0	1.009	0.0012	1.006 - 1.009	59.6	54.5	53.7	50.6	49.4	47.5	
... 120 days	15d ATM Fly	59.0 / 73.5 / 88.5	1.030	0.0009	1.026 - 1.030	62.2	56.8	54.5	51.7	50.2	47.8	
... 120 days	5d ATM Fly	49.0 / 73.5 / 99.5	1.118	0.0048	1.110 - 1.118	71.0	59.4	58.9	52.8	50.8	47.7	

MDR – “Realized Vol” Grid

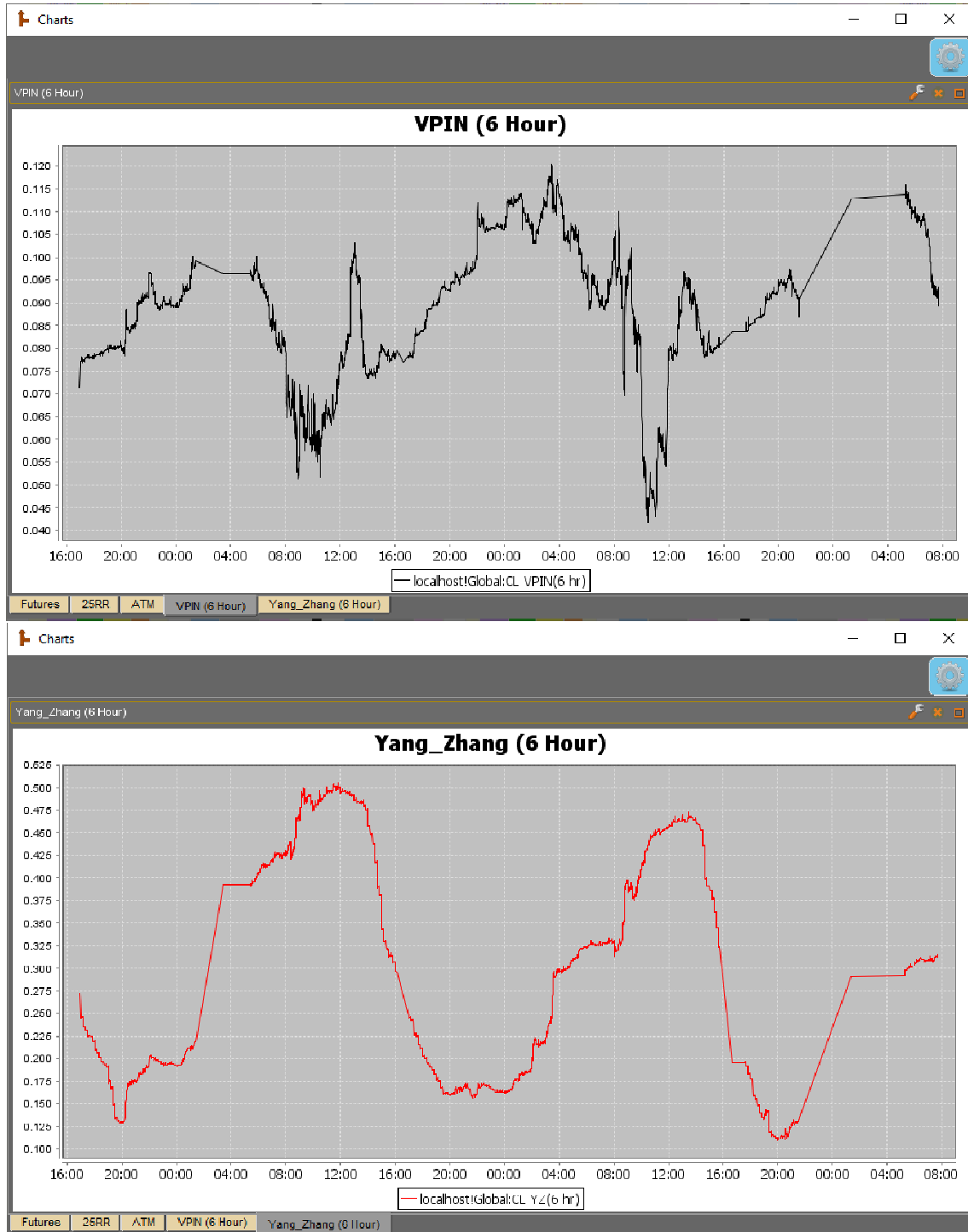
This grid displays a variety of realized volatility metrics and other related metrics:

- “Close-to-Close”: The standard intraday lognormal realized volatility calculation over 10-minute realtime bars in the “front month” underlying future.
- “Upside C2C” and “Downside C2C”: The individual volatility components (split out) of the futures moves up in price versus down in price.
- “Parkinson”: The lognormal intraday Parkinson estimator of realized vol.
- “Yang-Zhang”: The lognormal intraday Yang-Zhang estimator of realized vol.
- “Historical Vol Risk Premia”: The actual value of (IV from 20 trading days ago – realized volatility over those same 20 trading days).
- “Est. Vol Risk Premia”: The current estimates of Vol Risk Premia using (the current ATM options IV – the current realized vol estimates over various lookback periods).
- “VPIN”: This important leading indicator of volatility tracks buy versus sell volume imbalances. High VPIN readings often precede sharp spikes in volatility. More information about “Volume-synchronized Probability of **IN**formed trading” can be found online.
- “Hurst(underlying)”: The Hurst exponent measures the level of fractal complexity in a time series. High Hurst exponents indicate a decreased level of complexity and increased level of trend fragility, and high Hurst exponents indicate an increased probability of trend reversal.
- “RSI(underlying)”: The Relative Strength Index value on the underlying price.
- “Hurst(YZ 10-day)”: The Hurst exponent on the Yang-Zhang 10-day lookback vols.
- “RSI(YZ 10-day)”: The RSI on the Yang-Zhang 10-day lookback realized vols.

Metric	6 hours	1 day	2 days	5 days	10 days	20 days	Weighted Avg
Close-to-Close	30.17	25.56	27.23	39.49	37.01	34.36	35.02
Upside C2C	23.56 (61.0%)	19.26 (56.7%)	21.75 (63.8%)	31.96 (65.5%)	27.99 (57.2%)	25.43 (54.8%)	27.00 (59.5%)
Downside C2C	18.84 (39.0%)	16.81 (43.3%)	16.39 (36.2%)	23.19 (34.5%)	24.21 (42.8%)	23.10 (45.2%)	22.24 (40.3%)
Parkinson	30.59	28.64	29.95	35.67	34.64	32.96	33.50
Yang-Zhang	30.99	29.82	30.87	46.53	40.74	36.25	39.08
Historical Vol Risk Premia						-0.32 (0.991)	
Est. Vol Risk Premia	1.88 (1.061)	3.05 (1.102)	2.00 (1.065)	-13.66 (0.706)	-7.87 (0.807)	-3.38 (0.907)	-6.21 (0.841)
VPIN	9.35 (26%)	8.23 (-3%)	9.02 (-4%)	8.24 (-7%)	8.05 (2%)	8.17 (-2%)	8.27
Hurst(underlying)	0.211	0.403	0.403	0.258	0.108	0.098	
RSI(underlying)	66.5	58.0	58.7	56.0	54.5	53.6	
Hurst(YZ 10-day)		0.442	0.354	0.572	0.630	0.419	
RSI(YZ 10-day)	46.6	50.1	52.6	67.5	67.5	60.4	
Vol(YZ 30-day)	5.51	6.36	6.41	85.09	92.79	68.04	68.18
Vol(IV 30-day 50-delta)	47.85	47.37	44.71	110.84	49.97	44.15	62.48

- “Vol(YZ 30-day)”: The realized vol of the Yang-Zhang 30-day lookback realized vols.
- “Vol(IV 30-day 50-delta)”: The realized vol of the 30-day constant maturity 50-delta IVs of the options derived from the futures contract.

The VPIN (6 hour lookback) and Yang-Zhang (6 hour lookback) realtime values can also be plotted on the chart using the available algo probe outputs.



Configuration Options

The example screenshot below shows the Configuration screen for a typical job instance. Note that only one VolLevels algo instance (a.k.a “job”) is required to monitor any number of products and their expirations.

The screenshot shows a configuration window titled "Configure - VolLevelsJob.1". It is divided into two main sections: "System Defined" and "Job Defined".

System Defined

Name	Description	Value
dynamic	job supports dynamic configuration (read only)	<input type="checkbox"/>
owner	job owner	
ownergroup	job group owner	
autostart	auto-start job when server starts	<input checked="" type="checkbox"/>
autostop	auto-stop job if no active users	<input type="checkbox"/>
group	job group identifier	
description	description of this job	Vol Levels
priority	job priority	normal
orderoptions	configure default order options	
limits	configure job limits	ordersPerSec=1;modifiesPerSec=1;openOrders=1;tradesPerSec=1;crossTicks=99999
testmode	in 'testmode' orders are not submitted	<input type="checkbox"/>
debugmode	in 'debugmode' detailed log messages are sent to the client	<input type="checkbox"/>
timer	how often (in ms) to generate timer events, or 0 to disable	5000
services	comma delimited list of services this job provides	
requires	comma delimited list of services this job requires	

Job Defined

Name	Description	Value
options	the options expirations to model	LO;0;;;SEP19,OCT19,NOV19,DEC19,JAN20,FEB20,MAR20,JUN20;0;
verbosity	log detail level. 0=Minimal, 1=Basic, 2=Full, 3=Debug	1
delta_points	comma-separated list of 4 descending deltas	35,25,15,5
sigma_points	comma-separated list of 4 ascending standard deviations	1,0,2,0,2,5,3,0
sigma_points_calc	0=normal (standardized simple moneyness), 1=lognormal (standardized log moneyness)	1
vol_change_units	0=100*decimal vol, 1=equivalent ATM ticks	0
RESET	clear all saved info from the database	<input type="checkbox"/>
REQTRD	require at least one futures or options trade before vol curve tracking begins	<input type="checkbox"/>
REQOTRD	require at least one options trade before vol curve tracking begins	<input type="checkbox"/>
debug_flags		

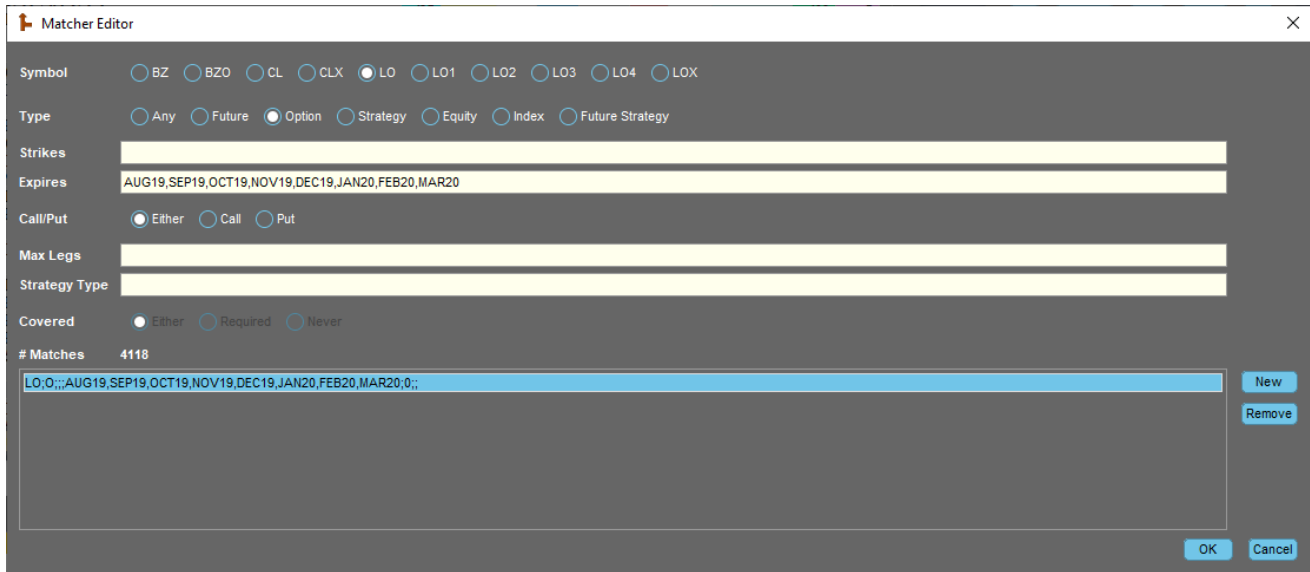
Job status is STARTED

Buttons: Help, Permissions, Start, Stop, Simple Mode, OK, Apply, Cancel

“options”

Double-click the value cell to pop open the Matcher Editor dialog. Click the “New” button to unlock the filter fields. Select the radio button for the options symbol, set “Type” to “Option”, and then type in the comma-separated expirations codes for each expiration to monitor for that options symbol in the “Expires” fields. For example, the Expires field of “SEP19,DEC19,MAR20” would include the September 2019, December 2019, and March 2020 options expirations for the selected options symbol. Success can be confirmed by viewing a positive number of matches (number of matching outright contracts) at the bottom field (see image below). All other fields can be left blank or at

the default values. To include multiple options symbols for monitoring (for multiple products), just click the “New” button again and start adding the fields for the next options symbol.



“verbosity”

An integer value that controls the level of detail reported in the log.

- 0: Minimal
- 1: Basic
- 2: Full
- 3: Debug (only useful for debugging)

Recommended initial value is 1 (Basic).

“delta_points”

A list of 4 descending OTM deltas in the range of 1-49. The default setting is “35,25,15,5”. These points specify the positive (call side) half of the symmetric array of OTM delta points, where the 50 delta point is the implicit center point and the negative copies of these points compose the negative (put side) half. These delta points control the relevant columns and rows in various grids that show “by delta” perspectives, as well as the “Changes By Strike” grid that is also based on the nearest strikes to these delta points.

“sigma_points”

A list of 4 ascending standard deviations that are greater than 0.00. The default setting is “1.0,2.0,2.5,3.0”. These points specify the positive (call side) half of the symmetric array of sigma points, where the 0.00 sigma point (ATM price) is the implicit center point and the negative copies of these points compose the negative (put side) half.

These delta points control the relevant columns and rows in various grids that show “by sigma” perspectives.

“sigma_points_calc”

This integer setting controls whether the sigma points are calculated via normal standardized moneyness (setting of 0) or lognormal standardized moneyness (setting of 1). The normal calculation may be more applicable to Treasuries, rates, and currency products; the lognormal calculation may be more appropriate for many other commodities representing a physical resource with some inherent value. See the “Changes By Sigma’ Grid” section for more detail.

“vol_change_units”

This integer value controls the initial units used by the algo to display net changes and net change ranges. The user can always toggle to different display units on-the-fly by clicking either the “IV Units” or “Tick Units” buttons, while the algo is running.

- **0 = IV Units:** This option displays the raw difference in IVs: $(IV_{\text{current}} - IV_{\text{reference}})$. The displayed values are formatted as 100.0 times the IV difference.
- **1= Tick Units:** This option displays the raw difference in IVs transformed into approximate ATM tick units: $f(IV_{\text{current}} - IV_{\text{reference}})$. The function $f(x)$ is a robust and uniquely derived normalizing function that works accurately in all products and time-to-expiration horizons. It does *not* suffer from any of the deficiencies that can occur when using simple vega ratios.

“tp_update_freq”

This 5+ integer value controls the number of seconds between periodic updates of the Live columns in the “Trade Performance” grid.

“tp_last_n_trades”

This integer value controls the number of most recent intraday trades to track in the “Trade Performance” grid. The allowed range is 1-999. The oldest displayed trade will roll off to make room for a new incoming trade.

“tp_min_trade_qty”

This 1+ integer values controls the minimum number of contracts required for a trade to be displayed in the “Trade Performance” grid. Any trades with a quantity less than this value will not be displayed.

“tp_live_PL_calc”

This dropdown choice setting allows the user to specify the preferred calculation method for certain Live columns (including P/L values) in the “Trade Performance” grid.

- **Mark to model:** Live values for tracked trades will be calculated using the current theoretical prices for the instrument. This is equivalent to the Metro tradesheets calculations and is the recommended setting.

- **Mark to market:** Live values for tracked trades will be calculated using the current market prices for the instrument. If a bid or ask price is missing on the required closing side, no value will be displayed.

"tp_min_hedging_res"

This decimal setting accepts a value between 0.0 and 1.0 and represents the rounding resolution to use on the assumed delta-neutralizing hedge against the underlying at the time of the initial trade. For example, a setting of 0.5 would round to the nearest half futures lot (e.g. 1.34 options delta would assume a 1.5 futures lots hedge). Or for example, a setting of 0.1 would round to the nearest tenth of a futures lot (e.g. 1.34 options delta would assume a 1.30 futures lots hedge). The default setting of 0.0 assumes a perfect resolution hedge (e.g. 1.34 options delta would assume a 1.34 futures lots hedge). Although fractional futures lots are not usually possible to trade on the exchange, at the portfolio level, the overall hedging of positions may approach a fine resolution from the perspective of any single trade. A setting greater than 0.0 does introduce some “noise” into the P/L dollar values; thus a setting of 0.0 is usually recommended for most traders.

"tp_filter_trader"

This optional text setting accepts a comma-separated list of traders for whom to display intraday trades in the “Trade Performance” grid. If this setting is blank, trades for all traders will be displayed. If one or more traders are specified here, only trades for those traders are eligible for display in the grid.

"tp_filter_account"

This optional text setting accepts a comma-separated list of trade accounts for which to display intraday trades in the “Trade Performance” grid. If this setting is blank, trades for all trade accounts will be displayed. If one or more accounts are specified here, only trades for those accounts are eligible for display in the grid.

"tp_underlying_tick_\$_vals"

This optional text setting accepts a comma-separated list of key-value pairs, where the key is the underlying symbol and the value is the dollar value change for one lot changing by one minimum price increment. This information is used to calculate the Live P/L values in the “Trade Performance” grid. Many common underlying symbols and their corresponding tick \$ values have already been hard-coded into the algo. However, the user can optionally add new values here (to add any missing symbols), or overwrite existing values (to correct any possible mistakes), using this field. For example, the setting of “CL=10.00,ZC=12.50” would assign the crude oil future a \$10.00/tick value and the corn future a \$12.50/tick value (both of these futures symbols are already hard-coded into the algo, so this hypothetical setting would actually be unnecessary). This setting will only be required if the user is trading unusual or niche underlying products that have not been previously hard-coded into the algo.

"tp_options_tick_\$_vals"

This optional text setting accepts a comma-separated list of key-value pairs, where the key is the options symbol and the value is the dollar value change for one contract changing by one minimum price increment. This information is used to calculate the Live P/L values in the "Trade Performance" grid. For example, the setting of "LO=10.00,OZC=6.25" would assign the crude oil options a \$10.00/tick value and the corn options a \$6.25/tick value (both of these options symbols are already hard-coded into the algo, so this hypothetical setting would actually be unnecessary). This setting will only be required if the user is trading unusual or niche options products that have not been previously hard-coded into the algo.

"RESET"

This special flag tells the algo to reset any persisted information upon the next algo restart. While the range (high/low) information is automatically reset at the start of each new trading day, all tracked metrics, their ranges, and both reference curves are always stored in the database. This allows the algo to be restarted intraday with no loss of data. However, in certain rare cases, the user may wish to clear all saved data from the database and restart completely from scratch. One such case might be after an algo version update that is not backwards compatible.

"REQTRD"

This special flag requires the algo to observe at least one market trade in the options (or linked underlying future) before it begins tracking vol curves (i.e., looking for new vol curve publications). This flag could be useful if the user wishes to edit or alter published vol curves from the Model Settings page prior to market open but, however, would prefer these custom fits not to be seen or tracked by the VolLevels algo.

"REQOTRD"

This special flag is nearly identical to the "REQTRD" flag. The only difference is that this flag explicitly requires an options trade to be observed before it publishes the very first vol curve (observed underlying trades do not count). This flag could be useful if the underlying market is open when the options market is still closed and the user wishes to ignore any potential curve publications prior to the options market opening.

"debug_flags"

This text field allows the user to assign various optional rare flags controlling algo behavior. These flags are intended for development and troubleshooting purposes only.