Volume Divergence Algo
User Manual NT8

Fully Automated Trading Algo

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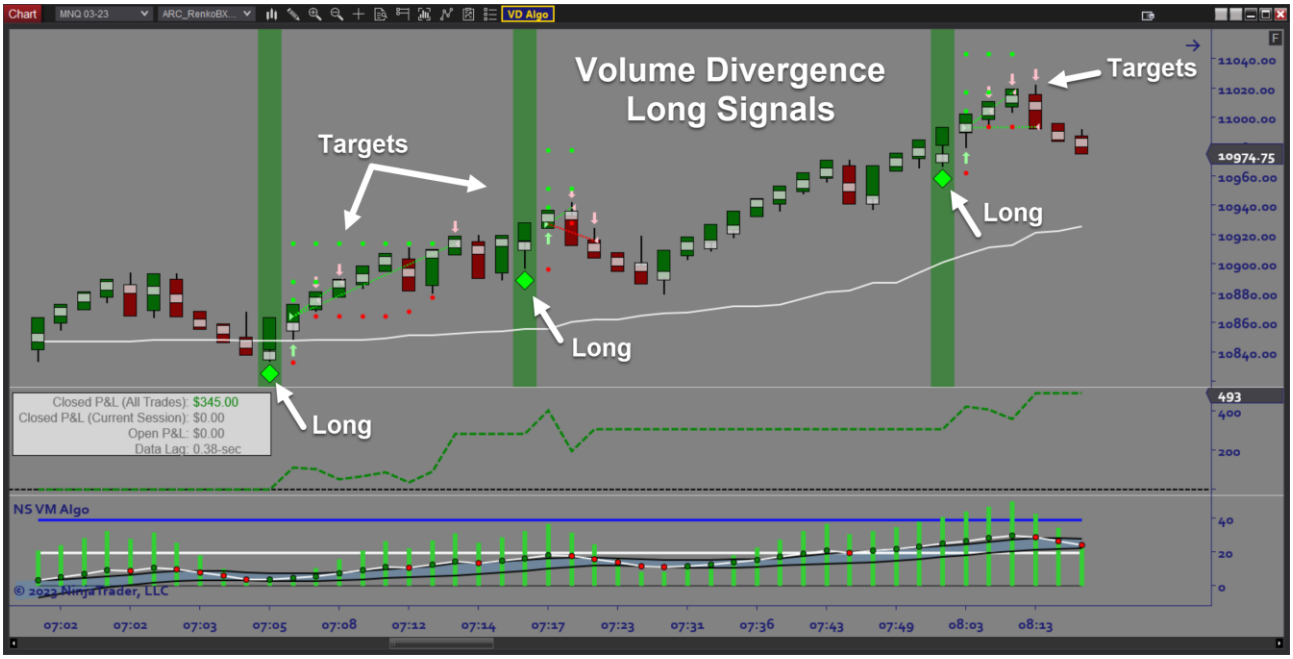
General Description:

The ARC_VolumeDivergence Algo (VDA) is a fully automated trading solution for Ninjatrader based on micro volume pattern recognition. The software is designed to exploit a specific situation where volume and price diverge in a pattern which can often lead to a price move following a Signal bar. It accomplishes this by scanning price action and bar volume continuously in real time and the generating a trade signal when the pattern criteria are met. Once a trade has been entered, the software manages the position according to a predetermined trade plan which includes up to 3 targets. The software also includes risk management, money management, breakeven, and trail functionality as well as a variety of trade selection filters such as trend, momentum, and time of day. Trade performance, backtesting, and optimization are all supported as part of Ninjatrader Strategy functionality.

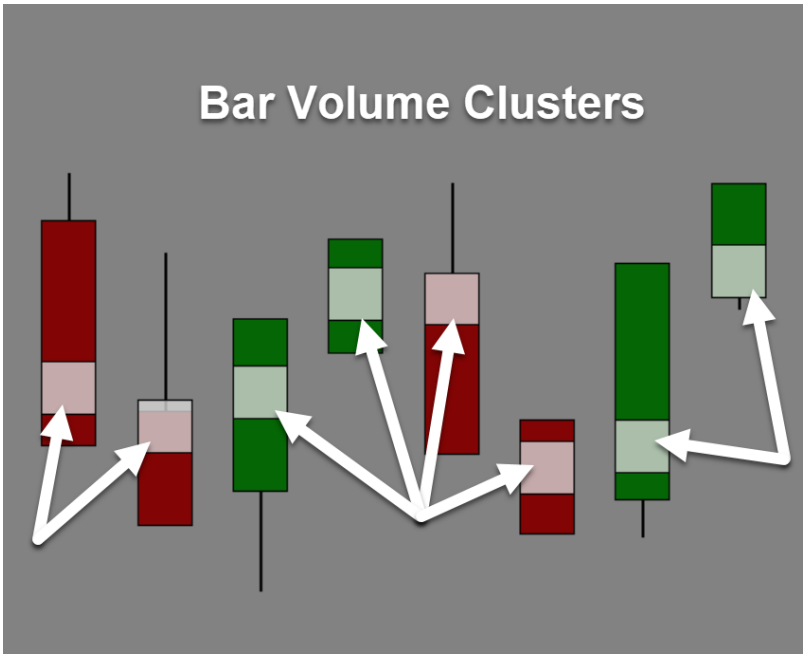
Here is an example of long trades taken by the algo in an uptrending environment:



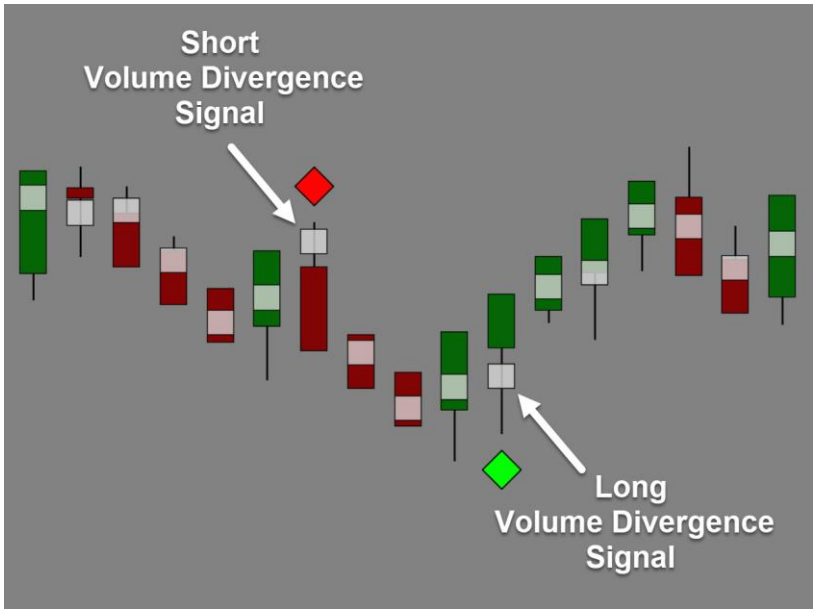
Here is an example of short trades taken by the algo in a downtrending environment:

Understanding the Signal Logic

Using tick level data, the software calculates a volume profile for each bar. The price level with the highest volume within each bar is called the Volume Cluster and it is key component of the signal logic. The Cluster is typically 3-5 ticks in size (vertical height) but can be set to any size by the user. The appropriate size often depends on the instrument and timeframe.



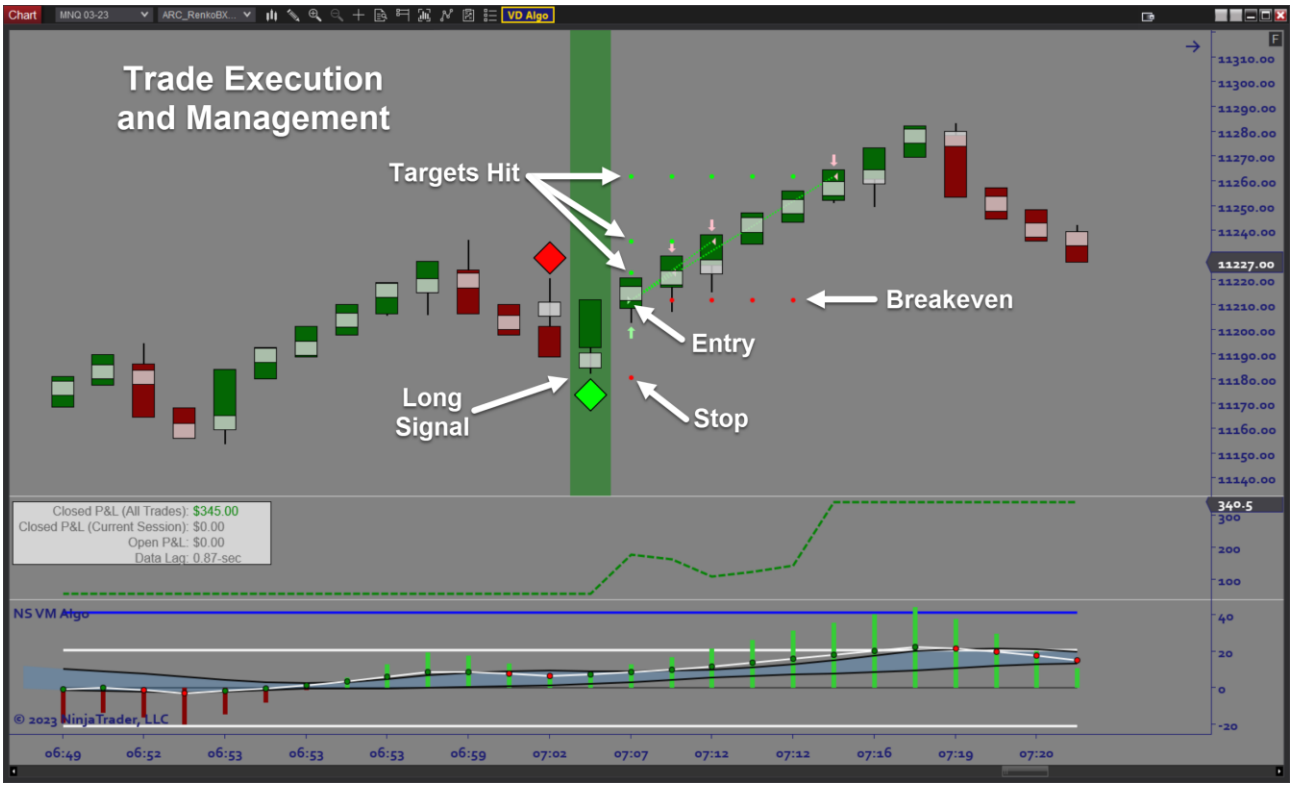
The location of the Cluster on the bar is key to determining whether a signal will be generated. When there is a concentration of volume near the high or low of a candle but there is a strong move away from that price level before the bar closes, we call this Volume Divergence at the individual bar level. After the bar closes there is often enough follow-through for a scalp trade as well as larger trades on higher timeframes.



Once a signal is generated, the strategy is to enter at or near the signal bar close in the direction of the signal bar. The software will submit either a market or limit order (user's choice) to accomplish this and will continue to manage that position according to the Trade Plan.

With this type of setup, speed is of the essence. The strategy is to enter immediately once the signal bar closes. When price is moving fast, this can be very difficult to do manually. However, with autotrading the signals are recognized instantly and the entry orders are issued to the platform. With market orders, the entry can be nearly instantaneous and certainly much faster than manual trading.

Notice that the software will highlight the appearance of a signal with a diamond placed on the signal bar (above the bar for shorts, below the bar for longs). When the signal is detected by the algo engine, a trade is entered and that open position is managed until a stop or a target is hit.



In addition to a Diamond, the Signal is highlighted by a vertical “racing stripe”, the color of which can be customized in the algo settings.

For clarity, here are the specific conditions that must be met for both a long and short trade signal to be generated:

- Long Signal Requirements
  - The bar close price must be higher than the bar open price (i.e. it is an up bar)
  - The top of the Cluster must be below the bar open (i.e. the Cluster is not touching the candle body meaning it is located entirely on the lower wick)
- Short Signal Requirements
  - The bar close price must be lower than the bar open price (i.e. it is a down bar)
  - The bottom of the Cluster must be above the bar open (i.e. the Cluster is not touching the candle body meaning it is located entirely on the upper wick)

The Signal Logic described in this section is the first step in determining whether a trade will actually be entered. It simply means that the pattern requirements have been met. There are several algo engine components (eg. signal filters, time windows, money management) which can block a signal from being taken. These components will be covered in detail below.

Algo Engine Components

The Algo Engine components can be grouped into 4 categories:

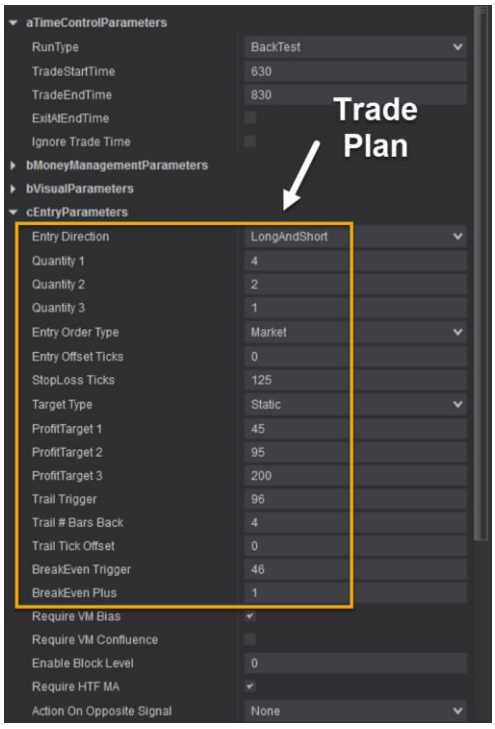
- **Trade Plan** – This specifies all the details about how the trade will be managed from entry to closing the position. This includes trade size, stop, targets, breakeven and trail strategies
- **Signal Filters** – This specifies conditions that will block a trade signal from being taken. This includes trend, momentum, and time filters.
- **Money Management** – This applies rules that protect capital once there is a certain amount of profit reached.
- **Optimization/Backtesting** – This serves as the backbone of any automated strategy. It centers on making full use of Ninjatrader strategy analyzer functionality in conjunction with the Backtest mode of operation that is built into the software.

Trade Plan

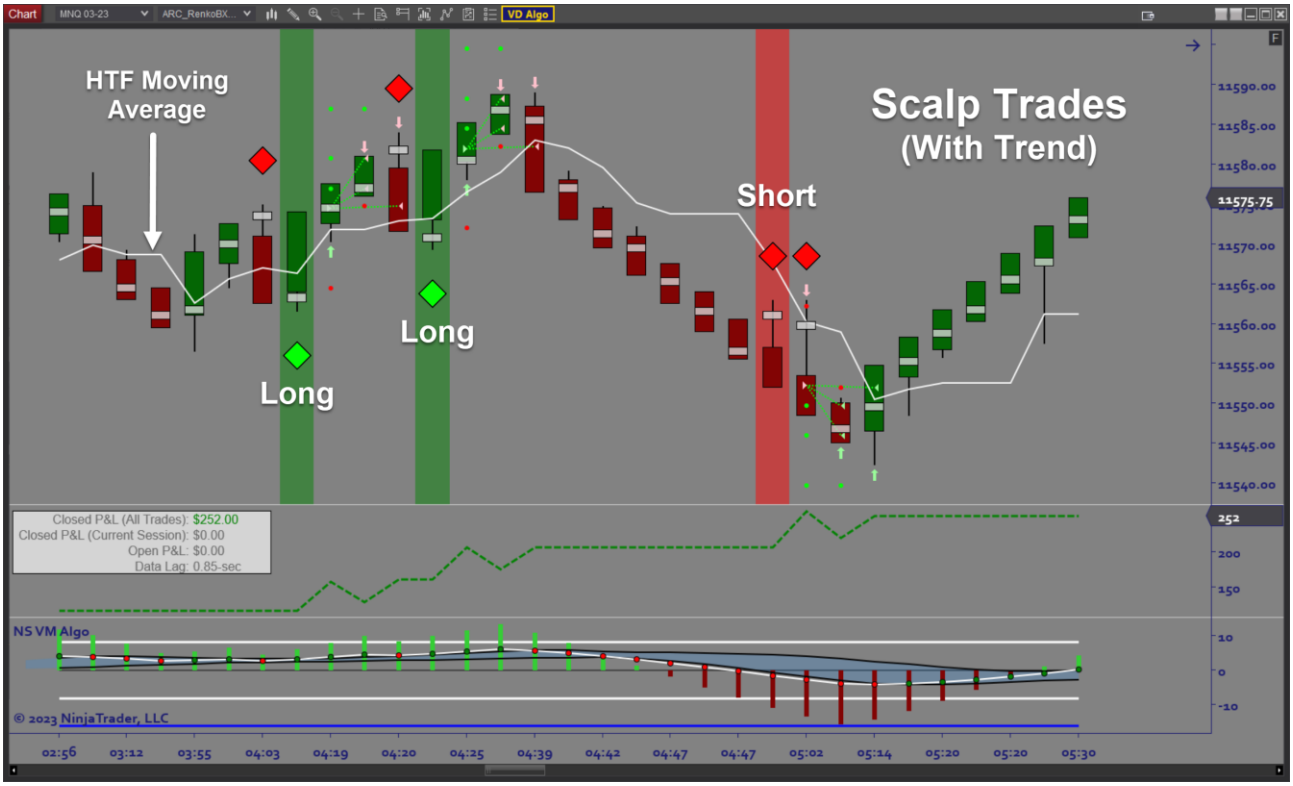
The Trade Plan is implemented when a trade signal is generated. The Trade Plan includes the following components:

- **Entry Direction** – Choose Long Only, Short Only, or Both Directions
- **Lot Size** – Quantities can be allocated across 3 separate targets
- **Order Type** – Choose Market or Limit orders (if Limit, select an Entry Offset for better fills)
- **Stop Size** – Set the amount of risk per contract (in ticks)
- **Targets** – Select the distance to each target (up to 3 targets)
- **Breakeven** – If used, set the trigger distance as well as a Breakeven Plus amount
- **Trail** – If used, set the trigger distance and the trailing method (number of bars back or a fixed trail distance)

All the settings which define the Trade Plan can be found in the Entry Parameters section in the strategy properties window:



The Trade Plan can be for a larger daytrade or a smaller scalp trade. Here is an example small scalp trades with a Trend Filter:



There were 2 longs following by a short. In all 3 trades, the first 2 targets were hit then the stop was moved to Breakeven with the runner getting stopped out for no loss.

Trade Plan Usage Tips

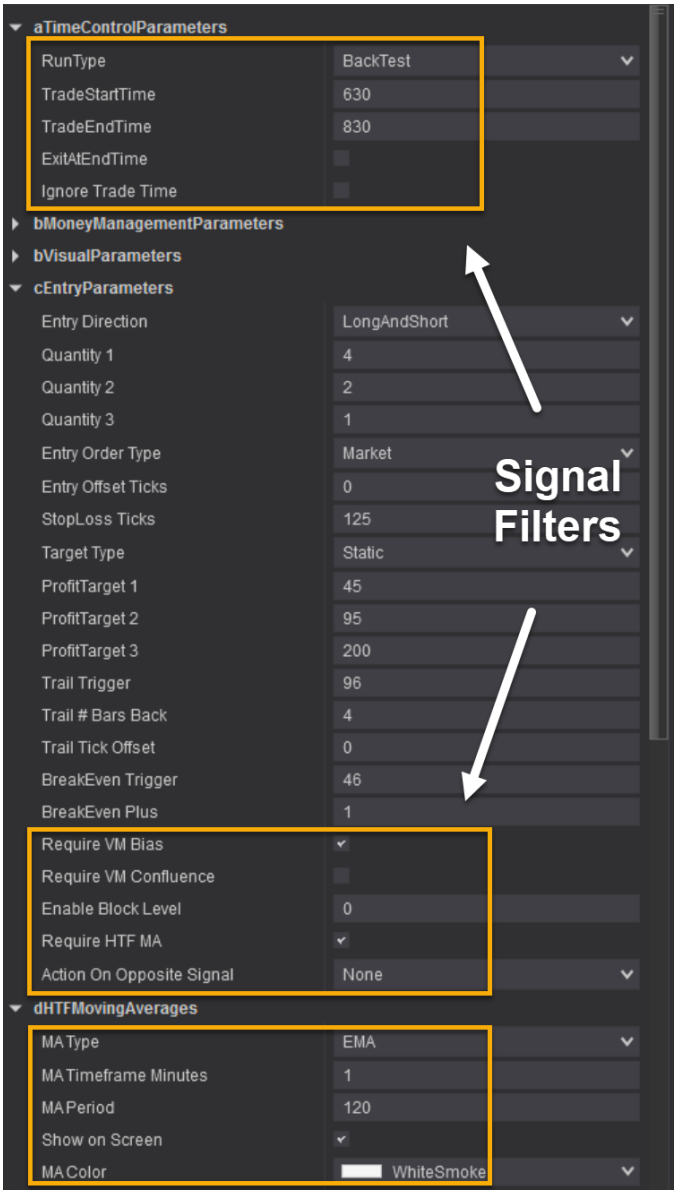
1. If you have a directional bias and only want to trade in that direction, set the Trade Direction parameter accordingly.
2. You can trade up to 3 targets. The software will only enter trades for a target quantity that is greater than 0. Entering a 0 for Target Quantity means that Target will be ignored.
3. Limit orders may not get filled depending on price action after the order is placed.
4. Entry Offset only applies to Limit orders.
5. Target Type of Static means you enter the number of ticks. When Target Type is set to RR, that means you specify a multiple relative to the Stop Size.
6. Entering a Target distance of 0 (and that Target's quantity is greater than 0), then the quantity associated with that Target will be treated as a runner.
7. Trail and Breakeven triggers simply tell the software at how much profit those functions become active.
8. Trail Bars Back means the Stop price adjusts according to the low (longs) or high (shorts) X bars prior to the current bar, where X is entered by the user. If a Trail Tick Offset is entered for this method, the Bars Back price is further adjusted by that amount.
9. If Trail Bars Back is set to 0 while a Trail Tick Offset is entered, the Trail Tick Offset becomes the actual Trail amount.

Signal Filters

There are 4 types of filters that can be used to block or allow trades under certain conditions:

- **Trend Filter** – The software internally tracks a higher timeframe moving average and filters out trade signals that are on the wrong side of the moving average line.
- **Momentum Filters** – The software supports 3 different momentum filters, all derived from the VMLean indicator which is included in the VDA system. The momentum filters are explained in detail in a later section.
- **Trading Times** – The software allows the user to define a trading window such that any signal occurring outside of that window will be blocked.
- **Opposite Signal Handling** – While a position is still open, the software can be instructed what to do when an opposing signal occurs. The options are to close the current position, reverse the position, or ignore the opposing signal.

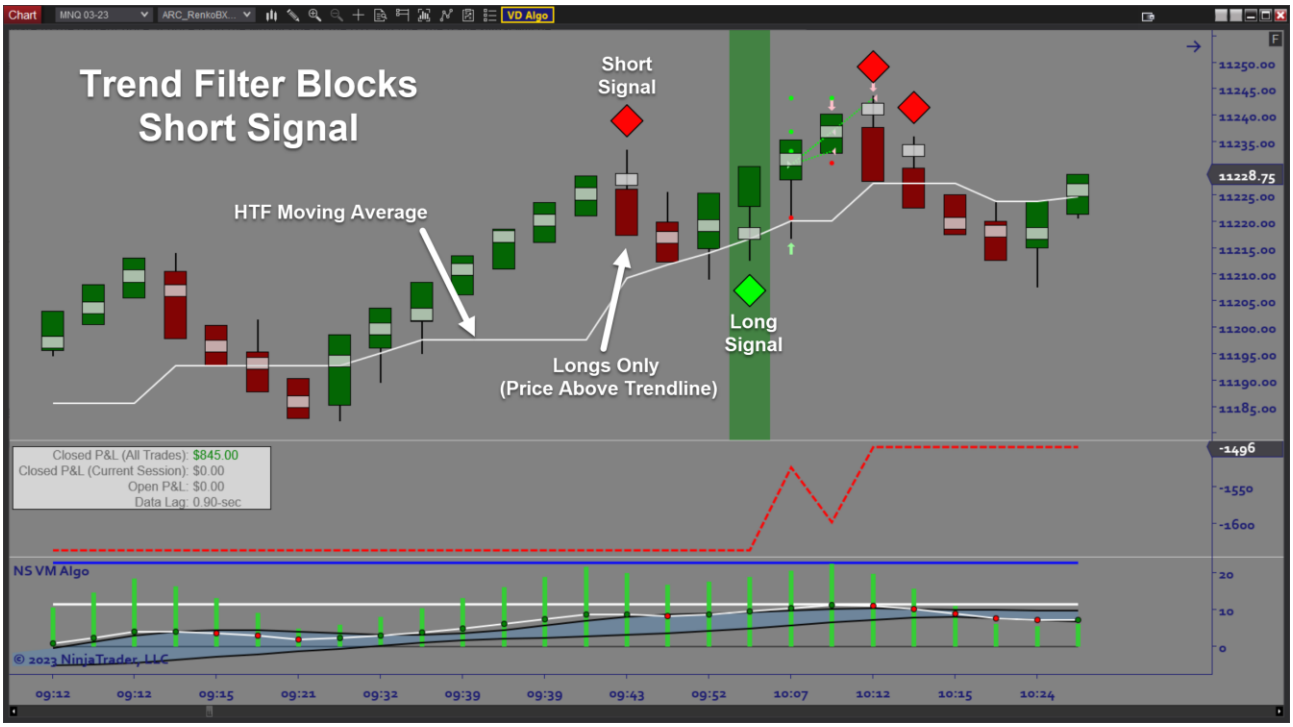
All the settings which define the Signal Filters can be found in the Time Control and Entry Parameters sections in the strategy properties window:



Trend Filter: Higher Timeframe Moving Average (HTF MA)

To apply a Trend Filter, the software allows the user to select a higher timeframe moving average (HTF MA) to compare to the current price. If price is on the wrong side of the HTF MA line, the trade signal will be ignored. The 2 available moving average types are Simple Moving Average (SMA) and Exponential Moving Average (EMA). The moving average calculations can be applied to a different (background data) timeframe than the main chart series which is being traded.

- Example: You trade off a one minute chart but for a HTF MA filter you want to use a 20 period moving average of the 5 minute bars for that same instrument.



In this case, a Short Signal was detected but the current price was above the HTF MA. Therefore, short trades are blocked.

HTF MA Usage Tips

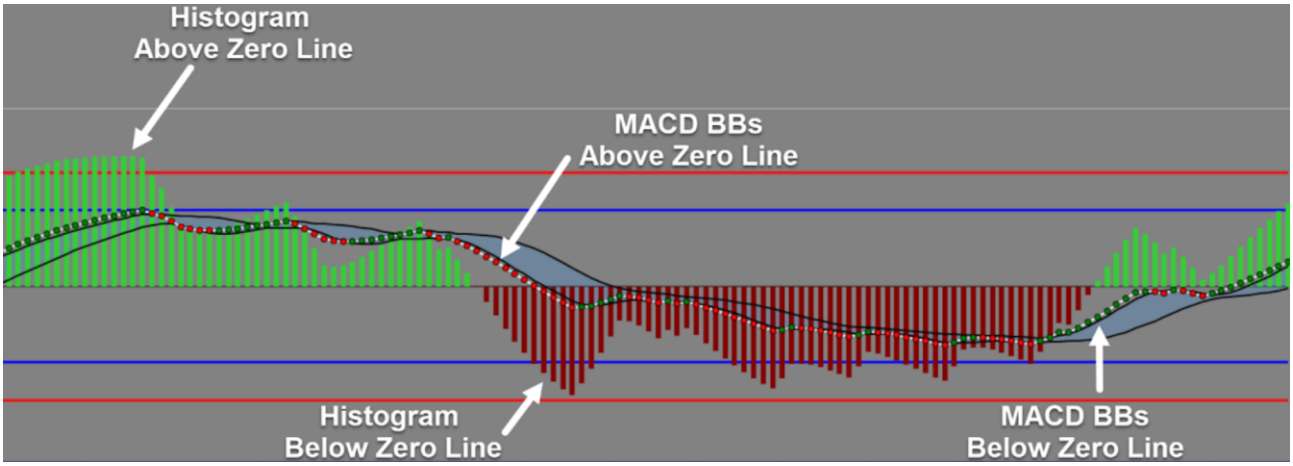
1. A Trend Filter is only applied if the Require HTF MA option is turned on.
2. When a Trend Filter is turned On, you must specify the moving average type, the background data series timeframe (in minutes), and the moving average period.
3. You can choose to display or hide the moving average line on the price chart (regardless of whether the Filter is being applied).
4. The background data series for calculating the moving average will always be in minutes, regardless of what bartype is being traded.

VMLean Indicator

The VMLean indicator is a hybrid momentum oscillator that includes both a fast and slow measure of momentum. The 2 momentum oscillators include the Velocity **Histogram** (multiple timeframe velocity cycles) and **MACD BB** (Moving Average Convergence Divergence/Bollinger Bands).

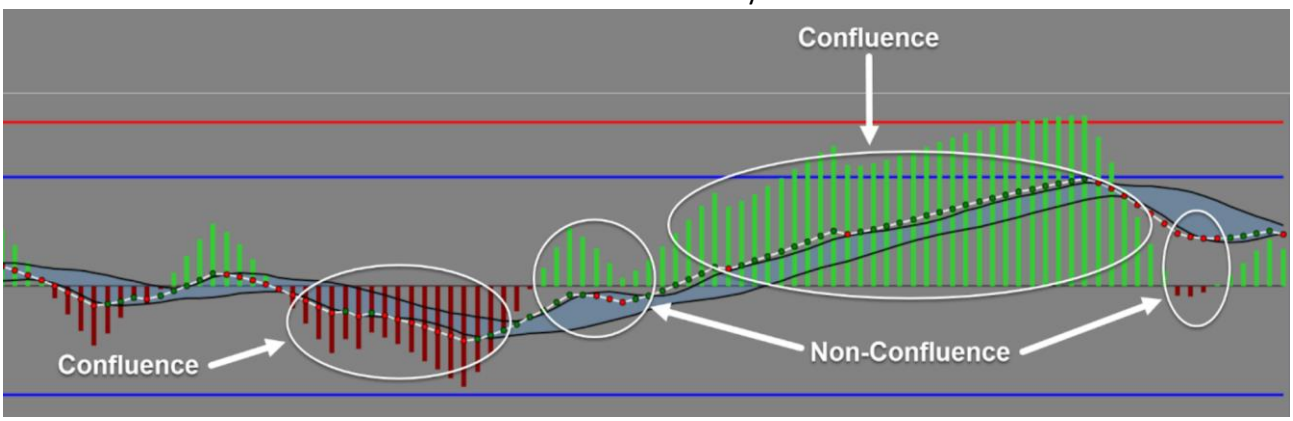
- The **Histogram** measures multiple timeframe cycles of price velocity and represents immediate directional price movement that leads trend formation.
- The **MACD BB's** are a secondary measure of long-term price momentum. It is made up of 2 components:
    - The BB's show us momentum represented by the price movement. The angle and distance between the BB's is indication of strength or weakness in a trend. The BB's are connected with a line that helps identify the angle and spacing between the BB's.
    - The Bollinger Bands act as support and resistance. If the BB dots are above the Bollinger bands the BB's use the bands as support. If the BB dots are below the Bollinger bands the BB's use the bands as resistance. When the BB dots are between the bands, the BB's will often run towards the next level of support or resistance.

Here is an example of the Histogram and MACD BB's from the VMLean indicator:



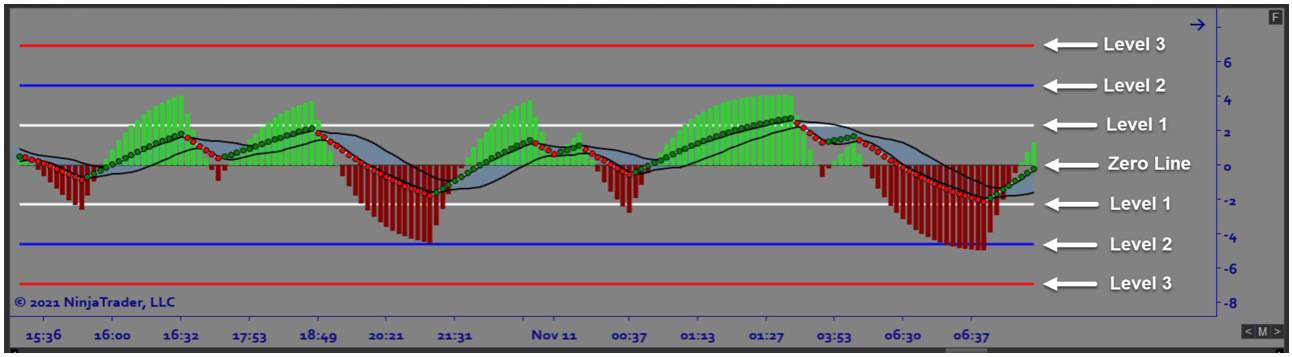
The oscillator lines shown above will be displayed in a subpanel below the price chart.

When both the fast (Histogram) and slow (MACD BB) oscillators are on the same side of the Zero Line, it can be said that there is Confluence in momentum. This simply means that everything is lined up in terms of directional energy. You can choose to require Confluence before a trade is taken. This would be the most restrictive momentum filter, resulting in the fewest trades. Here is a picture which illustrates both Confluence and Non-Confluence in momentum as measured by the VMLean indicator:



In the context of the Volume Divergence Algo software, the VMLean indicator can be used as a filter for trade selection and odds enhancement. The 2 components of the oscillator can be used together or separately. The effectiveness of the VMLean components as filters will depend on several factors, such as the instrument and timeframe being traded, the trade management strategy being used, and the market conditions at the time of trading.

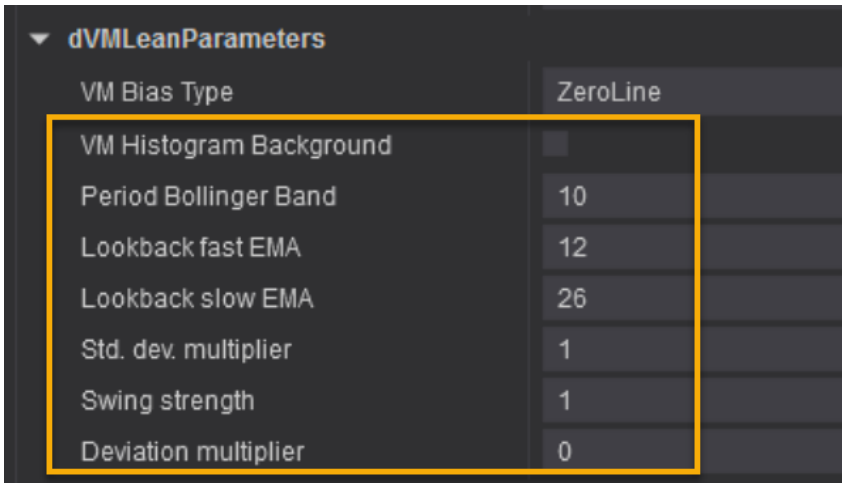
You will also notice Overbought/Oversold levels in the VMLean subpanel. These are called Excursion Levels 1, 2, and 3:



The VMLean Excursion Levels measure the degree to which price is oversold or overbought and can be used as a Signal Filter (see later section).

VMLean Indicator Settings

The VMLean indicator is included in the Volume Divergence Algo software. This means that the settings which control the components of the momentum subpanel are accessible in the strategy properties window. The default settings are usually suitable for most applications but they can be changed if desired. All the VMLean settings can be found in the VMLean Parameters section of the strategy properties window:



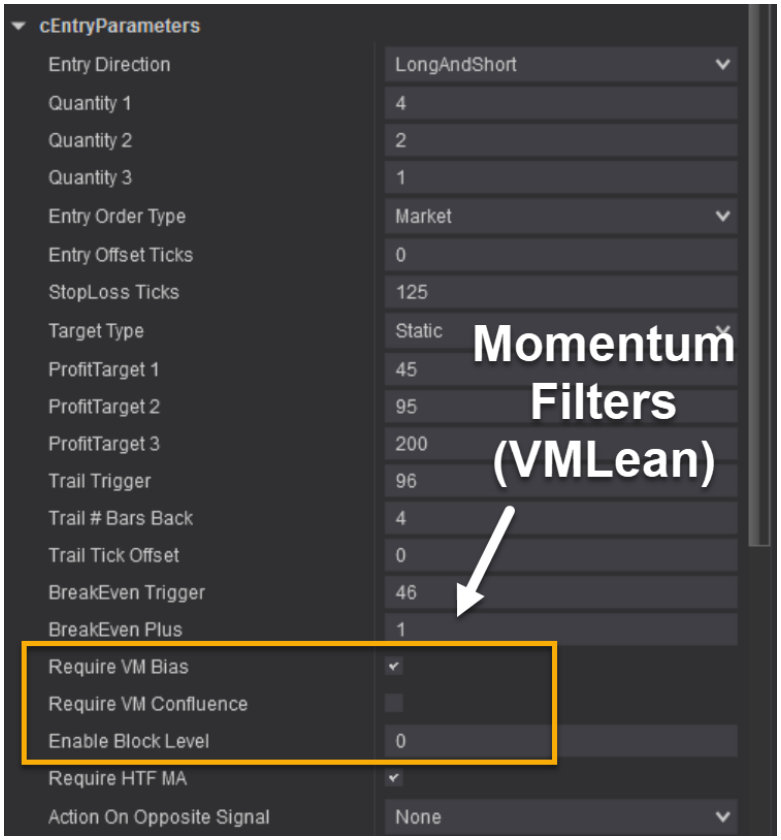
For an explanation of each parameter, please refer to the parameters table at the end of this document.

Momentum Filters (VMLean)

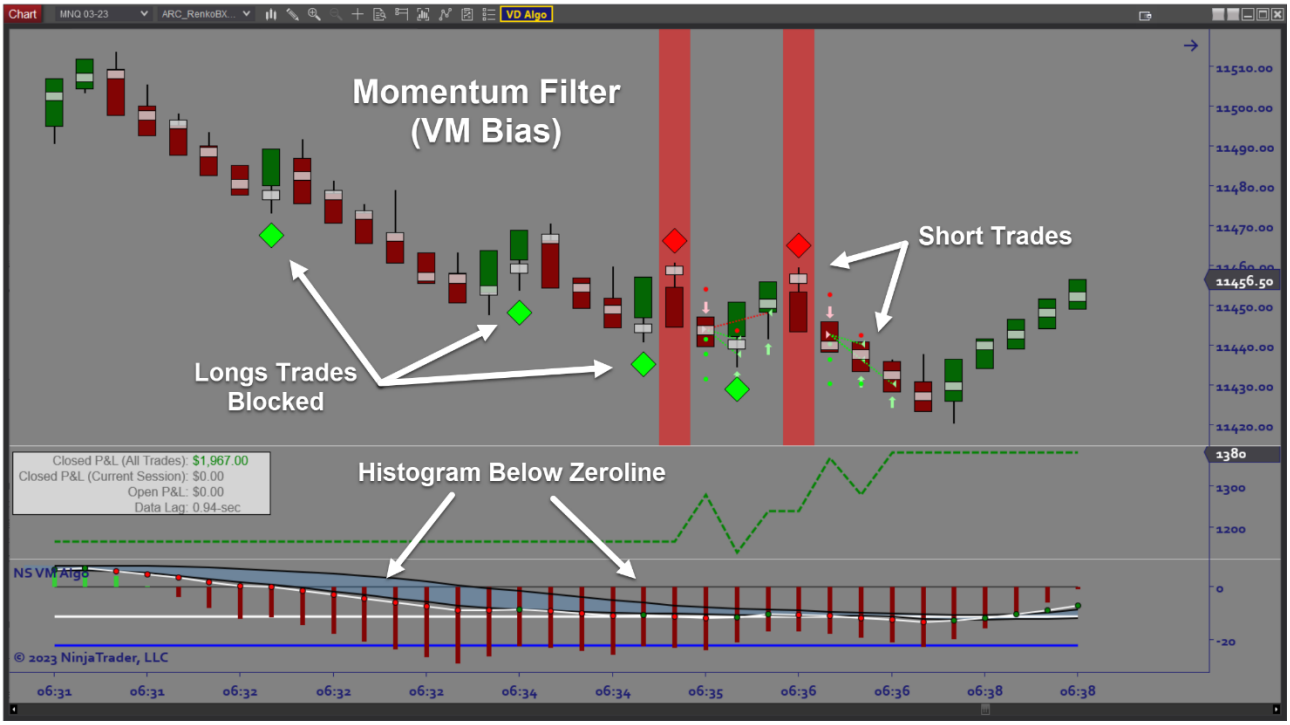
Now that we have explained the VMLean indicator, we can explain the momentum filters. There are 3 options:

- **Require VM Bias** – Trades are only allowed if the VMLean Histogram is on the correct side of the Zero Line.
- **Require VM Confluence** – Trades are only allowed if the VMLean BB's are on the correct side of the Zero Line.
- **Enable Block Level** – Use the VMLean Excursion Levels to block trades that are overbought or oversold.

All the settings which define the Momentum Filters can be found in the Entry Parameters section in the strategy properties window:



Here is an example of a momentum filter (VM Bias) being applied. The VM Bias filter requires the Histogram (VMLean indicator) to be on the correct side of the Zeroline:



In this case only shorts are allowed because the Histograms are below the Zeroline.

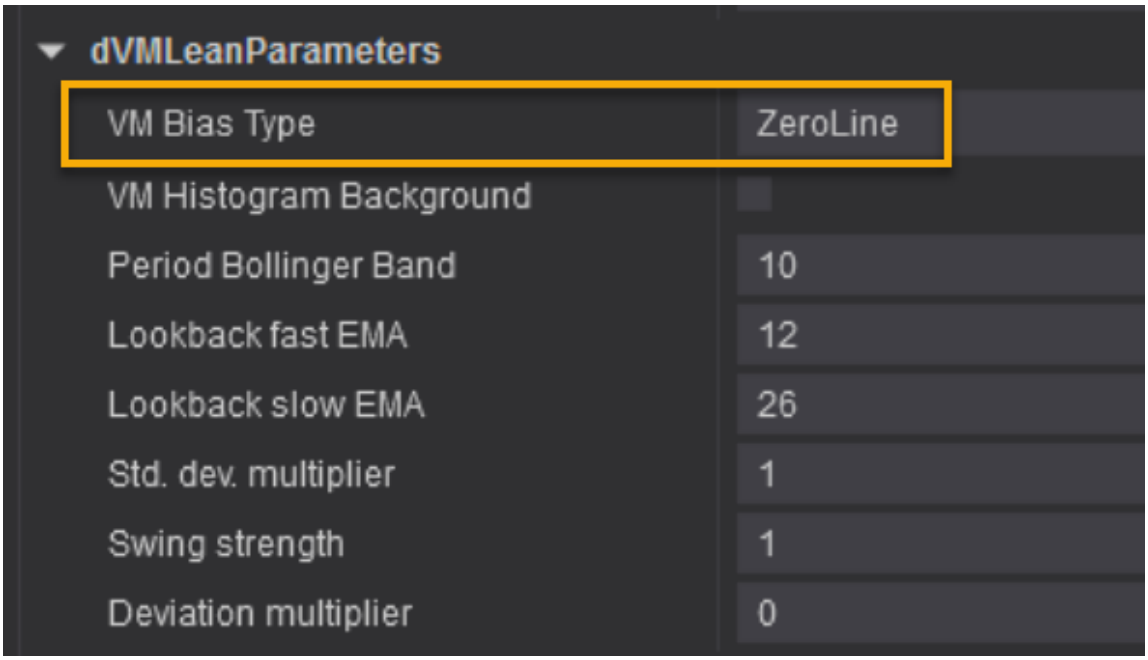
VM Bias Type Options

When choosing to apply a fast momentum signal filter (Require VM Bias), keep in mind that the software offers 2 ways to measure fast momentum. This determined by the **VM Bias Type** parameter, which can be set to either **ZERO_LINE** or **STRUCTURAL**.

- **ZERO_LINE**: When this method is chosen, the fast momentum indicator (Histogram) must be above the Zero Line for longs and below the Zero Line for Shorts.
- **STRUCTURAL**: When this method is chosen, the market structure of the price bars must be up for longs and down for shorts.

If **Require VM Bias** is turned off, the **VM Bias Type** parameter is ignored.

The **VM Bias Type** setting can be found in the VMLean Parameters section in the strategy properties window:



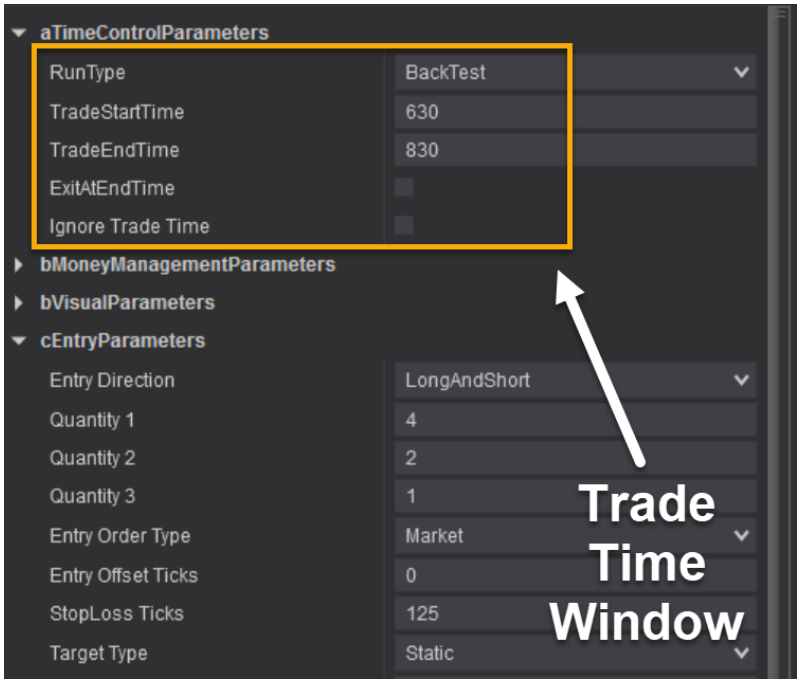
Momentum Filter Usage Tips

1. Using momentum filters will reduce the number of trades taken significantly.
2. VM Bias refers only the VMLean Histogram.
3. VM Confluence refers only to the MACD BB's component of the VMLean indicator.
4. Enable Block Level lets you select which Excursion Level must be reached before trading is blocked. Selecting 0 will disable this feature.

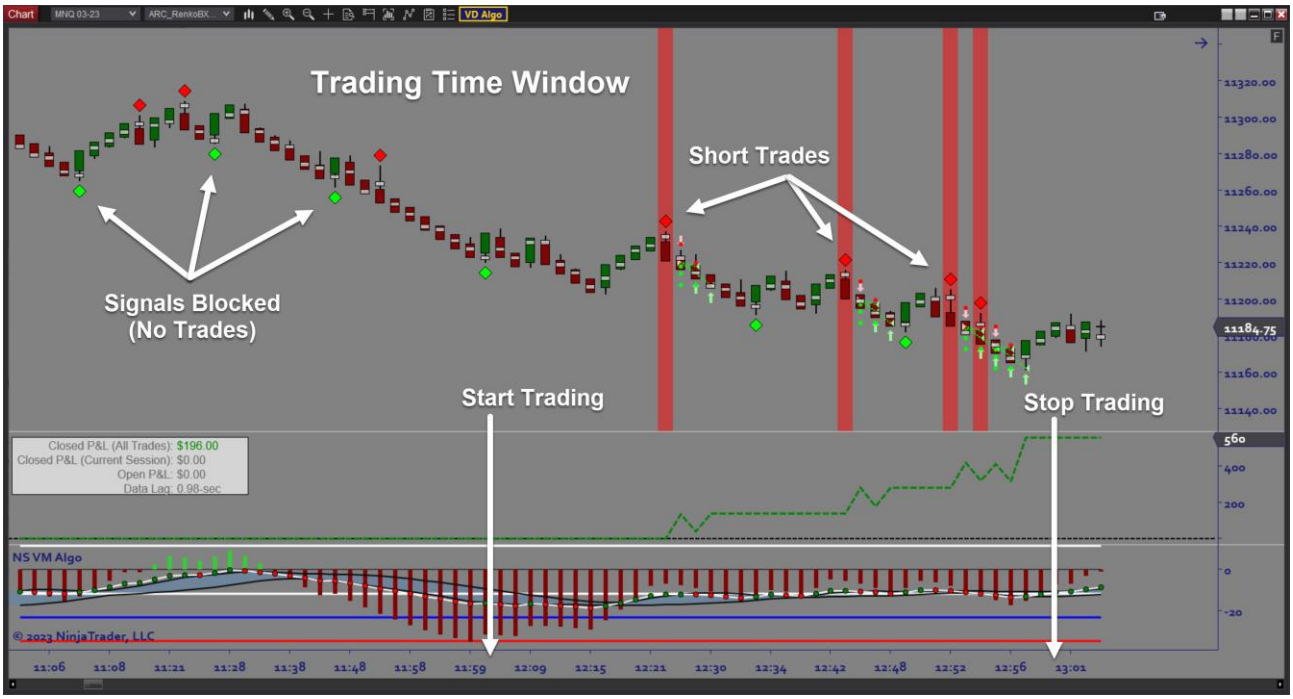
Trading Times

An important component of optimizing a strategy is to find the best times to trade. The Volume Divergence Algo software provides an option to select a trading time window, such that any signals outside of that window will be ignored. This can be applied to backtesting historical data or realtime trading (live or sim).

All the settings which define the Trading Time Filter can be found in the Time Control Parameters section in the strategy properties window:



The following example shows a one-hour trading window:



Trading Times Usage Tips

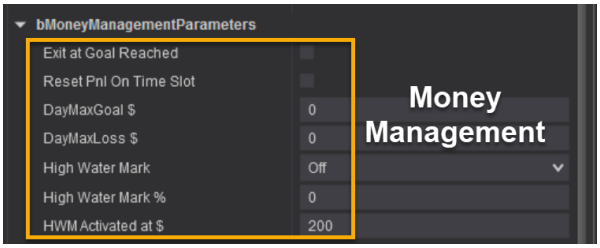
1. To apply a time window requirement for algo trading, you must turn **Ignore Trade Time** off.
2. If **Exit At End Time** is turned off, an existing position is allowed to remain open past the **Trade End Time** and will close normally based on trade management settings in the Trade Plan.
3. Trade Times entered match the 24 hour clock. (Example: 3:00pm is entered as “1500”)

Money Management

The software includes the option to impose certain Money Management rules to protect capital once some profits have been realized. This a way to use capital instead of ticks to protect against unwanted drawdowns in your P&L. There are 3 main components to the Money Management functionality:

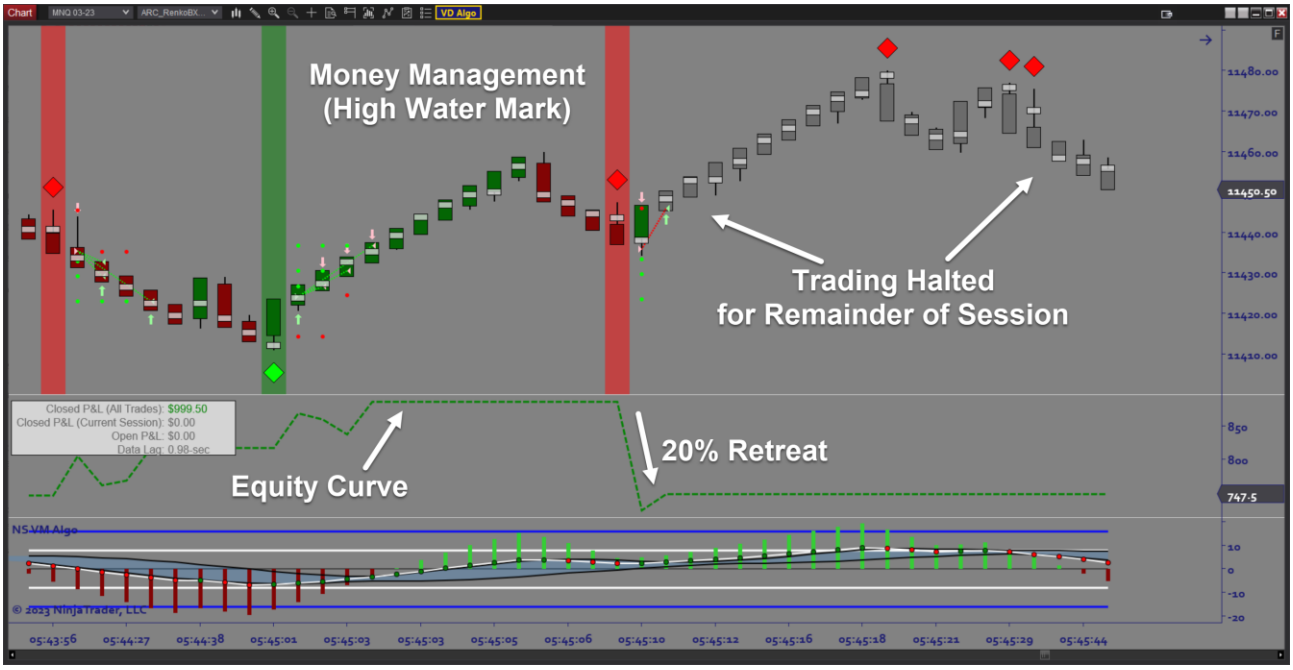
- **Max Daily Goal**: The user can specify a Daily Profit Goal which, if reached, will stop any further trades from being taken for the defined trading session or even to immediately close any open position
- **Max Daily Loss**: The user can specify a Daily Maximum Loss allowed such that, if reached, will stop any further trades from being taken for the defined trading session or even close any open position
- **High Water Mark (HWM)**: The software keeps track of the highest profit level achieved at any given point in time for that session and then will stop any further trades if subsequent losses cause the daily PnL to retrace by a specified percentage of that HWM level

You will find the Money Management parameters in the strategy properties window:



For historical (backtesting) analysis, you must turn on **Reset Pnl On Time Slot** in order to apply money management to each day's session. If the PnL is not reset then the Money Management rules will be applied only once for the first session loaded. A Daily Profit Goal and a Max Daily Loss can be specified, meaning if either is reached then trading is halted for the remainder of the session.

High Water Mark (HWM) management detects when a period of winning trades is followed by some losing trades. If a certain percentage of your profits is given back, the software will halt trading for that session. The give back amount is expressed as a percentage of the max profit achieved so far. When this is triggered, you can select a Realized or Unrealized basis for exiting the position. When Unrealized is chosen, any open positions are closed immediately. If the Realized option is chosen, any open trades will be allowed to continue until a Stop or Target is hit (Note: This can result in the actual Daily Max Loss being exceeded).



Money Management Usage Tips

1. The user must specify a trade start and stop time in order to define the Trading Session
2. Ignoring start and stop times means the operative Trading Session will not end
3. The user must choose to Reset PnL on Time Slot so that Money Management can reset for each new session
4. Not resetting the PnL means that if trading is stopped due to Money Management functionality, it will never be allowed to restart again
5. The only way to ensure that your Max Daily Loss is not exceeded (other than slippage) is to select Unrealized for High Water Mark.
6. You can set a minimum profit that must be achieved before HWM is triggered.
    - Example: You want to halt trading if you give back 50% of your daily profit. But you don't want to halt if the pullback is from a small profit level, such as achieving $50 in profit then giving back $25. The solution is to specify **HWM Activated At $**200, meaning HWM is ignored until daily profit reaches $200.

RunType Options

The software can be run in one of the following 3 modes:

Backtest Mode means that the software will use historical data to generate signals and calculate the resulting Profit and Loss based on all the settings chosen. This is done for the entire historical time period loaded on the chart. The purpose of Backtest Mode is strategy development. It provides an efficient way to test the profitability of various time fractals and Algo settings.

Realtime Mode means that the software will start processing incoming live tick data going forward from the moment the Strategy is Enabled, generating Signals when the conditions are met, executing and managing trades (for your Live or Sim account), and tracking the Profit and Loss of all trades taken, all subject to the user-specified Algo settings as described above. In Realtime Mode, no historical Signals are displayed.

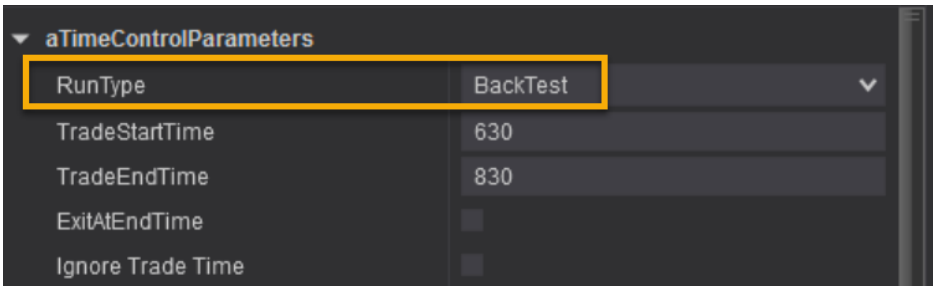
Combined Mode means essentially a combination of Backtest and Realtime Mode. In Combined Mode, historical trades historical trades are displayed as they are in Backtest Mode and then going forward from the time you enable the strategy you will see new trades displayed as they are in Realtime Mode. The main purpose of Combined Mode to engage live trading and still be able to see historical performance on the chart.

Optimization/Backtesting

The Volume Divergence Algo software is a Ninjatrader strategy and is designed to take advantage of the platform's functionality for strategy design and optimization for the purpose of finding the most profitable strategy settings. This can be implemented in one of the following 2 ways:

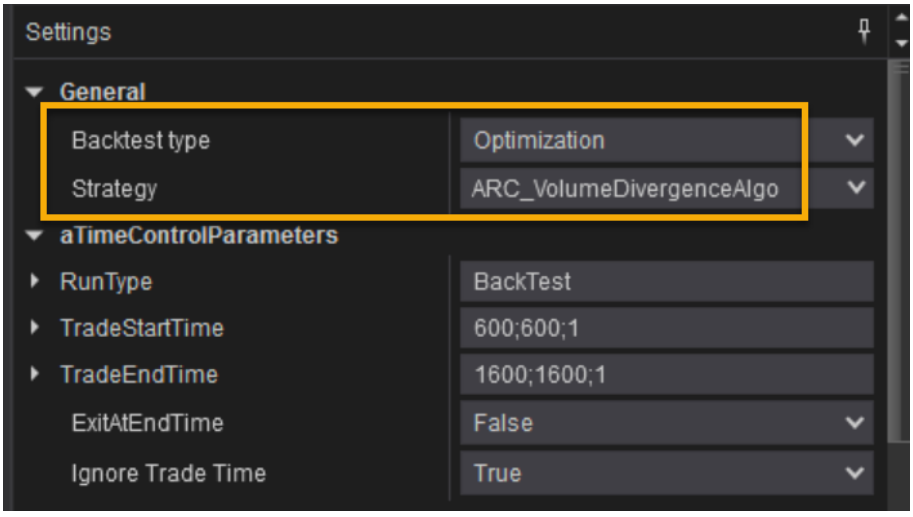
- **Backtest** – When running the algo on the chart (enabling the strategy), setting **RunType** equal to either Backtest or Combined will calculate historical trade results for all historical data loaded on the chart.
    - Example: Define a Trade Plan, Money Management rules, and Signal Filter settings, then run the algo software on a chart with 10 days of history loaded, then view the profitability and other performance metrics that would have been achieved with those settings.
- **Strategy Analyzer (Optimizer)** – This is where you can optimize over a range of values for selected parameters to find the best performing combination of settings.
    - Example: For a given historical time period and a given stop size, optimize the T1 (target) size over a range of values (minimum, maximum, and step amount specified by the user).

A single Backtest can be run directly on the chart by selecting **RunType** equal to **Backtest**:



*Note: Selecting **Realtime** for this parameter will not generate a Backtest (it will only trade real time data coming in). However, selecting **Combined** produces both a Backtest and Realtime results.*

Opening a Strategy Analyzer window will provide the environment to perform an optimization using the Volume Divergence Algo engine. In the Strategy Analyzer settings window, select **Backtest Type** equal to **Optimization**:



Choosing this setting will modify the interface so that you can enter a range of values for each parameter. Once you have entered all the values, click **Run** to start the optimization. When it is finished, the results can be evaluated and analyzed as part of the process to find the most profitable settings. Care should be taken

to avoid optimizing over a large number of values for several parameters in a single optimization run because the number of iterations can quickly become very large and take a very long time to process.

Optimization Usage Tips

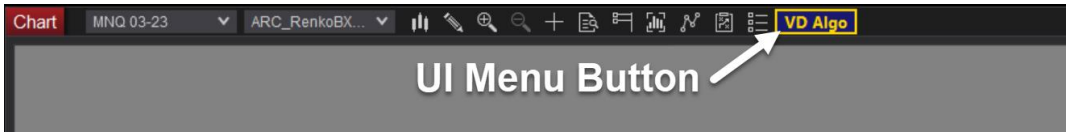
1. The number of combinations can increase exponentially as you increase the number of values for each setting. In fact, it is best to minimize the number of parameters being optimized at any one time. Otherwise, a single optimization run can take too long to be practical.
2. The Ninjatrader Optimizer does not support loading multiple time series which means that the MA Timeframe Minutes parameter must be set to a value of 1 during any optimization. This does not prevent the optimization of the HTF MA filter because you can still optimize on the MA Period parameter. For example, instead of selecting a 5-minute MA Timeframe with a 20 period lookback, simply choose a 100 period lookback using a 1-minute MA Timeframe instead.

User Interface

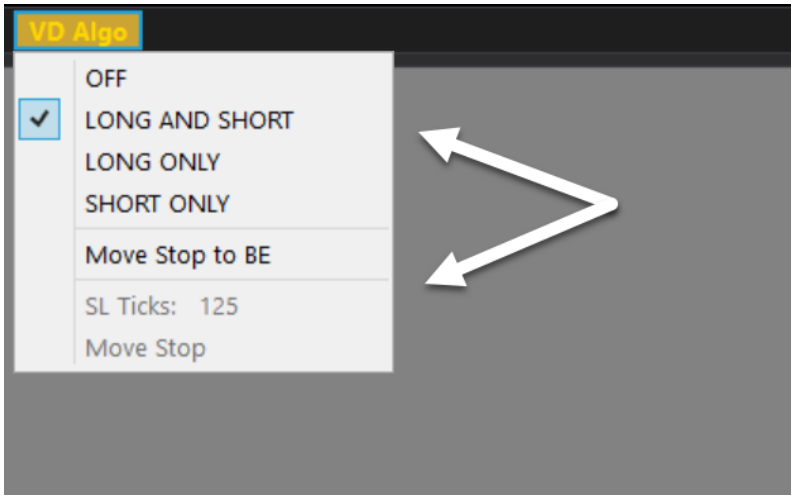
The User Interface (UI) serves as both a viewing window into the trading actions of the algo software as well as a way to access some of the main strategy controls directly from the chart rather than having to disable the strategy in order to change a setting. The main components of the User Interface are

- **UI Button Menu** – This is a clickable button at the top of the chart window that reveals a menu of key algo controls that can be changed on the fly in real time
- **Pnl Tracking subpanel** – The cumulative equity curve is displayed in the first subpanel as well as an info box with dollar Profit/Loss for the entire chart, current session, and currently open trade.
- **Momentum subpanel** – The second subpanel displays all the components of the VMLean indicator, which is used for applying a momentum filter to the signal generator
- **Datalag Timer** – A measure of datafeed latency is displayed in the Pnl Info box. Excessive datalags can signify unsafe trading conditions.

Here is an image of the UI Button and where it is located on the chart:



Clicking the menu button reveals the available menu options:



All these functions can be manipulated in real time while the algo is running. Without this capability, making any change to the strategy would require disabling and restarting the strategy.

- **OFF** – Block all trades going forward. If there is an open position when this is selected, it is closed immediately.
- **LONG AND SHORT** – Actively trade in both directions.
- **LONG ONLY** – Going forward only take long trades.
- **SHORT ONLY** – Going forward only take short trades
- **MOVE STOP TO BE** – On the currently open position, immediately move the stop to Breakeven.
- **SL Ticks** – Set the number of ticks for moving the stop.
- **Move Stop** – Move the stop consistent with SL Ticks above.

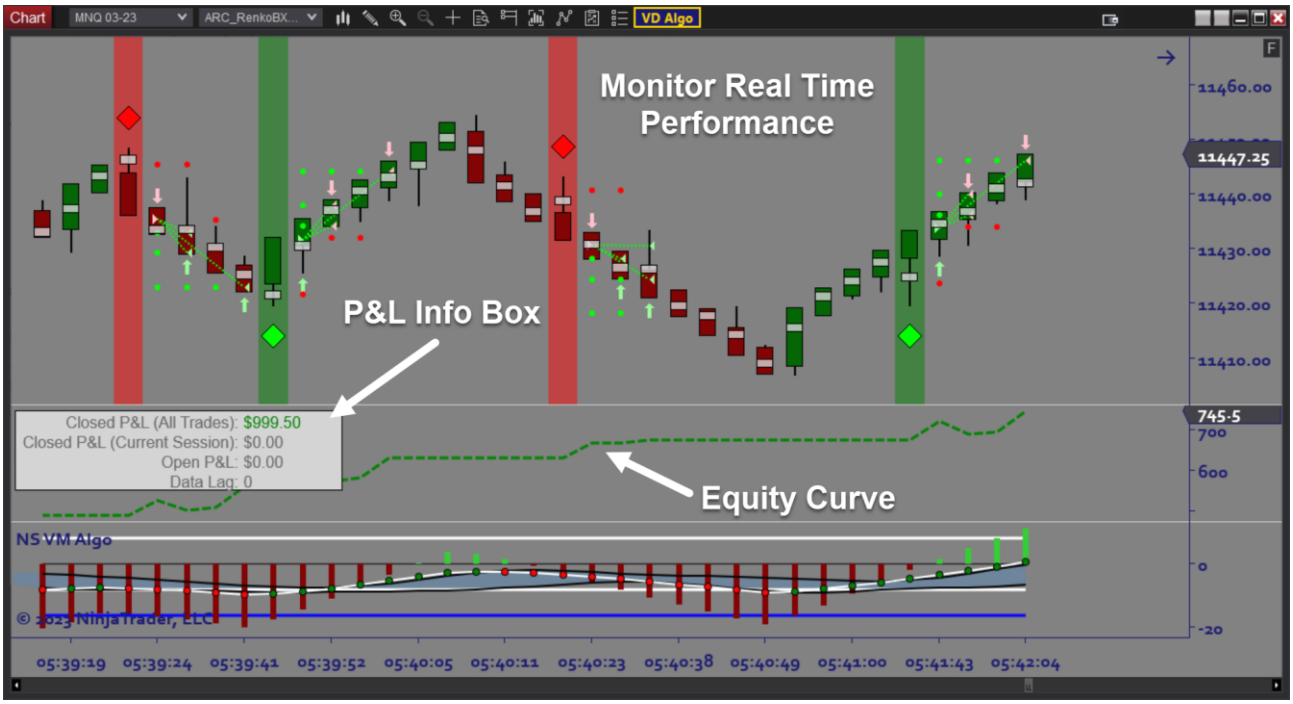
UI Menu Button Usage Tips

1. It is a good practice to always set Trade Direction to OFF when you first enable the strategy. Then use the UI Menu to start trading by selecting one of the directional options. This ensures you don't get unwanted trades before all conditions are met to engage the strategy.
2. Moving Stop to BE has no effect if the open trade is currently in a loss position.
3. The OFF option is the fastest way to close any open position if speed is of the essence.

Pnl Tracking Subpanel

The software displays a Pnl graph and info box to help keep track of the running profit and loss associated with strategy. The graph is a cumulative equity curve from the beginning of trading. It is provided for both historical and live realtime trades. The info box displays the following information:

- **Closed P&L (All Trades)** – Total realized profit and loss for the entire chart period
- **Closed P&L (Current Session)** – Total realized profit and loss for the current trading session
- **Open P&L** – Current unrealized profit/loss for a currently open position



Pnl Subpanel Usage Tips

1. There is an option to make the historical equity curve a dashed line while the real time equity curve is a solid line. This makes it easier to identify the transition from Backtest to Realtime visually.
2. Changing the Pnl subpanel right margin scaling to be **Based On the Entire Date Range** of the chart helps visualize historical profit relative to it's High Water Mark.

Datalag Timer

The Data Lag Timer is a simple but useful indicator which is also included in the Volume Divergence Algo software. The information produced by this indicator is displayed in the Profit and Loss Info Box displayed in the subpanel below the price chart. Here is a screenshot:

The purpose of this indicator is to alert you when there is a significant lag in incoming data. When there is a significant data lag, it can be unsafe to trade live because your chart is lagging behind the current market price. When this happens and a trade is taken, it can result in fills at unexpected prices which can adversely affect your PnL. A small lag is normal but in rare cases where the lag is temporarily increased substantially (often caused by a large influx of data due to a news shock, market open, or other causes), it is best to stop trading until the lag returns to an acceptable level.

The way the indicator works is to compare the timestamps of incoming ticks with your computer's time clock. The displayed lag is a measure of the "freshness" of the incoming data. Lags of this nature relate to issues with your data server or the internet. It is important to understand that this only represents one source of processing lags. If the incoming data is "fresh" but your platform is lagging (or locked up/sluggish in some way), it will also be unsafe to trade but the Data Lag Timer may still show a small lag in this situation. Problematic lags do not happen very often but when they do it is important to adjust accordingly. The main message here is to always be aware of any signs that either data issues and/or platform processing issues are significant enough to warrant a discontinuation of trading until the lags return to an acceptable level.

Bartypes and Timeframes

The strategy can work with any bartype but is especially well suited for fixed range bartypes, such as Range or Renko. The reason is that fixed range candles often trace out directional changes more smoothly, resulting in more responsive volume-based trade signals.

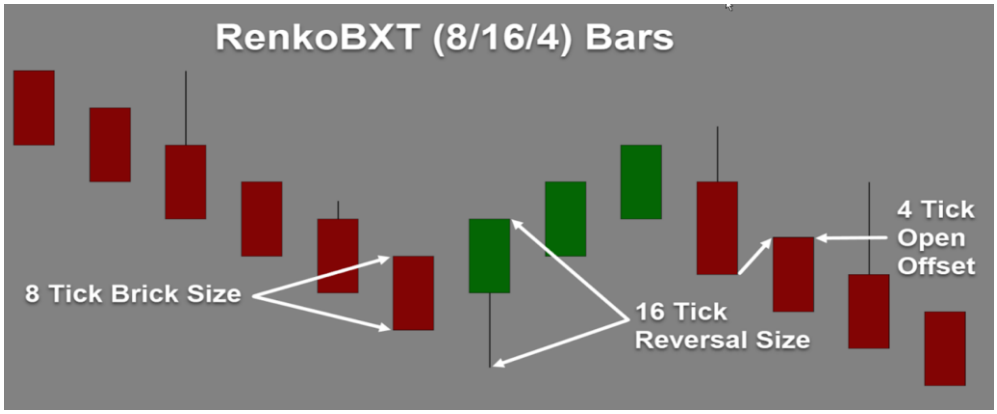
Regarding timeframes, most traders have a preferred timeframe for the chart that they use for entering and managing their trades. Higher timeframes produce potentially bigger targets but also larger stop losses. Some traders prefer smaller timeframes to limit risk. The choice of timeframe is entirely a matter of trader preference but the Volume Divergence Algo software will work on any timeframe.

RenkoBXT Custom Bartype

RenkoBXT is a custom bartype available from Architects AI. It is especially well suited for autotrading Volume Divergence setups. It is a modified Renko bar that includes 3 settings that control the bar construction:

- **Bar Size** – the size of each bar in ticks (sometimes called brick size)
- **Reversal Size** – the number of ticks required for a reversal bar
- **Open Offset** – the open price expressed as a number of ticks adjustment to the previous bar close

Here is an example of RenkoBXT bars:



Note: The Open Price of each bar is an artificial open, meaning that price may or may not trade at that level while that particular bar is forming. This would normally affect Ninjatrader Backtest results because the NT backtest engine normally executes the trade at the bar open after the Signal bar. However, this is not an issue with the VolumeDivergence Algo software because the order execution in the code utilizes a tick level datafeed, which means that the OHLC values for the Signal bar are not used to generate fills in the backtesting results.

Live Trading Checklist

The following is provided as a useful checklist to review prior to initiating live trading:

1. Connect to live data
2. Select Instrument
3. Select a bartype and timeframe
4. Open chart and add the strategy to the chart
5. Select Runtype (Backtest, Realtime, Combined)
6. Define Directional Bias
7. Define Trade Plan settings
8. Define Trading Time Window
9. Define Signal Filters (Trend/Momentum/OBOS)
10. Define Money Management rules
11. Define Volume Cluster size
12. Alter Visual settings if desired
13. Enable Strategy
14. Review historical trade results (if applicable)
15. Monitor Live trading (if applicable) using the UI menu button to access on the fly control of directional bias and breakeven strategy
16. If live trading, remain aware of datalag issues which may require a temporary halt until the datafeed stabilizes
17. If live trading, when any settings need to be adjusted, disable the strategy, make the necessary changes and then re-enable the strategy to continue trading

Volume Divergence Algo Strategy Parameters and Settings

The following table provides a detailed explanation of every parameter in the Strategy window, including allowable values, default values, and examples.

Group	Parameters	Allowable Values	Description
Time Control Parameters	**RunType**	**Backtest/Realtime/ Combined** **Default = Backtest**	This determines the processing mode for the Strategy. If set to **RealTime**, the Strategy will engage in live trades going forward. If set to **Backtest**, the Strategy will compile trade results historically for the entire date range loaded on the chart. **Combined** Mode is essentially a combination of **Backtest** and **Realtime** Mode.
	TradeStartTime	**Integer between 0 and 2400 (hhmm format)** **Default = 600**	If **IgnoreTradeTime** (see below) is set to False, trades will only be allowed between the **TradeStartTime** and **TradeEndTime**. The time entered corresponds to the time zone selected for your chart, which will be your local time zone by default.
	TradeEndTime	**Integer between 0 and 2400 (hhmm format)** **Default = 1600**	If **IgnoreTradeTime** (see below) is set to False, trades will only be allowed between the **TradeStartTime** and **TradeEndTime**. The time entered corresponds to the time zone selected for your chart, which will be your local time zone by default.
	ExitAtEndTime	**On/Off** **Default = Off**	If set to **On**, any open trade will be closed at the **TradeEndTime**. If set to **Off**, that trade will remain open past the **TradeEndTime** and will close normally based on trade management settings.
	Ignore Trade Time	**On/Off** **Default = On**	If set to **On**, **TradeStartTime** and **TradeEndTime** will be ignored, meaning trades will occur around the clock. If set to **Off**, trades will only be allowed between the specified Start and Stop times.
Money Management Parameters	**Exit at Goal Reached**	**On/Off** **Default = Off**	If set to **On**, the strategy will close any open position when the PnL Goal is reached.
	Reset PnL On Time Slot	**On/Off** **Default = Off**	If set to **On**, the PnL will be reset to 0 at the **TradeStartTime**. This only applies when **IgnoreTradeTime** is set to False.
	DayMaxGoal $	**Integer >= 0** **Default = 0**	This defines the Daily Profit Goal in dollars. When reached, no further trades will be taken. Enter 0 to disable this feature.
	DayMaxLoss $	**Integer >= 0** **Default = 0**	This defines the Daily Max Loss in dollars. When reached, no further trades will be taken. Enter 0 to disable this feature.
	High Water Mark	**OFF/REALIZED/**	This engages the High Water Mark (HWM) Money Management function.

		REALIZED_PLUS_UNREALIZED **Default = OFF**	**UNREALIZED** means the HWM calculation is continually performed while the trade is open and the position will be closed immediately as soon as the unrealized PnL retraces by the specified %. **REALIZED** means that the HWM calculation only occurs once the trade is closed based on the Trade Management and Signal settings. It is important to understand that choosing the **REALIZED** option may result in the PnL retracement exceeding the specified %.
	High Water Mark %	**Integer >= 0** **Default = 0**	This is the maximum allowable PnL retracement from the High Water Mark reached for the session (or the cumulative PnL if **Reset PnL On Time Slot** is set to **Off**).
	HWM Activated at $	**Integer >= 0** **Default = 200**	This feature disables the High Water Mark (HWM) money management functionality until profit reaches a specified amount. If set to 0, the HWM function starts immediately.
Visual Parameters	**Long Stripe Signal Color**	**Any available color** **Default = Green**	This sets the color of the racing stripes for long signals.
	Long Stripe Opacity	**Integer 0 – 100** **Default = 50**	This sets the opacity of the racing stripes for long signals.
	Short Stripe Signal Color	**Any available color** **Default = Red**	This sets the color for the racing stripes for short signals.
	Short Stripe Opacity	**Integer 0 - 100** **Default = 50**	This sets the opacity for the racing stripes for short signals.
	Button Text	**Any Character String** **Default = Tr St Algo**	This determines the character string that will appear in the Drop Down Button on the User Interface.
	Stop Dot Color	**Any Available Color** **Default = Red**	This sets the color of the Stop line for each trade.
	Target Dot Color	**Any Available Color** **Default = Lime**	This sets the color of the Target lines for each trade.
	Chart PnL Text Color	**Any Available Color** **Default = DimGray**	This sets the color of the text in the PnL Info Box.
	Dash Historical PNL	**On/Off** **Default = On**	When turned On, the Pnl line is dashed for historical bars and solid for live incoming bars. This feature makes it easy to distinguish between backtest and realtime results when using Combined Runtype.
	Missed Order Color (Unfilled)	**Any available color** **Default = Yellow**	When an order goes unfilled before the close of the bar following the signal bar, the entry order is cancelled and a Yellow racing stripe is displayed (the user can customize this color). Note: This only applies to Limit orders.
	Missed Order Color (Gap Bar)	**Any available color** **Default = Orange**	When price jumps instantly by an amount that is greater than the bar size, a fixed

			bartype (such as Range or Renko) will produce 2 or more consecutive bars with the same timestamp. As a safety mechanism, the software blocks any signals in this situation and also highlights the duplicate bar with an Orange racing stripe (the user can customize this color).
Entry Parameters	**Entry Direction**	**LONG_AND_SHORT** **LONG_ONLY** **SHORT_ONLY** **OFF** **Default = LONG_AND_SHORT**	This determines whether Short and/or Long trades will be taken. Setting this to **OFF** means no trades will be taken (see the **UI Button** section above for how to change these settings on the fly from the User Interface)
	Quantity 1	**Integer >= 0** **Default = 1**	This sets the quantity for Target 1.
	Quantity 2	**Integer >= 0** **Default = 0**	This sets the quantity for Target 2.
	Quantity 3	**Integer >= 0** **Default = 0**	This sets the quantity for Target 3.
	Entry Order Type	**Market/Limit** **Default = Limit**	This determines whether the Entry Order will be a Market or Limit order. Depending on price action, Limit Orders may not get filled. Unfilled Limit Order will be displayed as a yellow racing stripe on the chart.
	Entry Offset Ticks	**Integer >= 0** **Default = 0**	The allows for an Offset (in ticks) on Limit Orders (ignored if using Market Orders). Long example: An Entry Offset of 1 means that the Limit Price of the order is 1 tick lower than the close price of the signal bar. Short example: An Entry Offset of 2 means that the Limit Price of the order is 2 ticks higher than the close price of the signal bar.
	StopLoss Ticks	**Integer > 0** **Default = 10**	This is the size of the Stop Loss (in ticks) for all trades entered. If 0 is entered, no Stop Loss will be placed.
	Target Type	**Static/RR** **Default = Static**	When set to **Static**, the Profit Targets entered are in ticks. When set to **RR**, the Profit Targets are expressed as a multiple of the Stop Loss size.
	ProfitTarget 1	**Value > 0** **Default = 8**	This is the distance from Entry to T1. If **Target Type** is set to **STATIC**, this is measured in ticks. If **Target Type** is set to **RR**, this is measured as a multiple of the Stop Size. If 0 is entered, no target will be placed.
	ProfitTarget 2	**Integer > 0** **Default = 0**	This is the distance from Entry to T2. If **Target Type** is set to **STATIC**, this is measured in ticks. If **Target Type** is set to **RR**, this is measured as a multiple of the

			Stop Size. If 0 is entered, no target will be placed.
	ProfitTarget 3	**Integer > 0** **Default = 0**	This is the distance from Entry to T3. If **Target Type** is set to **STATIC**, this is measured in ticks. If **Target Type** is set to **RR**, this is measured as a multiple of the Stop Size. If 0 is entered, no target will be placed.
	Trail Trigger	**Integer >= 0** **Default =0**	While a trade is open, this defines how many ticks of profit must be achieved before the Trail Stop is engaged. Entering a value of 0 means no Trailing Stop will be applied. When set to a positive integer, the Trail Stop functionality waits until the trigger is hit before applying the Trailing Stop.
	Trail # Bars Back	**Integer >= 0** **Default = 0**	When **Trail Trigger Ticks** is set to a positive integer, this determines which Trail Stop Method will be used. When **Trail # Bars Back** is set to 0, a Price Trail Method is used. When set to a positive integer (n), a Bars Back Trail Method is used. The Price Trail Method sets the Trailing Stop behind the most favorable price achieved while the trade is open by the number of ticks entered for the **Trail Tick Offset** parameter (see below). The Bars Back Trail Method trails the stop based on the Highs/Lows of the (n) previous bars, where (n) is the value entered for the **Trail # Bars Back** parameter. For Longs, the Lowest Low of the previous (n) bars is used. For Shorts, the Highest High of the previous (n) bars is used. An Offset can be used in conjunction with the Bars Back Method (see description of **Trail Tick Offset** parameter below).
	Trail Tick Offset	**Integer >= 0** **Default = 0**	This is the number of ticks to Offset the Trail Price. How it is applied depends on which Trail Method is being used. For the Bars Back Method, the Offset applies to the Highs/Lows of the previous (n) bars. For the Price Trail Method, the Offset applies to the highest price achieved (Longs) or the lowest price achieved (Shorts) since the trade was entered. Long Example (BarsBack=2, Offset=2): Once the Trail Trigger is met, the Stop price will be equal to the Lowest Low of the previous 2 bars minus 2 ticks. Short Example (BarsBack=0, Offset=8): Once the Trail Trigger is met, the

			Stop price will be equal to the lowest price achieved since the trade entry plus 8 ticks.
	BreakEven Trigger	**Integer >= 0** **Default = 0**	While a trade is open, this defines how many ticks of profit must be achieved before the Stop is adjusted to Breakeven. The BreakEven Price is equal to the Trade Entry Price before any adjustments (see **BreakEven Plus** parameter below). Setting the **BreakEven Trigger** parameter to 0 will disengage the BreakEven function.
	BreakEven Plus	**Integer >= 0** **Default = 0**	When **BreakEven Trigger** is set to a positive integer, this is the number of ticks to adjust the Stop from the Breakeven Price (which is the Entry Price). For Longs, it adds this number of ticks. For Shorts, it subtracts this number of ticks.
	Require VM Bias	**On/Off** **Default = Off**	When set to On, this applies a fast momentum filter on the trade Signals. This is subject to the VM Bias Type selected (see below). When set to Off, this filter is ignored.
	Require VM Confluence	**On/Off** **Default = Off**	When set to On, this applies a slow momentum filter on the trade Signals. When set to Off, this requirement is ignored.
	Enable Block Level	**Integer >= 0** **Max Value = 3** **Default = 0**	This parameter enables the blocking of trades when overbought/oversold levels are reached. The VMLean indicator includes 3 Excursion Levels based on standard deviations of the fast oscillator (Histogram). You can enter a value of 1, 2, or 3 to indicate that you want to block trades when the oscillator exceeds that Excursion Level (above for Longs, below for shorts). Entering a value of 0 will disable this feature.
	Require HTF MA	**On/Off** **Default = Off**	This filter will block Long trades if current price is below the Higher Time Frame Moving Average (HTF MA) and block Short trades if current price is above the HTF MA. Setting this to Off will disable this feature.
	Action On Opposite Signal	**None/ExitOnly/Reverse** **Default = None**	This determines what occurs when an opposite signal is encountered while in an open position (example: when in a long position, an opposite signal is when a short trade signal appears). When this parameter is set to **ExitOnly**, the open position is exited. When it is set to **Reverse**, the open position is reversed (example: while short, if an opposite signal occurs the short is closed out and a long position is initiated).

			If this is set to **None**, all opposite signals are ignored until that position is closed by hitting a stop or target.
HTF Moving Averages	**MA Type**	**EMA/SMA** **Default = EMA**	This determines whether a Simple Moving Average or Exponential Moving Average will be used when the **Require HTF MA** option is turned **On.**
	MA Timeframe Minutes	**Integer > 0** **Default = 1**	Since the HTF MA is based on minute data rather than the chart bartype such as Renko, this determines what timeframe will be used to calculate HTF MA. A value of 1 means 1-minute bars will be used, a value of 5 means 5-minute bars will be used, etc.
	MA Period	**Integer > 0** **Default = 15**	This determines the length of the HTF MA. Example: **MA Timeframe Minutes** is set to 2 and **MA Period** is set to 30. That means that the HTF MA used for filtering trades will be a 30 bar average of 2 minute bars, thereby reflecting price action over a 60 minute period.
	Show on Screen	**On/Off** **Default = On**	Turning this On will display the HTF Moving Average on the price graph.
	MA Color	**Any Available Color** **Default = WhiteSmoke**	This sets the color of the HTF Moving Average.
VMLean Parameters	**VM Bias Type**	**Structural** **ZeroLine** **Default = ZeroLine**	This determines what filter method will be used when Require VM Bias is turned On. **Structural** means price structure must be up for longs and must be down for shorts. **ZeroLine** means the VMLean Histogram must be above the Zero Line for longs and below the Zero Line for shorts.
	VM Histogram Background	**On/Off** **Default = Off**	Turning this On will flood the background in the VMLean subpanel. When the Histogram is above the Zero Line the background is green. When the Histogram is below the Zero Line, the background is red. Turning this Off will disable the background flooding.
	Period Bollinger Band	**Integer > 0** **Default = 10**	This is the smoothing factor for the MACD BB's.
	Lookback Fast EMA	**Integer > 0** **Default = 12**	This is the number of bars to construct the fast EMA.
	Lookback Slow EMA	**Integer > 0** **Default = 26**	This is the number of bars to construct the slow EMA.
	Std. Dev. Multiplier	**Integer > 0** **Default = 1**	This is the number of standard deviations used to construct the Bollinger Bands for the MACD BB's.
	Swing Strength	**Integer > 0** **Default = 1**	Number of bars used to identify a Swing High or Low. This is a component of the VMLean indicator.

	Deviation Multiplier	**Integer > 0** **Default = 0**	Multiplier used to calculate minimum deviation as an ATR multiple for Swing Highs and Lows. This is a component of the VMLean indicator.
VMLean Plots	**Rising Dots Above Channel**	**Any Available Color** **Default = Green**	This sets the color of the rising BB dots above the Bollinger Channel.
	Rising dots inside/below channel	**Any Available Color** **Default = Green**	This sets the color of the rising BB dots inside/below the Bollinger channel.
	Falling dots below channel	**Any Available Color** **Default = Red**	This sets the color of the falling BB dots below the Bollinger channel.
	Falling dots inside/above channel	**Any Available Color** **Default = Red**	This sets the color of the Falling BB dots inside/above the Bollinger channel.
	Dots rim	**Any Available Color** **Default = Black**	This sets the color of the BB dot rims.
	Bollinger average	**Any Available Color** **Default = Transparent**	This sets the color of the Bollinger average line.
	Bollinger upper band	**Any Available Color** **Default = Black**	This sets the color of the Bollinger upper band.
	Bollinger lower band	**Any Available Color** **Default = Black**	This sets the color of the Bollinger lower band.
	Momo Histogram Hi Color	**Any Available Color** **Default = LimeGreen**	This sets the color of the Momo Histogram when it is above the zero line.
	Momo Histogram Down Color	**Any Available Color** **Default = Maroon**	This sets the color of the Momo Histogram when it is below the zero line.
	ZeroLine	**Any Available Color** **Default = Black**	This sets the color of the ZeroLine.
	Connector	**Any Available Color** **Default = White**	This sets the color of the Connector
	Channel shading	**Any Available Color** **Default = DodgerBlue**	This sets the color of the Bollinger Channel shading.
	Deep Bearish background flooding	**Any Available Color** **Default = DarkRed**	This sets the color of the Deep Bearish background flooding.
	Bearish background flooding	**Any Available Color** **Default = Red**	This sets the color of the Bearish background flooding.
	Opposite background flooding	**Any Available Color** **Default = Gray**	This sets the color of the Opposite background flooding.
	Bullish background flooding	**Any Available Color** **Default = Green**	This sets the color of the Bullish background flooding.
	Deep bullish background flooding	**Any Available Color** **Default = DarkGreen**	This sets the color of the Deep bullish background flooding.
	Excursion Level 1 Color	**Any Available Color** **Default = White**	This sets the color of the Level 1 Excursion Line in the VMLean subpanel.
	Excursion Level 2 Color	**Any Available Color** **Default = Blue**	This sets the color of the Level 2 Excursion Line in the VMLean subpanel.

	Excursion Level 3 Color	**Any Available Color** **Default = Red**	This sets the color of the Level 3 Excursion Line in the VMLean subpanel.
Misc	**ModuleName**	**Display Only**	This displays the code file name.
	ProductVersion	**Display Only**	This parameter identifies the release number and release date of the software version that you have installed.
Volume Divergence	**Ticks Per Cluster**	**Integer > 0** **Default = 3**	This determines the size of the volume cluster for each bar. The value entered represents the number of adjacent tick price levels that make up the cluster.
Volume Divergence Signals	**Signals – Offset (Pixels)**	**Integer >= 0** **Default = 0**	This setting will shift the signals (diamonds) away from the signal bar by the number of pixels specified.
	Signals – Long (Fill)	**Any Available Color** **Default = Lime**	This defines the fill color of the Long Signal markers (diamonds).
	Signals – Long (Outline)	**Any Available Color** **Default = Black**	This defines the outline color of the Long Signal markers (diamonds).
	Signals – Short (Fill)	**Any Available Color** **Default = Red**	This defines the fill color of the Short Signal markers (diamonds).
	Signals – Short (Outline)	**Any Available Color** **Default = Black**	This defines the outline color of the Short Signal markers (diamonds).
	Signals – Opacity (%)	**Integer 0-100** **Default = 100**	This defines the opacity of the Signal markers (diamonds).
	Signals – Outline Thickness (Pixels)	**Integer > 0** **Default = 1**	This defines the thickness of the Signal marker outlines.
	Volume Cluster (Fill)	**Any Available Color** **Default = LightGray**	This defines the fill color of the volume clusters.
	Volume Cluster (Outline)	**Any Available Color** **Default = Black**	This defines the Outline color of the volume clusters.
	Cluster – Opacity (%)	**Integer = 100** **Default = 75**	This defines the opacity of the volume clusters.
	Cluster – Outline Thickness (Pixels)	**Integer > 0** **Default = 1**	This defines the thickness of the cluster outlines.
Data Series	**Input Series**	**Default = Chart Data Series**	This is the Data Series for the instrument being traded or backtested, typically a Renko or other custom bartype.
Setup	**Account**	**Any available account** **Default = Sim101**	This is the trading account (Live or Sim) for which trades will be entered.
	Calculate	**OnBarClose/ OnEachTick/ OnPriceChange** **Default = OnBarClose**	This should always be set to OnBarClose.
	Label	**Any Character string** **Default = VolumeDivergence Algo**	This will be displayed in the upper left corner of the chart to identify the Strategy loaded on the chart. Leaving this blank will not display anything.
	Maximum Bars Look Back	**Infinite/256** **Default = Infinite**	This determines the maximum number of bars the indicator can look back to perform calculations on historical data. It is

			recommended to leave this at the Default value of 256.
	Bars Required to Trade	**Integer > 0** **Default = 20**	This is the number of bars required before a trade can be taken.
	Start Behavior	**Immediately Submit/ ImmediatelySubmit-SynchronizeAccount/ WaitUntilFlat/ WaitUntilFlat-SynchronizeAccount** **Default = WaitUntilFlat**	These are standard Ninjatrader options for how to initiate strategy processing. It is recommended to use the Default setting. Reference: https://ninjatrader.com/support/helpGuides/nt8/?syncing_account_positions.htm
	Enabled	**On/Off** **Default = Off**	This is the main On/Off switch for the Strategy within the Strategy window. Change this to **On** and click Apply to engage the Strategy whether in Backtest or Realtime Mode. (See the **UI Button** section above for an explanation how to turn On/Off trading or to change directional bias on the fly while the Strategy remains engaged).
Historical Fill Processing	**Order Fill Resolution**	**High/ Standard(Fastest)** **Default = Standard(Fastest)**	This is a standard Ninjatrader setting to determine how orders are filled by the Strategy. The Standard (Default) Resolution can be used as the Algo software uses a tick level datafeed for the most accurate fills.
	Fill Limit Orders on Touch	**On/Off** **Default = Off**	This applies to backtesting. When turned **On**, limit orders are filled on first touch. If turned **Off**, price must trade though the Limit Price in order for the trade to be filled.
	Slippage	**Integer >= 0** **Default = 0**	When backtesting, this is the number of ticks by which each trade fill will be adjusted unfavorably to reflect more realistic market conditions.
Order Handling	**Entries Per Direction**	**Integer > 0** **Default = 1**	This is the maximum number of trades per direction. If you are trading with 3 targets, then you must set this parameter to 3.
	Entry Handling	**All Entries/ Unique Entries** **Default = All entries**	This is a standard Ninjatrader setting to determine the manner in how entry orders will handle. This should be left as the Default setting. Reference: https://ninjatrader.com/support/helpGuides/nt8/?entryhandling.htm
	Exit on Session Close	**On/Off** **Default = Off**	This will determine whether positions are carried over to the next session. If you wish to Daytrade only, you will need to set this parameter to **On** so that no position will be held ovenight.
	Stop & Target Submission	**By Strategy Position/ Per Entry Execution**	This is a standard Ninjatrader setting to determine to determine how stop and target orders are submitted during an entry

		Default = Per Entry Execution	order execution. The Default setting is recommended.
Order Properties	**Default Quantity**	**Integer > 0** **Default = 1**	This will be the order quantity if **Set Order Quantity** (see below) is set to "Default Quantity", otherwise this parameter will be hidden.
	Set Order Quantity	**Default Quantity/ Strategy** **Default = Strategy**	This determines the order quantity. The Default setting is recommended so that the order quantities will be set in the Strategy parameters.
	Time in Force	**DAY/GTC/GTD** **Default = GTC**	This sets the time that orders will be remain active. The Default setting is recommended.

Architects A.I. thanks you for your business and use of the Volume Divergence Algo software.
Should you need assistance or support please email support@architectsai.com.