Kiwi Trader™ User Manual

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1. Introduction

1.1 Conventions and Terminology

1.1.1 An Introduction to the Foreign Exchange Market

The worldwide market for trading currencies is known broadly as Foreign Exchange (also called Forex, or FX). The Forex market is composed of two sectors: Interbank and retail.

Interbank Foreign Exchange refers to transactions and transaction settlement conducted mainly between governments, major banks and global corporations, with individual transactions sometimes worth billions of dollars.

Retail Foreign Exchange, the market you are about to participate in, is the speculative trading of currencies on margin between traders (you) and counterparties (dealing desks).

In the retail Forex market, transactions occur outside of a centralized exchange. Traders perform multiple trades over time in order to capitalize on the changes in the relative prices of various currencies.

Prices are quoted in terms of "bid" and "ask" rates, or the prices at which the trader can buy (at the "ask" rate) or sell (at the "bid" rate) an amount of the base currency in exchange for the counter currency of a currency pair (i.e. EURUSD).

1.1.2 Trading Conventions

In the Forex market, currencies are always traded in pairs. This is logical, as any trade is always an exchange of one currency for another. The quote for a currency pair (the exchange rate) signifies the *price of the base currency in terms of the counter currency*. For example, "EURUSD trades at 1.1241" means that one Euro is worth 1.1241 US Dollars.

Each trade involves the purchase or sale of the base currency in exchange for the counter currency. For example, selling EURUSD means selling Euros and receiving US Dollars, and buying EURUSD means buying Euros and paying in US Dollars. In other words, a trade in the Forex market always involves buying one currency and selling the other simultaneously.

In retail Forex, trade sizes are not fluid. They are increments of either 100,000 or 10,000 units of the base currency. Each 100,000 or 10,000 unit increment is called a "lot."

Trading terminology in the Forex market is generally consistent with other financial markets. A trader buys a base currency from the dealer at the "ask" price and sells it back to the dealer at the "bid" price; a trader who has purchased a currency is "long" in that currency and "short" in the other currency of that pair.

A typical trade on the retail Forex market would proceed as follows:

The trader sees the following on their trading platform:

Dealing Rates		
Symbol	Bid	Ask
USDCAD	1.3485	1.3488

The dealing rate displayed for the "USDCAD" currency pair signifies the value of one US Dollar in terms of Canadian Dollars.

The trader can either buy the US Dollar at the "Ask" price of 1.3488 Canadian Dollars per 1 US Dollar, or sell the US Dollar at the "Bid" price of 1.3485 Canadian Dollars per 1 US Dollar.

The trader who has 10,000 US Dollars in her account, which, at a 1:100 margin, allows her to control 1,000,000 US Dollars—or ten 100,000 US Dollar lots— for trading.

As the trader believes that the value of the US Dollar in relation to the Canadian Dollar will rise, she decides to buy the US Dollar (simultaneously selling the Canadian Dollar).

She buys one lot, purchasing 100,000 US Dollars in exchange for (i.e. by selling) 134,880 Canadian Dollars.

Several hours pass, and the US Dollar indeed rises in value against the Canadian Dollar ("USDCAD goes up"). The USDCAD currency pair now trades at 1.3508/1.3511 (Bid: 1.3508, Ask: 1.3511), a rise of 23 "pips" (a pip being the smallest unit of price change, in this case 0.0001 Canadian Dollars).

She then sells back her lot of 100,000 US Dollars to the dealer at the Bid price of 1.3508, receiving 135,080 Canadian dollars. Her realized profit is 135,080 - 134,880 = 200 Canadian Dollars, which—at the current rate of 1.3508 Canadian Dollars per US Dollars, equals 148 US Dollars and 6 cents.

Trade Summary		
Action	Explanation	
Buy 1 lot USDCAD at 1.3488	The trader has bought one lot of 100,000 US Dollars in exchange for (i.e. by	
11000000	selling) 134,880 Canadian Dollars.	
USDCAD rises to 1.3508/1.3511		
Sell 1 lot USDCAD at 1.3508	100,000 US Dollars is exchanged back for 135,090 Canadian Dollars.	
Profit Calculation	134,880 CAD - 135,090 = 200 CAD Profit. Converted back to the trader's accounting currency (US Dollars) by the current exchange rate of 1.3508, 200 CAD equals 148.06 USD.	

1.1.3 Glossary of Terms

Ask Rate

The price at which a trader can buy a currency pair from the dealer.

Bid Rate

The price at which a trader can sell a currency to the dealer.

Bid/Ask Spread

The difference between the bid and ask prices.

Cross Rates - An exchange rate between two currencies. The cross rate is said to be non-standard in the country where the currency pair is quoted. For example, in the US, a GBP/CHF quote would be considered a cross rate, whereas in the UK or Switzerland it would be one of the primary currency pairs traded

Currencies

Currencies are the fundamental units of monetary exchange; issued by the governments of nation-states and the European Union, they are denoted by three-letter codes, as per the SWIFT (Society for Worldwide Interbank Financial Telecommunications) payment system.

Currencies are traded on the international Foreign Exchange (FX, or Forex) market. The most commonly traded currencies and their three-letter designations are:

Commonly Traded Currencies		
Currency	Issuer	Code
US Dollar	United States	USD
Euro	European Central Bank (used in Belgium, Germany, Greece, Spain, France, Ireland, Italy, Luxembourg, the Netherlands, Austria, Portugal and Finland.)	EUR
Pound	Great Britain	GBP
Yen	Japan	JPY
Swiss Franc	Switzerland	CHF
Canadian Dollar	Canada	CAD
New Zealand Dollar	New Zealand	NZD
Australian Dollar	Australia	AUD

Currency Pair

A currency pair is the basic trading unit in the currency trading markets: two currencies that can be exchanged, written in terms of their SWIFT designations. In a currency pair, EURUSD for example, the first currency is called the "base currency" and the second is called the "counter currency."

In currency trading, the price for a currency pair (the exchange rate) signifies the price of the base currency in terms of the counter currency. For example, "EURUSD trades at 1.1241" means that one Euro is worth 1.1241 US Dollars.

Exchange Rate

The exchange rate is the price of one unit of a currency in terms of another.

Limit Order

When placed on its own (called "Entry Limit"), it is an order to buy a currency pair at a price that is above the current price or to sell a currency pair at a price that is below the current level (if/when the market price reaches that level).

When added to an already existing position, it is an order to close a long (buy) position at a price above the current level or to close a short (sell) position at a price that is below the current level (if/when the market price reaches that level).

Long Position

For a currency pair, it is a position where the trader has purchased the base currency in exchange for the counter currency, i.e. they are "long" in the base currency. Profit is accumulated when the base currency of a long position appreciates.

Lot

The standard unit of trading for currencies. Generally, one lot is either 100,000 or 10,000 units of the base currency.

Margin

The cash collateral deposit required to enter into positions, and therefore the maximum amount of loss that a trader can endure before their positions are closed.

Margin Call

A demand from the dealer for additional collateral/capital to increase a trader's margin to cover losses on positions when the market has moved against the trader.

Market Order

An order to buy or sell a currency pair (i.e. to buy or sell the base currency in exchange for the counter currency) at the current market price.

Order

A request from a trader to a dealer to execute a trade at a specified price or at the market price.

Over The Counter (OTC)

A transaction or market where transactions are conducted not via a centralized exchange, but between individual parties.

Pip

The smallest possible move in the exchange rate for a currency pair. For most currencies, a pip is 0.0001, while for USDJPY, it is 0.01.

(Exchange) Rate

The price of one currency in terms of another.

Rollover - The settlement of a deal is rolled forward to another value date with the cost of this process based on the interest rate differential of the two currencies.

Short Position

For a currency pair, it is a position where the trader has sold the base currency in exchange for the counter currency, i.e. they are "short" in the base currency. Profit is accumulated when the base currency of a short position depreciates.

Stop Order

When placed on its own (called "Entry Stop"), it is an order to buy a currency pair at a price that is below the current price or to sell a currency pair at a price that is above the current level (if/when the market price reaches that level).

When added to an already existing position, it is an order to close a long (buy) position at a price below the current level or to close a short (sell) position at a price that is above the current level (if/when the market price reaches that level).

Spread

See Bid/Ask Spread

Tick

A tick is the time increment between each change in price.

2 Trading Manual

2.1 Order Types

Order Types				
Туре	Subtype	Explanation		
	Market Orders			
Market		A Market Order is an order to open or close a position at the current market price for a chosen currency pair. If the market price has not changed while a Market Order is being sent, the order it will be executed at the price displayed at the moment of order creation. If market price has been changed, the order behavior depends on the price change:		
		If the market price moves against the trader, but lies within the trader's acceptable slippage range, the market order is executed at the new market price. If the price movement falls outside of the trader's acceptable slippage range, the system begins negotiation for the price chance.		
		If market price moved in the trader's favor, the market order is executed at the order open rate—the rate at which the market order was sent.		
		There are two kinds of Market Orders, "Initial" and "Close":		
	I	An Initial Order is an order to buy or sell a chosen currency at the current market price.		
	С	A Close Order is an order to close an open position at current market price.		
		Stop and Limit Orders		
(Buy) or Sho Stop and Lin opened at a assigned to	Entry Stop and Entry Limit orders, are intended to be executed and entered into the market as Long (Buy) or Short (Sell) positions when market reaches a desired price level. Stop and Limit orders for open positions are issued to close a specific position that has already been opened at a desired price level. An open position can have only one Stop (S) and one Limit (L) order assigned to it at a time. Limit (L) orders are used to close the position when a desired level of profit is reached, while Stop (S) orders are used to close the position when profit is negative, so as to stop			
Entry Stop Orders		Entry Stop Orders are orders with postponed execution. The system executes such orders as soon as the market reaches or passes through the Stop Price level , which is set by the trader. Once issued, the stop order will be held as pending until the stop price level is reached.		
		Stop orders can be used to close out a position (Stop Loss), to reverse a position, or to open a new position. The most common use is to protect an existing position (by limiting losses or protecting unrealized gains).		
		Once the market hits or goes through the stop price, the order is activated (triggered) and the system executes the order at the next available price. A Stop Order does not guarantee execution at the stop price, however. Market conditions, including volatility and lack of volume at the Stop Price, may cause a Stop order to be executed at a price different than the pre-set Stop Price level.		
		For example, if a stop order is placed to sell EUR/USD at 1.2315, the trade will be executed when the bid reaches 1. 2315. In the rare instance the market skips over the requested rate, and stop order is filled at the best available price.		

	•	
Entry Stop Buy	ES Buy	An <i>Entry Stop Buy</i> order is placed at a price ABOVE the current dealing Ask price and is not activated until the market Ask price is at or above the Stop Price. The buy stop order, once triggered, becomes a market order to buy at the current market price.
Entry Stop Sell	ES Sell	An <i>Entry Stop Sell</i> order is placed at a price BELOW the current dealing Bid price and is not activated until the market Bid price is at or below the Stop Price. The sell stop order, once triggered, becomes a market order to sell at the current market price.
Stop Loss	S	Stop Loss orders are linked to a specific opened position and are designed to close that linked position when market price reaches a selected level to stop position loses. Stop Loss orders are meant to be triggered when the position is incurring a loss to close that position, therefore they are set opposite to the original position at a price lower (for long (Buy) positions) or higher (for short (Sell) positions) than the current market price
Entry Limit		Entry Limit Orders are orders to Buy or Sell a specific amount of Currency Pair at a user defined price. An Entry Limit Order does not guarantee execution; rather it guarantees only that if execution occurs, it will be triggered when the market reaches or passes through the stated Limit Price. Once issued, the limit order will be held pending until the limit price is reached. Once the market hits or goes through the limit price, the order is triggered and the trade system attempts to execute the order at the Limit Price.
Buy Limit	EL Buy	An order to enter the market with a long (Buy) position when the market reaches a desired price that is below than the current dealing Ask price.
Sell Limit	EL Sell	An order to enter the market with a short (Sell) position when the market reaches a desired price that is above than the current dealing Ask price.
Limit profit	L	Limit Profit orders are Entry Orders linked to specific opened positions and intended to close that linked position when the market price reaches the selected level to Limit position profit. Limit profit orders are meant to be triggered when the position is accruing a profit to close that position, therefore they are set opposite to the original position at a price higher (for long (Buy) positions) or lower (for short (Sell) positions) than the current market price.
осо		A One Cancels Order is one Stop and one Limit order set simultaneously, with the condition that if either the Stop or the Limit order is executed, the other is canceled. For example, an OCO may be placed to close an existing position either with a Limit (to take profit), or with a protective Stop (to stop loss).

2.2 Order Details

Order Duration

Orders have a time to live which is controlled by the "Order duration" parameter, with two available options: GST and DAY. All GTC (Good Till Cancelled) orders remain open until they are triggered or cancelled, and all DAY orders are deleted by the system when trading is closed for the day when the order was placed.

Trailing Stops

Entry Stop and Position Stop orders have a "Trailing" option which allows the order price to be changed automatically, following the market price level. It keeps Stop orders at a specified distance from the current market price. If the market moves in the order's direction, the orders stay in their places until they are cancelled or market direction has changed.

The Trailing option for stops is used to minimize position loss relative to the best closing price.

For example:

Current EUR/USD Bid price is 1.2405. We open an Entry Stop Buy order at 1.2420 with the "Trailing" option. Then if the market price goes down and the bid price becomes 1.2400 the order also goes down and becomes 1.2415. If the market price goes up, the order price will stay unchanged and will be executed at the bid price of 1.2415.

First In First Out (FIFO)

Open positions are closed according to the FIFO accounting rule. All positions opened within a particular currency pair are liquidated in the order in which they were originally opened.

2.3 Order Execution

2.3.1 Market Order Execution

Market (I, C) **Orders** are orders designed to open or close a position at the current market price for a chosen currency pair.

Depending on the "MaxAutoAmount" trader account setting, Market Orders can be executed automatically by the system or manually by a dealer. The setting specifies the maximum order amount that can be processed automatically, without a dealer's intervention. If an order amount is less than "MaxAutoAmount," the order will be executed by the system, otherwise it will be sent to a dealer for further processing.

When a trader creates a market order, the system sets the order open price equal to the current market price. If the market price has moved against the trader, but lies within the trader's acceptable slippage range, the market order is executed at the new market price. If the price movement falls outside of the trader's acceptable slippage range, the system begins negotiation for the price chance. Order execution and system behavior in this case is controlled by the "Slippage" parameter.

Example:

A trader opens a Market Buy Order at the Ask price 1.2405. As the order is being placed, the market price changes to 1.2410. Because the default value of the Slippage parameter is 0, the system cannot execute the order and sends an offer of a new order price to the trader. If the trader accepts the offer, the order is executed at the new market price of 1.2410, otherwise it is deleted.

To avoid such situations, and to provide automatic order execution on fast moving markets, traders can set the Slippage parameter (in pips) using the Order Creation dialog.

For example, if the trader creates a Market Buy Order at a price of 1.2405 and sets 10 pips slippage, it means that he would like to buy at price 1.2405, but he will accept any available price up to 1.2415.

2.3.2 Conditional & Other Order Execution

Stop/Limit Order Execution

The system maintains the list of available Stop/Limit (S/L) orders and checks the order conditions against EVERY incoming price. If the system finds that the new price meets the order criteria, the system creates new Close (C) orders for trades to which the Stops/Limits are assigned using current market price, then processes the new Close orders.

Conditional Entry Order Execution

The system maintains the list of available Entry (ES/EL) orders and checks the orders conditions against EVERY incoming price. If the system finds that the new price meets the order criteria, it creates new Initial(I) orders for the conditional entry orders using the current market price, then processes the Initial orders.

Hedging

The Hedging flag affects order execution when a trader places trades opposite to current orders. If the flag is set, then positions opened in the opposite direction are not closed when the opposing order is executed.

Example:

Trader has a EUR/USD 10 lots short (Sell) position. The trader then sends a new market order to Buy 20 lots EUR/USD. If the Hedging flag is not set, the system would close 10 lots of the existing Sell position and open a new buy position for 10 lots. If the trader sets the Hedging flag for the order, the system keeps the 10 lots Sell position and opens a new 20 lots Buy position. After the order execution the trader would have two positions: EUR/USD 10 lots Sell and EUR/USD 20 lots Buy.

Conditional Entry Order-Position relations

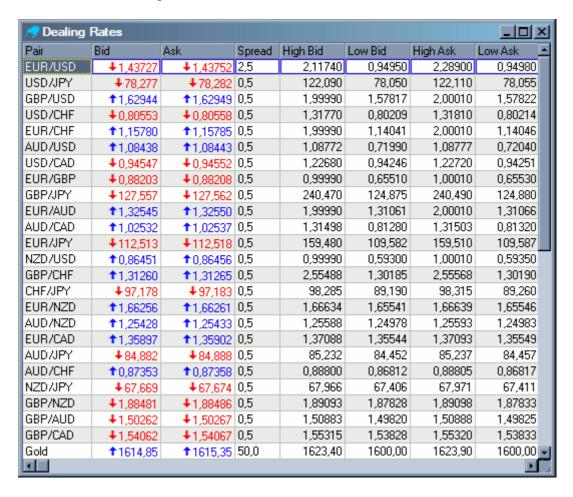
It should be clear that in contrast to Stop/Limits for open positions, there is no direct dependency between conditional Entry Orders and opened positions. For instance, if the trader places a conditional Entry Buy Order to close an existing Sell position but the position was closed before the order was fired, the order would stay in the system and would be executed if a matching price comes, and a new position would be opened. Be careful when you place conditional Entry Orders; track them carefully to avoid side effects.

3. User Interface

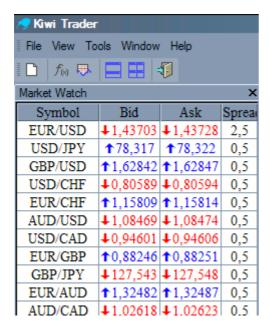
3.1 Trading Windows

3.1.1 Dealing Rates Window

The Dealing Rates window displays live, executable, price quotes for tradable instruments. Trading can be initiated from this window.

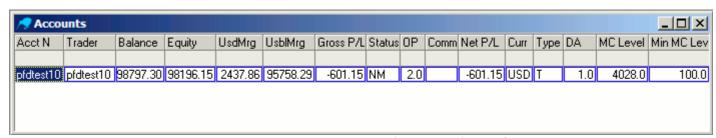


Live quotes are also displayed in the "Market Watch" window.



3.1.2 Accounts Window¹

The Accounts window displays information regarding accounts on a dealer's system.



Individual account status data is displayed in the following fields (each row representing one account):

Balance

Current account balance

Equity

Current account balance plus or minus any Profit or Loss (PL) incurred on currently open positions.

Used Margin (UsdMrg)

The amount of the current trader's deposit currently being used to guarantee open positions.

Usable Margin (UsblMrg)

¹ Accessible only via the dealing interface.

The amount of the current trader's deposit that can be used to guarantee future positions. Depending on the account settings (set on the server), it is calculated as Balance - Used Margin or Equity - Used Margin.

Gross PL

Profit or Loss incurred on currently open positions, in terms of the base currency of the trader's account.

Net PI

Profit or Loss incurred on currently open positions minus any commissions or premiums, in terms of the base currency of the trader's account.

Status

Account status: either "NM," for normal, or "MC," for Margin Call.

OP (Open Positions)

Total number of lots in currently open positions.

Comm (Commission)

Total commission on currently open positions.

Prm (Premium)

Total premium on currently open positions.

Type

Account type: "B" for Banking Account, "C" for Clearing Account and "T" for Trader Account.

Accounts Window: Totals (∑) Row

All total amounts displayed in the Accounts window are computed and displayed in the base currency of the Market Maker. The summary row amounts are determined as follows:

BalanceTotal

Sum of all trader account balances multiplied by (-1).

OPTotal

Sum of the number of lots across all trader accounts.

Used MarginTotal (UsdMrg)

Sum of the used margin across all traders multiplied by (-1).

Gross PL^{Total}

Sum of the Profit and Loss on open positions across all trader accounts multiplied by (-1).

Net PL^{Total}

Sum of the Net Profit and Loss op open positions across all trader accounts multiplied by (-1).

Comm^{Total} (Commission)

Sum of commissions charged on open positions across all trader accounts multiplied by (-1).

Prm^{Total} (Premium)

Sum of premiums charged on open positions across all trader accounts multiplied by (-1).

Equity^{Total}

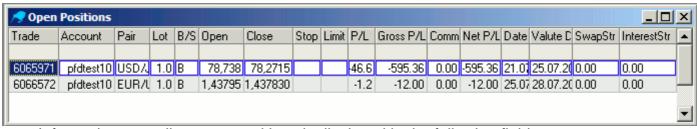
Calculated as Balance^{Total} + Gross PL^{Total}.

Usable MarginTotal (UsblMrg)

Calculated as Equity Total - Used Margin Total.

3.1.3 Open Positions Window

The Open Positions window displays information on currently open positions.



Information regarding open positions is displayed in the following fields:

Trade

Ticket number assigned to the position by the system.

Account

Account number from which the position was opened.

Currency pair for the position.

Lot

Number of lots in the position.

B/S

Whether the base currency for the position was bought (B) or sold (S).



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Open

Price at which the position was opened.

Close

Live price at which the position could be closed.

If a Stop order has been placed for this position, the trigger price is displayed.

If a Limit order has been placed for this position, the trigger price is displayed.

P/L

Real-time Profit or Loss for the position, in pips.

Gross PL

Real-time Profit or Loss for the position, in currency. For the dealer interface, the amount is displayed in terms of the Market Maker's base currency. For the trader interface, the amount is displayed in terms of the trader's account's base currency.

Net P/L

Real-time Profit or Loss for the position including any commissions or premiums charged, in currency. For the dealer interface, the amount is displayed in terms of the Market Maker's base currency. For the trader interface, the amount is displayed in terms of the trader's account's base currency.

Date

Date and time of the last change in the position.

Open Positions Window: Right-Click Actions

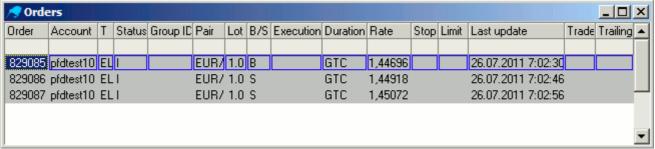
Right-clicking on a position in the Open Positions window brings up a menu which allows the following actions for the selected position:

\times	Create an order to close the position.	
X	Close the position with a hedge.	
6	Open an opposing hedge position.	
	Create a limit order for the position.	
1	Create a stop order for the position.	

3.1.4 Orders Window

The Orders window displays orders that have not yet been executed.





Information regarding orders is displayed in the following fields:

Order

Order number.

Account

Account number from which the order was issued.

Т

Order type.

Pair

Currency pair for which the order was issued.

Lot

Number of lots the order applies to.

B/S

Whether order is to buy (B) or sell (S) the base currency of the currency pair the order applies to.

Duration

The time during which the order is valid: GTC (Good Till Cancelled)—the order is valid forever, until cancelled) or DAY—the order is valid until the end of the current day. DAY orders are removed at the close of the day when they were issued.

Rate

The price at which the order was issued.

Stop (for Entry orders)

If the Entry order has a stop, the trigger price of the Stop order is displayed.

Limit (for Entry orders)

If the Entry order has a limit, the trigger price of the Limit order is displayed.

Trailing (for Stop and Entry Stop orders)

Whether or not the order is a Trailing (Trailing-stop) order.

Last Update

Date and time of the creation of last change to the order.

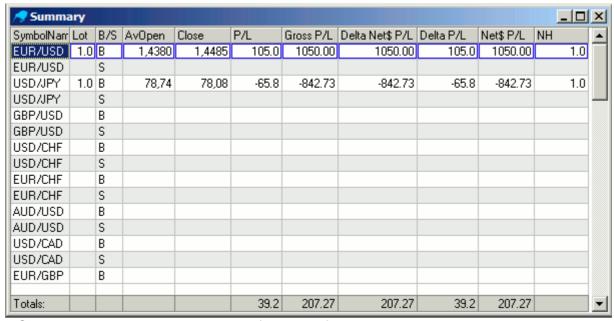
Orders Window: Right-Click Actions

Right-clicking on an order in the Orders window brings up a menu which allows the following actions for the selected order:

\times	Remove the order.			
7	Change the trigger price for the order.			
IMI	Create a Limit order for a selected Entry order.			
1	Create a Stop order for a selected Entry order.			
The following actions are available only on the dealer interface.				
0k	Confirm I or C orders.			
>	Remove conditional order.			
XΥ	Reject order.			

3.1.5 Summary Window

The Summary window displays summary information on positions across available instruments.



Summary data is displayed in the following fields:

Symbol Name

Base currency of the currency pair.

Counter currency of the currency pair.

Lot

Total number of lots across positions in the currency pair.

R/S

Whether the base currency for the position was bought (B) or sold (S).

AvOpen

Average opening price for positions in the selected instrument.

Close

Live price at which the positions for the selected currency pair could be closed.

P/L

Real-time Profit or Loss positions across the selected currency pair, in pips.

Gross P/L

Real-time Profit or Loss for positions across the selected currency pair, in base currency.

Delta Net\$ P/L

Floating Profit or Loss for positions across the selected currency pair, summed by sell and buy positions, in base currency.

Delta P/L

Floating Profit or Loss for positions across the selected currency pair, summed by sell and buy positions, in pips.

Net\$ P/L

Real-time Profit or Loss for positions across the selected currency pair, including any commissions or premiums charged, in currency.

NH

Number of non-hedged lots.

4. Trading

Placing Orders

Market orders can be created from charts or from the Dealing Rates window.

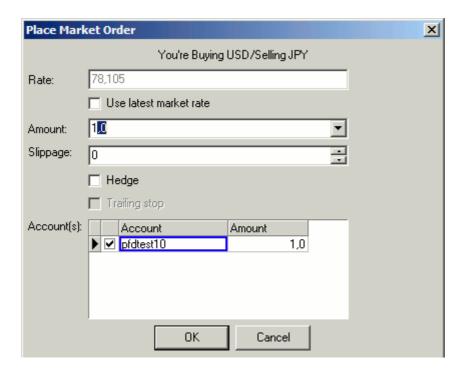
To create an order from the charts, right-click on the chart and choose one of the options in the pop-up menu: Buy <buy>
sell <sell price>
, Entry Stop/Limit Sell: <Price>



After choosing Buy <Price> or Sell <Price>, the Place Market Order dialog box will open, allowing you to enter the number of lots and allowable slippage.

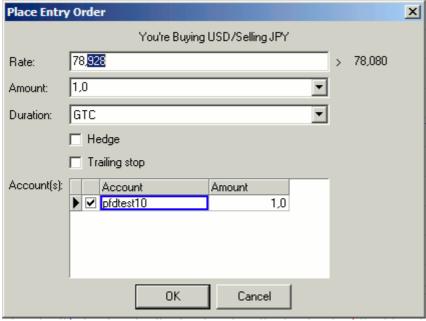
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After OK is pressed, the order will be sent to the system.

After choosing Buy >, Entry Stop/Limit Buy : <Price>, Entry Stop/Limit Sell: <Price>, the Place Entry Order dialog box will open, allowing you to enter the number of lots and allowable slippage for your conditional order.



After OK is pressed, the order will be sent to the system.

Notifications

When a user sends a command to the system (order creation, for example), information about the command appears in the messages window, as shown below. If that window is not opened on your system, it is opened automatically when a new notification arrives.



In addition to commands sent to the server, the Messages widow also displays messages and notifications from the server that reflect the flow of trading.

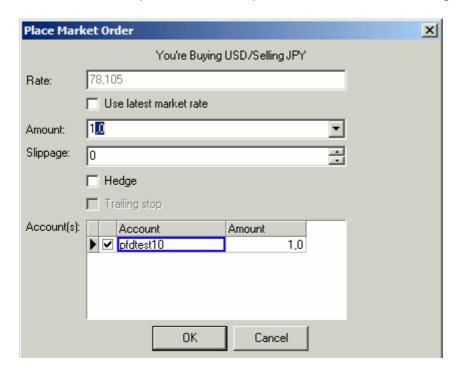
Conditional Orders

Stop/Limit orders can be created from the Charts or from trading windows.

To create a Stop or Limit order from the charts, right-click on the point that corresponds to the desired Stop/Limit price, and choose Stop or Limit from the popup menu that appears.



You can edit the price for the Stop or Limit order in the dialog box that appears.



Stop and Limit orders can also be placed the same way from the trading screen, by selecting the position for which the Stop or Limit order is being placed in the Open Positions window, and clicking on the appropriate button on the toolbar.

Stops and Limits for Entry orders can be created from the Orders window by selecting the required Entry order and clicking on Stop or Limit in the window's toolbar.

Stop and Limit orders are displayed on the charts as colored horizontal lines, which can be adjusted to change the trigger price of the applicable Stop or Limit orders by dragging the line in the desired direction.

5. **Technical analysis indicators.**

Kiwi Trader trading workstation is equipped with a powerful indicator formula language (IndicatorFL) allowing you to define your own indicators and write custom commentaries.

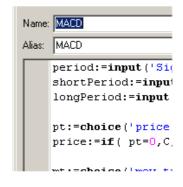
5.1 Indicator editor

The **Indicator Builder** dialog is accessible by choosing **Indicator Builder** item from the Tools menu.



Indicator builder window enables you to define your own custom indicators. You can add a new indicator by pressing **New** button or change existing ones by pressing Edit button. Delete button will remove an indicator from the list.

When you add or edit an indicator, Name field stands for the indicator's name. Alias field stands for the indicator's alias. Indicator script is located in the editor window. When you enter indicator values and press **OK** button application will check input parameters for correctness. If invalid input detected, application will show error window and set cursor to the position of error in the editor window.

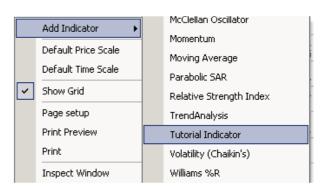




Unique identifier (like Windows GUID) is assigned to every indicator. This technique gives you ability to change indicator's name and alias at anytime.

5.2 Place indicator on the chart.

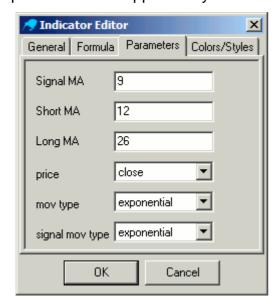
Do right-click on a chart to drop down the menu where you can now select an indicator. When the indicator is selected, the **Indicator Editor** window will be shown.



```
Indicator Editor
                                                                    X
General Formula
🐰 🖺 🖺 🗠 🏂
    period:=input('Signal MA',1,100,9);
    shortPeriod:=input('Short MA',1,200,12);
    longPeriod:=input('Long MA',3,255,26);
    pt:=choice('price','close;open;low;high',0);
    price:=if( pt=0,C, if(pt=1,0,if(pt=2,L, H )));
    mt:=choice('mov type' , 'simple; weighted; exponential' ,2);
    mts:=choice('signal mov type' , 'simple; weighted; exponential
    FL := Mov( price, shortPeriod, mt ) - Mov( price, longPeriod, n
    SL := Mov(Mov( price, shortPeriod, mt ) - Mov( price, longPerio
    MD:=FL-SL;
4
                                                                 F
                            OK.
                                     Cancel
```

Indicator script belongs to indicator, not to the running instance. Suppose you have 3 **MACD** indicators and you are changing the script while adding fourth **MACD** indicator, you will see that all running instances of the **MACD** indicators are reflecting changes.

On the **Parameters** page you can quickly change indicator parameters. These parameters are applied only to the current indicator instance.



After pressing **OK** button you have to specify the target frame, where new indicator instance would be placed. When you place indicator into the existing chart frame, indicator values must be in proportion to with the chart values scale.

You can use Inspect Window to display selected indicator or chart values.



3 Using Indicator Formula Language

The Indicator Formula Language is a special programming language used to build custom indicators. It was developed to be compatible with the Metastock formula language.

In its simplest form, the Indicators formula language is comprised of high-level functions (e.g., mov(), rsi(), abs()), mathematical operators (e.g., +, -, /, *), and parameters (open, high, low, close, etc.). Using Indicator Builder each of these basic components can be combined with each other to create your own indicators with the Indicator Builder. Thus, it does look like Metastock with the following differences:

- special functions for input data (Input, Choice)
- special function for plot chart (Plot)

Indicator Formula Language allows creating indicators without any effort. It has such a simply syntax that even inexperienced users can develop their own indicators. In order to be easy to be studied all predefined application indicators are written on Indicators Formula Language.

For example, let's explore MACD indicator:

```
{ input parameters definition }
period:=input('Signal MA',1,100,9);
shortPeriod:=input('Short MA',1,200,12);
longPeriod:=input('Long MA',3,255,26);
pt:=choice('price','close;open;low;high',0);
price:=if( pt=0,C, if(pt=1,0,if(pt=2,L, H )));
mt:=choice('mov type' , 'simple; weighted; exponential' ,2);
mts:=choice('signal mov type' , 'simple;weighted;exponential' ,2);
{ indicators lines calculation }
FL := Mov( price, shortPeriod, mt ) - Mov( price, longPeriod, mt );
SL := Mov(Mov( price, shortPeriod, mt ) -
Mov( price,longPeriod,mt ),period,mts);
MD:=FL-SL;
{ plotting results to chart }
plot(MD,'Delta Line','green',0,'diagramm');
plot(FL,'Fast Line','blue',0,'solid');
plot(SL,'Signal Line','red',0,'solid');
```

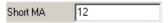
Just as many other programs, indicator script consists of the following blocks:

- Data definition and input block
- Calculations block
- Results output block.

Application has special functions to get input parameters. In this example user must supply parameters of two different types:

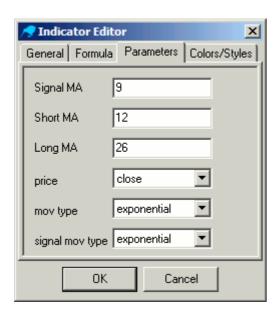
- Integer values using Edit boxes.
- Typified values using Combo boxes.

Input function is used for entering numeric parameters. It is fully equal to the similar Metastock function.



Choice function used for entering typified parameters. This function does not exist in Metastock.





In this example all necessary variables are declared in the **Input parameters** definition block.

Input and **Choice** functions can be placed in any script place (since they return values they must be used on the right side of the expression).

Following script is used to input price type using **Choice** function:

```
pt:=choice('price','close;open;low;high',0);
price:=if( pt=0,C, if(pt=1,O,if(pt=2,L, H )));
```

First command reads selected price type row index from the combo box into the variable **pt**. Each drop down row has a unique index: Close -0, Open -1, Low -2, High -3. So, numbering starts from zero.



Second command assigns variable **Price** to one of the predefined price arrays (Open prices, Close prices, High prices, Low prices). Assignment depends on current **Pt** value.

If function is used to convert row index into array symbolic name. If is fully equal to similar Metastock function.

Indicator lines calculation block is used to calculate indicator's data.

```
{indicators lines calculation}
FL := Mov( price, shortPeriod, mt ) - Mov( price, longPeriod, mt );
SL := Mov(Mov(price, shortPeriod, mt) - Mov(price, longPeriod, mt ), period, mts);
MD:=FL-SL;
```

This block calculates following output variables:

- FL fast line
- SL slow line
- MD MACD line

Like in Metastock, IndicatorFL assignments have the following form:

```
variable := expression
```

where

- Variable name of the variable which contains result of expression.
- **Expression** any valid IndicatorFL expression



This example uses **Mov** function to calculate the moving average (smoothing).

Plotting results Block displays indicator's data.

```
{plotting results to chart}
plot(MD,'Delta Line','green',0,'diagramm');
plot(FL,'Fast Line','blue',0,'solid');
plot(SL,'Signal Line','red',0,'solid');
```

Function **Plot** is used to plot indicator at the chart. This function belongs to the IndicatorFL and does not exist in Metastock. It allows you to specify color, style and width of indicator curve as well as to print the indicator's name.

5.4 Language description.

IndicatorsFL is a functional language; i.e., program is a collection of calls of standard and user defined functions just as in LISP programming language. For better flexibility, **IndicatorsFL** has variables to hold temporary calculations, results, logic operators, arithmetic operators and assignment operators.

Variables do not have to be explicitly defined. For the future use variables must be initialized, i.e., appear in the left part of the assignment operator. For example:

```
X := mov(C, 18, E);

Y := mov(X, 20, S);
```

In this example usage of the variable X is correct, since X is implicitly declared on the previous row.

But if the script is defined the following way:

```
Y := mov(X, 20, S);
```

It will cause compilation errors because variable X was not defined.

IndicatorFL does not have any cycles or branch operators. The only way to define a condition jump is **If** function. For example:

```
if( close > mov(c,10,s), rsi(9), rsi(14))
```

If the first parameter is **True** then **If** function returns the second parameter, otherwise it returns the third parameter.



Main feature of the **IndicatorFL** (like in Metastock formula language) is the special way of addressing an input price and temporary data (also known as **Data Arrays**).

In general, IndicatorFL language is used for constructing functions for price data arrays analysis. **Open** price, **Close** price, **High** price and **Low** price in script can be abbreviated as **O**, **C**, **H**, **L**. Just like in Metastock, functions, which use data arrays work not only with current value, but with the whole data arrays. For example:

$$X := Mov(C, 18, S)$$

Returns average value of previous 18 bars, i.e.,

$$X = \frac{C_0 + C_{-1} + \dots + C_{-17}}{18}$$

Where C₀ is close price of first candle

 C_1 is close price of second candle and so on.

Therefore only **Data Array type** can be used as first parameter of the **Mov** function. Data arrays function can operate not only with predefined data arrays (C, O, H, L). Any data array can be used as a parameter. Take a look:

$$X := mov(C, 18, E);$$

 $Y := mov(X, 20, S);$

Second **Mov** function uses temporary data array which is calculated in the first **Mov** function. In other words second **Mov** does simple average smoothing using result of the first **Mov** function with period 20.

Constant values as well can be used in the place of data arrays type. For example:

Is equal to the formula:

$$X = \frac{0.2 + 0.2 + 0.2}{3}$$

Data arrays can be used in arithmetic and logic operators. In this example current (last) value of the Data Array is used. For example:

It means that if the current close value is greater than the current open value, **If** function returns value of variable X, otherwise it returns value of variable Y.



5.5 Data arrays access

Predefined data arrays can be accessed using following symbolic names:

Name	Description	Usage example
C, CLOSE	Close prices	X:=mov(C,12,E)
O, OPEN	Open prices	X:=mov(O,12,E)
H, HIGY	High prices	X:=mov(H,12,E)
L, LOW	Low prices	X:=mov(L,12,E)
TP()	Function returning typical price	X:=mov(tp(),12,E)
MP()	Function returning median price	X:=mov(mp(),12,E)

5.6 Data arrays addressing

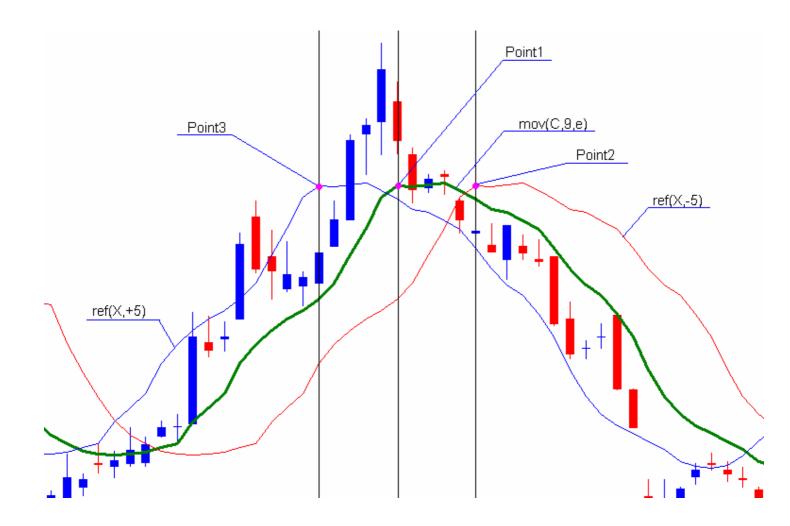
For addressing any candles (bars) other than current, **Ref** function is used. It has the following syntax:

Ref (DATA ARRAY, PERIODS). Ref function references a previous or subsequent element in a DATA ARRAY. A positive PERIOD references "n" periods in the future; a negative PERIOD references "n" periods ago.

Take a look at **Ref** usage example:

```
X:=mov(C,9,e);
refBack:=ref(X,-5);
refFuture:=ref(X,+5);

Plot(X,'x','green',3,'solid');
Plot(refBack,'ref(X,-5)','red',0,'solid');
Plot(refFuture,'ref(X,+5)','blue',0,'solid');
```



X:=mov(C, 9, E);

This expression calculates exponential smoothing from the close prices. Variable X hold result data array of calculation.

Suppose we have several bar amount (1024 for example)

Starting from beginning, application will execute script and Mov (C, 9, E) will be executed 1024 times, i.e., one time for each bar. As result X data array will be calculated.



Then the application will execute refBack:=ref(X,-5);. Function Ref will be executed for each bar just like in the previous explanation of the Mov function. Then application will execute refFuture:=ref(X,+5) function for each bar. Since the moment of execution refFuture:=ref(X,+5) all values for X array are calculated at the Point3 you can use values of Point1.

When a new bar arrives, application executes all calculation only once for each row, since it can use previously calculated results. In our example, when 1025 bar will arrive, the program would execute:

X:=mov(C,9,e);, then refBack:=ref(X,-5);, and finally refFuture:=ref(X,+5);. Notice, all calculation will be executed only once.