



Omnesys Technologies



NEST Strategy Script
Single Strike Market Making Strategy

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Single Strike Market Making Strategy:

This strategy allows the user to do stand on both sides of BFO options based on the volatility of the NFO options. The hedging is done on BFO futures.

Nest Strategy Client:

Portfolio Tree: Each portfolio comprises of **4** tokens: one option and one futures token in BSE and one options and one futures token in NSE. The idea is to stand on both sides of BSE options based on the price/vol of the NSE option. The hedging is done on BSE futures. NFO futures token is used to calculate the IV for the NFO options.

Input Parameters:

Following user parameters need to be entered.

Portfolio Name: The name of the portfolio.

Pro/CLI : It gives user an option to do in PRO or in CLI. When cli is selected will give an option to select Account id and Participant id.

Following parameters needs to populate for futures and options token for each exchange (BSE/NSE) and is applicable for both buy/sell side:

Exchange: User needs to populate relevant exchange.

Instrument Type: User needs to select the relevant instrument type (futures or options) for the selected exchange and for the selected symbol. This needs to be entered for each leg.

Symbol: User needs to select relevant symbol for that particular exchange.

Expiry Date: User needs to select the relevant expiry date for the selected options (or futures). This needs to be entered for each leg.

Opt Type: User needs to select the relevant option type (CALL or PUT), if option token is selected in instrument type in either exchange.

Strike: User needs to select the relevant strike for the options selected. If futures is selected, the field is automatically disabled. This needs to be entered for each option leg that has option token.

Buy Lots: This is the quantity to be placed per opportunity for BSE options (Stocks or Futures) and can be multiple lots but it has to be a multiple of Buy total lots.

Buy Total Lots: This is the total trade quantity that the user intends to trade in buy side for options traded in BSE.

Sell Lots: This is the quantity to be placed per opportunity for BSE options (Stocks or Futures) and can be multiple lots but it has to be a multiple of Sell total lots.

Sell Total Lots: This is the total trade quantity that the user intends to trade in sell side for options traded in BSE.

Vol Type: Selection of this parameter determines which NFO IV needs to be considered for calculating Net IV for the calculation method as IV Based and to calculate the BFO option price for the calculation method selected as Rs. Based. It has **four** types: **Bid Vol, Ask Vol, LTP Vol, and Mid Vol**. If Bid Vol is selected and calculation method is 'IV-Based', then NFO option 'Bid Vol +/- Buy Residual' is used to calculate the BFO Buy option price and NFO option 'Bid Vol +/- Sell Residual' is used to Calculate BFO Sell Option price.

Calculation Method: It has two types:

1. **IV Based:** Based on the NFO option and futures selected, IV from it will be subscribed. The buy residual and sell residual will be added/subtracted to calculate the desired IV (NFO Options IV + Buy/Sell Residual IV) for BSE options. Based on the desired IV, option price will be calculated for the BFO Option selected. *It should be entered based on percentage.*
2. **Rs. Based:** Based on the NFO option and futures selected, IV from it will be subscribed. The option price for both buy and sell side will be calculated for the BFO options based on the IVs subscribed. The residual value will be then added/subtracted to calculate the desired option price (NFO Options price + Buy/Sell Residual price) for BFO options for both buy and sell side.

Sell Res: This is where user needs to enter sell residual value that will be used to calculate the option price. If calculation method is IV based, then user needs to enter residual IV to calculate the desired IV, based on which the strategy will calculate the option price for sell side. If calculation method is Rs. Based, then user needs to enter the sell residual in Rs, that needs to be added / subtracted to NFO option price to calculate the BFO option price for sell side. User can enter positive or negative residual value.

Buy Res: This is where user needs to enter buy residual value that will be used to calculate the option price. If calculation method is IV based, then user needs to enter residual IV to calculate the desired IV, based on which the strategy will calculate the option price for buy side. If calculation method is Rs. Based, then user needs to enter the buy residual in Rs, that needs to be added / subtracted to NFO option price to calculate the BFO option price for buy side. User can enter positive or negative residual value.

Order Type: There are two categories in the order type: Best Bid/Ask and Sweep/Stand Price.

- a. **Best Bid/Ask:** If user selects Best Bid/Ask, then the strategy will place a single day order with Option token, after the trade confirmation of first leg, second leg future hedge order is placed depending on second leg order type selected. For placing first leg, our system will calculate the option price and place the order in the market. If the user is buying the first leg and the calculated option price is greater than the first leg touchline price, it will modify the current bid rate by modify factor to become best buyer (bid rate + modify factor). If calculated option price is less than the first leg touchline price, it will stand at that price and will not bid to become best buyer. Similarly, if the user is selling first leg and calculated option price is less than the first leg touchline price, it will modify the current option price by modify factor to become best seller (ask rate – modify factor). If calculated option price is more than

the first leg touchline price, it will stand at that price and will not bid to become best seller.

It should be noted that bidding to become best buyer and best seller till the calculated option price. So calculated option price becomes a floor/ceiling for bidding.

- b. Sweep/Stand Price: If user selects Sweep/Stand Price, then the strategy will place a single day order with Option token, after the trade confirmation of first leg, second leg future hedge order is placed according to the Second leg Type selected. For placing first leg, our system will calculate the option price and place the order in the market at the calculated price but **will not** become best buyer or seller.

Modify Factor: This parameter is only used when the order type selected is Best Bid/Ask. Modify factor will be disabled if Sweep/Stand option is selected.

Market Protection Type: is useful to prevent user from manual/typing errors. It has three options:

- a. **In Percentage:** is useful to prevent user from manual/typing errors. For example, lets say user is buying an option, and based on its IV, the price comes out to be 160, user has entered the market protection of 30%, and current ask price is Rs. 100, it will not allow order to enter for anything more than Rs. 130. Similarly, if user was selling an option, based on its IV, the price came out to be Rs. 60, however with current market protection of 30%, and current bid rate is 100Rs, it will not put orders for anything less than Rs. 70.
- b. **Absolute:** The orders will not be generated if the set limit is beyond the market protection limit. Based on the value entered, it will create a band of current option price +/- Market protection limit. If the calculated option price is beyond this band it will not allow any orders to be placed.
- c. **No:** If this option is selected, then the Market protection will not be considered before placing the orders.

Market Protection: This is where the value needs to be entered for market protection after selecting market protection type. If market protection type is selected as no, this parameter field will be disabled. In order to apply the market protection, one needs to calculate the current market rate to compare with the limit specified by the user.

It should be noted that once the BFO options on either side (buy or sell) gets traded Hedging Qty is placed based on the market delta (Parameter used for calculating market delta is given in the tabular form in later section).

Second Leg Type: This parameter is exclusively for the hedging leg. Once the first leg gets completed, how should the hedging leg be placed depends on this parameter along with delta and delta threshold. It has **two** options to place the hedging leg and are mentioned below:

1. **Market:** Once the first leg is completed, depending on the delta and delta threshold specified, the hedging leg is placed in market (with price protection).
2. **LTP Based MPP%:** Once the first leg is completed, hedging future leg is placed based on the LTP +/- MPP%. In other words, let say, user is selling first leg (option),

and hedging leg is the buy order, it will take the LTP of that scrip add x% specified in the MPP% parameter and then place the order. If for any reason it is not completed, and there is a change in LTP, it will modify the order price accordingly. Similarly, let say, user is buying first leg (option), and hedging leg is the sell order, it will take the LTP of that scrip subtract x% specified in the MPP% parameter and then place the order. If for any reason it is not completed, and there is a change in LTP, it will modify the order price for that leg accordingly. For any reason, if this option is selected, and user stops the strategy, the pending hedging future leg order will be canceled.

MPP%: This parameter is enabled only when Second leg type selected is **LTP Based MPP%**.

For Hedging Future Leg **Buy** Orders:

$$\text{Placed Second (Hedging) Leg Buy Price} = \text{LTP} + (\text{LTP} * \text{MPP}\%)$$

For Hedging Future Leg **Sell** Orders:

$$\text{Placed Second (Hedging) Leg Sell Price} = \text{LTP} - (\text{LTP} * \text{MPP}\%)$$

The range that can be entered in this field is **0.01%** to **3%**.

Delta threshold: This is to decide the hedging quantity. For instance, let's say, User wants to buy a Sensex Call Option with strike price 15000 of January Expiry. The user wants to hedge it with current month expiry (BSXJAN2012) at market delta. Current market delta is 0.6. User has entered Delta threshold as 100%. Assume 7 lots of BSXA1C15000 got traded. Since Market delta is 0.6, number of lots in future to be hedged depends on delta and delta threshold, which in our case is 0.6 and 100% respectively. So the quantity to be hedged is:

$$\text{Delta} * \text{Order lots traded} * \text{lot size of future hedge}$$

$$0.6 * 7 * 15 = 63.$$

Now because my delta threshold is 100%, unless 100% of the lot is not available it will not do any extra lots. In other words, in our current example, it comes out to be 4.2 (63 qty) lots, so it will only hedge 4 lots (60 qty).

Now let's say user had entered, delta threshold (%) as 20%, this comes out to be $15 * 20\% = 0.2$ lots or 3 qty, hence any decimal after total lots comes out to be 0.2 or greater, it would hedge one more extra lot. In our current example, the lot to be hedged comes out to be 4.2 lots (63 qty), so it will hedge, in all 5 lots (75 qty), as delta threshold is 20%.

It should be **noted** that at every trade, the hedging is done at portfolio level. For example consider a buy side, User wants to buy a Sensex Call Option with strike price 15000 of January Expiry (BSXA1C15000). The user wants to hedge it with current month expiry (BSXJAN2012) at market delta. Current market delta is 0.6. User has entered Delta threshold as 100%. Let's say order lot was 5, out of which 3 got traded, so now partial hedge would be: $3 * 0.6 = 1.8$ or $1.8 * 15 = 27$. Since delta threshold is 100%, it will hedge 1 lot or 15 qty in future.

Now let's say 1 more lot of option got traded, so total lots traded 4, market delta still is 0.6, so future to be hedged now is: $0.6 * 4 = 2.4$ lots $= 2.4 * 15 = 36$ qty. Since delta threshold remains 100%, it should hedge 2 lots (30 qty) at this point of time at portfolio level. However, out of 2 lots (30 qty), 1 lot (15 qty) of future is already traded, hence, only 1 lot (15 qty) needs to be traded in future for hedging.

Nest Strategy Engine:

The execution of the script happens in the Nest Strategy engine running at backend.

Execution:

Option price for both sides is calculated by considering the Desired IV (for both buy and sell side) and other relevant parameters. The way the order will be placed depends on the 'order type' selected by the user for both buy and sell side.

Hedge qty = Option traded qty * option delta – future traded qty (if any in previous round).

Hedging of future will be based on following conditions:

1. Buy Call – Sell Underlying
2. Sell Call – Buy Underlying
3. Buy Put – Buy Underlying
4. Sell Put – Sell Underlying

Example:

Let's say user has selected BSXA1C15000 i.e he wants to trade in January Sensex Index Call option with strike rate 15000 and wants to hedge with current month Sensex Future January Expiry (BSXJAN2012) with calculation method as IV based. The user has selected nifty option NIFTYJAN5200CE from which IV will be derived and added/subtracted from the buy residual IV and sell residual IV specified by the user to derive desired buy IV and sell IV. This desired buy IV and desired sell IV for BSE option will be used to calculate the buy and sell option price. The user has selected the Delta Threshold is 100%, Delta is automatically considered as Market Delta. Order lot is 1, Total lot is 20. Order type is Best Bid/Ask, and user is buying and selling a Call Option.

If the user is buying the call option, strategy will sell the future accordingly for buy side. Assuming user enters buy residual iv's as -2% and Nifty options IV is 22%, so the desired buy IV is 20% with modify factor as 0.05 Rs. Additionally, the calculated option price is greater than the market rate for that option price, it will be start bidding. It will modify the current bid rate by 5 paise to become best buyer (bid rate + 0.05), otherwise, it will stand at that price. Once the order is hit for the first leg (BFO option), it will hedge the future (Sensex) accordingly based on the parameters specified and the foresaid hedging option conditions.

If the user is selling the call option, strategy will buy the future accordingly for sell side. Assuming user enters sell residual iv's as 2% and Nifty options IV is 22%, so the desired sell IV is 24% with modify factor as 0.05 Rs. Additionally, the calculated option price is less than the market rate for that option price, it will be start bidding. It will modify the current ask rate by 5 paise to become best seller (bid rate - 0.05), otherwise, it will stand at that

price. Once the order is hit for the first leg (BFO option), it will hedge the future (Sensex) accordingly based on the parameters specified and the foresaid hedging option conditions.

Hedging for both buy side and sell side are independent of one another.

Below is another illustration of how hedging is done.

Sr. No	Option Qty Traded	Current Market Delta	Cumulative Qty Traded previously	Qty to be hedged	Total qty to be hedged currently	Delta Threshold %
1	4	0.6	0	$4 \times 0.6 = 2.4$	2	100%
2	6	0.5	$= 4 + 6 = 10$	$10 \times 0.5 = 5$	$5 - 2 = 3$	100%
3	3	0.2	$= 10 + 3 = 13$	$13 \times 0.2 = 2.6$	$2 - 5 = -3$ so 0*	100%
4	5	0.8	$= 13 + 5 = 18$	$18 \times 0.8 = 14.4$	$14 - 5 = 9$	100%
5	2	0.9	$= 18 + 2 = 20$	$20 \times 0.9 = 18$	$18 - 14 = 4$	100%

* No Hedge

Screenshots:

The screenshot shows the 'singlestrikemrktmaking' window with the following details:

- Portfolio:** DEMO
- Acct Details:** Acct ID: 0000211730, PartID: (empty)
- Order Entry Fields:**
 - Exch:** BFO, **InstrType:** IO, **Symbol:** BSXOPT, **Exp Date:** 09Aug2012, **Opt Type:** CE, **Strike Price:** 14600.00, **Buy Lot:** 5, **Buy Total Lot:** 50, **Sell Lot:** 5, **Sell Total Lot:** 50
 - Vol Type:** Ltp Vol, **Calc Method:** Rs Based, **SellRes:** 2, **BuyRes:** -2, **DeltaThresh(%):** (empty)
 - Exch:** NFO, **InstrType:** OPTIDX, **Symbol:** NIFTY, **Exp Date:** 30Aug2012, **Opt Type:** CE, **Strike Price:** 5300.00, **Order Type:** Sweep Stand, **second leg type:** LTP based MPP, **MPP%:** 0.01, **MP Type:** Absolute, **MP:** 30
 - Exch:** NFO, **InstrType:** FUTIDX, **Symbol:** NIFTY, **Exp Date:** 30Aug2012, **Opt Type:** XX, **Strike Price:** -0.01, **Mod Factor:** (empty), **BseTTM:** (empty), **NseTTM:** (empty), **Traded Qty:** (empty), **Rem Qty:** (empty)
- Buttons:** Save, Cancel

Following parameters are used in Calculations of:

a. BSE Option Price

Option Type	Option Buy Price	Option Sell Price
Buy CE	BSE Fut Ltp, BSE Strike Price, BSE TTM, Buy Net Vol	BSE Fut Ltp, BSE Strike Price, BSE TTM, Sell Net Vol
Sell CE	BSE Fut Ltp, BSE Strike Price, BSE TTM, Buy Net Vol	BSE Fut Ltp, BSE Strike Price, BSE TTM, Sell Net Vol
Buy PE	BSE Fut Ltp, BSE Strike Price, BSE TTM, Buy Net Vol	BSE Fut Ltp, BSE Strike Price, BSE TTM, Sell Net Vol
Sell PE	BSE Fut Ltp, BSE Strike Price, BSE TTM, Buy Net Vol	BSE Fut Ltp, BSE Strike Price, BSE TTM, Sell Net Vol

b. Market Delta

Option Type	Sell Delta	Buy Delta
Buy CE	BSE Fut Ltp, BSE Strike Price, BSE Option Bid Rate, BSE TTM , NFO Sell Vol	BSE Fut Ltp, BSE Strike Price, BSE Option Ask Rate, BSE TTM, NFO Buy Vol
Sell CE	BSE Fut Ltp, BSE Strike Price, BSE Option Bid Rate, BSE TTM ,NFO Sell Vol	BSE Fut Ltp, BSE Strike Price, BSE Option Ask Rate, BSE TTM, NFO Buy Vol
Buy PE	BSE Fut Ltp, BSE Strike Price, BSE Option Bid Rate, BSE TTM , NFO Sell Vol	BSE Fut Ltp, BSE Strike Price, BSE Option Ask Rate, BSE TTM, NFO Buy Vol
Sell PE	BSE Fut Ltp, BSE Strike Price, BSE Option Bid Rate, BSE TTM , NFO Sell Vol	BSE Fut Ltp, BSE Strike Price, BSE Option Ask Rate, BSE TTM, NFO Buy Vol

Risk Management

Risk Management System can be configured to have following checks before the orders are released to the exchange. The checks which are defined by exchange with respect to Algorithms are in place in the system. Below mention rules can be configured in the system to control the risk parameter which is defined by exchange.

Sr.No.	Checks	Rules to set	Remarks
1	Price Check	Check Price Range Based on LTP Check Circuit Limit	This rules will create a price range on the basis of Last Traded Priced as per the percentage set in the category window.
2	Quantity Check	Order Quantity including Square off Order Board Lot Quantity including Square off Order	This rules will restrict per order the number of quantity to be placed in market which is defined the category window. The user can define the number of quantity in Weights and in lots for Futures.
3	Order Value Check	Order Value including Square off Order	This rule will restrict per order the order value which can be placed in the market which is defined in category window
4	Trade Price Protection Check	Check Circuit Limit including square off order	This rule does not allow to place the order which has been placed above the Higher Circuit Limit or Lower circuit limit which id defined for contract/scrip by exchange
5	Market Price Protection	Check Price Range Based on LTP	This rule will create a price range on the basis of Last Traded Priced as per the percentage set in the category window.
6	Cumulative Open Order Value check	Pending order value	This rule will restrict the Open Order with the Value set in the category
7	Automated Execution Check	Turnover Order Level and Turnover Order Level Limit	This rule will calculate the value of all executed/ Unexecuted and un confirm orders and if breach the value set in category then further order will get rejected
8	Automatic stoppage in event of Algo execution leading to a loop or a runaway situation.	Order Throttle	If there number of order per seconds breaches the value which is set in Throttle then further order gets rejected by the system.
9	Net Position Vs. available margin	Gross Exposure, Gross Exposure Derivative, Var Margin Order Level, Span Margin Order Level	User can set the risk parameter based on Exposure and Margin based on which the margin used will be calculated on the basis of position taken. If the Margin used is equal to Cash margin then further order will be rejected by the system
10	RBI Violation checks for	Restricted Basket	User need to create a Restricted basket

	FII Restricted stocks.	or RMS Blocking	for the scrip and assign to the category of the user / client. Also RMS blocking can be used.
11	MWPL violation check	RMS Ban Symbol or RMS Blocking	The scrip for which market wide position limit is breach then scrip can be blocked or it needs to be in Ban.
12	Position Limit Checks	Scrip Group / Scrip Margin	User can define the quantity scrip wise in which the position can be taken in scrip group and then it needs to be assign to category at client level
13	Trading Limit Checks	Scrip Group / Scrip Margin	User can define the quantity scrip wise in which the position can be taken in scrip group and then it needs to be assign to category at branch level
14	Exposure Limit check at individual client level and at overall level	Gross Exposure and Gross Exposure Limit	User can define the Exposure at Branch Level as well as Broker Level
15	Number of orders for the logic	NA	Depends on the user parameter (i.e order qty) set. This can vary from a minimum of a single lot to a maximum of total qty set.
16	Maximum number of scrips / contracts in which the logic will work at a time	NA	At a time, maximum number of scrips/contracts in which logic will work at a time is 2 for each side and four if both sides are considered.
17	Number of legs		Two for each side and four both sides