



***Hybrid Algo
User Manual NT8***

Fully Automated Trading Algo

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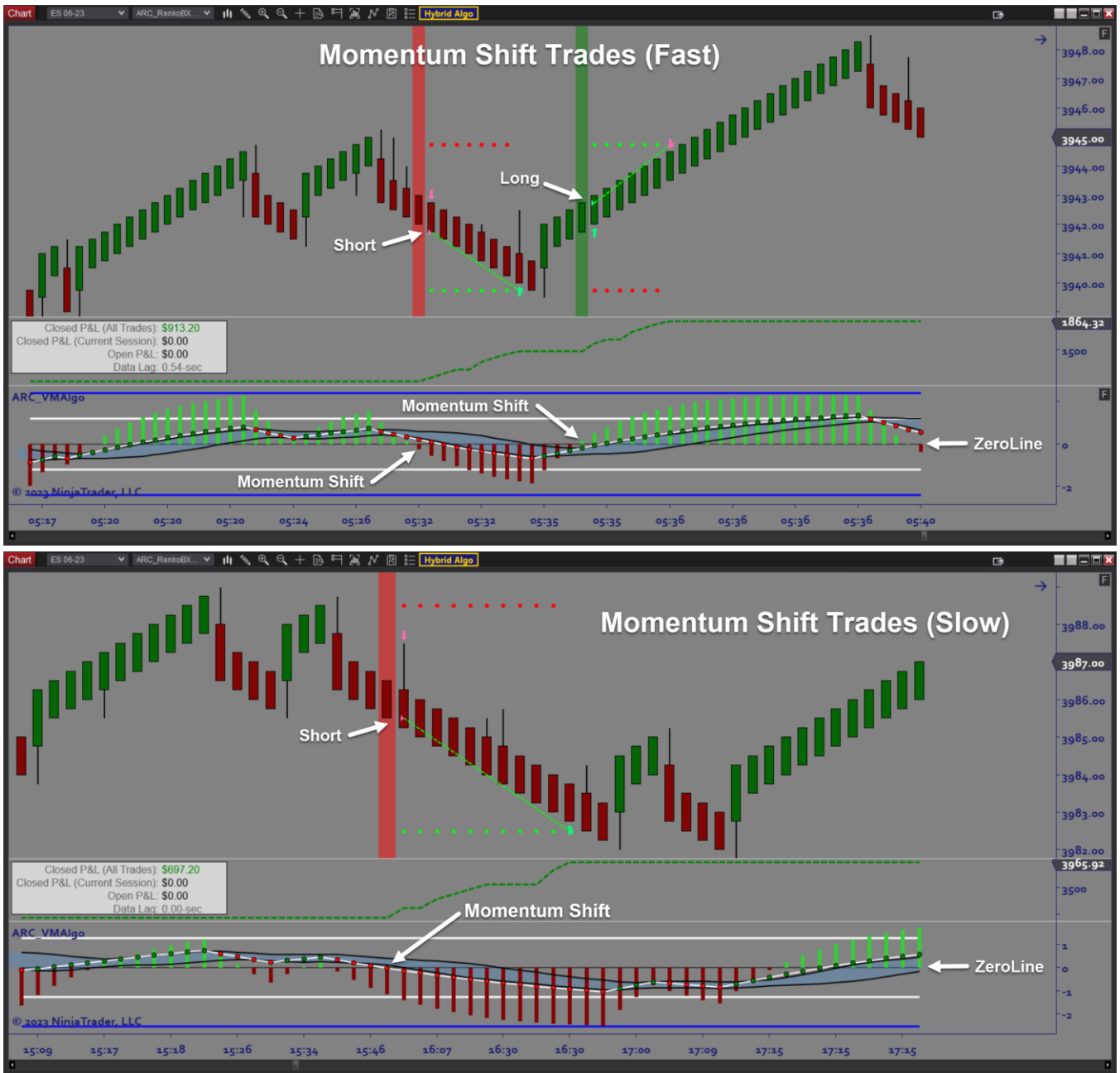
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General Description:

The ARC_Hybrid Algo software is an automated trading solution for Ninjatrade which provides a simple but effective way to auto-trade both reversal patterns and momentum setups. The software leverages custom bartypes to identify trade setups through pattern recognition. There are 2 types reversal setups. First, the pure Reversal setup generates a Signal on a reversal bar which occurs at the end of a trending move. Second, the "Wick Retest" reversal setup produces a Signal on a temporary pullback within a trend. The 2 momentum setups generate Signals at or near the transition in momentum from negative to positive and vice versa. The 2 versions of this setup are derived from 2 separate momentum measures (fast and slow). The software is also capable of trading any combination of all four Signals simultaneously making it a versatile trader's toolbox for reversal and momentum trading.

The ARC_Hybrid Algo software allows the user to fine tune trade selectivity by providing a variety of filters which define the conditions for a valid signal. This makes it possible to find quality trade setups while avoiding over-trading. Once a trade has been entered, the software manages the position according to a user-defined trade plan with customizable risk and reward metrics. The software also includes risk management, money management, breakeven, and trail functionality as well as a variety of trade selection filters such as higher time frame trend, momentum, and user-defined trade times. Trade performance, backtesting, and optimization are all supported as part of Ninjatrade Strategy functionality. Below are examples of the available trade setups:





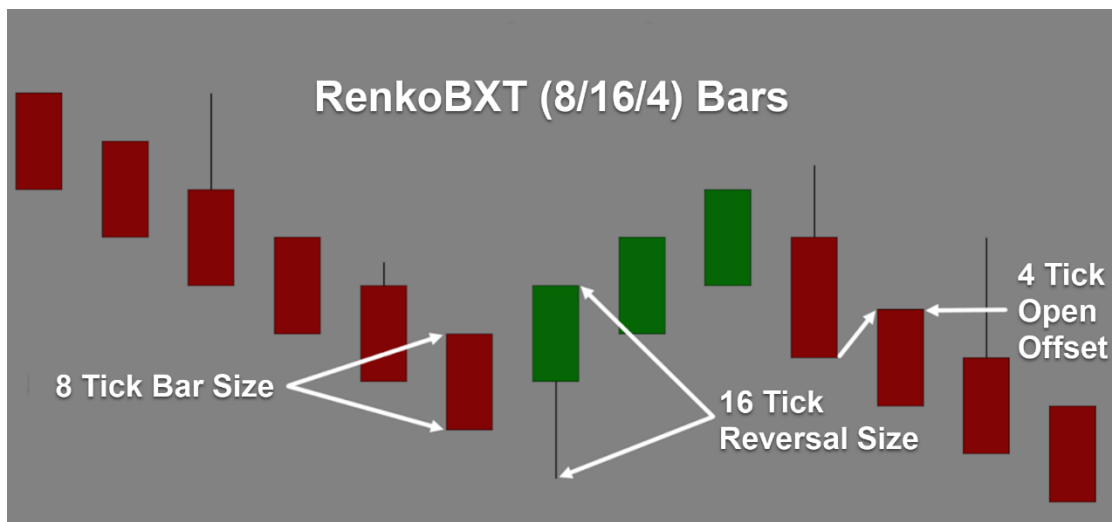
RenkoBXT Custom Bartype

A key component of the ARC_Hybrid Algo is the use of the RenkoBXT custom bartype, which includes 3 settings that determine the look and shape of the bars:

- **Bar Size** – the size of each bar in ticks
- **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

With these settings, the bars are constructed entirely based on price distance travelled rather than time elapsed. This reduces noise and preserves the trend while minimizing false reversals. These characteristics are ideal for capturing both reversal trades and momentum shift trades.

Here is a close up look at RenkoBXT Bars:



Note: The Open Price of each bar is an artificial open, meaning that price may or may not trade at the open price while the new bar is forming. This would normally affect backtest results because the Ninjatrade backtest engine executes the trade at the bar open after the Signal bar. However, this is bypassed completely by the ARC_Hybrid Algo software because the order execution engine utilizes a tick level datafeed, which completely ignores the open price and instead executes the fill at the next available tick after the signal bar closes.

The Reversal Size setting is a key component of this trading solution because it dictates how much price must move to get a reversal bar. Larger values for this Reversal Size setting translate into fewer reversal bars and therefore fewer signals. And fewer reversals mean longer trends without interruption. Using a smaller Reversal Size would have the opposite effect. Instruments will vary in terms of the appropriate values for each RenkoBXT bar setting. Backtesting with a few different RenkoBXT bar settings will be a valuable exercise before deciding on a final set of values.

Understanding the Signal Logic

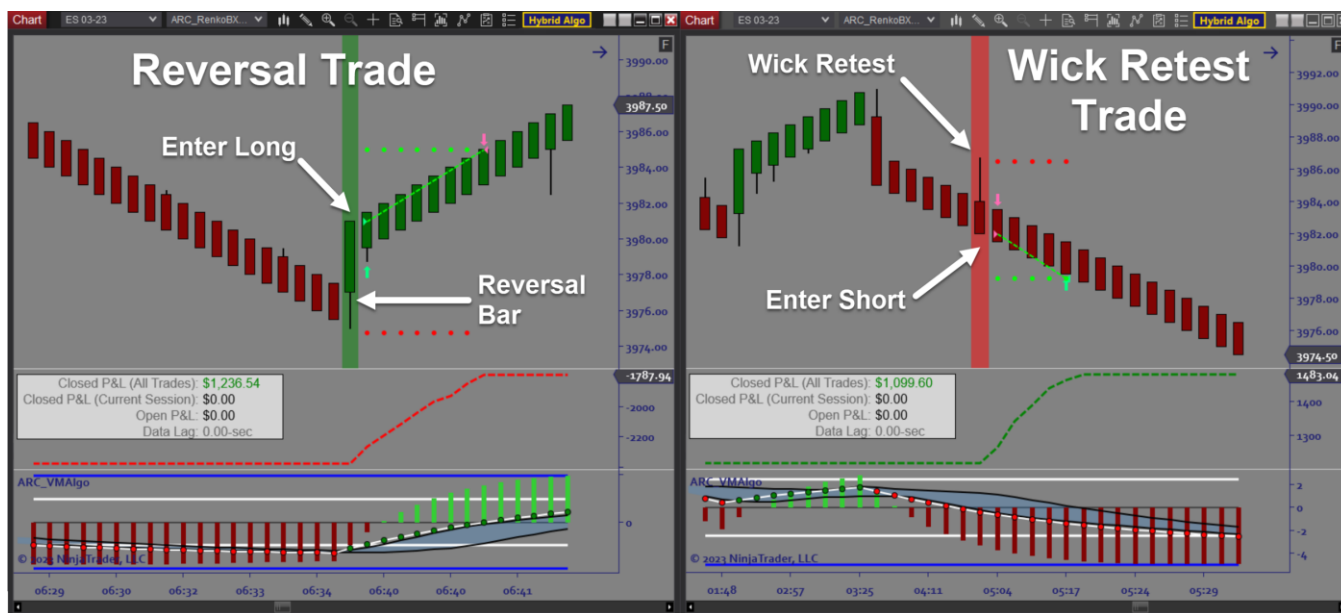
As explained earlier, there are a total of 4 separate trade Signals included in the ARC_Hybrid Algo software (2 Reversal Signals and 2 Momentum Signals). In this section, a complete description of the Signal logic for each is provided. The Signal logic determines when the pattern for a trade setup is identified. Whether the recognized pattern actually results in a trade being taken depends on additional Signal filters which will be explained later.

Reversal Trades

Pure Reversal setups and Wick Retest setups are the 2 patterns which generate potential Reversal trade Signals in the ARC_Hybrid Algo software. This section describes the Setup rules for both patterns.

- **Reversal Trade Signals**
 - Signal occurs when a price bar reverses enough to meet the RenkoBXT Reversal Size requirement
 - Once the reversal bar closes, a signal in that bar's direction is generated with the entry at bar close
- **Wick Retest Signals**
 - Signal occurs on a pullback within a trend
 - The pullback is not large enough to trigger a reversal bar
 - Trailing Wick of the retest bar is measured and used to define a deep pullback
 - When the pullback ends, price continues in the existing trend direction

- When that bar closes, a Signal is generated at bar close
- This pattern often exhibits enough follow through after the signal for profitable trade setups



Because these patterns occur quite frequently, we need ways to be more selective so that less desirable setups are skipped. For example, a small pullback may not be significant and only represents typical noise in price action. As another example, taking a directional trade in the late stages of an established trend may be ill-advised. The next section explains the methods available for fine tuning trade selection.

Signal Selection for Reversal Trades

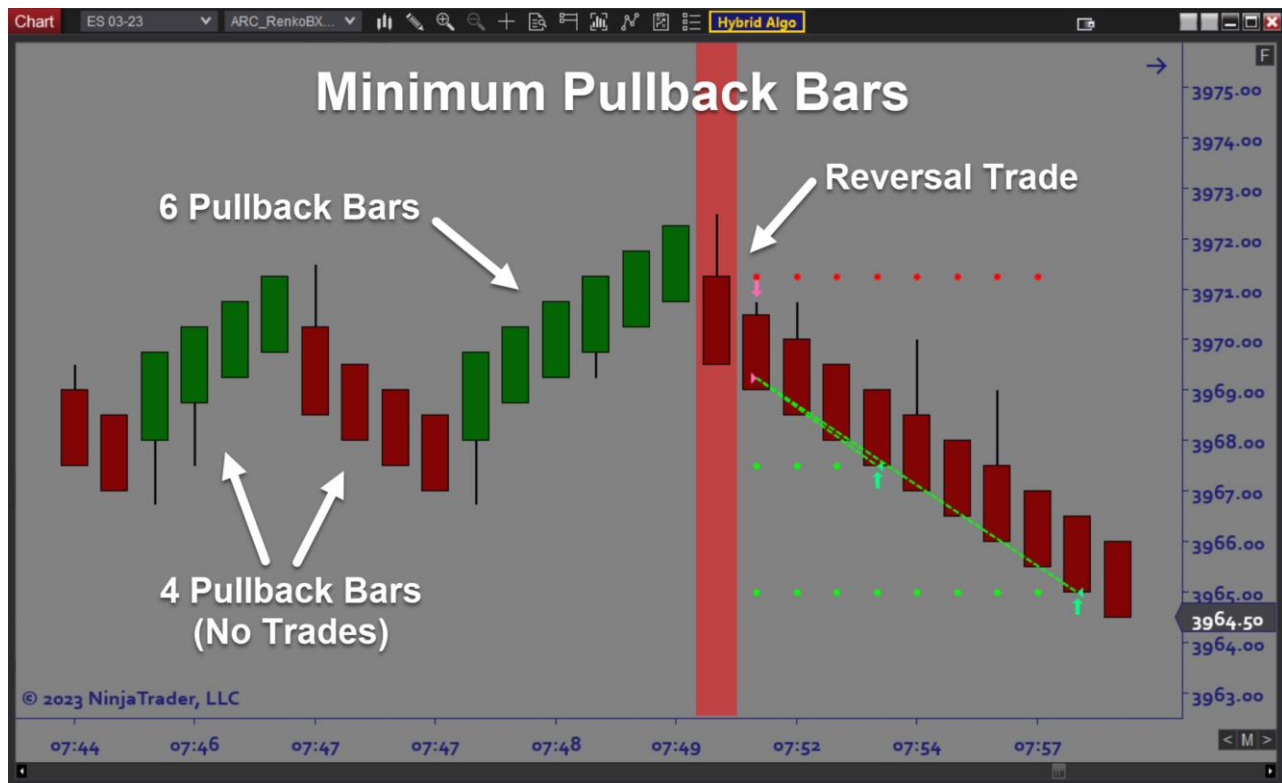
Because Reversal and Pullback patterns are quite common, the ARC_Hybrid Algo software includes various settings which are designed to filter out Signals with the goal of focusing on the best setups. It is not necessary to take a large number of trades. With the right selection criteria, a few quality setups can be enough to achieve consistent profitability.

The basic concept is that a pullback that fails to reverse the direction of the market can result in a continuation move once the trend resumes. If the pullback is shallow, there may be less followthrough. With pure Reversal setups, this can be measured by how many bars appeared in the previous trend prior to the reversal bar. With Wick Retest Trades, the pullback and continuation happens within a single candle.

Reversal Trade Signal Filters

We don't normally want to trade every reversal bar. The software allows the user to selectively filter out shallow pullbacks. The parameter listed below acts as a Signal Filter to enhance performance.

- **Minimum Pullback Bars**
 - User defines this value (in number of bars)
 - Defined as how many bars in the previous direction before the reversal bar occurred
 - Measured by counting Pullback Bars, starting from the reversal bar and counting backwards
 - Stop counting when the previous reversal bar is reached (i.e. where the previous trend started)
 - If the number of Pullback Bars is less than the user-define minimum, the Signal is skipped (i.e. no trade is entered)



In the above example, the Minimum Pullback Bars was set to 5. To avoid taking too many trades, increase the Minimum Pullback Bars. Decreasing the Minimum Pullback Bars will result in a larger number of trades, adding opportunities for profit but also potentially adding false signals. It becomes a tradeoff between filtering out too many good trades and allowing profits to be eroded during choppy conditions. Ultimately it is a matter of trader preferences which is the reason it has been added as a completely user-defined setting.

Wick Retest Trade Signal Filters

When a pullback occurs and reverses all within the same candle, this is called a Wick Retest Bar within a trend. We want to focus on the length of the trailing wick of the Wick Retest Bar. The software allows the user to specify how large the wick must be to qualify as a Signal. There are also additional settings which will control the frequency and occurrence of Wick Retest Signals. Here are the settings which serve as the Signal Filter for Wick Retest Trades:

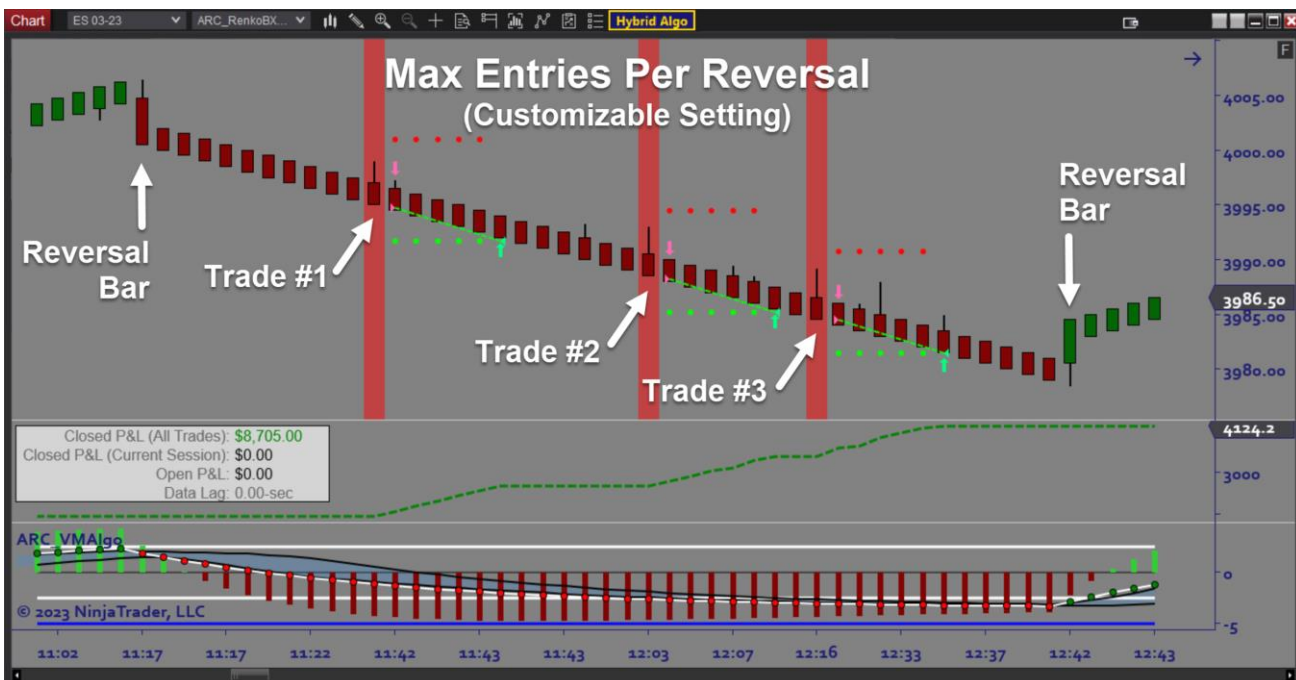
- **Minimum Pullback Bars**
 - Same definition as above (see Reversal Trades section)
 - Pertains to the bars preceding the reversal bar that started the new trend
 - If the number of Pullback Bars does not meet the user-specified minimum, the signal will be blocked
- **Max Bars Since Reversal**
 - Designed to prevent directional Trend Trades that occur at the later stages of the trend
 - User specifies the maximum number of bars that can print between the reversal bar and the signal bar and still qualify as a signal (Signals that occur after that number of bars are blocked)
 - The bar count restarts after each reversal bar
- **Signal Wick Basis**
 - This specifies the method of measuring the wick size. There are 3 options:
 - **Ticks** – Specify the Minimum Wick Size in ticks
 - **Body** – Specify the Minimum Wick Size as a multiple of the candle body size
 - **ATR** – Specify the Minimum Wick Size as a multiple of the ATR of the chart series
 - When this option is selected, an ATR lookback period must also be specified

- **Minimum Wick Size**

- Specify the Minimum Wick Size in number of ticks (only applies when Signal Wick Basis = Ticks)
- Specify the Minimum Wick Size as a multiple of the signal bar body size (only applies when Signal Wick Basis = Body)
- Specify the Minimum Wick Size as a multiple of the ATR of the chart series (only applies when Signal Wick Basis = ATR)
 - The ATR of the chart series would be fairly constant when using RenkoBXT bars and may be more applicable if a variable range bartype is used

- **Max Entries Per Reversal**

- This places a limit on how many Wick Retest Trades can occur between reversal bars (i.e. after a reversal bar before the next reversal)
- Once a reversal bar occurs, the signal count for the new trend restarts

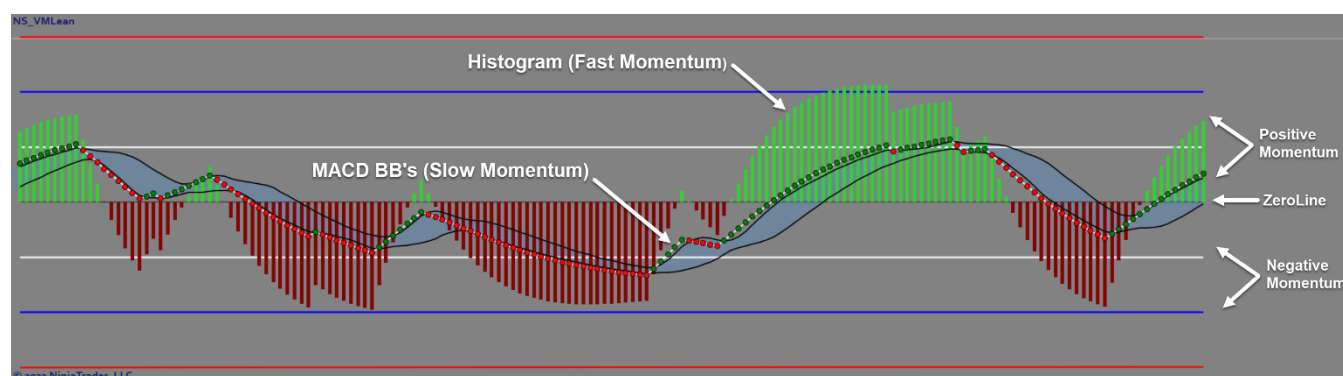


In the first example above, the sixth bar after the reversal bar (first green bar) has a small trailing wick and therefore does not qualify as a Signal. On the ninth bar (i.e. 3 bars later), another bar with a trailing wick occurs. Because it is a large trailing wick, it qualifies as a Long Signal. The entry is at the bar close of the Signal bar. In this case, if Max Bars Since Reversal was set to 8 or less, the trade shown above would be blocked. Lastly, if Max Entries Per Reversal is set to 1, then the trade shown would be the only trade allowed during that uptrend. A reversal bar in the down direction would be required before additional trades could be taken. In the second example above, Max Entries Per Reversal was set to 3, allowing 3 short trades to be taken after the reversal bar that began the downtrend.

Momentum Trades

When there is a reversal of the trend direction and this coincides with a shift in momentum, there is often enough follow through for a profitable trade. The ARC_Hybrid Algo software scans for these Momentum Shift setups. There are 2 possible patterns. Both involve a shift in momentum as measured by the VM Lean software (included in the Algo software). The VM Lean indicator is explained in more detail in a later section. However, the main point here is that VM Lean includes both a fast and a slow momentum measure and this translates into 2 separate Momentum Signals included in the Algo software.

Before describing the setup rules for the 2 Momentum Shift trades, here is an image which shows the 2 momentum measures provided by VM Lean:



The Histogram measures fast momentum. The MACD BB's measure slow momentum. When the selected momentum measure crosses the Zero Line, this signifies a momentum shift. Of course, false breakouts can occur but there is often sufficient follow through to be profitable. This is the basis for the Momentum Signals included in the ARC_Hybrid Algo software. Signal Filters, described later, provide ways to fine tune the selection of which Signals are actually traded.

- **Fast Momentum Shift Trades**
 - After a reversal bar, trade in the direction of the trend as soon as the VM Lean Histogram shifts to the correct side of the Zero Line
 - Enter at the close of the first bar that meets this criteria
 - It is preferable to avoid taken trades too long after the reversal bar
- **Slow Momentum Shift Trades**
 - After a reversal bar, trade in the direction of the trend as soon as the VM Lean MACD BB's shift to the correct side of the Zero Line
 - Enter at the close of the first bar that meets this criteria
 - It is preferable to avoid taken trades too long after the reversal bar
 - Typically occurs less frequently but can often result in larger trades with bigger targets

Below are examples of the 2 types of Momentum Shift trades:



Signal Selection for Momentum Shift Trades

Taking a trade every time momentum crosses the Zero Line would not be a good strategy. When momentum is exhausted in one direction it eventually shifts directional energy. This often happens when the market becomes overbought or oversold. When the move is strong enough to shift the momentum, the follow through can generate good trade opportunities. The best strategy is usually to catch the momentum shifts early. Waiting too long can result in missing out on most of the profits.

Momentum Trade Signal Filters

The ARC_Hybrid Algo software includes various options which are designed to filter out Signals with the goal of focusing on the best setups. Here are the options:

Fast Momentum Signal Filters

- **Max Bars To Momo Signal**
 - This limits how many bars are allowed between the reversal bar which started the trend and the Signal bar
 - The purpose of this settings is to ensure that a Momentum Shift trade occurs soon after the momentum shift
 - A smaller value used for this setting will result in fewer trades taken
 - Larger values for this setting may result in entering too late in the trend
- **Min Opposing Momo Bars**
 - This parameter requires a minimum number of bars to have momentum values on the opposite side of the Zero Line
 - Example: A momentum shift Long setup must be preceded by 10 or more bars with Momentum below Zero
 - The purpose of this setting is to avoid trading when momentum is flat and oscillating around the Zero Line
 - Large values used for this setting will reduce the frequency of trades taken

In the following example of a Fast Momentum Shift Trade, **Max Bars to Momo Signal** is set to 4 and **Min Opposing Momo Bars** is set to 6:



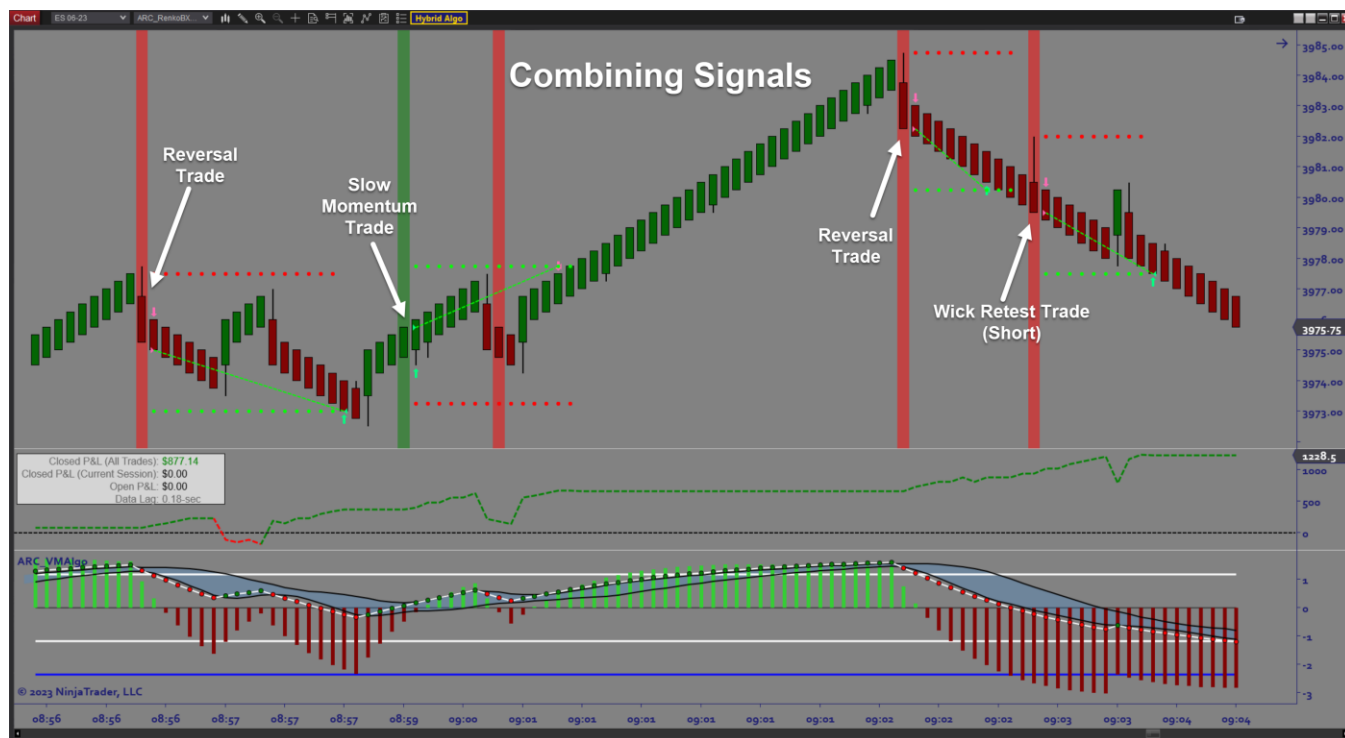
Slow Momentum Signal Filters

The Signal Filters for Slow Momentum trades are the same as for Fast Momentum trades. Specifically, you must define the **Max Bars to Momo Signal** and **Min Opposing Momo Bars** just as they were defined in the previous section. The only difference is that the momentum measure being used is the MACD BB's rather than the Histogram (VM Lean). Because Slow Momentum Signals occur less frequently, your final settings will most likely differ when you switch to Slow Momentum Signals. The most important point to be made here is that these Filters have the same meaning regardless of whether Fast or Slow Momo Signals are used.

Combining Both Signal Types

All 4 Signals can be turned On or Off independently. Some traders will choose to focus on one Signal type at a time. Others will find that combining 2 or more Signals and trading them simultaneously produces the best results. The software is completely flexible and allows any combination as desired. You simply select which Signals to trade and set the required parameters for each. Keep in mind that combining signals will sometimes skip some Signals because of an open position resulting from a different Signal type. A good practice is to focus on one Signal at a time and only expand to multiple Signals if you find that to be a better approach.

Here is one example of multiple Signals being traded simultaneously:



Algo Engine Components

The software handles the automated entry and trade management of the position once a signal is generated. There is also an option to apply additional signal filters before a trade can be entered as a way to avoid unfavorable environments. All these components of the autotrading functionality are controlled by the user. This is accomplished by customizing the settings before enabling live trading. These settings are also used for when backtesting and optimizing strategies. Here are the main components:

- **Entries** – Set trade quantity, direction, order type, and open position signal handling.
- **Stop Losses** – Set Stop Size, Trail, and Breakeven strategies.
- **Targets** – Define exit order handling and set static/dynamic distance to 3 Targets.
- **Time Controls** – Isolate trading within selected time windows.
- **Money Management** – Set Daily Goals, Max Daily Loss, and High Watermark Trail feature.
- **Higher Timeframe (HTF) Moving Averages Filters** – Block trades that go ahead the prevailing trend.
- **VMLean** – Apply fast and slow momentum filters and Overbought/Oversold signal filters.

What follows is a detailed explanation of each component.

Entries

This is the part of the trade plan where the user controls how trades are entered and in what quantity. The available components are as follows:

- **Entry Direction** – The options are Long, Short, or Both
- **Quantity 1/2/3** – Set the trade quantity for up to 3 targets, with the total trade size being the sum of those 3 quantities
- **Entry Order Type** – Choose Market or Limit orders (if Limit, select an Entry Offset for better fills)

- **Action on Opposite Signal** – When in a open position and an opposite signal occurs, it can be used to exit or reverse the existing position or simply ignored in which case the trade will exit when a stop or target is hit.

▼ Entries	
Entry ARC_HybridAlgo_Direction	LongAndShort ▼
Quantity 1	1
Quantity 2	0
Quantity 3	0
Entry Order Type	Market ▼
Action On Opposite Signal	None ▼

Stop Losses

This is the part of the Trade Plan where the user sets the Stop Size. The Stop Size can be static, such as a defined number of ticks. It can also be dynamic where the Stop Size is a multiple of the Average True Range (ATR) of the instrument being traded. This is also where a Trailing Stop and Breakeven strategy can be deployed. The available components are:

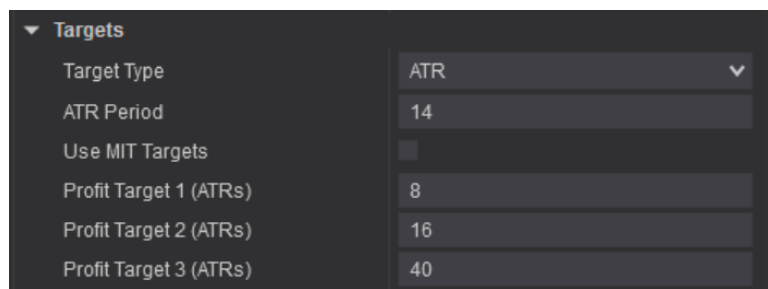
- **Stop Loss Type** – The options are a fixed number of ticks or a multiple of the ATR
- **ATR Period** – This is the lookback period for calculating the ATR
- **Stop Loss Size** – This is the size of the stop in units of measurement consistent with the method chosen for Stop Loss Type
- **Trail Trigger** – Set the distance price must travel for the Trailing Stop to be activated
- **Trail # Bars Back** – The reference trailing stop price is the least favorable price traded over the last defined number of bars (if 0 then the Trail distance is a fixed number of ticks)
- **Trail Tick Offset** – This is the fixed Trail amount (if Bars Back is used then this is an offset to the reference trailing stop price)
- **Breakeven Trigger** – Set the distance price must travel for the Stop to be moved to Breakeven
- **Breakeven Plus** – If Breakeven is used, this shifts the new stop price relative to the entry price

▼ Stop Losses	
Stop Loss Type	ATR ▼
Stop Loss ATR Period	14
Stop Loss (ATRs)	20
Trail Trigger	15
Trail # Bars Back	4
Trail Tick Offset	0
BreakEven Trigger	8
BreakEven Plus	1

Targets

This is the part of the Trade Plan where the user sets the distance to each target. The Target distance can be static, such as a defined number of ticks. It can also be dynamic where the Target Distance is a multiple of the Average True Range (ATR) of the instrument being traded. A third option is to define a risk reward ratio relative to the stop size for each target. This is also where you can choose the order type used when a target is hit. The available components are:

- **Target Type** – The options are Ticks, Average True Range (ATR), and RiskReward (RR). ATR is a multiple of the chart ATR. RR is a multiple of the Stop Size determined in the last section.
- **ATR Period** – This is the lookback period for calculating the ATR
- **Use MIT Targets** – If this is enabled, target exits will be MIT (Market if Touched) orders. If disabled, target exits will be submitted as Limit Orders.
- **Profit Target 1** – This is the distance to Target 1 as determined above.
- **Profit Target 2** – This is the distance to Target 2 as determined above.
- **Profit Target 3** – This is the distance to Target 3 as determined above.



Putting it all together we have a complete Trade Plan being implemented in an autotrading environment. This includes Entry Signals, Initial Stop placement, up to 3 Targets, and Breakeven/Trail strategies for protecting capital.

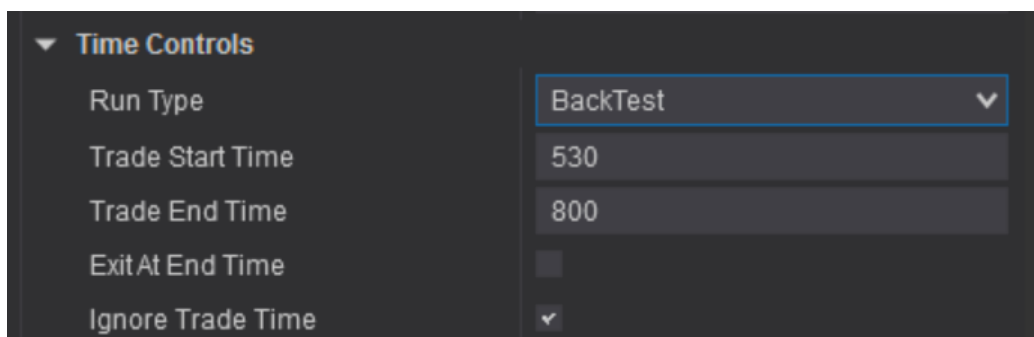
Trade Plan Usage Tips

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. 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.
6. Trail and Breakeven triggers simply tell the software at how much profit those functions become active.
7. 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 set by the user. If a Trail Tick Offset is entered for this method, the Bars Back price is further adjusted by that amount.
8. If Trail Bars Back is set to 0 while a Trail Tick Offset is entered, the Trail Tick Offset becomes the actual Trail amount.

Time Controls

An important component of optimizing a strategy is to find the best times to trade. The ARC_Hybrid 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). The available options are:

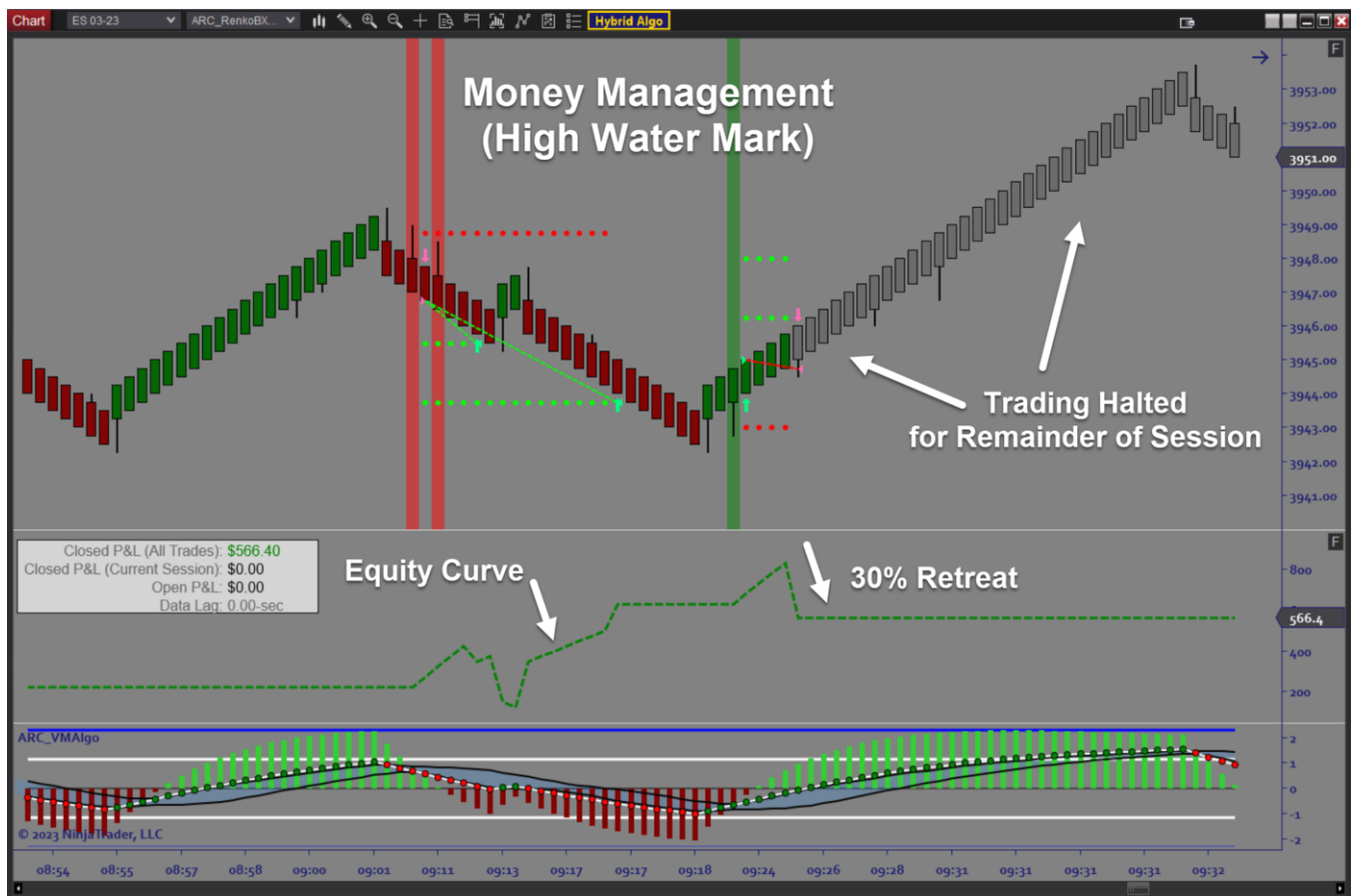
- **Run Type** – The options are Backtest (historical data), Realtime (live data), or Combined (both).
- **Trade Start Time** – Specify the earliest time a trade is allowed
- **Trade End Time** – Specify the latest time a trade is allowed
- **ExitAtEndTime** – If there is an open position when the End Time is reached, the user has the option to exit immediately or wait until a stop or target is hit.
- **Ignore Trade Time** – If disabled, the Start and End Times will be followed (Enter times in 24 hour format)



Money Management

The software includes the option to impose Money Management rules to limit daily losses and stop trading once your daily goal is reached. There is also a way to use capital instead of ticks to protect against unwanted drawdowns in your P&L. These are the components of the Money Management functionality:

- **Exit at Goal Reached** – Stop trading if the daily profit goal is achieved
- **Reset Pnl on Time Slot** – Turning this on is required in order to reset your goals and loss limits each day.
- **DailyMaxGoal\$** – The user can specify a Daily Profit Goal which, if reached, will stop any further trades from being taken for the current trading session
- **MaxDailyLoss\$** – The user can specify a Daily Maximum Loss allowed such that, if reached, will stop any further trades from being taken for the current trading session
- **High Water Mark (HWM)** – If enabled, there are 2 options for deploying the HWM feature. Unrealized means the position is exited as soon as HWM is triggered. Realized means the position remains open and is exited only once a stop or target is hit.
- **High Water Mark %** – The software keeps track of the highest profit level achieved and will stop further trading if a defined portion of those profits is given back. The defined portion is represented by the High Water Mark % setting
- **HWM Activated at \$** - This allows the HWM feature to remain disabled until a sufficient amount of daily profits are achieved. Early on when daily profits are small, a single losing trade can halt trading because on a percentage basis it meets the criteria. If set to 0, the HWM feature is active from the start of trading



In the above example, once HWM Money Management is triggered, a drop in cumulative daily profit will cause a halt to trading for the rest of the current session. The trigger level of profits and the % decrease in profit from the High Water Mark level are completely customizable in the software settings.

Money Management	
Exit at Goal Reached	<input type="checkbox"/>
Reset Pnl On Time Slot	<input checked="" type="checkbox"/>
DayMaxGoal \$	1000
DayMaxLoss \$	500
High Water Mark	Realized
High Water Mark %	0
HWM Activated at \$	200

Money Management Usage Tips

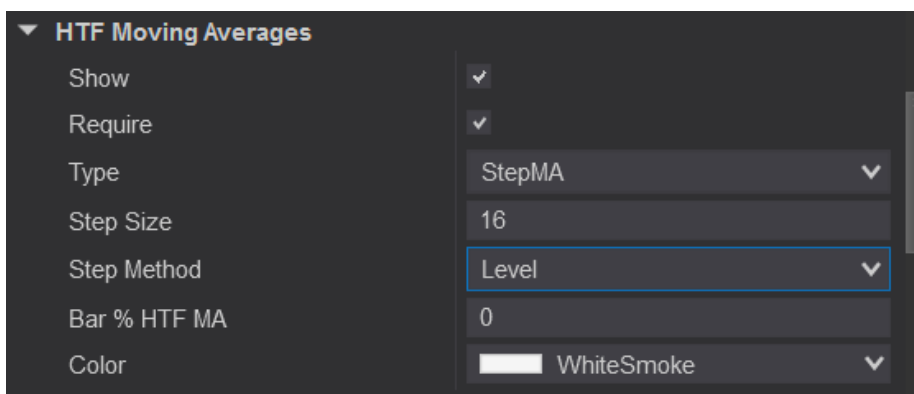
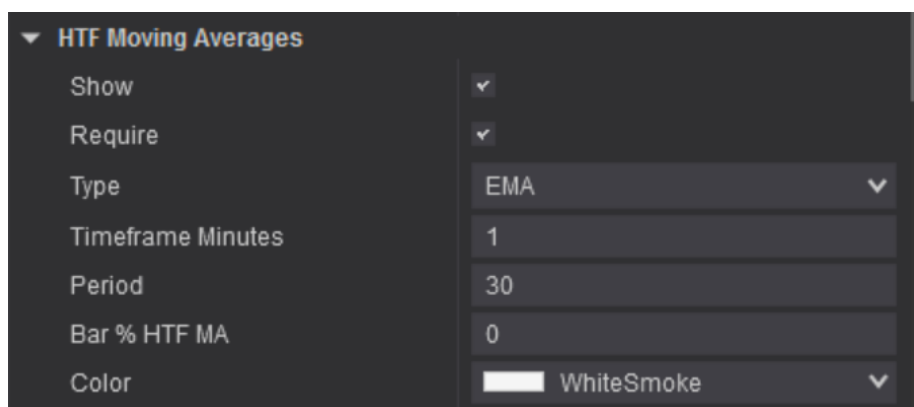
1. The user must specify a trade start and stop time in order to define the Trading Session
2. Ignoring start and stop times means the operative Trading Session will not end
3. The user must choose to Reset PnL on Time Slot so that Money Management can reset for each new session
4. Not resetting the 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.
 - o 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.

HTF Moving Averages

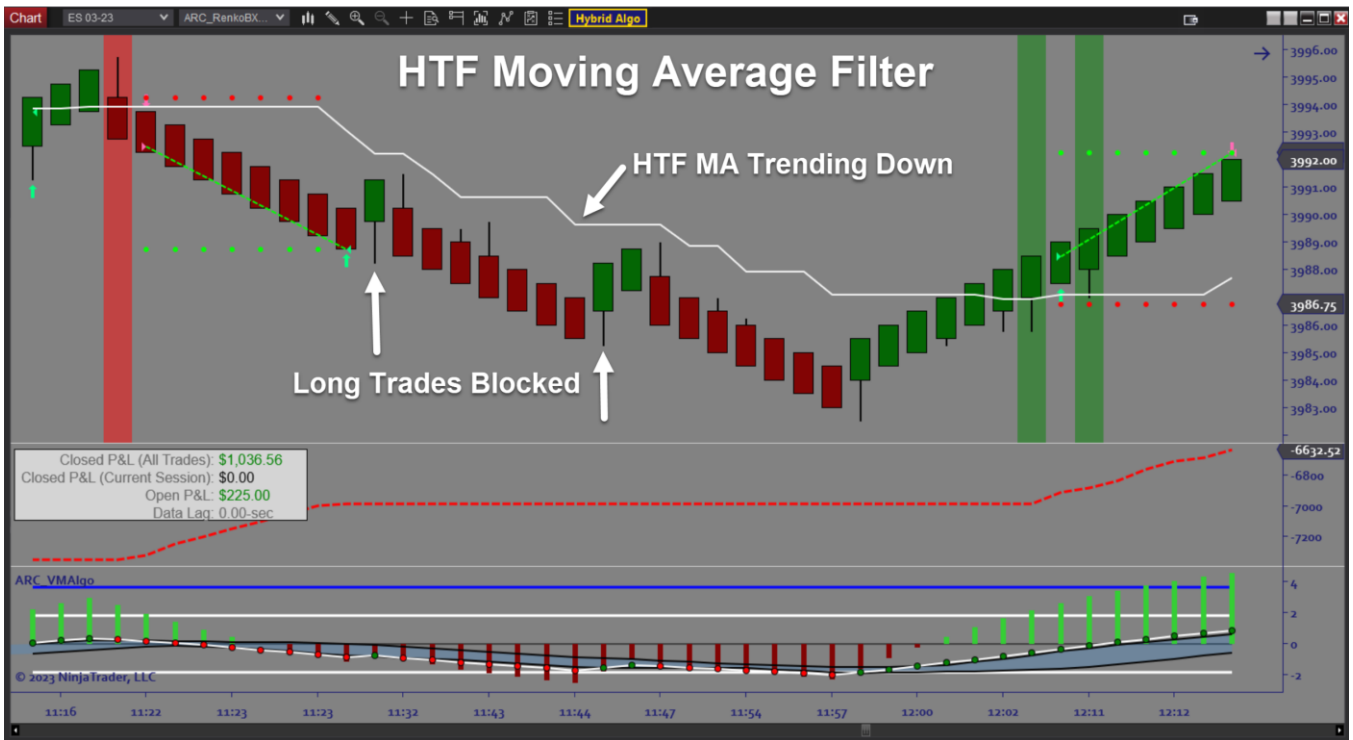
The software includes an option to filter trade signals with respect to a higher timeframe moving average (HTF MA) in relation to where current price is trading. If price is on the wrong side of the HTF MA line, the trade signal will be ignored. The 3 available moving average types are Simple Moving Average (SMA), Exponential Moving Average (EMA) and Step Moving Average (StepMA). For the SMA and EMA options, the user must select the timeframe (in minutes) to be used for the calculation of the moving average (this is accomplished by means of a background data feed) and the percentage of the bar above or below the HTF MA. The user must also set the lookback period for the moving average calculation. For the StepMA option, the user must select the Step Size in ticks, the Step Method and the percentage of the bar above or below the HTF MA (Level option only). Here are the settings:

- **Show** – This determines whether the HTF MA line will be displayed or hidden on the chart
- **Require** – Checking this box will apply the HTF MA filter to the trade signals
- **Type** – The 3 options are Simple Moving Average (SMA), Exponential Moving Average (EMA) and Step Moving Average (StepMA)
- **Timeframe Minutes** – This is the timeframe (in minutes) of the background datafeed that will be used for calculating the HTF MA line on the chart
- **Period** – This is the lookback period for the moving average calculations (applies to either MA Type)
- **Step Size** – This is the step size for the Step Moving Average (in ticks)
- **Step Method** – The 2 options are Level and Trend

- If set to Level, the filtering will be based on whether the bar closed above or below the Step Moving Average. The extent to which the bar must be above or below the moving average is determined by the value of the Bar % HTF MA (see below)
- If set to Trend, the filtering will be based on the Step Moving Average trend (the trend is considered as an uptrend from the point where the Step Moving Average turns up to the point where it turns down again, and the trend is considered a downtrend from the point where the Step Moving Average turns down to the point where it turns up again)
- **Bar % HTF MA** – This enhances the logic to compare current price to the Moving Average line
 - If set to 0, the filter simply compares the bar close price to the moving average line
 - If set to a value between 0 and 100, the software will calculate what % of the bar is above/below the moving average line
 - Intended to prevent false signals by requiring price to more decisively cross the moving average before allowing a trade
- **Color** – This defines the color of the HTF MA displayed on the chart



In the example below, the moving average is a 9-period exponential moving average of 5-minute bars (background timeframe). As can be seen, the long reversal trades are blocked below the HTF MA line.



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. If EMA or SMA is selected, the background data series timeframe (in minutes) and the moving average period must be specified. If the StepMA is selected, the step size and the step method must be selected. For any moving average type, the bar percentage over or under the HTF MA must also be specified.
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.

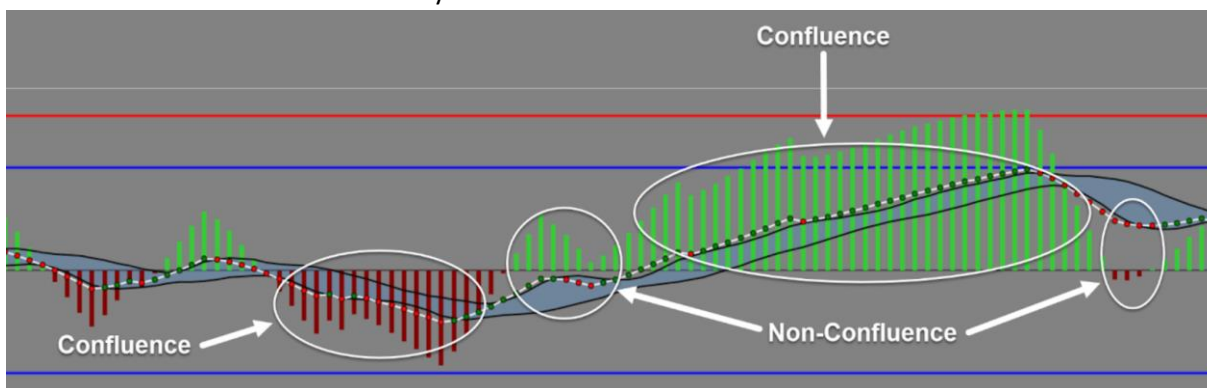
- The Bollinger Bands act as support and resistance. If the BB dots are above the Bollinger bands the BB's use the bands as support. If the BB dots are below the Bollinger bands the BB's use the bands as resistance. When the BB dots are between the bands, the BB's will often run towards the next level of support or resistance.

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



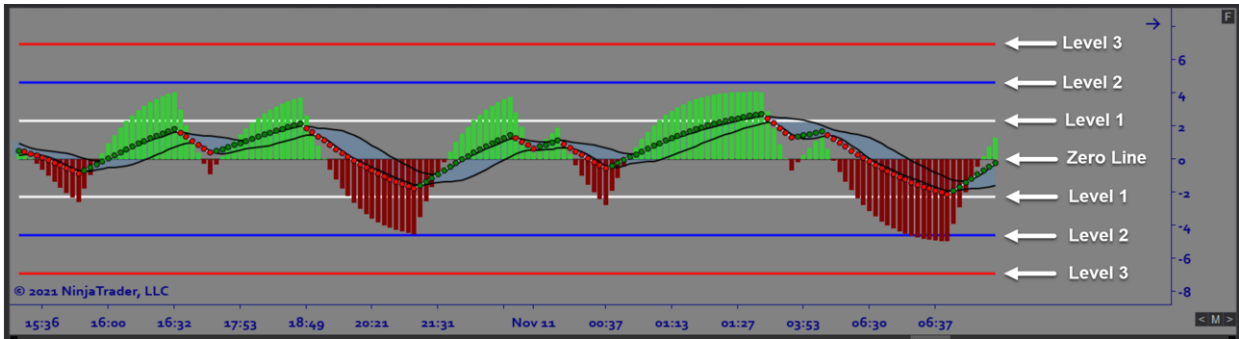
The oscillator lines shown above will be displayed in a subpanel below the price chart.

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 ARC_Hybrid 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:

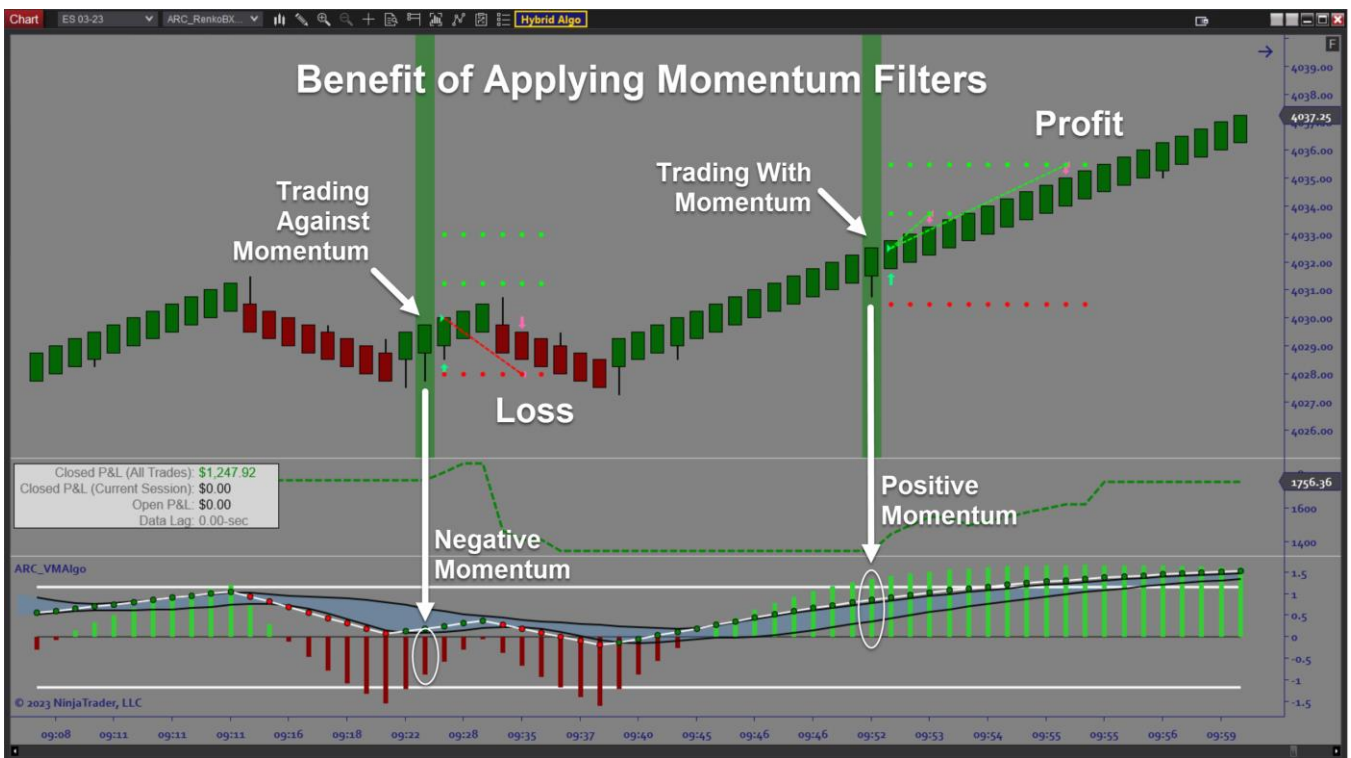
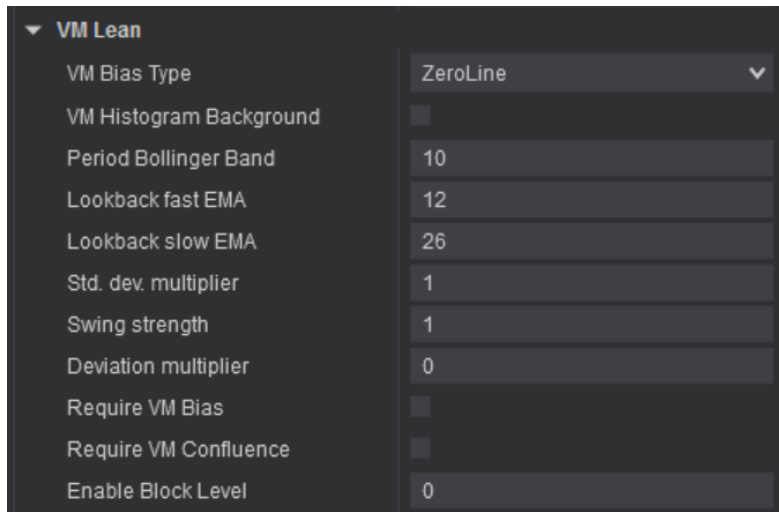


The VMLean Excursion Levels measure the degree to which price is oversold or overbought and can be used as a Signal Filter (see later section).

VMLean Momentum Filter Settings

The VMLean indicator is included in the ARC_Hybrid Algo software. It is used for applying momentum filters and rules about trading in overbought/oversold (OBOS) conditions. The VMLean indicator subpanel will be displayed on the chart regardless whether any filters are activated. The settings which control the components of the momentum subpanel are accessible in the strategy properties window (shown below). The default settings are usually suitable for most applications but they can be changed if desired. Here are the components:

- **VM Bias Type** – There are 2 options to be used for fast momentum bias: ZeroLine and Structural
 - **ZeroLine** means the momentum measure must be above the Zero Line for Longs and below the Zero Line for Shorts
 - **Structural** means the momentum measures are not used and instead the market structure of the price bars is used as the filter
- **VM Histogram Background** – This provides the option to color the subpanel background based on the Histogram (fast momentum) being above or below the Zero Line (purely for visual benefit)
- **Period Bollinger Band** – This controls the lookback period for the MACD BB's smoothing factor (this is a visual feature not affecting algo calculations)
- **Lookback fast EMA** – This is the number of bars to construct the fast EMA (applies to MACD BB's only)
- **Lookback slow EMA** – This is the number of bars to construct the slow EMA (applies to MACD BB's only)
- **Std. Dev. Multiplier** – This is the number of standard deviations used to construct the Bollinger Bands for the MACD BB's (this is a visual feature not affecting algo calculations)
- **Swing Strength** – Number of bars used to identify a Swing High or Low (applies only when VM Bias Type is set to Structural)
- **Deviation Multiplier** – Multiplier used to calculate minimum deviation as an ATR multiple for Swing Highs and Lows (applies only when VM Bias Type is set to Structural)
- **Require VM Bias** – Trades are only allowed if the VMLean Histogram is on the correct side of the Zero Line (ignored if VM Bias Type is Structural)
- **Require VM Confluence** – Trades are only allowed if the VMLean BB's are on the correct side of the Zero Line (ignored if VM Bias Type is Structural)
- **Enable Block Level** – You can enter a value of 1, 2, or 3 to indicate that you want to block trades when the oscillator reaches that Excursion Level (above for Longs, below for shorts) Note: Entering a value of 0 will disable this



In the above example, the Momentum filter is disabled. The first long trade is with negative momentum and results in a stop out. The second long trade is with positive momentum and results in profit. There is no guarantee but avoiding trades that go against momentum can help improve results and also reduce over-trading.

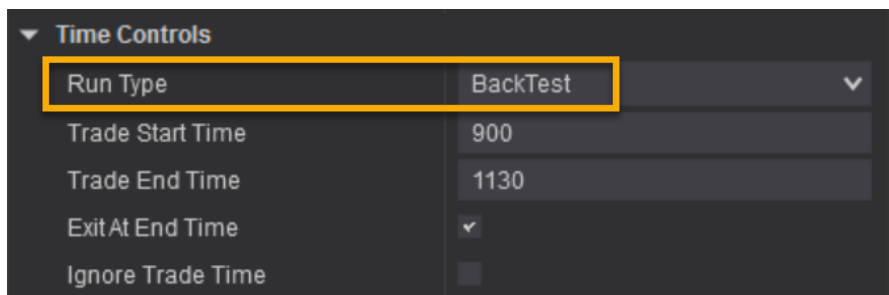
Optimization/Backtesting

The ARC_Hybrid Algo software is a Ninjatrade 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.

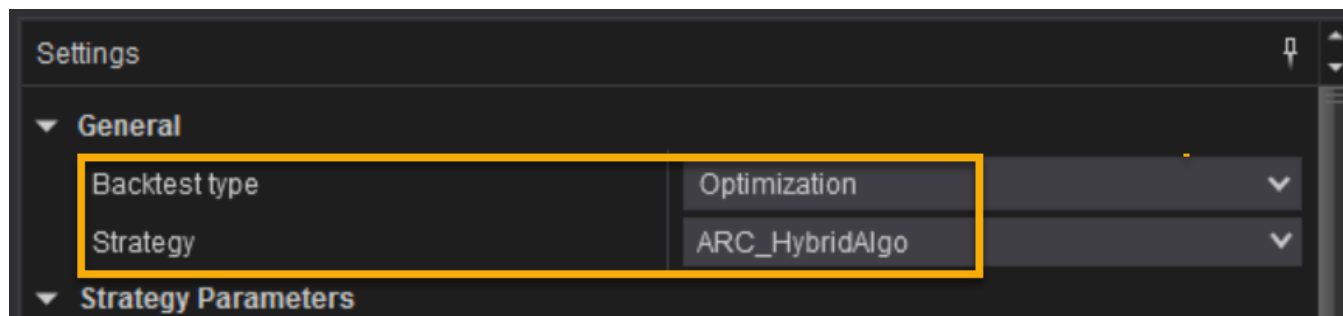
- Example: Define a Trade Plan, Money Management rules, and Signal Filter settings, then run the algo software on a chart with 10 days of history loaded, then view the profitability and other performance metrics that would have been achieved with those settings.
- **Strategy Analyzer (Optimizer)** – 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 ARC_Hybrid 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 Timeframe with a 20 period lookback, simply choose a 100 period

lookback using a 1-minute MA Timeframe instead ($5 \times 20 = 100 \times 1$) as this will provide a good approximation.

User Interface

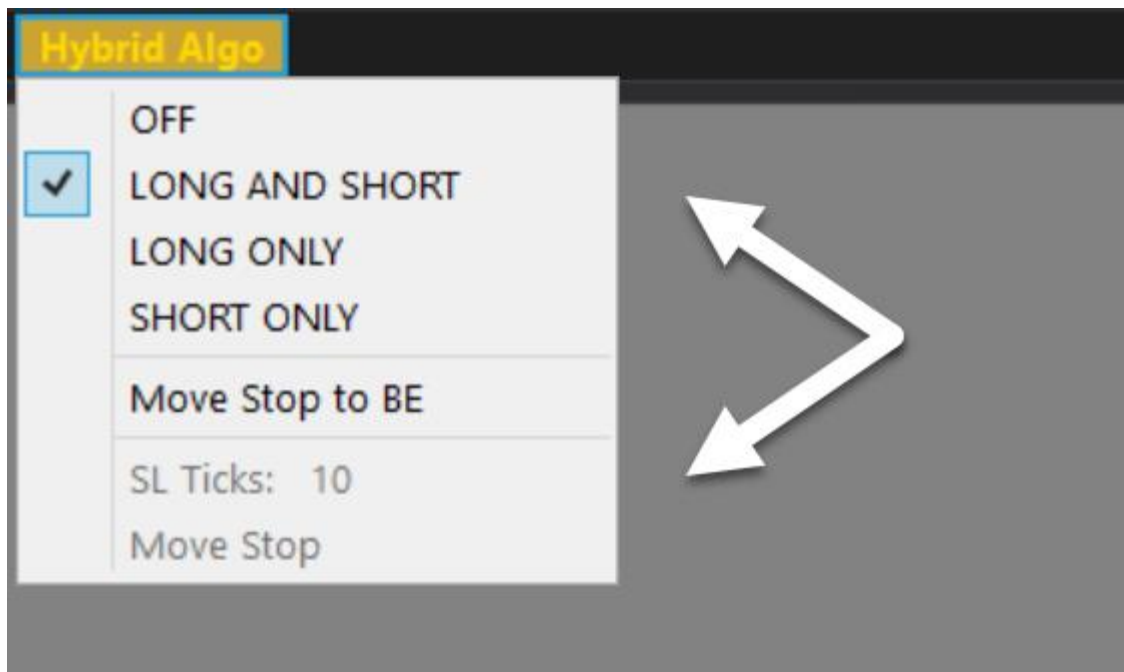
The User Interface (UI) serves as both a viewing window into the trading actions of the algo software as well as a way to access some of the main strategy controls directly from the chart rather than having to disable the strategy in order to change a setting. The main components of the User Interface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

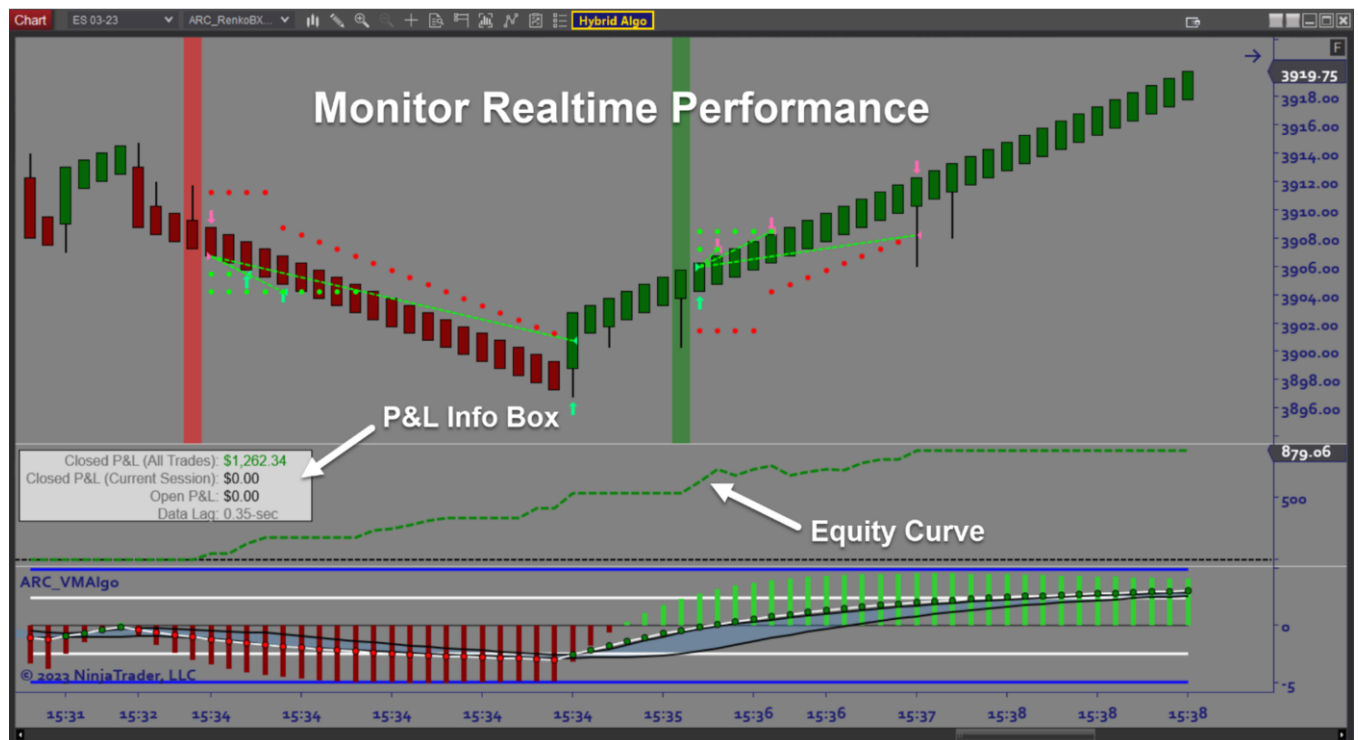
UI Menu Button Usage Tips

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 you are fully ready to start autotrading.
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

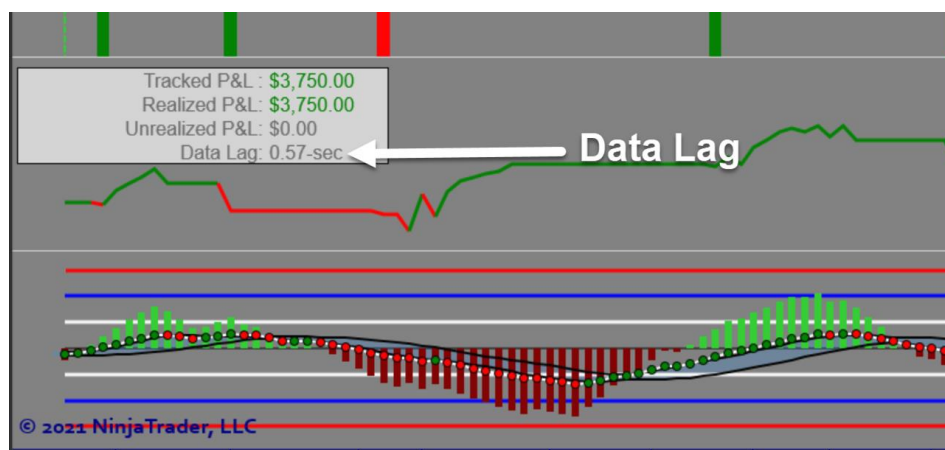


Pnl Subpanel Usage Tips

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 its High Water Mark achieved since the beginning of the chart.

Datalag Timer

The Data Lag Timer is a simple but useful indicator which is also included in the ARC_Hybrid 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 Data Lag is derived by comparing 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 environment stabilizes.

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 Signal types to trades
6. Define Strategy Parameters (Signal Rules)
7. Select Runtype (Backtest, Realtime, Combined)
8. Define Directional Bias
9. Define Trade Plan settings
10. Define Trading Time Window
11. Define Signal Filters (HTF Trend/Momentum/OBOS)
12. Define Money Management rules
13. Alter Visual settings if desired
14. Enable Strategy
15. Review historical trade results (if applicable)
16. Monitor Live trading (if applicable) using the UI menu button to access on-the-fly control of directional bias and breakeven strategy as well as immediately closing an open position using the OFF button
17. If live trading, remain aware of datalag issues which may require a temporary halt until the datafeed stabilizes
18. 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

ARC Hybrid 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
Strategy Parameters	Enable Reversal Signals	On/Off Default = On	This enables/disables Reversal Signals.
	Minimum Pullback Bars	Integer > 0 Default = 2	User defines how many prior bars in the previous direction are required before the reversal signal is allowed. If the number of Pullback Bars is less than the user-defined minimum, the Signal is skipped (i.e. no trade is entered).
	Enable Wick Signals	On/Off Default = On	This enables/disables Wick Retest Signals.
	Max Wick Entries Per Reversal	Integer > 0 Default = 1	This places a limit on how may Wick Retest Trades can occur between reversal bars.
	Max Bars to Wick Signal	Integer > 0 Default = 5	User specifies the maximum number of bars that can print after the reversal bar and still qualify as a Wick Retest Trade signal.

	Signal Wick Basis	Ticks/Body/ATR Default = Ticks	This determines the measurement method for the Minimum Wick Size requirement for generating a signal. You can express the minimum size as a number of Ticks , a multiple of the signal bar's Body size, or a multiple of the ATR calculated for the chart bars.
	Wick Basis ATR Period	Integer > 0 Default = 100	This specifies the lookback period for calculating the ATR (only applies if Signal Wick Basis is set to ATR).
	Minimum Wick Size	Value > 0 Default = 3	Specify the Minimum Wick Size that is required to generate a Wick Retest Trade signal. The unit of measurement for this setting depends on the Signal Wick Basis that was selected.
	Enable Histo Momo Signals	On/Off Default = On	This enables/disables Histo (Fast) Momentum Signals.
	Max Bars to Momo Signal (Histo)	Integer > 0 Default = 5	This is the maximum allowable number of bars from the reversal bar to the Fast Momentum Signal bar.
	Min Opposing Momo Bars (Histo)	Integer > 0 Default = 14	This is the minimum allowable number of bars preceding the Signal bar where the Histogram is on the opposing side of the Zero Line.
	Enable BB Momo Signals	On/Off Default = On	This enables/disables the MACD BB's (Slow) Momentum Signals.
	Max Bars to Momo Signal (BB)	Integer > 0 Default = 5	This is the maximum allowable number of bars from the reversal bar to the Slow Momentum Signal bar.
	Min Opposing Momo Bars (BB)	Integer > 0 Default = 14	This is the minimum allowable number of bars preceding the Signal bar where the MACD BB's are on the opposing side of the Zero Line.
Entries	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.
	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.
Stop Losses	Stop Loss Type	Ticks/ATR Default = Ticks	This determines how the Stop Size is set. You can set the Stop Size as a fixed number of Ticks or as a multiple of the ATR of the chart series.
	Stop Loss ATR Period	Integer > 0 Default = 14	This is the lookback period for calculating the ATR (only applies if Stop Loss Type is set to ATR)
	Stop Loss	Value > 0 Default = 10	If Stop Loss Type = Ticks , this signifies a fixed number of Ticks. If Stop Loss Type = ATR , the entered value represents a multiple of the calculated ATR.
	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.
Targets	Target Type	Ticks/RR/ATR Default = Ticks	This determines how the target distances are measured. The options are a fixed number of Ticks , a Risk Reward (RR) multiple of the Stop Size, and a multiple of the calculated ATR .
	ATR Period	Integer > 0 Default = 14	This sets the lookback period for calculating the ATR (only applies if Target Type = ATR)
	Use MIT Targets	On/Off Default = Off	If this is enabled, target exits will be MIT (Market if Touched) orders. If disabled, target exits will be submitted as Limit Orders.

	Profit Target 1	Integer > 0 Default = 8	This is the distance from Entry to T1. If Target Type = Ticks , this is measured in ticks. If Target Type = RR , this is measured as a multiple of the Stop Size. If Target Type = ATR , this is measured as a multiple of the calculated ATR. If a 0 is entered, no target will be placed.
	Profit Target 2	Integer > 0 Default = 0	This is the distance from Entry to T2. If Target Type = Ticks , this is measured in ticks. If Target Type = RR , this is measured as a multiple of the Stop Size. If Target Type = ATR , this is measured as a multiple of the calculated ATR. If a 0 is entered, no target will be placed.
	Profit Target 3	Integer > 0 Default = 0	This is the distance from Entry to T3. If Target Type = Ticks , this is measured in ticks. If Target Type = RR , this is measured as a multiple of the Stop Size. If Target Type = ATR , this is measured as a multiple of the calculated ATR. If a 0 is entered, no target will be placed.
Time Controls	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	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. Note: This must be turned on if applying Money Management on a daily basis for historical analysis, otherwise once trading is halted it will never restart.
	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/REALIZED_PLUS_UNREALIZED Default = OFF	This engages the High Water Mark (HWM) Money Management function. 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.
HTF Moving Averages	Show	On/Off Default = On	This determines whether the HTF MA is displayed or hidden on the chart. Note: The MA line can be displayed even if the HTF MA Filter is disabled.
	Require	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.
	Type	EMA/SMA/StepMA Default = EMA	This determines whether a Simple Moving Average, an Exponential Moving Average or

			a Step Moving Average will be used when the Require option is turned On .
	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, when the EMA or SMA moving average type is selected. A value of 1 means 1-minute bars will be used, a value of 5 means 5-minute bars will be used, etc.
	Period	Integer > 0 Default = 15	This determines the length of the HTF MA, when the EMA or SMA moving average type is selected. Example: Timeframe Minutes is set to 2 and 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.
	Step Size	Integer > 0 Default = 4	This determines the number of ticks of price movement required for the StepMA to change direction. This parameter is visible when the StepMA moving average type is selected and the Require option is turned On .
	Step Method	Level/Trend Default = Level	This determines which method will be used for filtering when the moving average type selected is StepMA. This parameter is visible when the StepMA moving average type is selected and the Require option is turned On .
	Bar % HTF MA	Integer 0 – 100 Default = 0	This determines what percent of the bar height of the signal bar must be on the correct side of the HTF MA line. Example: A value of 80 means that 80 percent of the signal bar must be above the HTF MA line for a Long trade.
	Color	Any Available Color Default = WhiteSmoke	This defines the color of the HTF MA line.
VM Lean	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.
	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.
Product Info	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.
VM Lean Visuals	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. Visuals	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).
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 = ARC_HybridAlgo	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 = 256	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/	These are standard Ninjatrade options for how to initiate strategy processing. It is

		ImmediatelySubmit-SynchronizeAccount/WaitUntilFlat/WaitUntilFlat-SynchronizeAccount Default = WaitUntilFlat	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 overnight.
	Stop & Target Submission	By Strategy Position/Per Entry Execution Default = Per Entry Execution	This is a standard Ninjatrader setting to determine to determine how stop and target orders are submitted during an entry 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 ARC_Hybrid Algo software.
Should you need assistance or support please email support@architectsai.com.**