

# **uTrade Solutions – Algo Trading Manual BSE (*ver 1.0*)**



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## 1. COMPANY OVERVIEW

*uTrade is a capital markets trading technology company providing multi-asset trading platform, algorithms and analytics for global financial institutions including brokers, banks, exchanges, other financial institutions and their customers.*

At uTrade Solutions Pvt. Ltd. (“uTrade”), we believe that *rapidly evolving technology contributes meaningfully to the growth of capital markets industry*. To address these changing needs, we are providing software products that are *redefining trading technology - a strong focus on user experience and use of automated technologies enables financial institutions and their clients to trade and analyze information and data more efficiently*.

Our product suite includes the following:

- **Trading platform** (retail and institutional) with application- and web-based front ends (including admin functions, risk management, order management, connectivity to exchanges etc.).
- **Low latency algorithmic trading platform** – used in exchange co-location environment for fastest access to markets to execute arbitrage, market making and various other strategies.
- **Analytics** platform that supports portfolio-level, pre-trade and post-trade analytics, content creation, management and distribution.
- **Custom Solutions** - we also customise various trading technology and analytics products, including modules of our own products, to improve the trading workflow of our partner clients.

We have *built our products from ground-up with a modular architecture* in order to effectively address current and rapidly evolving client needs. We have also filed for 6 patents in India and 1 patent in US/UK to lead innovation in the trading life cycle.

## 2. UTRADE ALGO TRADING



μTrade is a high frequency trading platform that is delivered along with various automated algorithms

μTrade is a low latency infrastructure (~single digit microsecond latency from market data tick input to order out) that is live in several exchanges co-location facilities. It works across asset classes (equities, futures, options, currencies and commodities) and supports extensive pre-trade and post-trade risk checks. Our algorithms incorporate,

- Arbitrage (spreader algos, multi-leg equity / future / option, multi-exchange arbitrage, etc.)
- Market making (based on inventory, risk, price movements of benchmarks, with comprehensive hedging choices)
- Execution (VWAP, TWAP, With Volume, Smart Router, etc.)
- Quant based algorithms (pair trading, macro strategies, etc.)

## 3. SCOPE OF DOCUMENT

The objective of this document is

- To train and guide the dealers of the member to use the trader workstation for trading. It also provides an exhaustive list of tweaks for customizing the workstation according to the user's preferences and requirements.
- To provide the detailed information regarding all the Algos which are available within the application such as Cash Vs. Future Arbitrage, Future Vs. Future Arbitrage, Cash Vs. Cash Arbitrage, Bidding & Implied Volatility based strategies.
- To guide the IT/Technical Team of member who would be installing the workstation and to the Dealers, Users and RMS administrators of the member who would be using the workstation for their daily trading activities.

## 4. INTRODUCTION

This document contains functional specifications of  $\mu$ Trade Algo module which consists of key strategies described ahead.

**Market Making** Market making is the process of quoting bid and ask prices simultaneously implemented for the provision of generating liquidity in the market. The bid price is the price that market maker is willing to pay for a security, whereas the ask price is the price at which the market maker is willing to sell the security. The spreads and bids / offers can depend upon any reference instrument prices and maybe hedged with any hedge instruments in case either Bid or Ask gets executed.

**Cash Vs. Cash Arbitrage** This strategy allows same stock price arbitrage on one exchange versus the other exchange.

**Cash vs. Future** arbitrage quote model is used for gaining the advantage of volatile pricings between cash and future markets on the same instrument. This is an arbitrage algo that captures the price differential between the cash and the future on the same or different exchange.

**Future vs. Future** arbitrage quote model is used for rollover of future positions across different expiries for any future underlying. Strategy will bid for the first leg based on the price of the second leg and other user inputs.

**Implied volatility (IV) based Bidding Strategy** This Algorithm allow option bidding on Single Instrument, based on volatility wherein user trades in option based on user defined Implied Volatility(IV) and hedges it in Equity/Future/Option based on the specified option.

## 5. SALIENT FEATURES

- ✓ Highly customizable and flexible front end
- ✓ Exhaustive order management functionality
- ✓ Risk Management
- ✓ UI (User Interface) for editing, compiling & debugging the strategy logic
- ✓ UI for viewing orders, trades, strategies, net positions etc.
- ✓ Value-added information (Implied Volatility, Option Calculator, etc.)

## 6. LAUNCHING THE $\mu$ TRADE TWS

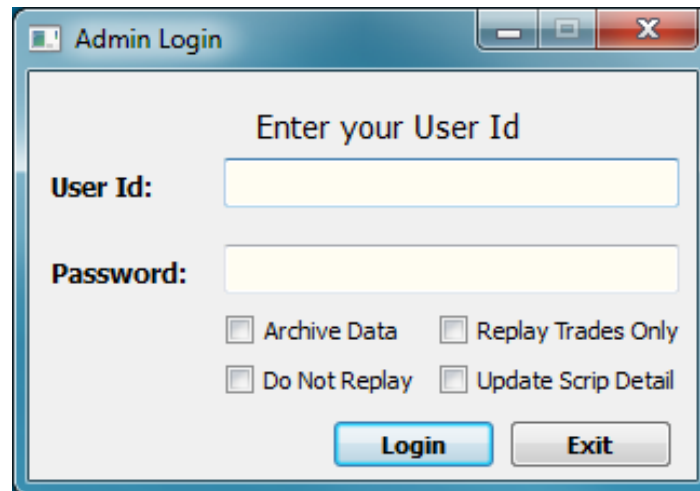
Double clicking on the icon placed on Desktop will open the Login screen as shown below.



Dealer has to enter User ID & password after which authentication will be done to allow the dealer to use the application.

- User ID: Enter the dealer Id provided by the Broker
- Password: Enter the password provided by the Broker





Admin Login

Enter your User Id

User Id:

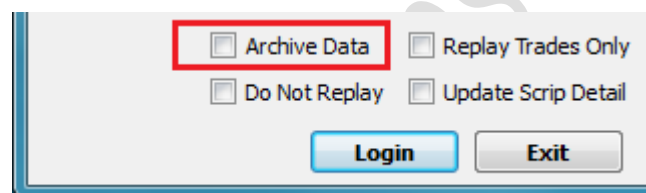
Password:

☐ Archive Data ☐ Replay Trades Only

☐ Do Not Replay ☐ Update Scrip Detail

## 6.1 ARCHIVE OLD DATA

The Login window has the option to Archive Old data, if the user wants to clear all previous data and make the widgets empty from GUI for fresh BOD trading.



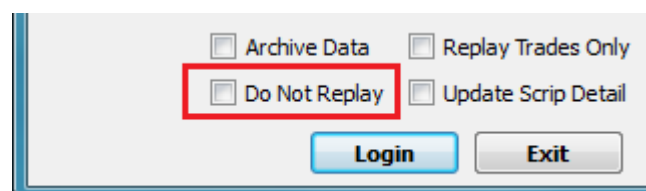
☐ Archive Data ☐ Replay Trades Only

☐ Do Not Replay ☐ Update Scrip Detail

**Note:** It's recommended to apply a check on "Archive Old Data" before Login, whenever the backend server is restarted.

## 6.2 DO NOT REPLAY

The Login window gives the user an option for not downloading any reports i.e. Order, Trade and Net position History. Select "**Do Not Replay**" and click on **Login** to access the application without downloading any past information.



☐ Archive Data ☐ Replay Trades Only

☐ Do Not Replay ☐ Update Scrip Detail

### 6.3 REPLAY TRADES ONLY

The Login window gives the user an option for downloading Trade Reports only before logging into the application. Select **“Replay Trades Only”** and click on **Login** to access the application with past trade information.

### 6.4 UPDATE SCRIP DETAILS

In order to download the latest security information, user needs to select **“Update Scrip Details”**. Latest security master will be stored in the respective folder on the hard disk.

## 7. TRADING WORK STATION MAIN WINDOW

### 7.1 WORKSPACE

Upon successful login, user has the option to create his own workspace by adding several widgets. A workspace image is shown below. The workspace can consist of the following:

1. Menu bar, Title bar
2. All reports window i.e. Order, Trade, Net position, Strategy & History reports
3. Market watch with supporting Order depth widget
4. The Connected/disconnected status is displayed at the top right corner of window.
5. Indices Widget shows the current value of different indices.

The screenshot shows the uTrade software interface with several components labeled:

- Main Menu Bar:** Located at the top, containing 'Orders', 'Books', 'Commands', 'Configuration', 'Options Monitor', and 'About'.
- Market Watch:** A table displaying market data for various instruments, including SENSEX, NIFTY, and TATASL.
- Main Indices Snapshot:** A section showing the current values of major indices like SENSEX and NIFTY.
- Connectivity Status:** A section indicating the status of the trading connection.
- Indices:** A section displaying the current values of various indices.
- Trade Book:** A section showing the order book for a specific instrument, including order ID, mode, market, symbol, inst type, strategy ID, filled qty, filled price, and status.
- Strategy Form:** A form for configuring trading strategies, including fields for portfolio name, order type, and various parameters.
- Order Book:** A section showing the order book for a specific instrument, including order ID, inst type, quantity, price, and status.
- Order Depth:** A section showing the order depth for a specific instrument, including order ID, quantity, price, and status.
- Net Positions:** A section showing the net positions for a specific instrument, including market, inst type, symbol name, buy qty, avg buy price, buy amount, sell qty, avg sell price, and sell amount.

## 7.2 MENU

The main menu on top of the screen provides the following options. We will be going through each module one by one.



## 7.3 ORDERS

Orders	Books	Commands	Configuration
		Two Leg Arbitrage	Alt+T
		Market Making/Pair Trading	Alt+S
		Conversion-Reversal	Alt+C
		Two Leg Three Leg Four Leg	Alt+R
		Cash Cash Arbitrage	Alt+A
		Implied Volatility	Alt+T
		Buy	F1
		Sell	F2
		Exit	

This is the main option where user can choose different algo strategies. We will elaborate on these algos separately one by one in the later part of this document.

### 7.3.1 ORDER MANAGEMENT

Apart from the Algos, user has the option to place orders by using Single Buy/Sell Order Ticket. Order Ticket is an interactive window that allows you to enter single orders in Exchange.

A new buy order can be entered using shortcut key “F1” or numeric key “+”. Buy order can also be placed using Menu- **Orders>>Buy**

The screenshot shows the 'Single Order' window with the following fields and annotations:

- Select Exchange:** Points to the 'BSE' dropdown menu.
- Toggle to Buy/Sell:** Points to the 'BUY' and 'SELL' radio buttons.
- Select Order Type:** Points to the 'Limit Order' dropdown menu.
- Fill Price:** Points to the 'Price' field showing '905.00'.
- Select Symbol:** Points to the 'Symbol' field showing 'ICICIBANK'.
- Fill Quantity:** Points to the 'Quantity (Lots)' field showing '100'.

Other visible fields include: 'Scrip Code' (532174), 'Inst. Type' (STOCK), 'Series' (A), 'Date', 'Opt Mode', 'Strike Price', 'Order Validity' (DAY), 'Trigger Price' (0.00), 'Lot Size' (1), 'Disclosed Qty' (0), and 'Product' (Delivery). 'Submit' and 'Reset' buttons are at the bottom right.

A new sell order can be entered using shortcut key “F2” or numeric key “-”. Sell order can also be placed using Menu- **Orders>>Sell**

The order entry panel consists of following fields

The order entry panel will be populated with selected contract from the market watch or any other book in focus. User can however change the contract fields.

- **Market:** select the market you want to trade on (eg. NSE/BSE/MCX)
- **Inst. Type:** select the instrument type you want to trade in - common stock, future or option
- **Symbol:** type in or select the symbol of the security you want to trade in. This is a searchable drop down box.
- **Series:** Currently our system provides trading in series “EQ” & “BE”, this series is for common Stock & Trade to Trade scrips. In future other series might be introduced for various other instruments that are traded on the exchange. Eg. Preferred shares, bonds etc.

- **Date:** for F&O trades, select the date in the future when the trade should be settled. (The Maturity date for these derivatives).
- **Option Mode:** denotes Option Type. Select the option type - Put Option or Call Option
- **Strike Price:** Select strike price from the drop down for a particular option.
- **Scrip Code:** For each symbol exchange provides a unique security id, this will get auto populated as soon as user will select symbol.
- **Order Validity:** Dropdown has option as Day/IOC. Select Day to place an active order. Active orders are those which will be present in Exchange Books until the same is not filled. Choose IOC, if you want your order to be cancelled if it is not filled immediately. If an order is partially filled, the rest of the order is cancelled if it cannot be filled immediately.
- **Order Type:** select the order type
  - **Market:** select market order if you want to buy or sell a security at the best market price at the time of execution of the order
  - **Limit:** when buying a stock, Limit order will enable the purchase at or below your limit price. When selling a stock, Limit order will enable the sale at or above your limit price
  - **Stop [Loss]:** a stop [loss] order is an order to buy (or sell) a security once the price of the security climbed above (or dropped below) a specified stop price. When the specified stop price is reached, the stop [loss] order is entered as a market order (no limit)
  - **Stop Limit:** a stop limit order is an order to buy a security at no more (or sell at no less) than a specified limit price, once a trigger price has reached
- **Price:** The price entered in this field would determine the price at which the ordered quantity has to be bought or sold. This field is editable and can be set to any feasible value. If the user is calling the buy order window from the market watch, by default it will pick the best sell price available for that scrip and in case of sell order, by default it will pick the best buy available for that scrip.
- **Trigger Price:** This field is enabled only when the Stop or Stop limit order type is selected. It should be noted that, for a buy stop order, the trigger price should always be more than the market price and for a sell order the trigger price should always be less than the market price.

- **Lot(s):** When trading futures or options, the exchange mandates that the instruments must be traded as a multiple of lot size published by the exchange for that instrument. When placing an order for a future or an option, specify a number in the lot(s) field to buy or sell those many lots of the instrument.
- **Quantity:** By default this field will be set to 1. User can however change the value to any positive number. The quantity value can also be increased or decreased using the “Up Arrow” and “Down Arrow” keys on the keyboard.
- **Disclosed Qty:** Insert the units of security that should be disclosed to the market. Each order will be executed for the disclosed quantity unless the full order has been executed. This is also called the iceberg order. The disclosed quantity if specified will have to be minimum x% of the order quantity. This percentage would be specified by the exchange separately.
- **Product:** This will mention the product type of the order to be placed. Select among Intraday/Delivery or any Broker specific product shown in the drop down box. This will show only those product which are allowed to user by Administrator.
- **Submit:** click on the Submit button after carefully checking all the entered details. A reconfirmation would be sought from the user. Upon confirmation the order would be submitted to exchange.
- **Reset:** click on this to clear all fields.

**Note:** Buy and Sell order entry panel have a green and red background colours respectively.

### 7.3.3 ORDER STATUS DETAILS

There are many states of an order before finally getting traded on the market. Exchange provides the updated state of an order as soon as it is changed at the Exchange side:

**PENDING:** Acknowledgement for the order is pending from exchange

**CONFIRMED:** The system and Exchange has validated the order, and it is eligible to be filled



**FILLED:** The order has been filled.

**CANCELLED:** The order has been cancelled.

**REPLACED:** The initial order has been modified.

**NEW REJECTED:** Fresh order rejected from exchange or system due to violation in order parameters or Risk measures applied in the application

**CANCEL REJECTED:** Cancellation request rejected from exchange.

**REPLACE REJECTED:** Modification request rejected from exchange.

**FROZEN:** Exchange acknowledgment in case of erroneous price or quantity.

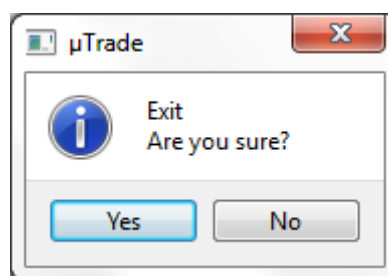
**PARTIAL FILLED:** Only partial quantity of the order has been filled.

**IOC/ CANCELLED:** An IOC order has been cancelled.

**RMS REJECTED:** Order rejected due to violation in RMS checks (Pre & Post Trade checks).

#### 7.3.4 EXIT/LOGOUT (ALT + F4)

Click on **Orders>>Exit** or use shortcut **"ALT + F4"** to logout from the application, while logging out the user will be prompted with a confirmation message and user needs to select "Yes" to logout successfully.





## 7.4 BOOKS

Books	Commands	Configuration	Options Monitor	Al
Order Book				F3
Trade Book				F8
Net Position				Alt+F6
Market Watch				F4
Order Depth				F6
Rejection History				Alt+H
Market Making Book				Alt+B
Two Leg Strategy Book				Alt+Y
Conversion-Reversal Strategy Book				Alt+Z
Two Leg Three Leg Four Leg Strategy Book				Alt+W
Implied Volatility Strategy Book				
BSE100 FUT Bidding Calculator				
Banned Scrips				
Indices				
Cash Arbitrage Book				Alt+X

This section includes various Books to see the details related to orders, trades and positions placed by using different algos. User can go to the menu and select individual books from the dropdown options or use shortcuts to open the respective window. Details of various Books such as Order Book, Trade Book, Net Position, etc. have been explained below. We will describe the Strategy Books separately with the Strategy window explanation.

### 7.4.1 ORDER BOOK (SHORTCUT – F3)

To open an Order book, click the **Order Book** button on the **Books** menu option. Order Book displays all orders which are neither filled completely nor are cancelled.

The Order Book allows you to view, modify and cancel orders that have been placed within System.

All confirmed orders can be seen in Order Book in the Books menu option. You can modify/cancel any or all confirmed orders at the click of a button. The order book also has all other details like time and price associated with the order.

After placing a buy/sell order, if it doesn't get any matching order in the exchange, then it will come under confirmed list. Once the confirmed order gets a matching order it will be traded immediately. Once the order gets traded, the record will be moved from the Order Book and it will be shown in the Trade Books.

The user can modify or cancel the order till it is there in the Order Book. The information displayed in a confirmed order window/Order Book is as follows.

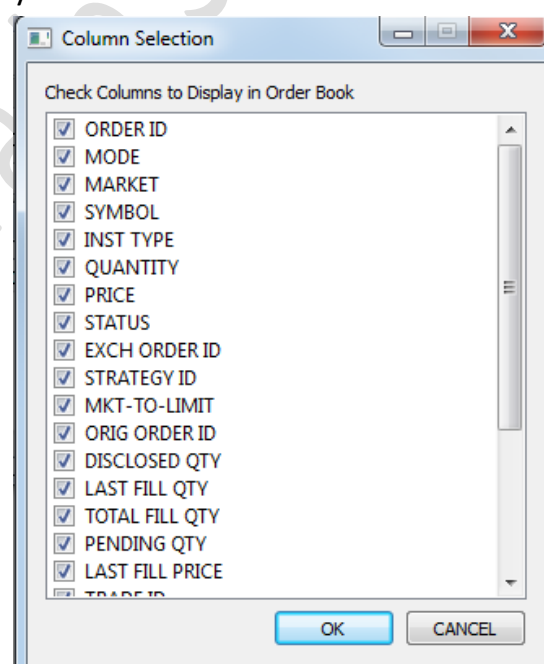
ORDER ID	MODE	MKT	SYMBOL	TYPE	PRICE	STATUS	QUANTITY	EXCHANGE ORDER ID	STRATEGY ID	MARKET-TO-LIMIT	ORIGINAL ORDER ID
354787	BUY	BSE	BSE100 28FEB13	Future	6110.00	CONFIRMED	50	19000021000015	0	NULL	NULL
454792	SELL	BSE	BSE100 28FEB13	Future	6111.00	CONFIRMED	50	19000021000016	0	NULL	NULL
554978	BUY	BSE	TATASTL	Common Stock	349.85	CONFIRMED	1	18000009000016	0	YES	NULL
654998	SELL	BSE	TATASTL	Common Stock	350.85	PARTIAL FILLED	1000	18000009000017	0	NULL	NULL

- **Order ID:** A system generated unique order ID which can be used to trace the order.
- **Mode:** Shows whether the order is a buy order or a sell order.
- **Market:** Shows the respective Market on which orders has been placed.
- **Symbol:** Shows the respective Symbol for which orders has been placed.
- **Instrument:** Shows the instrument type of the order placed.
- **Quantity, Price:** Shows respectively the Quantity and Price of the order.
- **Order Status:** One can further narrow down the list of orders placed by Order Status:
  - **Confirmed:** shows only the new orders that are coming in.
  - **Pending:** shows new orders that are still to be confirmed from exchange end.
  - **Partially filled:** shows orders that have been partially filled.
  - **Filled:** shows all filled orders. As soon as an order will get fully executed it will be removed from order book.
  - **Pending Cancel:** Shows cancel order requests which have been sent to the exchange but are pending to be executed.
  - **Pending Replace:** Shows modify (replace) order requests which have been sent to the exchange but are pending to be executed.
  - **Cancelled:** shows all orders that have been cancelled
  - **Rejected:** shows all orders that have been rejected [by the exchange].

- **Replaced:** Shows all orders that have been modified (replaced).
- **Exchange Order ID:** Exchange provides a unique order ID when it confirms an order.

**Note:** Using Shortcut **F3** once will show the confirmed order for the selected symbol on market watch. Pressing **F3** twice will open the confirmed order for all the symbols.

- **Right click menu:** Doing a right click anywhere in the order book brings out a window with multiple options
  - **Modify Order:** Allows you to make modifications to confirmed/partial filled orders placed by dealers. Selecting this option brings up the Buy/Sell window where you can make the changes. This is available for all the orders with status as "Confirmed" or "Partially Filled".
  - **Cancel Order:** Allows the dealer to cancel orders that are not yet executed. This is available for all the orders with status as "Confirmed" or "Partially Filled".
  - **Export to XLS:** gives an option to user to export the data in a CSV format.
  - **Resize to Contents:** Click on this to resize the rows as per data.
  - **Hide/Show Columns:** allows you to customize the output window according to your requirements. Check/Uncheck the columns which you would like to see in the order book.



## 7.4.2 TRADE BOOK (SHORTCUT – F8)

To open Trade Book, click the **Trade Book** under **Books** menu option from the Main Window Menu. Using this option opens a Trade book which displays only trades which are completely filled.

The user can view the executed trades in the following ways:

- By browsing through the menu -> Books -> Trade Book
- Selecting the scrip from the market watch and then pressing the F8 key. This will list the trades executed from that terminal for that particular scrip. Pressing F8 twice will list all the trades executed from that terminal.

ORDER ID	MODE	MKT	SYMBOL	INST TYPE	STRATEGY ID	FILLED QTY	FILLED PRICE	STATUS	TOTAL FILL QTY	EXCHANGE ORDER ID	TRADE ID	AMOUNT	PROF
755013	BUY	BSE	TATASTL	Common Stock	0	557	350.85	FILLED	557	18000009000018	1001	195423.45	DELIV
654998	SELL	BSE	TATASTL	Common Stock	0	557	350.85	FILLED	557	18000009000017	1001	195423.45	DELIV
855026	BUY	BSE	RIL	Common Stock	0	1	840.05	FILLED	1	19000005000067	1560	840.05	DELIV
955035	BUY	BSE	RIL	Common Stock	0	603	840.05	FILLED	603	19000005000068	1569	506550.15	DELIV

## 7.4.3 NET POSITIONS (SHORTCUT – ALT+F6)

To open a Net Position, Click the **Net Position** under Books Menu from the Main Window Menu. Net Position displays consolidated position across the security/contracts product wise. User can also press the shortcut key ALT+F6 to open the net position window.

The Net Position gives you real-time marked to market profit and loss report on your trades for the day. It shows realized as well as unrealized profit or loss for your trades for the day.

This window provides the positions of all the clients/client-wise, under all the exchanges/Individual Exchanges, who are under a particular dealer/all of the dealers. Information like Client ID, Exchange Segment, Symbol, Instrument type, Product, Buy

Quantity, Sell Quantity, Open Quantity, Buy Amount, Sell Amount, Buy Avg. Price, Sell Avg. Price, Last Trade Price, Mark to Market, Booked P&L are shown.

Net Positions												
MARKET	INSTRUMENT TYPE	PRODUCT	SYMBOL NAME	BUY QTY	AVG BUY PRICE	BUY AMOUNT	SELL QTY	AVG SELL PRICE	SELL AMOUNT	LTP	M2M LOSS/PROFIT	BOOKED LOSS/I
BSE	Common Stock	DELIVERY	TATASTL	557	350.85	195423.45	557	350.85	195423.45	350.85	0.00	0.00
BSE	Common Stock	DELIVERY	RIL	604	840.05	507390.20	0	0.00	0	839.90	-90.60	0.00

## COLUMN DESCRIPTION

**Market:** Displays the Market for which the security belongs.

**Symbol:** Displays the Symbol name

**Buy Qty:** Total Bought Qty against a particular security

**Avg Buy price:** Avg buying price for a particular security

**Buy Amount:** Buy Qty \* Avg Buy Price

**Sell Qty:** Total Sold Qty against a particular security

**Avg Sell Price:** Avg selling price for a particular security

**Sell Amount:** Sell Qty \* Avg Sell price

**Net Qty:** Buy-Sell

+ve value indicates Net Buy side is open

-ve Value indicates Net Sell side is open

**LTP (Last Traded Price):** will show the LTP of that particular security

## CALCULATIONS

Mark to Market Profit/Losses and Booked Profit/Losses are calculated on real time basis; for this the Last Traded Price is taken into consideration.

### Mark to Market P/L Formulae:

Scenario 1: If Net Qty is +ve

Net Qty \* (LTP-Net price) = +ve value is Profit; -ve value is Loss

Scenario 2: If Net Qty is -ve

Net Qty \* (LTP-Net price) = +ve value is Profit; -ve value is Loss

### Booked P/L Formulae:

- Pick the smaller value from Buy Qty & Sell Qty Columns
- Multiply the above number from the Difference of Avg Sell & Avg Buy Price

Small (Buy Qty, Sell Qty)\*(Avg Sell Price – Avg Buy Price) = +ve value is Profit; -ve value is Loss

**Note:** If Qty is same under both Buy Qty & Sell Qty column then pick either of the Qty

Profits and Losses will be highlighted in Green colour and Red colour respectively.

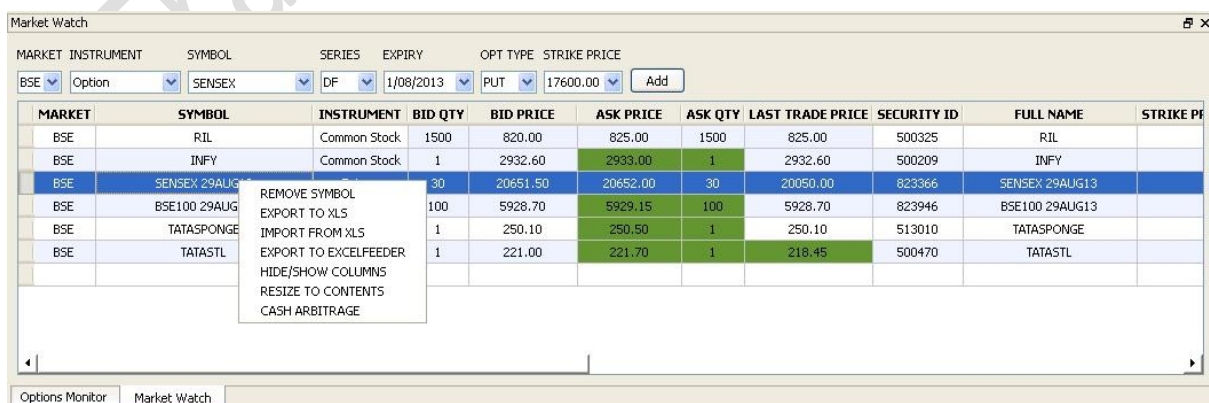
#### 7.4.4 MARKET WATCH (SHORTCUT – F4)

Market Watch is the main window used to check out the market related data of the scrips on a real time basis. Information like the Last Trade price, Open price, High Price, Low Price, Best Buy/Sell Price, Best Buy/Sell Quantity, Percentage Change, etc. can be viewed in a market watch window.

The user has the flexibility to decide the fields/columns as well as their order in which they should appear on the market watch.

The user can add scrips to the market watch from the scrips tool bar provided just above the market watch.

All the fields in the market watch can be sorted in ascending/descending order by just clicking on the top of the column (field) name. The user can drag and drop the columns as well as the rows to shift the position.



Market Watch

MARKET INSTRUMENT SYMBOL SERIES EXPIRY OPT TYPE STRIKE PRICE

BSE Option SENSEX DF 1/08/2013 PUT 17600.00 Add

MARKET	SYMBOL	INSTRUMENT	BID QTY	BID PRICE	ASK PRICE	ASK QTY	LAST TRADE PRICE	SECURITY ID	FULL NAME	STRIKE PRICE
BSE	RIL	Common Stock	1500	820.00	825.00	1500	825.00	500325	RIL	
BSE	INFY	Common Stock	1	2932.60	2933.00	1	2932.60	500209	INFY	
BSE	SENSEX 29AUG13		30	20651.50	20652.00	30	20050.00	823366	SENSEX 29AUG13	
BSE	BSE100 29AUG13		100	5928.70	5929.15	100	5928.70	823946	BSE100 29AUG13	
BSE	TATASPONGE		1	250.10	250.50	1	250.10	513010	TATASPONGE	
BSE	TATASTL		1	221.00	221.70	1	218.45	500470	TATASTL	

Options Monitor Market Watch



## Add Security in Market Watch

Security can be added by selecting relevant Market, Instrument, Symbol, Series, Expiry, Opt Type, Strike Price and pressing **ADD** button as shown below in snapshot.

The screenshot displays the 'Add Security' form in the uTrade Market Watch interface. The form consists of several dropdown menus and an 'Add' button. Callouts provide a detailed view of the options available for each field:

- MARKET:** NSE, BSE, NSE
- INSTRUMENT:** Option, Common Stock, Future, Option, Index
- SYMBOL:** SAIL, SENSEX, SESAGOA
- EXPIRY:** 29/08/2013, 26/...013, 31/...013, 26/...013, 27/...014, 26/...014, 24/...014, 25/...015, 31/...015, 30/...016
- OPT TYPE:** CALL, PUT, CALL
- STRIKE PRICE:** 16800.00, 17000.00, 17200.00, 17400.00, 17600.00, 17800.00, 18000.00, 18200.00, 18400.00, 18600.00

## Market Watch Options:

- User can add a particular security multiple times in market watch. This is basically used to pair the security with another security in market watch.
- User can remove the security from market watch by using the keyboard shortcut **Delete** or by clicking **Remove Symbol** on Right click window. User can also select multiple securities to remove it from market watch.
- Export to XLS (Right click option): User has the option to export the security/contract list which are present in market watch in CSV format. Right click on Market Watch and select **Export to XLS** to create the list in Excel.

- Import from XLS (Right click option): In case user would like to add security in market watch by using Excel, the same is possible by importing the CSV file. The CSV file will include columns such as Market, Scrip Code, Symbol, Symbol Name etc.
- Export to Excel feeder (Right click option): User can export live feed to excel, apply own calculations using different functions & formulas– the excel feeder can also be used as an independent application.

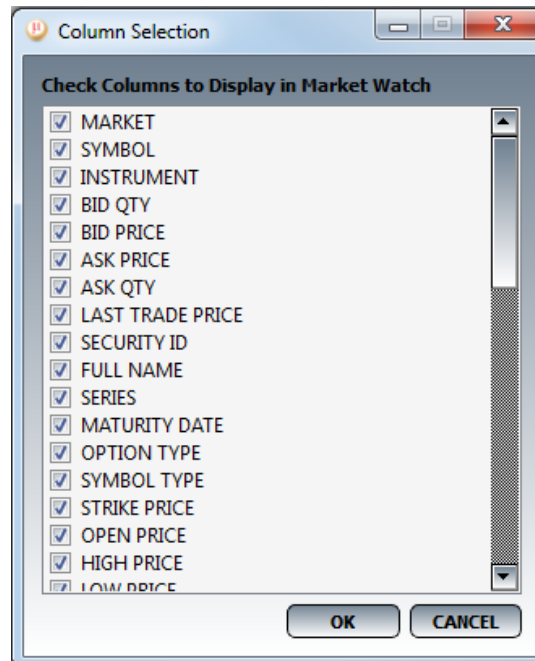
Security Id	Market	Scrip Name	Bid Qty	Bid Price	Ask Price	Ask Qty	Last Trade Qty	Last Trade Price	Volume
2885	BSE	RIL	0	0.00	886.65	6027	4	886.65	3818344
24225	BSE	RELAXO	2	806.05	825.00	6	13	810.00	329
163	BSE	APOLLOTYRE	0	0.00	86.00	2250	1000	86.00	3202350
13	BSE	ABB	1	650.35	650.80	10	20	650.80	136018
100	BSE	AMARAJABAT	4	308.45	308.95	284	13	308.95	198353
1333	BSE	HDFCBANK	0	0.00	643.05	4937	60	643.05	3470892
2331	BSE	JAYNECOIND	500	11.05	11.20	1080	380	11.05	93662
1726	BSE	JBCEPHARM	100	84.15	84.60	180	20	84.60	33065
1729	BSE	JBFIN	26	124.60	125.40	18	32	125.40	32357
15063	BSE	JCTEL	49202	0.65	0.70	22481	100	0.65	806
1738	BSE	JENSONICOL	5909	3.60	3.65	1147	93	3.60	4354
11709	BSE	JETAIRWAYS	92342	621.30	0.00	0	2	621.30	5182154
2112	BSE	MARALOVER	219	14.60	14.80	97	1	14.80	2600
13925	BSE	NFL	213	71.00	71.20	11	4	71.25	8131
17400	BSE	NHPC	0	0.00	29.00	1201758	8	29.00	91287760
11522	BSE	NIITLTD	7509	27.00	27.05	30	24	27.05	168881
11543	BSE	NIITTECH	200	269.05	269.95	22	50	269.05	79648
2421	BSE	NILKAMAL	0	0.00	212.85	27	6	212.85	3004
13300	BSE	NITCO	1050	21.55	0.00	0	398	21.55	14120
14682	BSE	NITINFIRE	285	71.50	71.65	1025	100	71.50	100009
13175	BSE	NITINSPIN	500	11.20	11.40	1242	88	11.30	20412
14977	BSE	POWERGRID	7124	109.85	109.90	2000	2	109.85	5911525
18357	BSE	PRADIP	1122	16.05	0.00	0	65	16.05	39314
2705	BSE	PRAJIND	861	46.10	46.15	1190	50	46.15	155940
2708	BSE	PRAKASH	248	45.95	46.05	283	615	46.05	39151
19599	BSE	PRAKASHSTL	10	102.20	103.70	4	19	103.75	12822

- Market Depth (Right Click Option): clicking on this will show TBT (Tick by Tick) Top 10 Bids/Ask

NSE : RELIANCE EQ			
Bids		Asks	
Qty	Price	Price	Qty
2	880.00	890.00	101
27	821.00	890.10	100
315	814.00	890.20	32
5	813.30	890.25	56
13	813.25	890.30	78
5	813.10	890.35	89
15	813.05	890.40	98
8	812.85	890.45	456
19	812.80	890.50	76
4	812.75	890.55	75



- Hide/Show columns (Right Click Option): allows user to customize the output window according to his/her own requirements. Check/Uncheck the columns which user would like to see/not see in the market watch.



- Resize to Contents (Right click option): Click on this to resize the rows as per data.
- Cash Arbitrage (Right click option): Clicking on this will directly fill the Data in Cash-Cash {(Inter-exchange (NSE-BSE))} Strategy form. This form is explained later in the document.

#### 7.4.5 ORDER DEPTH (SHORTCUT – F6)

Market Depth is a special feature of Trader Terminal. Market Depth details the following features:

- Real time scrip details.
- Best 5 Bid/Ask

#### Accessing Market Depth

To view Market Depth, single click on the scrip on your Market Watch and press F6. The Market Depth will open.

Order Depth - BSE : RIL

Best 5 Bids			Best 5 Asks		
No.	Qty	Price	Price	Qty	No.
22	22	880.00	890.25	52	1
2	315	814.00	890.30	78	1
1	5	813.30	890.35	89	1
2	13	813.25	890.40	98	1
1	5	813.10	890.45	456	1

#### 7.4.6 REJECTION/TRANSACTION HISTORY (SHORTCUT – ALT+H)

User has the option to see the transaction or rejection history through this window. Configuration needs to be changed from backend to see the logs as per user preference. Rejections are shown in the window by default as transaction logs will have a large number of data and application might respond slowly in order to download the transaction logs data.

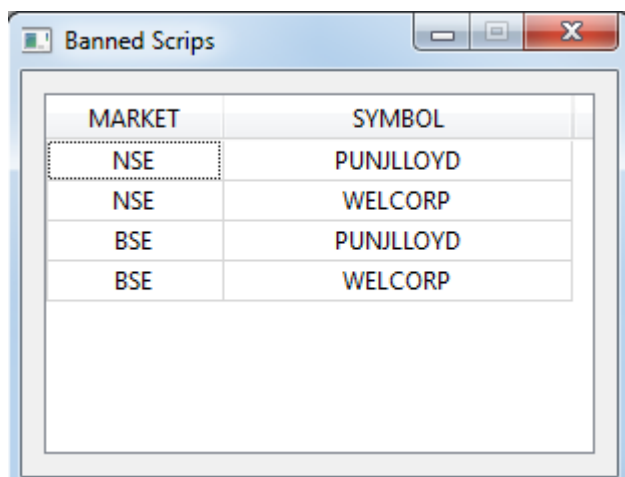
#### 7.4.7 STRATEGY BOOKS

Strategy Books such as Market Making Book, Two Leg Strategy Book, Conversion-Reversal Strategy Book, 2L/3L/4L Strategy Book, Implied Volatility Strategy Book, Cash Arbitrage Book will be explained briefly with each strategy description later in the document.

#### 7.4.8 BANNED SCRIPS

Those contracts which are in Banned category as confirmed from Exchange and are blocked from trading are covered in Banned Scrips. User needs to upload the excel file at backend to block the contracts.

The derivative contracts which have crossed 95% of the market-wide position limit are kept under ban period. It is mandatory that all clients/members shall trade in the derivative contracts of said security only to decrease their positions through offsetting positions.



MARKET	SYMBOL
NSE	PUNJILLOYD
NSE	WELCORP
BSE	PUNJILLOYD
BSE	WELCORP

#### 7.4.9 INDICES

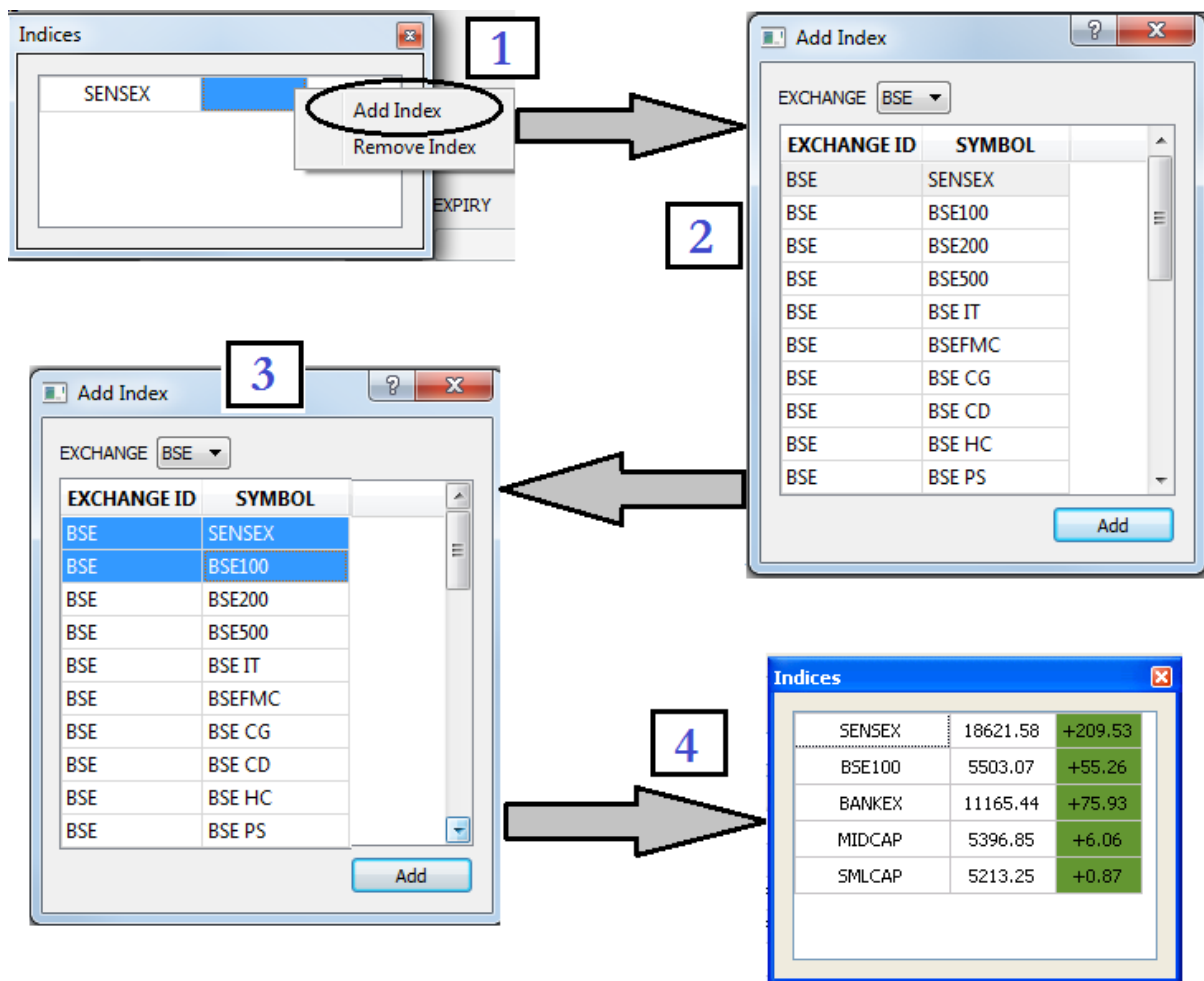
This window shows the current Index values and the price change from last closing value. User can add indices from different exchanges to see the respective indices.



INDEX	VALUE	CHANGE
SENSEX	18621.58	+209.53
BSE100	5503.07	+55.26
BANKEX	11165.44	+75.93
MIDCAP	5396.85	+6.06
SMLCAP	5213.25	+0.87

Steps to add Indices in the window are as under:

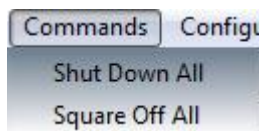
- Right click on the window will show the option **Add Index**.



- Clicking on **Add Index** will open a window which contains the list of all indices from NSE and BSE exchange.
- Select the respective index you want to add in the indices window and click on **Add**.
- Selected indices will appear in the Indices window.

## 7.5 COMMANDS

User has the option to terminate the running strategies by using this window. This is an important and mandatory tool required by Exchange (Panic Withdrawal) in case strategies lead to loop or runaway situation.



**Shut Down All:** Clicking on this option will

- a) Immediately cancel all the confirmed and partial filled orders placed with respect to the strategies in the application.
- b) System will further place square off orders to close the open positions which were executed by different strategies.
- c) Stop all the running strategies.

**Square off All:** Clicking on this option will square off all open positions existing in the position window.

## 7.6 CONFIGURATION

### WORKSPACE CONFIGURATION

User can customize the Screen by adding many windows such as Market Watch, Order Book, Market Depth, Trade Book etc. and place the windows as per user preference. A screenshot is attached for your reference.

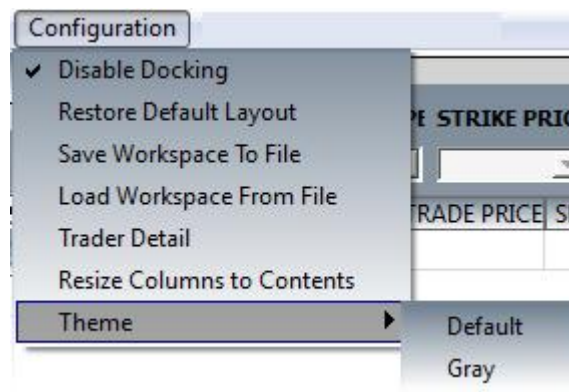
The screenshot displays the uTrade software interface with a customized workspace. The main window is titled 'Admin Ver 1.3.0.4 - User ID : 11'. It features a menu bar with 'Orders', 'Books', 'Commands', 'Configuration', 'Options Monitor', and 'About'. The status bar shows the time '11:28:53' and market data: 'SENSEX 18621.58 NIFTY 5485.00'. Below the menu bar, there are several floating windows:

- Market Watch:** A table showing market data for various instruments. It includes columns for MARKET, INSTRUMENT, SYMBOL, SERIES, EXPIRY, OPT TYPE, STRIKE PRICE, and LAST TRADE PRICE. The table lists instruments like BSE, RIL, INFY, SENSEX 29AUG13, BSE100 29AUG13, TATASPOINGE, and TATASTL.
- Trade Book:** A table showing trade history with columns for ORDER ID, MODE, MARKET, SYMBOL, INST TYPE, STRATEGY ID, FILLED QTY, FILLED PRICE, and STATUS. It lists trades for BSE100 29AUG13 and SENSEX 29AUG13.
- Two Leg Arbitrage:** A window for configuring two-leg arbitrage strategies. It includes fields for Portfolio Name, Order Type, Arbitrage Type (BUY FIRST :: SELL SECOND or BUY SECOND :: SELL FIRST), and strategy parameters like Total Lots, Total Quantity, Order Lots, Order Qty, Limit, Threshold Qty 1 (%), Threshold Qty 2 (%), Depth, Mod Time, Mod Factor (Rs.), Timer Leg 1 (sec), Timer Leg 2 (sec), and Sq Off.
- Net Positions:** A window showing net positions for various instruments. It includes columns for MARKET, INST TYPE, SYMBOL NAME, BUY QTY, AVG BUY PRICE, BUY AMOUNT, SELL QTY, AVG SELL PRICE, SELL AMOUNT, and MTM P/L. It lists positions for BSE Future, BSE100 29AUG13, and SENSEX 29AUG13.
- Options Monitor:** A window showing options data for BSE 29AUG13, including Best 5 Bids and Best 5 Asks.

The interface also includes a 'Rejection History' window and a 'Conv-Rev Strategy Book' window.

This is a customized screen also known as workspace which one can save other than default screen which is shown when user will log in for the first time. This way user can save as many workspaces as he/she wants.

It allows user to save or load ones workspace, personalize the workspace with the help of various options.



### 7.6.1 DISABLE DOCKING

Docking allows you to customize the workspace by placing various windows as per your preference. You need to first place the mouse at the respective Title Bar of the window, left click and move around and leave the mouse where you need to dock the window. This way you can arrange several windows and customize the workspace.

A sample workspace is shown as under when the docking is not disabled:

**Options Monitor**

Instrument To Hedge	Instrument Hedge With	Underlying Symbol	Derivative Symbol	Scrip Name	LTP	Best-Bid	Best-Ask	Position	Buy Qty	Sell Qty
<input type="checkbox"/>	<input type="checkbox"/>	SENSEX	SENSEX	SENSEX 29AUG13	0.00	0.00	0.00	0	0	0
<input type="checkbox"/>	<input type="checkbox"/>	SENSEX	SENSEX	SENSEX 29AUG13 CE 16600.00	0.00	0.00	0.00	0	0	0
<input type="checkbox"/>	<input type="checkbox"/>	SENSEX	SENSEX	SENSEX 29AUG13 PE 16600.00	0.00	0.00	0.00	0	0	0

**Portfolio PnL**

Booked 0 MTM 0

**Portfolio Greeks**

Delta 0 Gamma 0 Theta 0 Vega 0 Rho 0

**Configuration**

☒ Seconds Precision ☒ Use Spot ☐ Use Future

**Market Watch**

MARKET	SYMBOL	INSTRUMENT	BID QTY	BID PRICE	ASK PRICE	ASK QTY	LAST TRADE PRICE	SECURITY ID	FULL NAME	SERIES	MATURITY DATE	OPTION TYPE	SYMBOL TYPE	STRIKE PRICE	OPEN PRICE	HIGH PRICE	LOW PRICE	CLOSE
BSE	INFY	Common Stock	1	2932.60	0.00	0	2933.00	500209	INFY 29A...	DF	29 Aug 2013		Stock		0.00	-0.01	-0.01	2933.00
BSE	RIL	Common Stock	1	822.00	825.00	1463	821.00	500325	RIL	A					869.00	869.00	821.00	790
BSE	HDFC	Common Stock	1	740.00	0.00	0	745.30	500010	HDFC	A					0.00	-0.01	-0.01	734

**Order Depth - BSE : RIL**

No.	Qty	Price	Price	Qty	No.
0	1	822.00	825.00	1463	0
0	573	821.00	826.00	1700	0
0	1500	820.00	827.00	1500	0
0	1500	819.00	827.50	1500	0
0	1500	818.10	0.00	0	0

**Order Book (4)**

ORDER ID	MODE	MARKET	SYMBOL	INST TYPE	QUANTITY	PRICE	STATUS	EXCH ORDER ID	STRATEGY ID	MKT-TO-LIMIT	ORIG ORDER ID	DISCLOSED QTY	LAST
2299768	BUY	BSE	HDFC	Common ...	1	734.00	CONFIRMED	16000015000000	0	YES	NULL	0	0
1398996	BUY	BSE	INFY 29AUG13	Future	125	3000.00	CONFIRMED	1900000210000001	0	YES	NULL	0	0
1899096	BUY	BSE	INFY 29AUG13	Future	125	3000.00	CONFIRMED	1900000210000006	0	NULL	NULL	0	0
1999097	BUY	BSE	INFY 29AUG13	Future	125	3000.00	CONFIRMED	1900000210000007	0	NULL	NULL	0	0

Rejection History | Cash Arbitrage Book | Two Leg Strategy Book | Conv-Rev Strategy Book | Net Positions | Trade Book | Order Book (4)



Disable docking will lock the window and double clicking on the title bar will place the window in its previous placed position.

The screenshot displays the uTrade software interface with the following components:

- Top Bar:** Admin Ver 1.3.0.4 - User ID : 14. Navigation tabs: Orders, Books, Commands, Configuration, Options Monitor, About. Real-time data: 12:26:00, SENSEX 18599.22, NIFTY 5497.30, TERMINATE ALL. SERVER: SURVEILLANCE, NSECM, NSEFO, BSE, TBTCM, TBTFD.
- Market Watch:** A table showing market data for BSE, INFY, and HDFC.
- Net Positions:** A table showing positions for BSE, Common Stock, and INFY.
- Order Book (4):** A table showing order details including ORDER ID, MODE, MARKET, SYMBOL, INST TYPE, QUANTITY, PRICE, and STATUS.
- Order Depth - BSE : HDFC:** A table showing the best 5 bids and asks.
- Trade Book:** A table showing trade details including ORDER ID, MODE, MARKET, SYMBOL, INST TYPE, STRATEGY ID, FILLED QTY, FILLED PRICE, STATUS, EXCH ORDER ID, TRADE ID, AMOUNT, and DATE & TIME.
- Bottom Bar:** Rejection History, Cash Arbitrage Book, Two Leg Strategy Book, Conv-Rev Strategy Book.



## 7.6.2 RESTORE DEFAULT LAYOUT

Clicking on this option will restore the default workspace layout. Snapshot of the current default layout is shown as under:

The screenshot displays the uTrade application interface. At the top, there's a menu bar with options like Orders, Books, Commands, Configuration, Options Monitor, and About. Below the menu bar, a status bar shows the time as 12:24:37 and market data for SENSEX (18602.86) and NIFTY (5496.75). The main workspace is divided into several panels:

- Market Watch:** A table showing market data for various instruments, including BSE, INFY, and RIL. Columns include MARKET, SYMBOL, INSTRUMENT, BID QTY, BID PRICE, ASK PRICE, ASK QTY, LAST TRADE PRICE, SECURITY ID, FULL NAME, SERIES, MATURITY DATE, OPTION TYPE, SYMBOL TYPE, STRIKE PRICE, OPEN PRICE, HIGH PRICE, LOW PRICE, and CLOSE.
- Order Book (4):** A table showing order details, including ORDER ID, MODE, MARKET, SYMBOL, INST TYPE, QUANTITY, PRICE, and STATUS.
- Trade Book:** A table showing trade details, including ORDER ID, MODE, MARKET, SYMBOL, INST TYPE, STRATEGY ID, FILLED QTY, FILLED PRICE, STATUS, EXCH ORDER ID, TRADE ID, AMOUNT, and DATE.
- Order Depth - BSE : HDFC:** A table showing order depth details, including No., Qty, Price, and No. for both Best 5 Bids and Best 5 Asks.
- Net Positions:** A table showing net positions, including MARKET, INST TYPE, SYMBOL NAME, BUY QTY, AVG BUY PRICE, BUY AMOUNT, SELL QTY, AVG SELL PRICE, SELL AMOUNT, LTP, M2M LOSS/PROFIT, and BOOKED LOSS/PROFIT.

## 7.6.3 SAVE WORKSPACE TO FILE

User can customise the workspace and save it to a file on local hard disk. User can save unlimited workspace layouts by using this option.

## 7.6.4 LOAD WORKSPACE FROM FILE

User can browse on his/her local hard disk and search for the respective workspace file, he/she would like to load in the application.

### 7.6.5 TRADER DETAIL

This option provides Trader details and other important details related to connection parameters.

### 7.6.6 RESIZE COLUMNS TO CONTENTS

In case User would like to align columns as per the size of data in all the windows such as Market Watch, Strategy Books, Order Book, Trade Book, etc., click on **Resize columns to contents** will do the needful. A single click in this option will update the columns in windows as per the content size.

### 7.6.7 THEME

User can change the theme of workspace by clicking on available options (Default & Gray).

## **8. ALGO STRATEGIES**

We will be explaining the Strategies one by one with complete description of strategy window.

### **8.1 MARKET MAKING STRATEGY**

#### **A. SUMMARY**

Market making is the process of quoting bid and ask prices implemented for the provision of generating liquidity in the market. The bid price is the price that market maker is willing to pay for a security, whereas the ask price is the price at which the market maker is willing to sell the security. The spreads and bids / offers can depend upon any reference instrument prices and maybe hedged with any hedge instruments.

## B. STRATEGY WINDOW NOMENCLATURE

The screenshot shows the 'Market Making/Pair Trading' window in uTrade. The window is divided into several sections: 'Order Parameters', 'Hedging Parameters', and 'Strategy Information Box'. Annotations with arrows point to specific fields and explain their purpose.

**Annotations:**

- Select the Contract in which Bidding needs to be initiated for market making:** Points to the 'Inst Type' dropdown (set to 'FUTSTK').
- Select the Reference Price - Bidding Method:** Points to the 'Bidding Method' dropdown (set to 'ABSOLUTE').
- Select the Spread Reference:** Points to the 'Spread Reference' dropdown (set to 'ABSOLUTE').
- Choose from %age or Absolute:** Points to the 'PERCENT (%)' and 'ABSOLUTE' radio buttons.
- Select First Leg order to be placed:** Points to the 'BUY' and 'SELL' radio buttons.
- Choose for stopping trading:** Points to the 'YES' and 'NO' radio buttons.
- Select the Reference contract which will bench-marked for Bid/Ask price:** Points to the 'Reference Instrument' dropdown (set to 'BSE').
- Select the Hedging Contract to hedge against the trade in Market Making Instrument:** Points to the 'Hedging Instrument' dropdown (set to 'NSE').
- Strategy Information Box:** Points to the bottom section of the window.
- Provide parameters to stop algo:** Points to the 'Stop' button.
- Provide Hedging parameters Add / Load / Run / Stop / Remove - Strategies:** Points to the 'Add', 'Load', 'Run', 'Stop', and 'Remove' buttons.

**Order Parameters:**

- Order Price: BID
- Buy/Sell: BOTH
- First Leg: BUY
- Ord Lot(s): 1
- Max Trd Lot(s): 4
- Stop Trd: YES
- Lot Size: 1000
- Ord Size: 1000
- Ref Spread: ABSOLUTE
- Price Diff: 0.15
- Total Spread: 0.10
- %Trdhold: 0.00
- Depth: 0
- Max Spd: 2.00
- Max Ref %: 2.00

**Hedging Parameters:**

- Strategy: HEDGING
- Method: BEST BID/ASK
- Mod Count: 1
- Prc Diff(Trd): 1
- Time Prc(g): 1
- MKT ORD %: 0.10
- Opp Hedge: No
- ✓ Fat Sor Off: 1
- ✓ Stop Trd Unit: 1
- ✓ Best Prc Mtd: 0.20
- % Mkt Ord: 0.20

**Strategy Information Box:**

ID	STATE	ORDER	REFERENCE	UNDERLING	REF PRICE	ORD SIDE	FIRST LEG	SIDE	QTY	MAX TRD QTY	STOP TR
0	READY	BSE:BHARTIARTL 29AUG13	NSE:BHARTIARTL 29AUG13	NSE:BHARTIARTL 29AUG13	BID	BOTH	BUY	BUY	1000	4000	YES
0	READY	BSE:BHARTIARTL 29AUG13	NSE:BHARTIARTL 29AUG13	NSE:BHARTIARTL 29AUG13	BID	BOTH	BUY	BUY	1000	4000	YES
0	READY	BSE:BHARTIARTL 29AUG13	NSE:BHARTIARTL 29AUG13	NSE:BHARTIARTL 29AUG13	BID	BOTH	BUY	BUY	1000	4000	YES

## New Layout Image

The screenshot displays the 'Market Making/Pair Trading' window with the following sections:

- Order Instrument:** Exch (BSE), Inst Type (FUTSTK), Symbol (BHARTIAR), Expiry (29/08/2013), Strike Price, Opt Type.
- Reference Instrument:** Exch (BSE), Inst Type (FUTSTK), Symbol (BHARTIAR), Expiry (29/08/2013), Strike Price, Opt Type.
- Hedging Instrument:** Exch (BSE), Inst Type (FUTSTK), Symbol (BHARTIAR), Expiry (29/08/2013), Strike Price, Opt Type.
- Order Parameters:** Ref Price (BID), Buy/Sell (BOTH), First Leg (BUY), Ord Lot(s) (1), Max Trd Lot (4), Stop Trd (YES), Lot Size (1000), Ord Size (1000).
- Ref Spread:** Price Diff (0.10), Total Spread (ABSOLUTE 0.20), %Trshold (0.00), Depth (0), Max Spd (2.00), Max Ref % (2.00).
- Hedging Parameters:** Strategy (SQUARE UP), Method (BEST BID/ASK), Mod Count (1), Prc Diff(Tick) (1), Time Prd(s) (1), MKT ORD % (0.10), Opp Hedge (No).
- Buttons:** New, Edit, Commit, Add, Remove, RUN, Terminate.
- Table:**

ID	STATE	ORDER	REFERENCE	HEDGING	REF PRICE	ORD SIDE	FIRST LEG SIDE	QTY	MAX TRD QTY	STOP TRADE	REF SPRI
0	READY	BSE:BHARTIARTL 29AUG13	BSE:BHARTIARTL 29AUG13	BSE:BHARTIARTL 29AUG13	BID	BOTH	BUY	1000	4000	YES	ABSOLUT

### C. CONTRACT SPECIFICATIONS

In order to start this algo, user needs to first map the Market making contract, Reference contract and hedging contract in a excel file named **instrMap.csv** which will be stored in the specified file location. Normally this file will be stored in the folder where the algo application is installed.

#### Excel File content description:

**Bidding ID:** Security/Contract in which market making needs to be initiated

**Reference Instrument Ids:** This column will include the securities/contracts which will be used for reference purpose.

**Hedging Instrument Ids:** To hedge against the open positions; contracts which are specified in the mapping file will be shown in the strategy window.

**Delta hedging Instrument Ids:** Securities mapped for delta hedging in case of option positions

## 1. Order Instruments

Order Instrument					
Exch	Inst Type	Symbol	Expiry	Strike Price	Opt Type
BSE	FUTSTK	BHARTIAR	29/08/201		

User will choose the specific contract from various filter options available in order to run the Market Making Strategy. Only those contracts will be shown in the Symbol dropdown options which are uploaded in the excel file.

## 2. Reference Instruments

Reference Instrument					
Exch	Inst Type	Symbol	Expiry	Strike Price	Opt Type
BSE	FUTSTK	BHARTIAR	29/08/201		

These will be the instruments which will be benchmarked for calculating the Bid and ask prices based on different parameters. Broker can choose any instrument from BSE or any other exchanges for price reference as per different parameters.

## 3. Hedging Instruments

Hedging Instrument					
Exch	Inst Type	Symbol	Expiry	Strike Price	Opt Type
BSE	FUTSTK	BHARTIAR	29/08/201		

Select the respective hedging instrument for hedging open positions.

## D. ORDER PARAMETERS

Order Parameters							
Ref Price	Buy/Sell	First Leg	Ord Lot(s)	Max Trd Lot	Stop Trd	Lot Size	Ord Size
BID	BOTH	BUY	1	4	YES	1000	1000
Ref Spread	Price Diff	Total Spread	%Trshold	Depth	Max Spd	Max Ref %	
ABSOLUTE	0.10	ABSOLUTE 0.20	0.00	0	2.00	2.00	

### 1. REF PRICE (Bidding Method)

Select from BID, ASK, LTP, BID I.V., ASK I.V., and Last I.V. from the dropdown for choosing the reference price for placing order for the instrument which has been selected in the "ORDER INSTRUMENT" tab.

**BID:** In this method, price/value of best bid (buy) price of the reference product (as per selection made by the user) shall be used for bidding purposes.

**ASK:** In this method, price/value of best ask (sell) price of the reference product (as per selection made by the user) shall be used for bidding purposes.

**LTP:** In this method, price/value of Last Traded Price (LTP) of the reference product (as per selection made by the user) shall be used for bidding purposes.

**BID I.V.:** In this method, bid I.V. of the reference product (as per selection made by the user) shall be used for bidding purposes.

**ASK I.V.:** In this method, Ask I.V. of the reference product (as per selection made by the user) shall be used for bidding purposes.

**LAST I.V.:** In this method, Last I.V. of the reference product (as per selection made by the user) shall be used for bidding purposes.



## 2. TYPE OF BIDDING

User shall define whether he wants to place only buy or sell order or both buy and sell orders simultaneously.

## 3. FIRST LEG

User shall define whether on receipt of new broadcast regarding change in Price / Value of Bid / Ask / LTP (depending upon method chosen by user at “Bidding Method” above), it should first place/modify a Buy bid, or a Sell bid.

Example: If user chooses "Sell", then in all such cases whenever update regarding change in price/value of Bid/Ask/LTP of the Reference Product is received, the algo shall first place/modify price of Sell order and shall thereafter calculate and place/modify price of Buy Order.

## 4. ORDER LOTS

User shall define the No. of Lots for which bidding shall be made by the Algorithm.  
Order Size = Lot Size\*No. of Contacts.

Example: if user defines "5" as value in this box, then in case of BSE Sensex Futures, the buy/sell orders shall be placed with "75" as order quantity i.e. 15\*5

## 5. MAX TRD LOTS

User will define the maximum number of Lots which are allowed to get traded. As soon as the number will reach, algo strategy will be terminated immediately.

## 6. STOP TRD

If Buy Order Instrument Bid is equivalent to the Best Ask in the market or vice versa, this option provides the flexibility to user Biding or Not. Select “Yes” to allow not to Bid and “No” to keep Bidding.

## 7. REF SPREAD

User shall define whether the distance/difference between the Price/Value of Reference Product and price for Buy/Sell orders (to be used by the Software) shall be defined in Absolute Rupee Terms or in fraction/ratio term or in Volatility terms (in case of options)

Remarks: Ratio shall be used only in case of BSE Sensex Futures and BSE-100 Futures / Option Contracts. Volatility will be used only in case of Options as bidding instrument.

## 8. PRICE DIFFERENCE

User shall define the desired difference between the Price/Value of Reference Product and price for Buy/Sell orders (to be used by the Software).

If REF SPREAD value is being defined as "Absolute", Value defined in the input box shall always be deducted from the price/value of relevant reference product for calculation of buy order price, if buy order price is being calculated first. Further, the value defined in the input box shall always be added to the price/value of relevant reference product for calculation of sell order price, if sell order price is being calculated first.

If REF SPREAD value being defined as "Ratio", Value defined in the input box shall be multiplied with the price/value of relevant reference product for calculation of buy/sell order price. The multiplication value arrived at shall be rounded off to nearest tick value of the relevant bidding product.

## 9. TOTAL SPREAD

User shall define the desired difference (in Rupee Terms) that shall be maintained by the Software between the buy and sell orders of the specified bidding product. Spread can be provided in percentage or absolute terms.

If Reference Instrument is same as Order Instrument the value of Price Difference should always be less than Total Spread. If not, then an error message is displayed.

In other cases where the Reference Instrument is not the same as the Order Instrument, and Both is selected as Type of Bidding, a check before each order is placed that the Sell price calculated is always greater than the Best Ask Price present in the market and Buy Price calculated is always less than the Best Bid Price present in the market.

Absolute value shall be rounded off to lesser tick size only. Example: If Bid Price is Rs. 103 and Spread %age is 1.25% the value comes to 1.2875. Then the Total Spread shall be taken as Rs. 1.25 and not Rs. 1.30.

Total spread between quoted bids and offers may not be less than 0.1%

#### 10. THRESH-HOLD PERCENTAGE

This input box shall be used only in such cases where **reference instrument** chosen by user is **Stocks**. In such a case, the price/value of relevant reference product shall be taken as "weighted average price" of all such prices, at which Thresh-hold percentage of Reference Product may be bought/sold.

#### 11. MARKET DEPTH UPTO

This input box shall be used only in such cases where reference instrument chosen by user is "Stocks". It shall define the level of order book (market depth) which shall be used by software for calculation of "weighted average price".

#### 12. MAX SPREAD

User will specify the max spread value in the textbox, and as soon as the spread calculated is greater than the max spread value, algo strategy will be terminated.

#### 13. MAX REF %

After the algo is initiated and first bidding is done, algo will store the Price of Reference instrument and in case the price increases or decreases by the percentage specified here, algo strategy will be terminated.

## E. HEDGING PARAMETERS

### 1. STRATEGY

#### SQUARE UP

This option is used when the Hedging Instrument will be same as Bidding Instrument with same Expiry.

#### HEDGING

Similar to SQUARE UP but the hedging instrument won't be exactly the same as bidding instrument. In case of SENSEX vs BSE100, it will also calculate Hedge ratio to adjust hedge Quantity. Ratio will be a simple LTP ratio.

#### DELTA HEDGING

Applicable only when bidding instrument is Option. Algorithm will compute Delta. In case of BSE100 vs SENSEX, ratio will also be used besides delta to adjust hedge quantity.

#### NON-HEDGING

Hedging will be disabled only with this choice. However system will ask the user to mention the Position limit up to which the non-hedging has to be maintained.

### 2. HEDGING METHODS

#### Hit Ask/Bid

In this method, as and when any open position gets created, the Software will try to hedge/square-up the open position by throwing counter order i.e. Buy Order in case of -ve Open Position and Sell Order in case of +ve Open position for quantity equivalent to Open Position Quantity. The order price to be used for the purpose shall be equivalent to best buy price of Specified Hedging Product for Sell Order and best sell price of Specified Hedging Product for buy Order.

### Hit Bid/Ask

In this method, as and when any open position gets created, the Software will try to hedge/square-up the open position by throwing counter order i.e. Buy Order in case of -ve Open Position and Sell Order in case of +ve Open position for quantity equivalent to Open Position Quantity. The order price to be used for the purpose shall be equivalent to or better than best sell price of Specified Hedging Product in case of sell order and equivalent to or better than best buy price of Specified Hedging Product in case of buy Order.

### Market Order

In this method, as and when any open position gets created, the Software will try to hedge/square-up the open position by throwing counter order i.e. Buy Order in case of -ve Open Position and Sell Order in case of +ve Open position for quantity equivalent to Open Position Quantity. The order price shall not be a limit price, but Market Order %age above the LTP of Specified Hedging Product in case of Buy Order and Market Order %age below the LTP of Specified Hedging Product in case of Sell Order. If there still remain some open positions, then the software will cancel all pending orders and provide the user with a Pop-up.

## 3. BEST PRICE DIFFERENCE

Input Box shall provide the price in the form of tick size multiple by which the order price for hedging shall be better than best buy/sell order price of the specified hedging product.

Example: In case of input value 1 , the order shall be placed 1 tick above the price of best buyer in case of buy order and 1 tick below the best sell price in case of sell order. Further, in case of input value 0, the order shall be placed alongside the best buy/sell price, as the case may be.

## 4. MOD COUNT

Input Box shall specify the maximum no. of modification counts that shall be allowed to hedge any open position.

Remarks: The Mod Count shall become irrelevant as soon as the open position is fully hedged

Example: In case of input value 3, the hedging buy/sell order shall be allowed to be modified for upto 3 times, so that the Buy/Order placed for hedging by the software, may remain better than/equal to the best buy/sell order price of the Specified Hedging Product. After completion of ModCounts, the order will become Market Order.

#### **5. TIME PERIOD (in seconds)**

The input box shall specify time period (in second) after expiry of which a hedging order shall automatically get converted into a Market Order.

Remarks: Hedging Order/s shall be converted to Market Order immediately after completion of specified Mod Counts or expiry of Specified Time Period, whichever happens earlier.

#### **6. MARKET ORDER %LTP**

Input Box shall be used to define the %age by which Order price shall exceed the LTP of specified hedging product in case of placement of Buy Order and vice-versa for Sell Order.

#### **7. FIRST SQUARE OFF**

In case where algo will start placing Hedging/Square off orders, user can specify the Tick Size at which the square off order will be placed. Also if the order is in pending state for the duration (in seconds) specified in the textbox, user can choose to terminate the algo strategy.

#### **8. BEST PRICE METHOD**

Algo will compare the price of Hedging instrument and Order Instrument. If best price method is chosen then hedging order will be placed for the contract which has the best price in market.

## F. STRATEGY LAUNCH OPTIONS

Strategy ID:

**NEW (Ctrl+N):** To create a new strategy

**LOAD (Ctrl+L) (Right click):** To Load an existing saved strategy

**SAVE (Ctrl+S) (Right click):** To save a strategy to a file

**EDIT (Ctrl+E):** To edit the parameters of existing strategy, one which is already added (Both RUN & READY state)

**COMMIT (Ctrl+O):** To commit changes to the strategy in READY state

**ADD (Ctrl+A):** To add a new strategy

**REMOVE (Ctrl+M):** To remove an existing strategy

**RUN (Alt+R):** To RUN the selected strategy (Available in Ready state only)

**STOP (Alt+H):** To STOP a strategy (RUN state only)

**TERMINATE (Alt+T):** To STOP the RUNNING strategy

**SHUTDOWN (Alt+D):** To STOP & square off all existing positions of RUNNING strategy

## G. STRATEGY BOOK

ID	STATE	ORDER	REFERENCE	HEDGING	REF PRICE	ORD SIDE	FIRST LEG SIDE	QTY	MAX TRD QTY	STOP TRADE	REF SPRI
0	READY	BSE:BHARTIARTL 29AUG13	BSE:BHARTIARTL 29AUG13	BSE:BHARTIARTL 29AUG13	BID	BOTH	BUY	1000	4000	YES	ABSOLUT
0	READY	BSE:BHARTIARTL 29AUG13	BSE:BHARTIARTL 29AUG13	BSE:BHARTIARTL 29AUG13	BID	BOTH	BUY	1000	4000	YES	ABSOLUT

As soon as a strategy is executed (User has entered all the parameters and pressed RUN) the same is shown in the strategy book.

This Book shows the detailed parameters selected by user in the strategy form. Along with that, this book also shows that strategy statistics in detail.



## 8.2 CASH Vs. CASH ARBITRAGE

### A. SUMMARY

This is an Inter-Exchange Arbitrage Strategy that takes advantage of the price differential between the same underlying instrument on different exchanges.

This strategy allows same stock price arbitrage on one exchange versus the other exchange.

### B. STRATEGY WINDOW NOMENCLATURE:

**Cash Arbitrage**

**Portfolio Name**: TATASTEEL

**First Exch**: BSE **Symbol**: TATASPONGE

**Second Exch**: NSE **Symbol**: TATASPONGE

**Order Parameters**

First Leg	Sub Quantity	Total Quantity	Spread Range (Rs.)	%Thd.	Depth
SELL	150	1800	0.50 TO 0.55	100.00	5

**Hedging Parameters**

Hedge Method	Mod Count	Tick Difference	Time Period	Mkt Order %	Order Opp. Bid Factor
MARKET ORC	2	1	2	0.50	0.00

**ID**: 0 **New** **EDIT** **Commit** **Add** **Remove** **RUN** **Terminate**

ID	PORTFOLIO NAME	STATE	ORDER	HEDGING	UNDERLYING
0	TATASTEEL	READY	BSE:TATASPONGE	NSE:TATASPONGE EQ	BSE:TATASPONGE

## C. STRATEGY WINDOW DESCRIPTION

### 1. INSTRUMENT DETAILS

Portfolio Name	First Exch	Symbol	Second Exch	Symbol
TATASTEEL	BSE	TATASPONGE	NSE	TATASPONGE

**Portfolio Name:** Name the portfolio for future reference

**First/Second Exchange:** Primary/Secondary exchange to be specified for bidding & hedging respectively

**Symbol:** The underlying security

### 2. ORDER PARAMETERS

Order Parameters						
First Leg	Sub Quantity	Total Quantity	Spread Range (Rs.)		%Thd.	Depth
SELL	150	1800	0.50	TO 0.55	100.00	5

**First Leg:** Bidding order type buy or sell, If First leg selected is Buy then second leg automatically becomes sell and vice versa

**Sub Quantity:** Maximum order quantity to be placed per iteration

**Total Quantity:** Maximum Total quantity to be traded on either side

**Spread Range (Rs.):** Specifies the desired spread range by the user

**Threshold (%):** Check the minimum quantity available for bidding in First Leg

**Depth:** Check the threshold quantity in specified depth

**Spread Range (Rs):** When the Market spread is below spread range the Algo bids at lower limit of spread range specified & when the Market spread is with the spread range the Algo submits order at an order price making it the best buyer/seller in the market

The Algo will stop and will cancel current outstanding order in case of unavailability of Threshold quantity in specified Order depth.

### 3. HEDGING PARAMETERS

**Mod Count:** The number of times second leg order would be modified.

**Tick Difference:** The number of ticks above/below which the Best Bid/Ask order would be placed.

**Time Period:** The time period for which second leg order would wait for its trade. After this time period, irrespective of hedge method chosen, the strategy would place an IOC order at Market Order% above/below the best price available in case of buy/sell orders respectively.

**Mkt Order%:** The percentage of LTP in the market, above/below which final IOC order for second leg would be placed in case of buy/sell orders respectively.

### 4. HEDGING PARAMETERS

The different Hedge Methods are:

**Market Order** – Submits IOC order with order price after receiving the trade of first order at specified percentage above or below LTP depending on order mode

**Best Ask/Bid** – Submits limit order at current best bid/ask price against sell/buy respectively

**Ask/Bid** – Submits order at an order price making it the best buyer/seller in the market

**Actual Difference** – Submits orders at the actual difference set by the user

## 5. ORDER OPPORTUNITY

The Order opportunity is Reference Spread for Order generation in terms of difference, beyond or above which the algo will start bidding.

If checked, the bidding in first leg would start when the spread in the market is above Bid Factor specified. If unchecked the bidding would start irrespective of current spread.

Example:

If the target range of the specified strategy is 5 to 5.50 but the user wants to avoid continuous order generation by the algo, then user can assign as value say 2 in the Bid Factor as shown above. In that case the algo will only start bidding when ongoing spread in the market is 2.

## 6. STRATEGY LAUNCH OPTIONS

Same as explained in earlier Algos

## 8.3 CASH Vs. FUTURE ARBITRAGE

### A. SUMMARY

**Cash vs. Future** arbitrage quote model is used to gain the advantage of volatile pricings between cash and future markets on the same instrument. This is an arbitrage algo that captures the price differential between the cash and the future on the same or different exchange.

### B. STRATEGY WINDOW NOMENCLATURE

**Cash Future Arbitrage**

**SCRIP DETAIL**

Portfolio Name: BAJAJ Order Type: BID First Leg Mode: BUY

**FIRST LEG**

Exch: BSE Inst Type: STOCK Symbol Name: BAJAJAUT Exp Date: Series: A Lot Size: 1

**SECOND LEG**

Exch: NSE Inst Type: FUTURE Symbol Name: BAJAJ-AUTO Exp Date: 29/08/2013 Series: XX Lot Size: 125

**STRATEGY PARAMETERS**

Total Lots: 1 Total Quantity: 125 Order Lots: 1 Order Qty: 125

Limit (Rs.): 0.20 Thrshld Qty 1 (%): 70 Thrshld Qty2 (%): 100 Depth: 5

Mod Time: 1 Mod Fact: 0.05 Timer L1: 1.00 Timer L2: 1.00 Mkt Ord%: 2.00 Sq Off: 3

ID: 0 [NEW] [EDIT] [COMMIT] [ADD] [REMOVE] [RUN] [TERMINATE]

STRATEGY ID	PORTFOLIO NAME	FST LEG MODE	ORDER TYPE	SYMBOL FST LEG	SYMBOL SECOND LEG	QUANTITY
0	ICICI	BUY 1 SELL 2	BID	ICICIBANK	ICICIBANK 29AUG13	1250

## C. STRATEGY WINDOW DESCRIPTION

### 1. PORTFOLIO NAME

Name your portfolio for future reference.

### 2. ARBITRAGE TYPE

Allow user to select **Buy First::Sell second** or **Buy Second::Sell First**

### 3. ORDER TYPE

Select BID/IOC

### 4. FIRST LEG

Scrip/Contract **details for bidding**

### 5. SECOND LEG

Scrip/Contract **details for bidding**

### 6. ARBITRAGE PARAMETERS

**Quantity** Total quantity for which the strategy will be executed

**Sub Qty** Allow the user to pick available qty in slot

**Limit(Rs)** Minimum difference between both the contracts

**Threshold Qty(%)** With an aim to ensure orderly trading, users will be required to adhere to the order to trade ratio.

**Modify** Times Maximum modification count for first leg order

**Modify Factors(Rs)** Tick to modify first leg best price.

**Depth** Define level in Market depth for calculation to complete one leg's order

**Timer(Second)** Specify time for modification (10), If 0 automatically triggers Market Order with Market price protection



## 8.4 FUTURE Vs. FUTURE ARBITRAGE

### A. SUMMARY

**Future vs. Future** arbitrage quote model is used for rollover of future positions across different expiries for any future underlying. Strategy will bid for the first leg based on the price of the second leg and the other user inputs.

### B. STRATEGY WINDOW NOMENCLATURE

The screenshot shows the 'Future Future Arbitrage' window with the following sections:

- SCRIP DETAIL:** Portfolio Name (ICICI), Order Type (BID), First Leg Mode (BUY).
- FIRST LEG:** Exch (BSE), Inst Type (FUTURE), Symbol Name (ICICIBANK), Exp Date (29/08/2013), Series (DF), Lot Size (250).
- SECOND LEG:** Exch (BSE), Inst Type (FUTURE), Symbol Name (ICICIBANK), Exp Date (26/09/2013), Series (DF), Lot Size (250).
- STRATEGY PARAMETERS:**
  - Total Lots: 1, Total Quantity: 250, Order Lots: 1, Order Qty: 250
  - Limit (Rs.): 0.20, Thrshld Qty 1 (%): 70, Thrshld Qty2 (%): 100, Depth: 5
  - Mod Tim: 1, Mod Fact: 0.05, Timer L1: 1.00, Timer L2: 1.00, Mkt Ord: 2.00, Sq Off: 3
- Buttons:** ID (0), NEW, EDIT, COMMIT, ADD, REMOVE, RUN, TERMINATE.
- Table:**

STRATEGY ID	PORTFOLIO NAME	FST LEG MODE	ORDER TYPE	SYMBOL FST LEG	SYMBOL SECOND LEG	QUA
0	RELIANCE	BUY 1 SELL 2	BID	RIL 29AUG13	RIL 26SEP13	1
0	RIL	BUY 1 SELL 2	BID	RIL 29AUG13	RIL 26SEP13	1



### C. STRATEGY DESCRIPTION

The System allows the user to execute the following strategies.

#### ***Buy Near Month and Sell Far Month Future (Buy First::Sell Second)***

***Under Strategy “Buy Near Month and Sell Far Month Future”, the settings should be as follows:***

***Calculated Difference/Price Difference = (Best Bid Price of Far month – Best Ask Price of Near month)***

The Limit can be set as the required Difference value.

For example, if the user wants to execute Strategy “Buy Near Month and Sell Far Month Future” in JINDALSTEL with Difference of 50 for 10 lots, then user needs to set limit as 50, and Quantity as 1250 (10 lots). If there is a Difference of 50 or greater than 50 (far price – near price), then a Difference order with the specified Difference having 2 legs (i.e. First Leg order of 100 Rs. and Second Leg order of 150 Rs.) would be generated and submitted to exchange.

#### ***Sell Near Month and Buy Far Month Future (Buy Second::Sell First)***

***Under Strategy “Sell Near Month and Buy Far Month Future”, the settings should be as follows:***

***Calculated Difference/Price Difference = (Best Bid Price of Near month – Best Ask Price of Far month)***

If the user wants to execute Strategy “Sell Near Month and Buy Far Month Future” in JINDALSTEL with Difference of 25 for 10 lots, then he needs to set limit as 25, and Quantity as 1250 (10 lots). If there is a Difference of 25 or more than 25 (near price – far price), then a Difference order with the specified Difference having 2 legs (i.e. First leg order of 125 Rs. and Second Leg of 100 Rs.) would be generated and submitted to exchange.

Once the input parameters are updated in the system, the user can press submit to place the order. Whenever the calculated Difference meets the criteria of set parameter settings, the system places order to the exchange.

The user can verify the trades and positions from Trade Book and Net Position Book.

## 8.5 IMPLIED VOLATILITY (IV) BASED BIDDING STRATEGY

### A. SUMMARY

This Algorithm allow option bidding on Single Instrument, based on volatility wherein user trades in option based on user defined Implied Volatility(IV) and hedges it in Equity/Future/Option based on the specified option.

### B. STRATEGY WINDOW NOMENCLATURE

Shortcut to open this window is CTRL+I

The screenshot shows the 'IV Based Strategy' window with the following fields and values:

- Exchange:** BSE
- Instrument:** Option
- Symbol:** TECHM
- Expiry:** 29/08/2013
- Opt Type:** Call
- Strike Price:** 1220.00
- Lot Size:** 250
- Iv Method:** IV Order
- Order Mode:** Both
- Buy Vol:** 15.00
- Sell Vol:** 16.00
- Tot Buy Qty:** 1750
- Ord Buy Qty:** 500
- Tot Sell Qty:** 2750
- Ord Sell Qty:** 500
- Delta Hedging:** Yes
- Delta Seg:** Equity
- Expiry:** (empty)
- Opt Type:** (empty)
- Strike Price:** (empty)
- Hedge Method:** Market
- User Delta (%):** 2.00
- Hit/Bid:** Bid (selected)
- Opportunity Vol Diff:** Buy 0.00, Sell 0.00
- Pending Order Second:** Mkt Ord Upto 1.00, Mod Count 1, Timer 1

Buttons: ID 0, Load, Save, New, Edit, Commit, Add, Remove, Run, Terminate

Strategy id	Order instrument	Underlying instrument	Iv method	Order Mode	Req volatility
0	TECHM 29AUG13 CE 1220.00	TECHM EQ	IV Order	Buy	15.00
0	TECHM 29AUG13 CE 1220.00	TECHM EQ	IV Order	Sell	16.00

## C. STRATEGY WINDOW DESCRIPTION

### 1. ORDER INSTRUMENT

Exchange	Instrument	Symbol	Expiry	Opt Type	Strike Price	Lot Size
BSE	Option	TECHM	29/08/2013	Call	1220.00	250

**Exchange** : Define the desired exchange  
**Symbol** : Specifies options underlying  
**Expiry** : Instrument expiry date  
**Option Type** : CE/PE  
**Strike Price** : The exchange available strike Price for the instrument  
**Lot Size** : Underlying lot size defined by exchange

### 2. ORDER PARAMETERS

Iv Method	Order Mode	Buy Vol	Sell Vol	Tot Buy Qty	Ord Buy Qty	Tot Sell Qty	Ord Sell Qty
IV Order	Sell	0.00	15.00	0	0	1000	1000

Delta Hedging	Expiry	Opt Type	Strike Price	Hedge Method	<input checked="" type="checkbox"/> User Delta (%)

**Order Mode** : Bidding order type either buy or sell, both add's two rule (Buy/Sell) in the strategy form.

**Buy Vol** : User specified buy implied volatility %

**Sell Vol** : User specified sell implied volatility %

**Total Buy Quantity** : Total buy quantity to be done on either side

**Order Buy Quantity** : Maximum order quantity to be placed per iteration

**Total Sell Quantity** : Total sell quantity to be done on either side

**Order Sell Quantity** : Maximum order quantity to be placed per iteration

### 3. CALCULATE USER SPECIFIED IMPLIED VOLATILITY & OPTION GREEKS

The user can calculate pre-defined implied volatility based on option price or vice-versa using option calculator.

Click on “Calculate Option Price” to know the current option (Call/Put) price based on Volatility or Click on “Calculate Call Vol”/ “Calculate Put Vol” to determine Volatility corresponding to particular option.

Option Parameters		CALL		PUT	
Spot Price	316.75	Option Price	3.75	Option Price	7.00
Strike Price	320.00	Delta	0.4098	Delta	-0.5902
Current Date	21-Aug-2013	Gamma	0.0299	Gamma	0.0299
Maturity Date	29-Aug-2013	Vega	0.1823	Vega	0.1823
Vol %	27.7339	Theta	-0.315950	Theta	-0.3160
Rate Of Interest	10	Rho	0.0276	Rho	-0.0425
Calculate Option Price		Calculate Call Vol		Calculate Put Vol	

**Spot Price** : Underlying spot price

**Strike Price** : Option Instrument strike price used for bidding

**Current Date** : Equals to Today's Date

**Maturity Date** : Contract Instruments Expiry date

**Vol %** : Used defined Volatility

**Rate of Interest** : The current Market rate of Interest

#### 4. DELTA HEDGING PARAMETERS

Delta hedging if selected “No” will Terminate the Algo rule immediately as soon as the bid gets traded in the Market.

Delta Hedging	Delta Seg	Expiry	Opt Type	Strike Price	Hedge Method	<input checked="" type="checkbox"/> User Delta (%)
Yes	Option	29/08/2013	Call	100.00	Best Ask/Bid	2.00
No						
		Opportunity Vol Diff	Pending Order Second			

**Delta Hedging** : Yes/No – Option for delta Hedging or not

**Delta Segment** : Choice for hedging security – Equity/Future/Option

**Expiry Date** : Contract Instruments Expiry date

**Option Type** : CE/PE

**Strike Price** : Used defined strike Price

#### 5. DELTA HEDGING METHODS

In case of Delta hedging option selected as “Yes” user can specify delta clicking on “User Delta (%)” checkbox or opt for automated Hedge method based on current Market delta.

The different Hedge Methods are:

**Market Order** – Submits IOC order with order price after receiving the trade of first order at specified percentage above or below LTP depending on order mode

**Best Ask/Bid** – Submits limit order at current best bid/ask price against sell/buy respectively

**Ask/Bid** – Submits order at an order price making it the best buyer/seller in the market

**Actual Difference** – Submits orders at the actual difference set by the user

Delta Hedging <input type="checkbox"/> Yes <input type="checkbox"/> No	Delta Seg <input type="checkbox"/> Option <input type="checkbox"/> Other	Expiry 29/08/2013	Opt Type Call	Strike Price 100.00	Hedge Method Best Ask/Bid	<input checked="" type="checkbox"/> User Delta (%) 2.00
Hit/Bid <input checked="" type="radio"/> Hit <input type="radio"/> Bid		Opportunity Vol Diff Buy 0.00 Sell 2.00		Pending Order Second Mkt Ord Upto 2.00		

## 6. HIT/BID

An option to chose whether to start bidding proactively on case of Bid or to wait & execute the order in exchange after getting opportunity in case of Hit.

Hit/Bid <input checked="" type="radio"/> Hit <input type="radio"/> Bid	Opportunity Vol Diff Buy 0.00 Sell 2.00	Pending Order Second Mkt Ord Upto 2.00 Mod Count 2 Timer 1
ID 0	Load Save New Edit Commit Add Remove Run Terminate	

## 7. OPPORTUNITY VOL DIFF

The opportunity Vol Diff" is Reference Point for Order generation in terms of difference, beyond or above which the algo will start bidding.

The Buy/Sell opportunity diff can be specified to its respective columns.

Hit/Bid <input checked="" type="radio"/> Hit <input type="radio"/> Bid	Opportunity Vol Diff Buy 0.00 Sell 2.00	Pending Order Second Mkt Ord Upto 2.00 Mod Count 2 Timer 1
ID 0	Load Save New Edit Commit Add Remove Run Terminate	

Eg:

If the target difference of the specified strategy is 15 but the user wants to avoid continuous order generation by the algo then user can assign as value say 2 as above. In that case the algo will only start bidding when ongoing Market Volatility is within range i.e. 13 % as illustrated above.

## 7. PENDING ORDER SECOND

**Mkt Order Upto:** This specifies percentage for calculating the order price when hedge method selected as **Market**.

**Mod Count:** Mod count denote the maximum no. of modifications of outstanding order

**Timer:** Time out which denote the interval the time within which the outstanding order gets modified

**Note:** In case Mod count & timer whichever gets hit earlier the hedge order gets modified to Market order with limit price protection.

## 8. STRATEGY LAUNCH OPTIONS

**NEW (Ctrl+N):** To create a new strategy

**LOAD (Ctrl+L):** To Load an existing saved strategy

**SAVE (Ctrl+S):** To save a strategy to a file

**EDIT (Ctrl+E):** To edit the parameters of existing strategy, one which is already added (Both RUN & READY state)

**COMMIT (Ctrl+O):** To commit changes to the strategy in READY state

**ADD (Ctrl+A):** To add a new strategy

**REMOVE (Ctrl+M):** To remove an existing strategy



**RUN (Alt+R):** To RUN the selected strategy (Available in Ready state only)

**STOP (Alt+H):** To STOP a strategy (RUN state only)

**TERMINATE (Alt+T):** To STOP the RUNNING strategy

**SHUTDOWN (Alt+D):** To STOP & square off all existing positions of RUNNING strategy

## B. STRATEGY BOOK

As soon as a strategy is executed (User has entered all the parameters and pressed RUN) the same is shown in the strategy book.

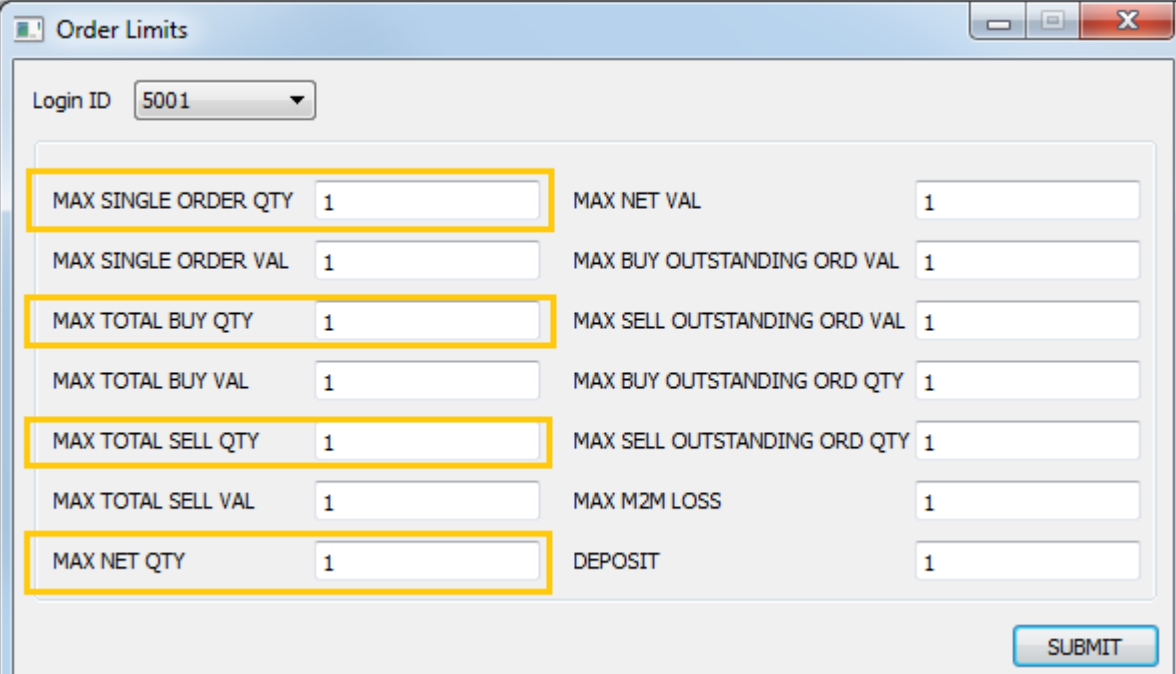
This Book shows the detailed parameters selected by user in the strategy form. Along with that, this book also shows that strategy statistics in detail.

IV Strategy Book										
Strategy id	Order instrument	Underlying instrument	Iv method	Order Mode	Req volatility	Total qty	Order qty	Is hedging	Hedging instrument	Hedge method
40	TECHM 29AUG13 CE 1220.00	TECHM EQ	IV Order	Sell	16.00	2750	500	Yes	TECHM EQ	Market
39	TECHM 29AUG13 CE 1220.00	TECHM EQ	IV Order	Buy	15.00	1750	500	Yes	TECHM EQ	Market
38	TECHM 29AUG13 CE 1220.00	TECHM EQ	IV Order	Sell	16.00	2750	500	Yes	TECHM EQ	Market
37	TECHM 29AUG13 CE 1220.00	TECHM EQ	IV Order	Buy	15.00	1750	500	Yes	TECHM EQ	Market

## 9. RISK MANAGEMENT

### 9.1 QUANTITY LIMITS CHECK

The trading platform validates Order Quantity, and the order generation takes place only if it complies with the Surveillance Measures set for the User with respect to Maximum Single Order Quantity (both Buy/Sell), Maximum Total Order Quantity (both Buy/Sell) and Maximum Net Quantity.



**Order Limits**

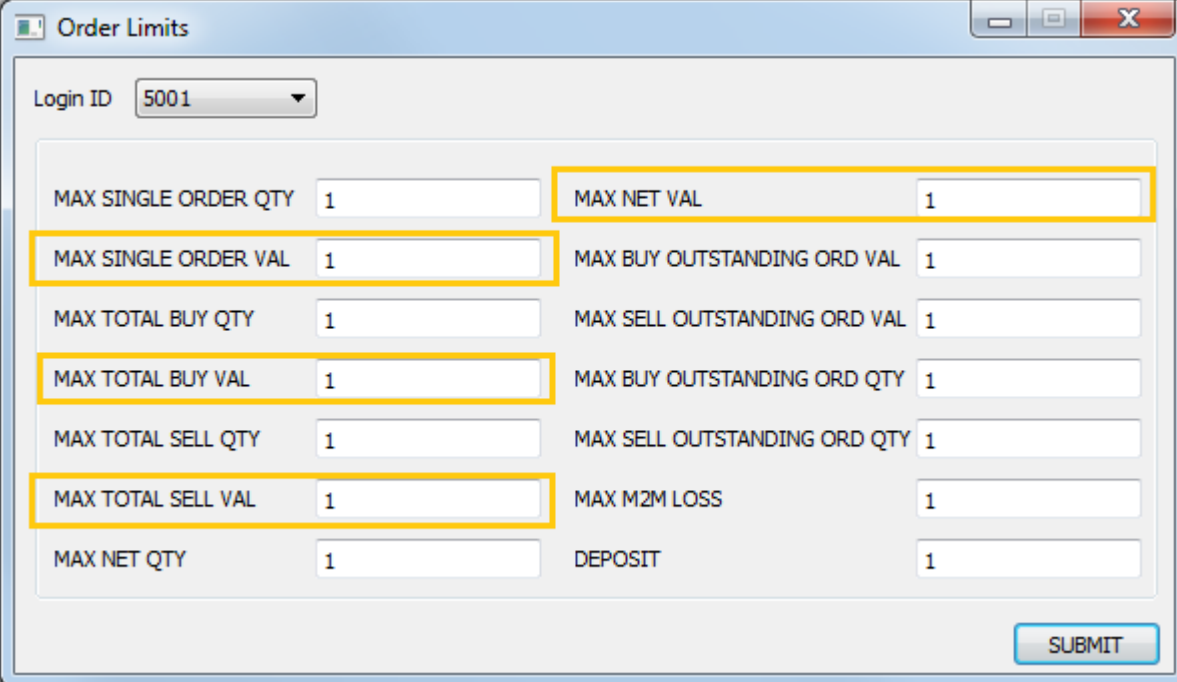
Login ID: 5001

MAX SINGLE ORDER QTY	1	MAX NET VAL	1
MAX SINGLE ORDER VAL	1	MAX BUY OUTSTANDING ORD VAL	1
MAX TOTAL BUY QTY	1	MAX SELL OUTSTANDING ORD VAL	1
MAX TOTAL BUY VAL	1	MAX BUY OUTSTANDING ORD QTY	1
MAX TOTAL SELL QTY	1	MAX SELL OUTSTANDING ORD QTY	1
MAX TOTAL SELL VAL	1	MAX M2M LOSS	1
MAX NET QTY	1	DEPOSIT	1

**SUBMIT**

## 9.2 ORDER VALUE CHECK

The valid Order Value Generation takes place only if it complies with the Surveillance Measures set for the User with respect to Maximum Single Order Value (both Buy/Sell), Maximum Total Order Value (both Buy/Sell) and Maximum Net Value.



**Order Limits**

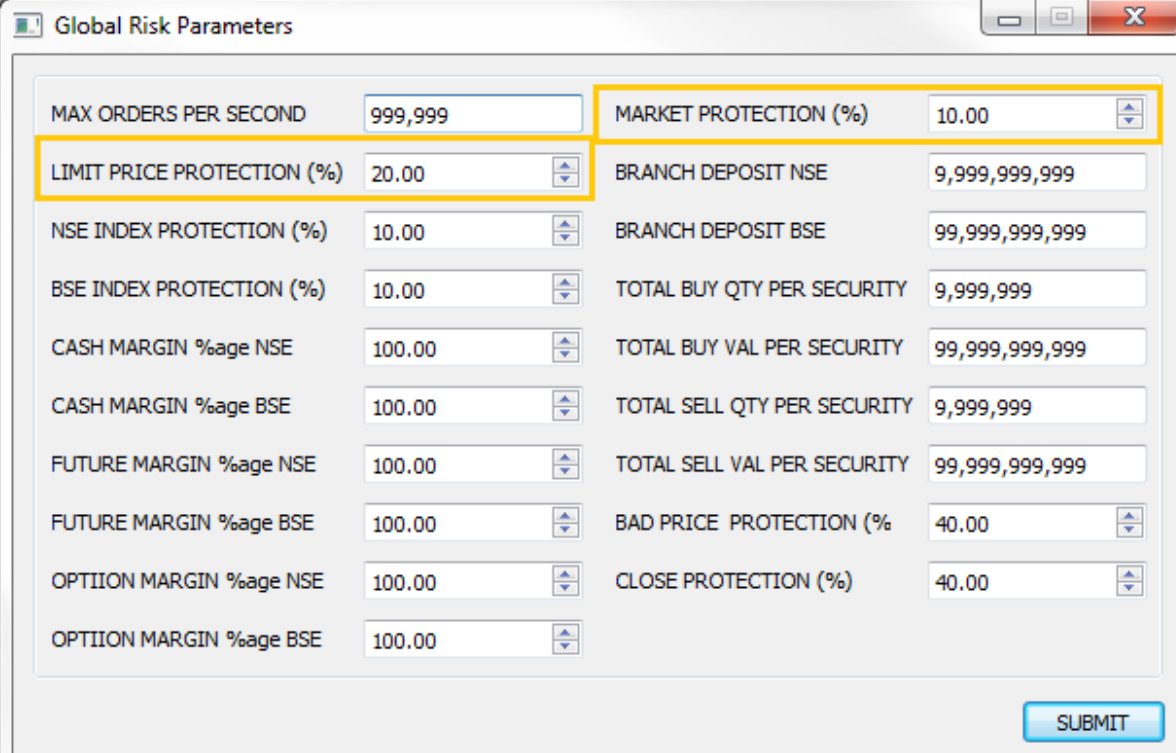
Login ID: 5001

MAX SINGLE ORDER QTY	1	MAX NET VAL	1
MAX SINGLE ORDER VAL	1	MAX BUY OUTSTANDING ORD VAL	1
MAX TOTAL BUY QTY	1	MAX SELL OUTSTANDING ORD VAL	1
MAX TOTAL BUY VAL	1	MAX BUY OUTSTANDING ORD QTY	1
MAX TOTAL SELL QTY	1	MAX SELL OUTSTANDING ORD QTY	1
MAX TOTAL SELL VAL	1	MAX M2M LOSS	1
MAX NET QTY	1	DEPOSIT	1

**SUBMIT**

### 9.3 PRICE RANGE CHECK

The order price generation mechanism strictly follows the specified Range provided to a trader to limit the risk within a pre-set percentage of the Last Trade Price (LTP). The percentage will be greater than zero and less than or equal to the applicable circuit limits including dummy circuit limits in respect of all algorithmic/single orders.



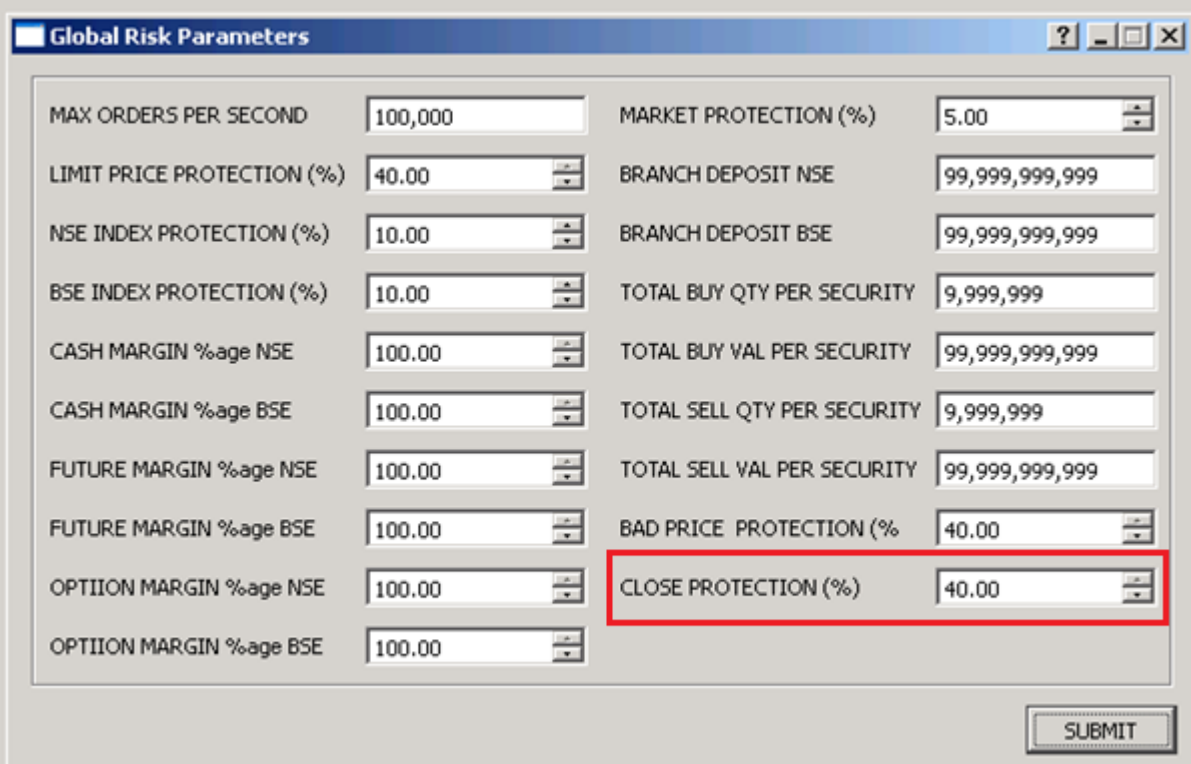
The screenshot shows a window titled "Global Risk Parameters" with a table of trading parameters. The parameters are organized into two columns. The first column includes parameters like "MAX ORDERS PER SECOND", "LIMIT PRICE PROTECTION (%)", "NSE INDEX PROTECTION (%)", "BSE INDEX PROTECTION (%)", "CASH MARGIN %age NSE", "CASH MARGIN %age BSE", "FUTURE MARGIN %age NSE", "FUTURE MARGIN %age BSE", "OPTIION MARGIN %age NSE", and "OPTIION MARGIN %age BSE". The second column includes "MARKET PROTECTION (%)", "BRANCH DEPOSIT NSE", "BRANCH DEPOSIT BSE", "TOTAL BUY QTY PER SECURITY", "TOTAL BUY VAL PER SECURITY", "TOTAL SELL QTY PER SECURITY", "TOTAL SELL VAL PER SECURITY", "BAD PRICE PROTECTION (%)", and "CLOSE PROTECTION (%)". Each parameter has a corresponding input field, mostly with up and down arrows for percentage values. A "SUBMIT" button is located at the bottom right of the window.

MAX ORDERS PER SECOND	999,999	MARKET PROTECTION (%)	10.00
LIMIT PRICE PROTECTION (%)	20.00	BRANCH DEPOSIT NSE	9,999,999,999
NSE INDEX PROTECTION (%)	10.00	BRANCH DEPOSIT BSE	99,999,999,999
BSE INDEX PROTECTION (%)	10.00	TOTAL BUY QTY PER SECURITY	9,999,999
CASH MARGIN %age NSE	100.00	TOTAL BUY VAL PER SECURITY	99,999,999,999
CASH MARGIN %age BSE	100.00	TOTAL SELL QTY PER SECURITY	9,999,999
FUTURE MARGIN %age NSE	100.00	TOTAL SELL VAL PER SECURITY	99,999,999,999
FUTURE MARGIN %age BSE	100.00	BAD PRICE PROTECTION (%)	40.00
OPTIION MARGIN %age NSE	100.00	CLOSE PROTECTION (%)	40.00
OPTIION MARGIN %age BSE	100.00		

SUBMIT

## 9.4 CLOSING PRICE CHECK

The order price generation mechanism strictly follows the specified Range provided to a trader to limit the risk within a pre-set percentage of the Closing Price.



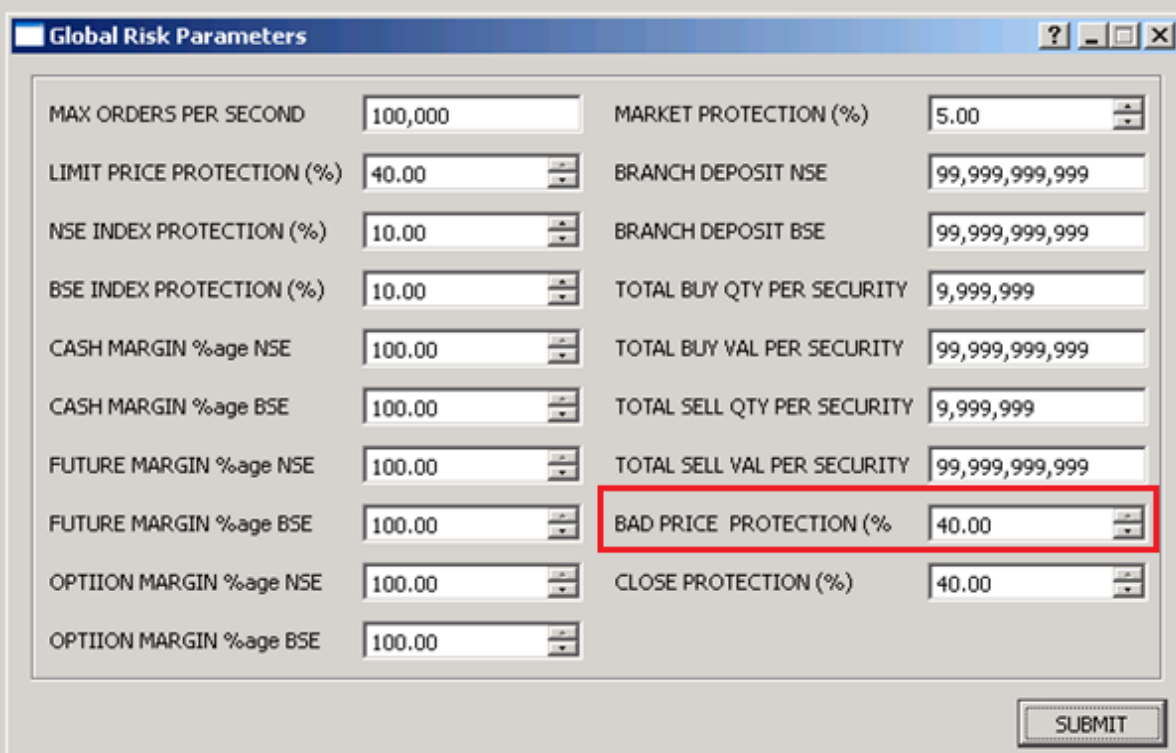
**Global Risk Parameters**

MAX ORDERS PER SECOND	100,000	MARKET PROTECTION (%)	5.00
LIMIT PRICE PROTECTION (%)	40.00	BRANCH DEPOSIT NSE	99,999,999,999
NSE INDEX PROTECTION (%)	10.00	BRANCH DEPOSIT BSE	99,999,999,999
BSE INDEX PROTECTION (%)	10.00	TOTAL BUY QTY PER SECURITY	9,999,999
CASH MARGIN %age NSE	100.00	TOTAL BUY VAL PER SECURITY	99,999,999,999
CASH MARGIN %age BSE	100.00	TOTAL SELL QTY PER SECURITY	9,999,999
FUTURE MARGIN %age NSE	100.00	TOTAL SELL VAL PER SECURITY	99,999,999,999
FUTURE MARGIN %age BSE	100.00	BAD PRICE PROTECTION (%)	40.00
OPTION MARGIN %age NSE	100.00	<b>CLOSE PROTECTION (%)</b>	<b>40.00</b>
OPTION MARGIN %age BSE	100.00		

**SUBMIT**

## 9.5 TRADE PRICE PROTECTION CHECK (BAD TRADE PROTECTION)

By defining a field value in Bad Price Protection % Change, order price generation can be restricted within a set percentage of last two LTP (Last trade price). Algo trade generation beyond set price bracket will result into rejection/freeze of the respective Algo rule until consecutive LTP received is within the set % range.



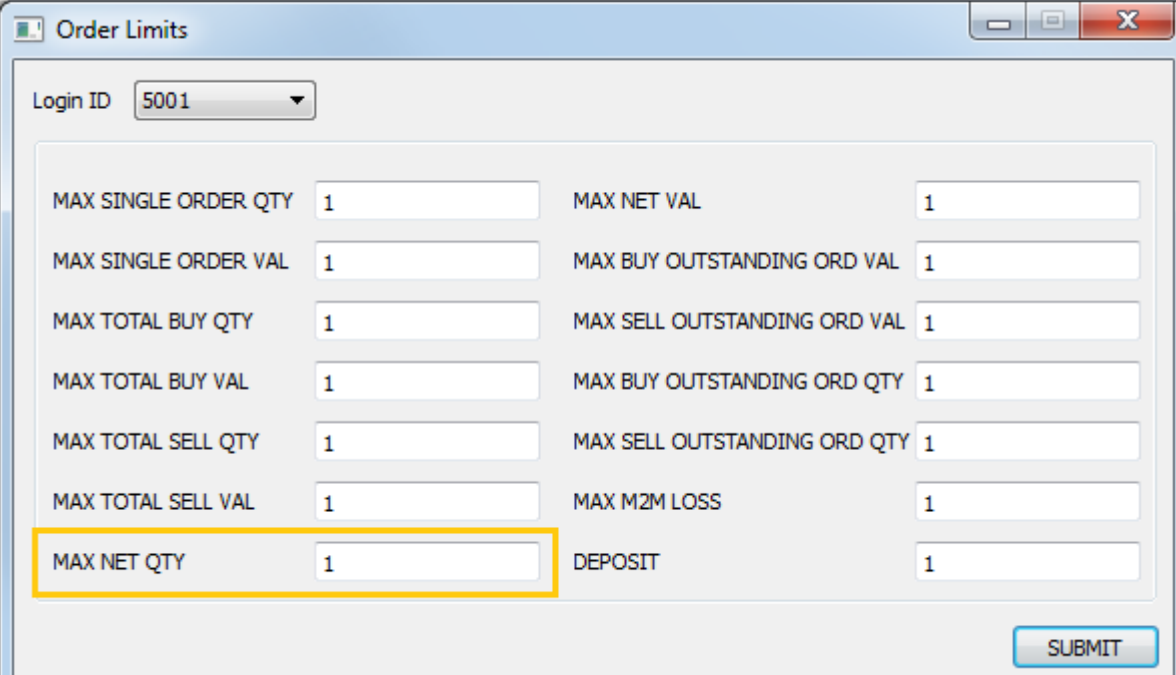
**Global Risk Parameters**

MAX ORDERS PER SECOND	100,000	MARKET PROTECTION (%)	5.00
LIMIT PRICE PROTECTION (%)	40.00	BRANCH DEPOSIT NSE	99,999,999,999
NSE INDEX PROTECTION (%)	10.00	BRANCH DEPOSIT BSE	99,999,999,999
BSE INDEX PROTECTION (%)	10.00	TOTAL BUY QTY PER SECURITY	9,999,999
CASH MARGIN %age NSE	100.00	TOTAL BUY VAL PER SECURITY	99,999,999,999
CASH MARGIN %age BSE	100.00	TOTAL SELL QTY PER SECURITY	9,999,999
FUTURE MARGIN %age NSE	100.00	TOTAL SELL VAL PER SECURITY	99,999,999,999
FUTURE MARGIN %age BSE	100.00	<b>BAD PRICE PROTECTION (%)</b>	<b>40.00</b>
OPTION MARGIN %age NSE	100.00	CLOSE PROTECTION (%)	40.00
OPTION MARGIN %age BSE	100.00		

**SUBMIT**

## 9.6 POSITION LEVEL CHECK

Position limit check at Client/User level can be established by defining the maximum permissible value in Net Quantity Field.



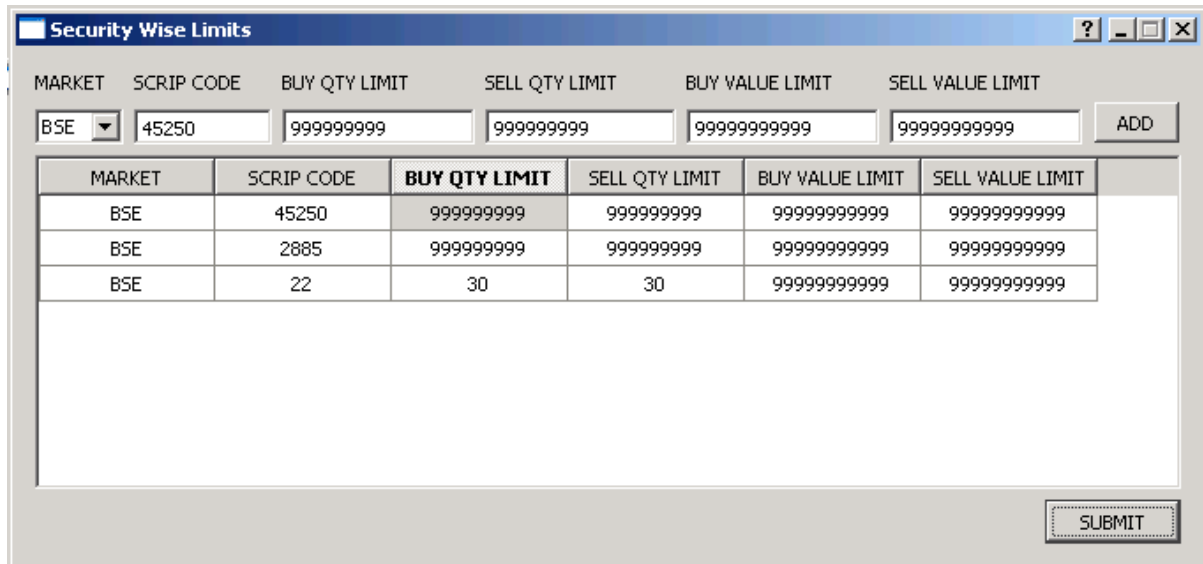
Order Limits	
Login ID	5001
MAX SINGLE ORDER QTY	1
MAX SINGLE ORDER VAL	1
MAX TOTAL BUY QTY	1
MAX TOTAL BUY VAL	1
MAX TOTAL SELL QTY	1
MAX TOTAL SELL VAL	1
<b>MAX NET QTY</b>	<b>1</b>
MAX NET VAL	1
MAX BUY OUTSTANDING ORD VAL	1
MAX SELL OUTSTANDING ORD VAL	1
MAX BUY OUTSTANDING ORD QTY	1
MAX SELL OUTSTANDING ORD QTY	1
MAX M2M LOSS	1
DEPOSIT	1

SUBMIT



## 9.7 SECURITY WISE LIMIT

The checks validates the buy/sell quantity & value security wise & prevent the user from entering of any fresh orders in case specified limit is reached.



**Security Wise Limits**

MARKET: BSE | SCRIP CODE: 45250 | BUY QTY LIMIT: 999999999 | SELL QTY LIMIT: 999999999 | BUY VALUE LIMIT: 999999999999 | SELL VALUE LIMIT: 999999999999 | **ADD**

MARKET	SCRIP CODE	BUY QTY LIMIT	SELL QTY LIMIT	BUY VALUE LIMIT	SELL VALUE LIMIT
BSE	45250	999999999	999999999	999999999999	999999999999
BSE	2885	999999999	999999999	999999999999	999999999999
BSE	22	30	30	999999999999	999999999999

**SUBMIT**

## **10. SYSTEM REQUIREMENTS**

### **10.1 ORDER IDENTIFICATION**

The orders generated through Algo Platform are identified with unique order number as per the exchange criteria.

### **10.2 NON- TAMPER ABLE AUDIT TRIAL**

Access to system is restricted to authorized person permitted by the system administrator. System has provision to create daily backup for trade log, Message log, and User maintenance back up, Order history back up, etc.

### **10.3 ORDERS PER SECOND**

Maximum number of Order released per second by the Algo platform is in accordance with the exchange criteria.

### **10.4 AUTOMATED EXECUTION THROTTLE**

*The Algo platform has In-built functions to ensure that next set of orders are generated only after fulfillment of first phase of Trade cycle.*

### **10.5 SYSTEM SECURITY**

*Access to system is restricted to authorized person permitted by the system administrator with valid User Id and Password.*

*Some more characteristics are:*

- ✓ *Automatic disablement of the user on entering erroneous password on three consecutive occasions.*
- ✓ *Automatic expiry of password on expiry of 14 calendar days.*
- ✓ *The Passwords are alphanumeric, instead of just being alphabets or just numerical.*
- ✓ *System doesn't allow the changed password to be the same as the last password*

- ✓ Login id of the user and password cannot be the same.
- ✓ Minimum password length is eight characters and not more than twelve characters.
- ✓ The Passwords are stored in encrypted form to safe guard against any misuse

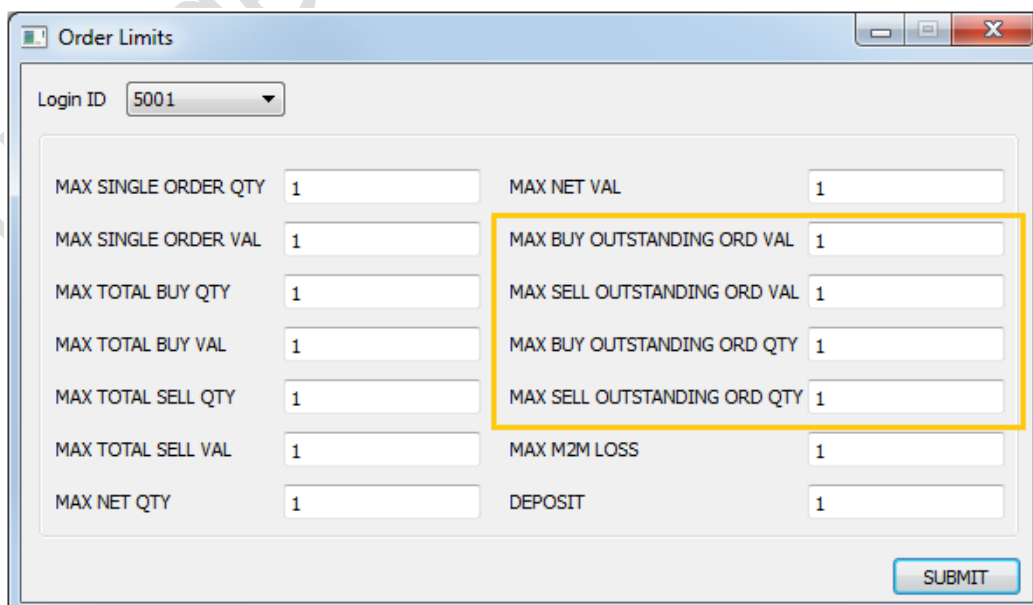
## 10.6 CONTROL VALUES

Audit trail created in our system captures the record of control parameters, orders, trades and data points emanating from trades executed through algorithm trading. Field values are made mandatory for all risk control parameters, and no risk parameters have provision to accept unlimited value or Zero value.

Before sending any order to exchange trading system, the orders are mandatorily filtered through the Surveillance system. Those orders which are within the set parameters will only flow to the exchange.

## 10.7 DYSFUNCTIONAL ALGOS

- ✓ Surveillance measures to check total cumulative Buy/Sell Quantity, Total Net Quantity are built into the system to restrict/identify position building on one side or overall basis. Further orders in excess of set standards of Surveillance will freeze/rejected. System has functions to restrict the entry on number of rules.



The screenshot shows a window titled "Order Limits" with a "Login ID" dropdown set to "5001". Below this, there are two columns of input fields, each with a "1" in the text box. The fields are:

Field Name	Value
MAX SINGLE ORDER QTY	1
MAX SINGLE ORDER VAL	1
MAX TOTAL BUY QTY	1
MAX TOTAL BUY VAL	1
MAX TOTAL SELL QTY	1
MAX TOTAL SELL VAL	1
MAX NET QTY	1
MAX NET VAL	1
MAX BUY OUTSTANDING ORD VAL	1
MAX SELL OUTSTANDING ORD VAL	1
MAX BUY OUTSTANDING ORD QTY	1
MAX SELL OUTSTANDING ORD QTY	1
MAX M2M LOSS	1
DEPOSIT	1

A yellow box highlights the four "OUTSTANDING" fields. A "SUBMIT" button is located at the bottom right of the window.

- ✓ The algorithm shall pause if the Maximum MTM loss crosses the specified limit

MAX SINGLE ORDER QTY	1	MAX NET VAL	1
MAX SINGLE ORDER VAL	1	MAX BUY OUTSTANDING ORD VAL	1
MAX TOTAL BUY QTY	1	MAX SELL OUTSTANDING ORD VAL	1
MAX TOTAL BUY VAL	1	MAX BUY OUTSTANDING ORD QTY	1
MAX TOTAL SELL QTY	1	MAX SELL OUTSTANDING ORD QTY	1
MAX TOTAL SELL VAL	1	MAX M2M LOSS	1
MAX NET QTY	1	DEPOSIT	1

## 10.8 MARKET PRICE PROTECTION

By defining a field value in Price % Change, order price generation can be restricted within a set percentage range of LTP. Algo price generation beyond set price bracket will result into rejection/freeze of the respective Algo rule.

MAX ORDERS PER SECOND	999,999	MARKET PROTECTION (%)	10.00
LIMIT PRICE PROTECTION (%)	20.00	BRANCH DEPOSIT NSE	9,999,999,999
NSE INDEX PROTECTION (%)	10.00	BRANCH DEPOSIT BSE	99,999,999,999
BSE INDEX PROTECTION (%)	10.00	TOTAL BUY QTY PER SECURITY	9,999,999
CASH MARGIN %age NSE	100.00	TOTAL BUY VAL PER SECURITY	99,999,999,999
CASH MARGIN %age BSE	100.00	TOTAL SELL QTY PER SECURITY	9,999,999
FUTURE MARGIN %age NSE	100.00	TOTAL SELL VAL PER SECURITY	99,999,999,999
FUTURE MARGIN %age BSE	100.00	BAD PRICE PROTECTION (%)	40.00
OPTION MARGIN %age NSE	100.00	CLOSE PROTECTION (%)	40.00
OPTION MARGIN %age BSE	100.00		

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