Standard Studies
Chapter 2: Chart Types
User Guide

CQG Client Version 7x1

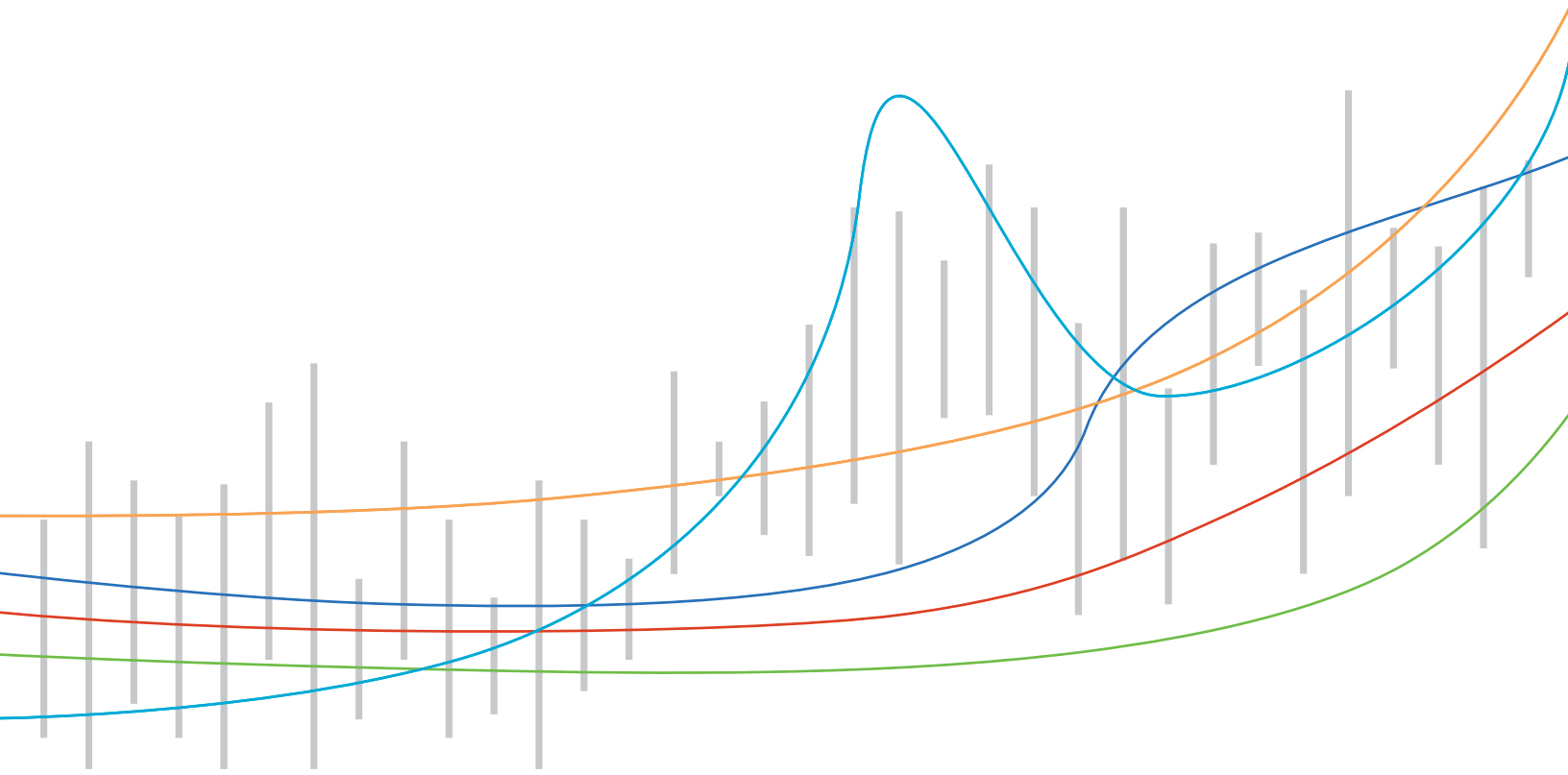

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Chart Types

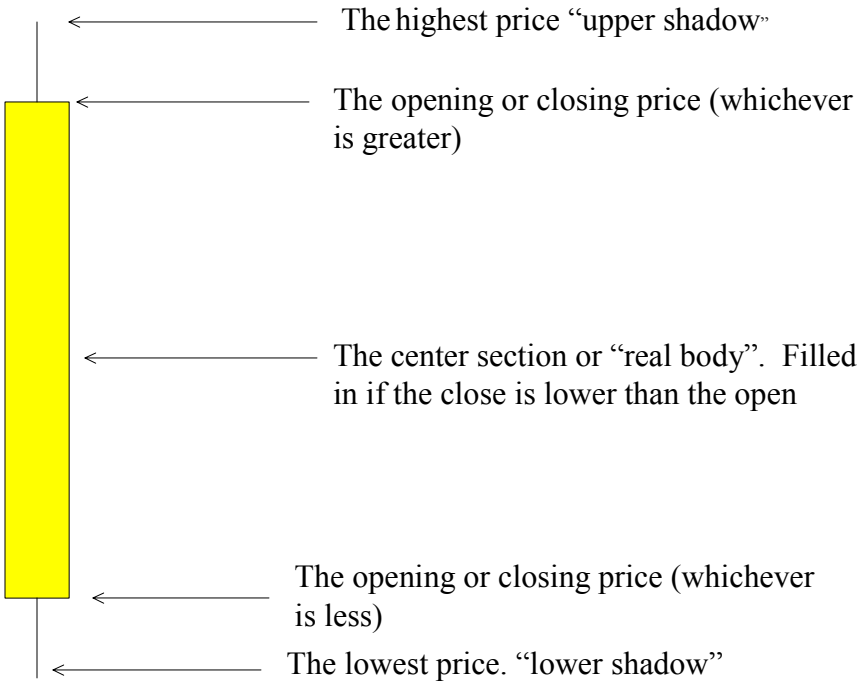
Bar - Bar

Bar Charts are constructed from the **Opening, Highest, Lowest** and **Closing** prices that occurred during the **Time Interval** of the bar. The opening price for the time interval will appear as a dash on the left side of the bar. The highest and lowest prices during the specified interval will appear on the top and bottom of the bar respectively, and the final price for the interval will appear as a dash on the right side of the bar.

Parameters for Bar

Parameter	Description
Info>>>	Accesses help for the Bar Chart Type.
Color	Allows users to set the colors for the bars.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Oldest Date	Sets the point for the leftmost bar.

Cndl - CandleStick



Candlestick charts represent an alternate way of displaying bar charts. In addition to simply displaying chart data as a candlestick chart, ***CQG*** offers users the ability to display Candlestick formations. These formations are more fully described in Steve Nison's book, **Japanese Candlestick Charting Techniques**.

Parameters for Candlesticks

Parameter	Description
Info>>>	Accesses help for the Candlestick studies.
Color	Allows users to set the colors for the various pars of the candle, depending on the row in the setup table (Cndl, Up or Down). In the Cndl row, this value sets the color for the outline of the candle. In the Up row, the color setting is applied to the body of an up candlestick. In the Down row, this value sets the color for the body of a down candlestick.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Oldest Date	Sets the point for the leftmost bar.

CVB - ConstantVolumeBar

Each bar in a Constant Volume Bar chart contains a specified volume level. This volume level is reached by accumulating the volume of each of the underlying bars. When the volume level is reached, the next Constant Volume Bar begins to accumulate volume from the underlying bars. For intraday charts, tick volume is used to determine the Constant Volume Bars. For historical charts, contract volume is used to determine the Constant Volume Bars.

When establishing a Constant Volume Bar chart, the volume level should be set significantly higher than the highest average volume for the bars displayed.

For example, if the average volume for a series of bars is 40 (ticks or contracts) and the volume level for the Constant Volume Bars is set to 200, each Constant Volume Bar would contain the data for approximately 5 bars.

The Volume (tick or contract) for each individual bar would be added until the total volume equals or exceeds the specified volume level. The resulting Constant Volume Bar would contain the composite prices (Open, High, Low, Close) for all of the bars that contributed their volume to reach the volume level of 200. The next Constant Volume Bar would contain the composite prices for all of the next series bars for which their accumulated volume equals or exceeds 200.

Note: Constant Volume Bar analysis is not the same as Equal Volume Bar analysis.
Constant Volume Bar analysis is not available for spreads.
Constant Volume Bar analysis is not available on contracts being received on a delayed basis.

Parameters for Constant Volume Bars

Parameter	Description
Info	Accesses help for the Constant Volume Bars chart.
Display>>>	Accesses the display characteristics dialog for the Constant Volume Bars chart.
>>>Info	Accesses help for the Constant Volume Bars chart.
>>>Color	Allows the user to select the color for the bars in the Constant Volume Bars chart.
>>>MarkIt	Allows the user to select conditions to be included in the display, and select a separate color for the Constant Volume Bars when a user-specified condition is met.
>>>Display	Selects the form for the Constant Volume Bars study. Choices include: **Bar, Line or Candle**.
VolumeLevel	Selects the volume covered by each bar.
Data	The source used to build the bars. Choices include: **Ticks, Ticks and Intraday Bars, Actual or Historical Bars**.
Volume Type	Select whether Volume type is Ticks or actual.
Flat Ticks	If checked, 0-plus and 0-minus ticks will be used when building the bars.
Real Time	If checked, the display updates with every new tick, rather than every new bar.
Oldest Date	Reports a 1 if the Point and figure chart is plotting an X and a zero if the point and figure chart is plotting an O.

Cnsldt - Consolidate Bar – See Spread Bar

Consolidate Bar has been renamed to Spread Bar.

ES - Equalize Sessions

The equalize sessions chart type adjusts the values of all the previous sessions to reflect the opening of the current session. For example, if the opening for the current bar is up ½ from the close of the previous bar, then all the values for the previous bar are adjusted up ½. Likewise, this adjustment will reverberate back to all the previous bars, which will be adjusted upward by ½.

Parameters for Equalize Sessions

Parameter	Description
Info>>>	Accesses the complete help for the Equalize Sessions chart type.
Color	Sets the thickness of the display for a line chart.
Weight	Allows users to set the thickness of the display for a line chart.
MarkIt	Allows users to select conditions to be included in the display, and set the format for the indicator to show when the condition has been met.
Display	The type of display. Choices are **Line** or **Bar**.
Oldest Date	Sets the leftmost bar in the display.

FG - Fill Gap

A Fill Gap chart fills in the time slots that have no activity using the previous bar's close as the Open, High, Low and Close for the bar with no activity.

Parameters for Fill Gap

Parameter	Description
Info	Accesses the help for the Fill Gap study.
Color	Allows the user to select the color for the Fill Gap study This is the same color as bars on the chart.
Weight	Allows users to select the thickness for the Fill Gap line, if line is selected as the display type.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Display	Allows users to select the form for the Fill Gap display. Choices include: **Line** or **Bar**.
Oldest Date	Sets the leftmost bar in the display.

Line - Line

Connects successive values on a chart. The setting in the Price parameter determines which values are connected.

Parameters for Line

Parameter	Description
Info>>>	Accesses the help for the line chart type.
Color	Selects the color for the line display.
Weight	Sets the thickness of the line (in pixels).
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Price	The price used to plot the line values. Choices include: **Open, High, Low, Close, Mid, HLC/3, Avg., True High, True Low, Range, True Range, Tick Volume** and **Volume.**
Display	Selects the form for the line display. Choices are: **GapOpen, GapDotted, Line** or **Histogram**.

MP - Market Profile

Market Profiles use letters to plot the prices that occur during each user-specified time period. The Market Profile assigns a letter to represent each time interval. As the trading day progresses, the Market Profile plots successive letters on the display at each price traded during the particular period. Traders can analyze the resulting price distribution, and distributions for other trading days, to determine market strength and weakness.

Parameters for Market Profile

For more information about Market Profile Parameters, refer to the *Market Profiles* chapter in the user's guide, and the section, *Changing Market Profile Parameters*.

NG - NoGap

When the No Gap "study" is applied to a chart, various gaps in the chart Data are simply removed from the Chart.

Through the Remove From parameter users can choose to remove all gaps or only those occurring at certain times.

Parameters for No Gap

Parameter	Description
Info>>>	Accesses help for the NoGap chart type.
Color	Allows the user to select the color for Gaps.
Weight	Sets the thickness of the line in a line graph.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
RemoveFrom	**Start of Session**- Removes gaps occurring at the start of a session. **End of Session**- Removes gaps occurring at the end of a session. **Start and End of Session** - Removes gaps occurring at the start and the end of the trading session. **All**- Removes gaps occurring at any time.
Display	Selects the form for the chart display. Choices include: **line** or **bar**.
Oldest Date	Sets the leftmost bar in the display.

PCB - Percent Bar

Percent Bar Charts are displayed as percentages from a user-selected **Base Price** or from the close of a bar determined by the **Base Index.**

Base Price is defined as the price from which all other values have their percentages derived.

Base Index is an offset number of bars from the current bar. The close of the **Base Index** bar is used as the price from which all other values have their percentages derived, if **Index** is select as the **Use** parameter.

If the **Base Price** indicates a price (i.e. not 0), the "0% point" is located at the specified **Base Price** and the **Base Index** value is ignored. All other percentages are derived from this "0% point."

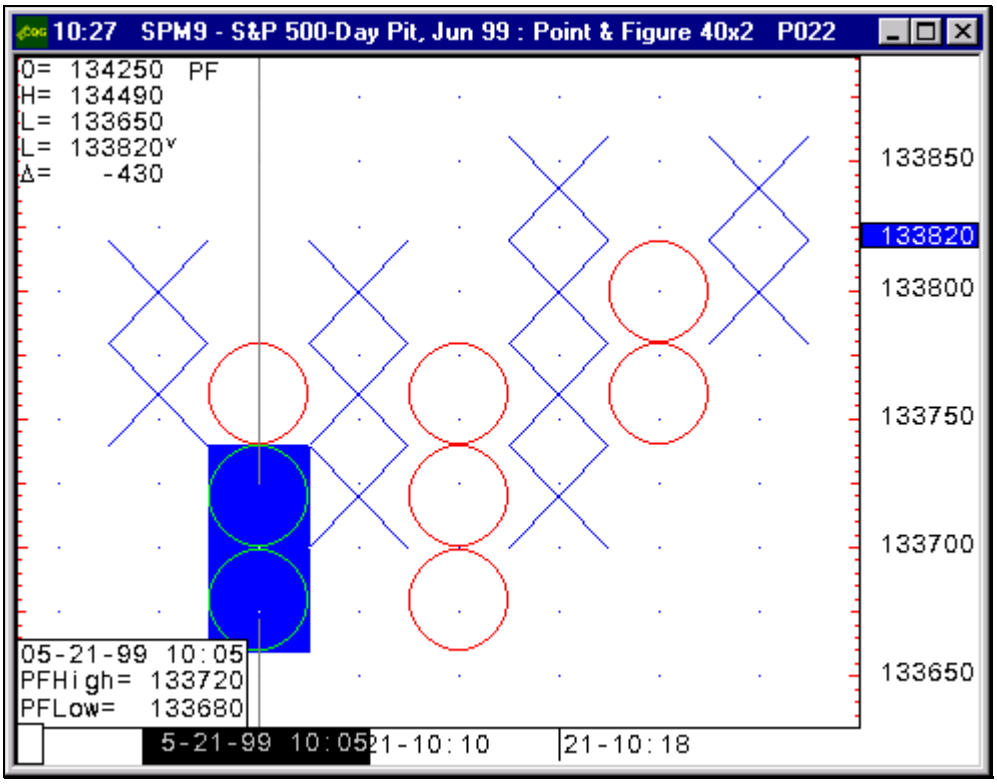
If the **Base Price** equals 0, the close of the **Base Index** bar is used as the "0% point."

If **Use** is set to **Date**, the "0% point" is set to the close value for the date entered.

Parameters for Percent Bar

Parameter	Description
>>>Info	Accesses help for the Percent Bar chart type.
Color	Allows the user to select the color to display the Percent Bar chart.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Use	Determines which value is used as the Basis for the Percent Bar Chart calculations. This parameter can be set to Price, Index, or date, as defined below.
Price	Allows the user to set the price to use as the basis for the percent bar chart.
Index	Allows the user to set the offset number used for the Base Index. The offset is the number used to count back from the current bar, and the Base Index uses the closing value from that bar.
Date	Allows the user to enter a date. When **Use** is set to **Date,** the close on the date entered in this field is sued as the 0% point.
Oldest Date	Sets the leftmost bar in the display.

PF - Point and Figure



Point & Figure Charts display price activity by plotting an "X" or "O" for each price (or number of prices) traded until the specified ***Reversal Amount*** occurs, at which time the system begins plotting either an X (if the previous column contained O's) or an O (if the previous column contained Xs). The range of prices represented by each "X" and "O" is specified in the Box ***Size*** parameter**.**

This process of plotting either an X or an O continues until the number specified in the ***Reversal*** parameter is reached. When the market reverses direction and trades to the specified ***Reversal Amount***, the Point & Figure chart moves to the right and begins plotting the other symbol (either an X or an O) representing a move in the opposite direction. The resulting formation of X and O columns can be analyzed to indicate market strength and weakness.

CQG allows reversals to be either single prices or a range of prices. Additionally, the convention for plotting Point & Figure charts dictates that each X column start one O above the lowest O in the most recent column, and each O column start one X below the high in the most recent X column. Therefore, there are many situations, especially in volatile markets, where the start of each X or O column does not actually represent a price the market traded. ***CQG*** alerts users to those situations by highlighting the Xs and Os, which represent actual trades when the vertical cursor is active (as shown above). Users are also made aware of those situations through the PF High and PFLow box where the actual trade prices for each reversal are clearly indicated.

CQG Point & Figure charts also allow you to specify, through the ***Data Source*** parameter, the time frame of the data that will be used to build the Point and Figure bars. Using longer term data means the display will be less detailed but faster to display. Conversely, using shorter term or tick data means the display will be more detailed but slower to build. Therefore, using ***Tick*** data produces the most detailed display, but is the slowest to build, and using ***Daily*** as the data source produces point and figure charts the fastest with the least detail.

Notes: Point and Figure charts are not available on contracts being received on a delayed basis.

For users running as LAN clients, the amount of data that can be displayed is limited to 2048 bars.

Parameters for Point & Figure

Parameter	Description
>>>Info	Accesses help for the Point and Figure chart type.
Color1	The color for the Xs.
Color2	The color for the Os.
Box Size	The minimum number of price changes represented by each X or O.
Box Units	Values are: Price or Ticks
Reversal	The Reversal Amount specifies the number of X's or O's (Boxes) that the market must reverse before the Point & Figure Chart shifts to the right and begins plotting the opposite X or O column.
Data Source	Allows users to select the time frame for the data that will be used to build the Point and Figure bars. Choices are ***1, 5, 15, 30*** or ***60 minute***, ***Daily*** or ***Ticks***.
Oldest Date	Selects the leftmost point on the chart.
PFMid*	The Average of the PFHigh & PFLow.
PFHigh*	The high price that triggered the reversal, that is, the top of the highlighted area.
PFLow*	The low price that triggered the reversal, that is, the bottom of the highlighted area.
PFUp*	Reports a 1 if the Point and figure chart is plotting an X and a zero if the point and figure chart is plotting an O.

* These parameters can be found in the ***Formula Toolbox.*** They can be used in formulas, conditions, custom studies, user values and alerts.

Box Size and Units

The Box Size specifies the minimum number of price units represented by each X and O. Through the **Box Units** parameter, users can specify the box size in either ***price*** units or ***tick*** units. For example, a Box Size of 10 price units for S &Ps plots an X or O for each 10 cent move in the S&Ps. Specifying a box size of 10 Price Units equates to a box size of one tick unit, since the minimum tick size in the S&Ps is 10. Therefore, entering any number between 10-19 when the box units are specified as Price units will not change the Point and Figure chart. However, adjusting the Box Size to 20 price units (2 tick units), for example, means that each X or O represents a 20 cent move. Therefore, there will be fewer X's or O's at any particular time compared to a box size of 10 price units or 1 tick unit.

Point and Figure Calculation Example

The Point and Figure calculations involving bar data are best illustrated by an example. Suppose the current trend is an up-trend. Initially the system checks the high for each new bar. If the high is high enough that a new box can be filled, we go on to the next bar. In the case where a new box can be filled, the low of the bar is not considered.

If the high of the bar is not high enough to fill a new box, we consider the low. If the low is low enough to cause a reversal from the high of the current up-trend, a new down-trend is created. This downtrend is drawn on the chart extending from one box below the high of the up-trend down to the box corresponding to the low of the bar. If the low is not low enough to cause a reversal, no action is taken and the up-trend remains the current trend.

For a more detailed discussion of Point & Figure data algorithms, see: ***Technical Analysis of the Futures Markets***, by John Murphy.

Note: In the case of point and figure charts using a one-box reversal, traditional charts differ significantly charts in CQG. Whereas traditional charts will never have a trend with a single box , CQG uses the same algorithms for one-box reversals as it does for all other point and figure charts. Therefore, a one-box trend can exist on CQG charts.

SprdBar - Spread Bar

Spread bar returns bars for spread values.

For example

Bar(42*HO-CL,1) when placed on a 5-minute chart, returns a bar which would represent the crack spread every 1 minute summed up over a 5-minute period. Normal display of a spread is a single line; this function creates a bar by taking the value at intervals smaller than the chart and creating a range.

Parameters for Spread Bars

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Info>>></td><td>Accesses help for the Spread Bar chart.</td></tr>
<tr><td>>>>Color</td><td>Allows the user to select the color for the bars in the Spread Bar chart.</td></tr>
<tr><td>>>>MarkIt</td><td>Allows the user to select conditions to be included in the display, and select a separate color for the Constant Volume Bars when a user-specified condition is met.</td></tr>
<tr><td>Interval</td><td>Bar interval used to create the consolidated bars.</td></tr>
<tr><td rowspan="2">Max Check</td><td>Checkbox that turns on or off the Max Check function that restricts the Interval, depending on the chart type displayed when the study is applied. Without Max Check selected, it could take a very long time to consolidate one minute bars on an annual chart, for example.
When Max Check is selected:
<table>
<tr><th><u>Chart Interval</u></th><th><u>Smallest Setup Interval Setting</u></th></tr>
<tr><td>Annual, Semi-annual, or Quarterly</td><td>M (Monthly)</td></tr>
<tr><td>Monthly</td><td>D (Daily)</td></tr>
<tr><td>Weekly</td><td>60 (minutes)</td></tr>
<tr><td>Daily</td><td>5 (minutes)</td></tr>
<tr><td>Interday</td><td>Ratio of Setup interval setting to Chart Interval must be <= 60. (For example, on a 120-minute chart, you could not use a 1 minute interval setting.)</td></tr>
</table></td></tr>
<tr><td>>>>Display</td><td>Selects the form for the Constant Volume Bars study. Choices include: Bar, Line or Candle.</td></tr>
<tr><td>Oldest Date</td><td>Optional setting. If no date is entered here, the study will consolidate all the bars visible on the current chart.</td></tr>
</table>

Output Values for Spread Bars

Output	Description
SBOpen	Returns the Open value for the spread. (Formerly CBOpen)
SBTrueRange	Returns the True Range for the Spread. True Range is the greatest distance of; 1) Current High to Current Low, 2) Previous Close to Current High, or 3) Previous Close to Current Low.(Formerly CBTrueRange)

Tick - Tick Chart

Tick Charts display each price traded as a unique point on the Tick Chart.

A reported trade that immediately follows an identical trade is considered a Flat Tick. The second trade, the Flat Tick, is shown on the Tick Chart when the Flat Tick checkbox is selected. Flat Ticks are not shown on the Tick Chart when the Flat Tick checkbox is not selected.

If Bids and Asks are not normally used to build Bar Charts for a particular market, the Bids and Asks are not shown on Tick Charts.

Note: Tick charts are not available on contracts being received on a delayed basis.

Parameters for Tick Charts

Parameter	Description
Info>>>	Accesses help for the Tick chart type.
Color	The color used for the Tick chart display.
Weight	Allows the user to set the thickness of the display line.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Flat Ticks	Flat ticks are displayed on the Tick chart when this checkbox is selected.
Oldest Date	Sets the leftmost point on the display.

Yield - Yield

Plots the yield for debt instruments.

Five models are used to calculate the yield.

Standard Bill

For bonds with 182 days or less until maturity, the yield, using the Standard Bill model is calculated based on the following formula:

Yield = 100.0 *((d * A_y) / (A_d – (d * T_{sm}))

Where,

d =	.01 * price (price in this case is the discount rate--the size of the price reduction for a 360-day period.)
A_d =	Number of days in the year used for quoting discount securities (360)
A_y =	Number of days in a year for interest earned (365)
T_{sm} =	Days from settlement to maturity

For a bill with more than 182 days until maturity, the yield is calculated based on the following formula:

$$y_{be} = y_{tm} = 2\left\{\frac{-\frac{T_{sm}}{A_y} + \sqrt{\left(\frac{T_{sm}}{A_y}\right)^2 - 2\left(\frac{T_{sm}}{A_y} - 1\right)\left(1 - \frac{F}{P}\right)}}{2\left(\frac{T_{sm}}{A_y}\right) - 1}\right\}$$

Where,

Y_{be} =	Bond Equivalent Yield
Y_{tm} =	Yield to Maturity
T_{sm} =	Days from settlement to maturity
A_y =	Number of days in a year for interest earned (365)
F =	Face Value
P =	Price

Simple Bond

The concept of simple yield-to-maturity takes into account the drag to par which occurs if a bond is bought at either a premium or a discount and then held to maturity, at which time it is redeemed at par.

The simple yield on a bond uses the following formula:

$$Ys = \frac{cF + \frac{R - P}{T_{sm} / 365}}{P}$$

Where,

cF =	Annual Coupon (in dollars)
R =	Redemptions Value
P =	Clean Price of a bond, i.e. the price paid for the bond without any accrued interest.
T_{sm} =	Days from settlement to maturity

Standard Bond

The standard bond formula is expressed as follows:

$$P = v^{t_{sn}}\left[C\frac{v\left(v^{N-1}-1\right)}{v-1} + Rv^{N-1} + C_n\right] - AI$$

Where,

P =	Price of the bond
v =	The annuity variable, which is defined as $(1+y_w)^{-1}$
Y_w =	Yield to maturity divided by the number of coupons per year
t_{sn} =	Days from settlement date to the next coupon date
C =	Coupon payment
N =	Number of remaining coupon payments
R =	Redemption value
AI =	Accrued interest
C_n =	Next coupon payment

Moosmuller

The Moosmuller method, used by the U.S. treasury to determine the price of T-notes and T-bonds, given the yield, is exactly the same as the Standard model, except the Moosmuller method uses money market discounting from the next coupon date, back to the settlement date. This difference is seen in the lead factor of the Moosmuller equation shown below:

$$P = \left(\frac{1}{1 + t_{sn} y_w}\right)\left[C\frac{v\left(v^{N-1} - 1\right)}{v - 1} + Rv^{N-1} + C_n\right] - A1$$

where

P	=	Price of the bond
t_{sn}	=	Days from settlement date to the next coupon date
Y_w	=	Yield to maturity divided by the number of coupons per year
C	=	Coupon payment
v	=	The annuity variable, which is defined as $(1+y_w)^{-1}$
N	=	Number of remaining coupon payments
R	=	Redemption value
C_n	=	Next coupon payment
AI	=	Accrued interest from the last coupon payment date to the settlement date (as measured by the appropriate day-count convention).

BraessFangmeyer

The BraessFangmeyer method computes prices and yields on an annual basis. Therefore, coupon payments are annual; periodic yields are converted to annual yields before using, and the remaining time to maturity is measured in years.

$$AI_{BF} = C\left[1 - \left(wt_{sm} - \text{int}\left(wt_{sm}\right)\right)\right]$$

where

AI = Accrued interest from the last coupon payment date to the settlement date (as measured by the appropriate day-count convention.)

C = Coupon payment.

w = Number of coupon periods per year.

t_{sm} = Days from settlement to maturity

Int = The annuity variable, which is defined as $(1+y_w)^{-1}$.

Parameters for Yield

Parameter	Description
Info>>>	Accesses help for the Yield chart type.
Color	Allows the user to select the color used for the Yield chart display.
MarkIt	Allows the user to select conditions to be included in the display, and set the color that will indicate the condition has been met.
Model	Allows users to select the desired model from the drop-down list.
Compound	Allows users to select the compounding period. Choices include: **Default, Annual** and **Semi-Annual**.

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