

STEP BY STEP GUIDE

for

ExpertAdvisor

In this guide, wherever you read “ExpertAdvisor” replace it by the name of the expert advisor you bought or rented.

The User Manual for ExpertAdvisor is a separate document.

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NOMENCLATURE

OP=open price at entry

TP=take profit price

SL=Stop Loss price

ATR= Average true range (latest value)

RPP= Risk per pip (computed based on risk amount, SL and lot size)

MAx = Moving Average of x periods

CP=current price

ASK=ask price

BID=bid price

EA=Expert Advisor

******All explanations are for a BUY trade. SELL trades follow the same logic with proper changes.

****** All TP and SL are checked against STOP and FREEZE levels.

****** All optimizable parameters show a bracket with suggested values to use in the optimization. For example, [0,2,12] means to set the variable go from 0 to 12 every 2. Additionally, if there is a value between vertical lines, it disables the variable. For instance, |<0|[0,1,5] means that when the variable is less than zero the variable has no effect. Values inside the brackets [] are recommended but not mandatory. Values inside the vertical lines | | are enforced in the code to disable the variable in question.

******* Since the currency of your account can be any, the EA reports currency amounts with a “C” in front of the value. For instance, if your profit is 1234.0 (in your account currency), the profit will be reported as C1234.0, meaning 1234.0 units of your account currency. If the amount is negative, you will see C-1234.0 instead. That is, you must interpret “C” as USD, or EUR, or JPY, or GBP, etc., depending on your account currency.

RISKS:

- Before purchasing this (or any!) EA, be aware of risks involved.
- Past performance is not a guarantee of future profitability (EA could also incur losses).
- Back-tests shown are optimized for the training data, and the performance cannot be directly applied to live trading in the future.
- There is a probability (although small) when using any EA that you may lose money in all your trades.
- Hence, risk the amount of money you are comfortable losing.

This guide will help users to perform two important steps:

- 1) Use the **ExpertAdvisor** to optimize parameters using the Tester in Metatrader 5
- 2) Use the **ExpertAdvisor** in a live account

In the package you downloaded there are these files:

- This document in PDF format
- **ExpertAdvisor.ex5**, the executable file
- **ExpertAdvisor.set**, the set file

1) STEPS TO OPTIMIZE PARAMETERS

(Please read and be familiar with the optimization strategy in Metatrader 5 in this article:

https://www.metatrader5.com/en/terminal/help/algorithmictrading/strategy_optimization)

- Launch Metatrader 5.
- Go to the Settings tab.
- Load the **ExpertAdvisor.ex5** expert advisor executable file you bought or rented. (in the figure below, the example is done with ZING expert advisor)
- Go to the Input tab to see all input parameters available to you. This has the default values for all parameters.
- Load **ExpertAdvisor.set** by right-clicking on any of the input parameters and press “load.” Find the **ExpertAdvisor.set** and load it.

Now you should be able to see input parameters again, but this time with some different values. Use these for the Optimization step next.

- Go to the “Settings” tab and fill all values.
 - Select the symbol you want to trade (see figure below).
 - Select any time frame (it will be over written by the EA). In the figure, H2 was chosen.
 - Select Custom Period. This should end on today’s date, and should start one year before.
 - Forward: No
 - Select the second option in the pull down menu in Delays.
 - Select “Every tick based on real ticks” in Modelling
 - Make sure to un-select “profit in pips....”
 - Enter the Deposit for the account, and the currency
 - Enter the leverage of this account (this information comes from your broker or prop firm)
 - Enter “Fast genetic based algorithm” in the Optimization
 - Select the objective to maximize. We recommend to use Custom max.

Expert:	MyEAs\zing_v1.0.ex5			IDE	
Symbol:	USDJPY	H2			
Date:	Custom period	2024.03.18	2025.03.15		
Forward:	No	1970.01.01			
Delays:	106 ms			emulate slippage and requotes during trade execution	
Modelling:	Every tick based on real ticks	<input type="checkbox"/>		profit in pips for faster calculations	
Deposit:	100000	USD	1:33	leverage	
Optimization:	Disabled	<input type="checkbox"/>		visual mode with the display of charts, indicators and trades	


- Click on the “Input” tab. You should be able to see the parameters that will be optimized. They can be identified because they have a blue check mark on them. Other parameters with no check marks, or with gray check marks, will be held constant during the optimization.

We recommend to perform your first optimization without changing anything in the Input tab. Once you get familiar with the EA, you should be able to change what parameters to optimize, and input ranges for each parameter, as you wish.

A complete description of all Input parameters is given below in the first page of the User Manual later in this document.

Below is what you should see in the Input parameter tab:

Input Tab for the example of USDJPY

Variable	Value	Start	Step	Stop	Steps
<input checked="" type="checkbox"/> Add any comment for your reference	USDJPY_mar_14_H3_ar58%_wr56%_rf5.7_tt59_ZING				
<div> ----- TIME PARAMETERS -----</div>					
<input checked="" type="checkbox"/> Time frame (bar period)	3 Hours	1 Hour		3 Hours	3
<input checked="" type="checkbox"/> Start trading at this server time (hour) [0,23]	0	0	1	10	
<input checked="" type="checkbox"/> Trade for this many hours each day [1,24]	24	24	1	240	
<input checked="" type="checkbox"/> Allow to open trades on Monday (server time)	true	false		true	
<input checked="" type="checkbox"/> Allow to open trades on Tuesday (server time)	true	false		true	
<input checked="" type="checkbox"/> Allow to open trades on Wednesday (server time)	true	false		true	
<input checked="" type="checkbox"/> Allow to open trades on Thursday (server time)	true	false		true	
<input checked="" type="checkbox"/> Allow to open trades on Friday (server time)	true	false		true	

In the next section, you use the **ExpertAdvisor** parameters. (as an example, ZING is used here)

----- ZING Strategy Params -----					
<input checked="" type="checkbox"/> i0_zing [1,1,10]	1	1	1	6	6
<input checked="" type="checkbox"/> stochastic 1	false	false		true	2
<input checked="" type="checkbox"/> stochastic 2	true	false		true	2
<input checked="" type="checkbox"/> stochastic 3	true	false		true	2
<input checked="" type="checkbox"/> stochastic 4	true	false		true	2

----- TP <OPEN> PARAMETERS -----					
<input type="checkbox"/> At Opening TP method	TPopFractal: TP_opA...	TPopMult: TP_opMul...		TPopGap: TP_opCon...	
<input type="checkbox"/> TP_opMult (if 0 => no TP)	8	0.0	2.0	8.0	
<input checked="" type="checkbox"/> TP_opAtr [0,2,20](if 0 => no TP)	6	0.0	2.0	8.0	5
<input type="checkbox"/> TP_opConvex01: [0,0.2,1](higher=>near to OP)	0	0.0	0.2	1.0	
<input type="checkbox"/> TP_opPct: from OP [0.5,0.5,2]	1.0	0.5	0.5	2.0	
<input checked="" type="checkbox"/> TP_opNbars # bars sup/res [0]	0	0	20	200	11

----- SL <OPEN> PARAMETERS -----					
<input type="checkbox"/> At the opening SL Method	PB+ATR: SL_opPrev...	FixPips: SL_opFixPips		Gap: SL_opConvex01	
<input type="checkbox"/> SL_opFixPips: [10,10,120]	30	10	20	120	
<input checked="" type="checkbox"/> SL_opATR: [1,1,10]	0.5	0.5	1.0	3.0	4
<input checked="" type="checkbox"/> SL_opPrevBar: number of previous bars [3,3,11]	3	3	3	10	3
<input type="checkbox"/> SL_opConvex01: [0.1,0.2,1]	0.7	0.	0.2	1	
<input type="checkbox"/> SL_opPricePct: [0.1,0.1,0.5]	0.5	0.1	0.1	0.5	
<input checked="" type="checkbox"/> SL_opAggr: open aggressivity (T/F)	false	false		true	2

----- SL <TRAILING> PARAMETERS -----					
<input type="checkbox"/> SL Trailing Method (at each new bar)	DelCl: SL_trConvex01	Static: SL won't move		Gap: SL_trConvex01	
<input checked="" type="checkbox"/> SL_trConvex01 [0,0.1,1]	0.2	0.0	0.2	1.0	6
<input type="checkbox"/> SL_trTrigFac: [0.2,0.2,1]	0.6	0.2	0.2	1.0	
<input type="checkbox"/> SL_trFixPips: [10,10,120]	40	20	20	100	
<input type="checkbox"/> SL_trATR: [0.5,0.5,]	1.5	0.5	0.5	2.0	
<input type="checkbox"/> SL_trPrevBar: number of previous bars [3,3,10]	6	3	3	10	
<input type="checkbox"/> SL_trAcc: [0.25,0.25,1.25]. Higher => more aggressiv...	0.75	0.25	0.25	1.25	
<input type="checkbox"/> SL_trFixMoney: [Currency amount]	400	100.0	100.0	500.0	
<input type="checkbox"/> SL_trBarCountOp: [3,1,5]	5	3	1	5	

-----SL PARAMS TO AVOID BIG LOSSES -----					
<input checked="" type="checkbox"/> SL_negGap: move SL when a negative Gap happens	false	false		true	2
<input checked="" type="checkbox"/> SL_BADbigBar ATR factor [0][2,1,5]	6	0.0	2.0	6.0	4
<input checked="" type="checkbox"/> SL_ClosePos (reduce SL if opp entry is better)	false	false		true	2
<input checked="" type="checkbox"/> SL_CloseX200 (reduce SL if cross MA200 & -trend)	false	false		true	2
<input checked="" type="checkbox"/> SL_ConsOppBars [1][1,2,11](reduce SL if conseq bars ...	3	1	2	11	6

----- SL PARAMS TO PRESERVE GAINS -----					
<input checked="" type="checkbox"/> SL_posGap: move SL when a positive Gap happens	false	false		true	2
<input checked="" type="checkbox"/> SL_GOODBigBar: ATR factor [0][2,1,5]	6	0.0	2.0	6.0	4
<input checked="" type="checkbox"/> SL_turbo01: fract. of TP-OP -> tightSL [0][0,2,1]	0.2	0.0	0.2	1.0	6
<input checked="" type="checkbox"/> SL_fractal: fractal near TP <0.5[0.4,0.1,1]	0.8	0.4	0.1	1.0	7

----- PARTIAL TAKE-PROFIT PARAMS <@each tick> -----					
<input type="checkbox"/> SL_Gain2BE: trigger to move to B.E. [0][0.5,0.5,TP]	0	0.5	0.5	3.0	
<input type="checkbox"/> SL_Gain2CL: added trigger to close %vol [0][0.5,0.5,TP]	0	0.5	0.5	3.0	
<input type="checkbox"/> SL_GainVpct: % vol to close (==0 -> move to break e...	0	50.0	10.0	80.0	

----- PROP FIRM INFORMATION ---					
<input checked="" type="checkbox"/> Prop.Firm-like rules for daily & account DD	FTMO-like Rules				
<input checked="" type="checkbox"/> Current GMT off set (eg, Prague=2 when DST, 1 other...	2				
<input checked="" type="checkbox"/> Roll over hour in PropFirm time (e.g., 17 for TFT)	24				

----- RISK MANAGEMENT (RM) PARAMETERS -----					
<input checked="" type="checkbox"/> Risk Management (RM) method at the open	Fixd % of Ini.Deposi...				
<input checked="" type="checkbox"/> RM0: Init.Deposit to calculate max loss allowed	100000				
<input type="checkbox"/> RM1: Initial % Risk (per trade)	2	1.0	0.1	10.0	
<input type="checkbox"/> RM2: Max % Risk (per trade)	10	10.0	1.0	100.0	
<input type="checkbox"/> RM3: Fixed Lot Size (per trade)	1	1.0	0.1	10.0	
<input type="checkbox"/> RM4: Lot Size Per every 10k of free margin	0.25	0.25	0.025	2.5	
<input type="checkbox"/> RM5: Cum.mult.factor of gain % [0.1,0.1,1]	0.5	0.5	0.05	5.0	
<input type="checkbox"/> RM6: Max Lot Size per trade [0][>0]	10	30.0	3.0	300.0	
<input type="checkbox"/> RM7: Fixed Currency amount risked per trade	100	100.0	10.0	1000.0	

----- OTHER RISK PARAMETERS (FIXED) -----					
<input checked="" type="checkbox"/> RM8: Prop.Firm MaxDailyLoss in % of Ini.Dep.	5				
<input checked="" type="checkbox"/> RM9: Safety factor for DailyLoss (RM8) [0.5,1]	0.9				
<input checked="" type="checkbox"/> RM10: Prop.Firm MaxAccountLoss in % of Ini.Dep.	10				
<input checked="" type="checkbox"/> RM11: Safety factor for Acct.Loss (RM10) [0.5,1]	0.9				
<input checked="" type="checkbox"/> RM12: Use RM8, RM10 when computing lot size	true				
<input checked="" type="checkbox"/> RM13: Safety factor for MARGIN_SO_CALL [1,5]	1.5				
<input checked="" type="checkbox"/> RM14: Nbr Simult. symbols in trading (Tester only)	2				
<input checked="" type="checkbox"/> RM15: % Ini.Dep. target (closeALL, stop EA) [0][>0]	0				
<input checked="" type="checkbox"/> RM16: Req.Margin must be less than Balance/2	false				

----- MISCELLANEOUS PARAMETERS -----					
<input checked="" type="checkbox"/> Order Type	Stop order (NBACK, ...	Market order (instan...		Stop order (NBACK, ...	2
<input type="checkbox"/> NBACK: # bars back high/low for Stop Orders	1	1	1	10	
<input type="checkbox"/> WBSO: Max # waiting bars for Stop Orders	2	2	1	20	
<input type="checkbox"/> WBLO: Max # waiting bars for Limit Orders	6	6	1	60	
<input type="checkbox"/> nBackLO: for Limit Orders	5	5	1	50	
<input type="checkbox"/> atrLO: for Limit Orders	2	2.0	0.2	20.0	
<input checked="" type="checkbox"/> Max # Open Symbols [0][1,1,n] (Live trading)	10				
<input checked="" type="checkbox"/> Slippage (points) [2,20]	10				
<input checked="" type="checkbox"/> Waiting time (minutes) before week starts	60				
<input checked="" type="checkbox"/> Round trip commission per lot (C/lot) (estimate)	4				
<input checked="" type="checkbox"/> Allow trades to BUY, or SELL or BOTH	Buy and Sell orders a...				
<input checked="" type="checkbox"/> Display Permitted daily losses (in Live trading)	false				
<input checked="" type="checkbox"/> Send me an email when opening an order	false				
<input checked="" type="checkbox"/> Magic number. If 0, autogenerate MAGIC number	0				

----- NEWS HANDLING PARAMETERS (Live trading only) -----					
<input checked="" type="checkbox"/>	Minutes before News to take actions	2			
<input checked="" type="checkbox"/>	Minutes after News to restart trading	2			
<input checked="" type="checkbox"/>	Action for profitable open positions	Close it			
<input checked="" type="checkbox"/>	Action for losing open positions	Keep open, same SL			
<input checked="" type="checkbox"/>	NAF: News Atr Factor to tight SL	0.5			
<input checked="" type="checkbox"/>	Reset SL back to original (after news)	true			
<input checked="" type="checkbox"/>	Close pending Orders before News	true			

----- WEEKEND HANDLING PARAMETERS -----					
<input checked="" type="checkbox"/>	Minutes before Friday 5pm EST to take actions	5			
<input type="checkbox"/>	Weekend action for profitable open positions	Keep open, same SL	Keep open, same SL		Keep open, move SL ...
<input type="checkbox"/>	Weekend action for losing open positions	Keep open, same SL	Close it		Keep open, move SL ...
<input checked="" type="checkbox"/>	WAF: Weekend Atr Factor to tight SL	0.5			
<input checked="" type="checkbox"/>	Close pending Orders before weekend	true			

---- Withdraw in Tester: if Bal. > Ini.Bal. + Wmult*Wmoney ----					
<input checked="" type="checkbox"/>	Wmoney [0][0,Ini.Dep.]	0			
<input checked="" type="checkbox"/>	Wmult [>=1]	2			

===== Custom Max Optimization =====					
Read this article: https://www.mql5.com/en/articles/14365					
- Build Custom Objective to Maximize:					
<input checked="" type="checkbox"/>	Select Objective Function to Maximize 1:	1] Annual Return %			
<input checked="" type="checkbox"/>	Target 1	100			
<input checked="" type="checkbox"/>	Weight 1	100			
<input checked="" type="checkbox"/>	Select Objective Function to Maximize 2:	10] Win Rate %			
<input checked="" type="checkbox"/>	Target 2	100			
<input checked="" type="checkbox"/>	Weight 2	10			
<input checked="" type="checkbox"/>	Select Objective Function to Maximize 3:	6] Recovery Factor			
<input checked="" type="checkbox"/>	Target 3	10			
<input checked="" type="checkbox"/>	Weight 3	10			
<input checked="" type="checkbox"/>	Select Objective Function to Maximize 4:	0] None			
<input checked="" type="checkbox"/>	Target 4	50			
<input checked="" type="checkbox"/>	Weight 4	25			
<input checked="" type="checkbox"/>	Select Objective Function to Maximize 5:	0] None			
<input checked="" type="checkbox"/>	Target 5	1			
<input checked="" type="checkbox"/>	Weight 5	1			

- Hard Constraints:					
<input checked="" type="checkbox"/>	if false, all constraints are ignored	true			
<input checked="" type="checkbox"/>	Select Constraint Function 1:	1] Daily Loss % InitD...			
<input checked="" type="checkbox"/>	Type 1	<= Less or equal to			
<input checked="" type="checkbox"/>	Bound Value 1	5			
<input checked="" type="checkbox"/>	Select Constraint Function 2:	2] Accnt Loss % Init...			
<input checked="" type="checkbox"/>	Type 2	<= Less or equal to			
<input checked="" type="checkbox"/>	Bound Value 2	10			
<input checked="" type="checkbox"/>	Select Constraint Function 3:	5] Win Rate %			
<input checked="" type="checkbox"/>	Type 3	>= Greater or equ...			
<input checked="" type="checkbox"/>	Bound Value 3	55			
<input checked="" type="checkbox"/>	Select Constraint Function 4:	4] Consecutive losin...			
<input checked="" type="checkbox"/>	Type 4	<= Less or equal to			
<input checked="" type="checkbox"/>	Bound Value 4	5			
<input checked="" type="checkbox"/>	Select Constraint Function 5:	7] Recov Factor			
<input checked="" type="checkbox"/>	Type 5	>= Greater or equ...			
<input checked="" type="checkbox"/>	Bound Value 5	3			
<input checked="" type="checkbox"/>	Select Constraint Function 6:	18] # MaxDailyLoss ...			
<input checked="" type="checkbox"/>	Type 6	<= Less or equal to			
<input checked="" type="checkbox"/>	Bound Value 6	0			
<input checked="" type="checkbox"/>	Select Constraint Function 7:	6] # trades/week			
<input checked="" type="checkbox"/>	Type 7	>= Greater or equ...			
<input checked="" type="checkbox"/>	Bound Value 7	0.5			
<input checked="" type="checkbox"/>	Select Constraint Function 8:	22] MaxEqtyDD/IniD...			
<input checked="" type="checkbox"/>	Type 8	<= Less or equal to			
<input checked="" type="checkbox"/>	Bound Value 8	10			
<input checked="" type="checkbox"/>	Select Constraint Function 9:	21] MCPredProf/MCP...			
<input checked="" type="checkbox"/>	Type 9	>= Greater or equ...			
<input checked="" type="checkbox"/>	Bound Value 9	2			
<input checked="" type="checkbox"/>	Select Constraint Function 10:	0] None			
<input checked="" type="checkbox"/>	Type 10	<= Less or equal to			
<input checked="" type="checkbox"/>	Bound Value 10	0			

----- Misc Optimization Params -----					
<input checked="" type="checkbox"/>	Choose Result-column's decimals	WinRate %			
<input checked="" type="checkbox"/>	Choose capital method for Risk of Ruin	Loss Allowed by Prop...			
<input checked="" type="checkbox"/>	Custom Value for Risk of Ruin (if needed)	0			
<input checked="" type="checkbox"/>	Annual Risk Free rate% for Sortino calc.	2			
<input checked="" type="checkbox"/>	Draw summary on chart	false			
<input checked="" type="checkbox"/>	Print summary on journal	true			
<input checked="" type="checkbox"/>	Subtract Largest Profit from Netprofit	true			
<input checked="" type="checkbox"/>	Add Largest Loss to Net profit	false			
<input checked="" type="checkbox"/>	Multiplier for Objectives (k_o)	100000			
<input checked="" type="checkbox"/>	Multiplier for Penalties (k_p)	100			

ANALYZING OPTIMIZATION RESULTS

Once Metatrader 5 finishes the optimization process, which may take several hours depending on the number of parameters to optimize, the number of combinations, the number of cores of your computer, and the time length of the back test you selected in the Settings tab (one year was recommended), then you will get lots of combinations of parameters in a table.

Below is the snippet of the Optimization Results Tab. The very first row in the table is the “best” combination of parameters, based on the Objective that was maximized. This table is sorted by the “Result” column by default. However, there may be other combinations that you may prefer based on how they perform in the entire past year. If you click on the name of a column, the table will be sorted based on that column. We recommend to individually simulate at least three combinations: the maximum Result combination, the maximum Profit combination, and the maximum Recovery Factor combination. Out of these three simulations, you select the one you like the most. In order to simulate a combination from the table, double-click on that row to simulate the back test of one year.

Optimization Results Tab

Table 1. Top ten combinations sorted by the Result column:

Pass	Result	Profit	Total trades	Recovery factor	xtimeFrame	i0_zing	b1_zing	b3_zing	b5_zing	b7_zing	TP_ophult	SL_opaTR	SL_trTrngFac	SL_trATR	SL_negGap	SL_BAGbigBar	SL_ClosePos	SL_ConsOppb...	SL_posGap
35,466	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	6	2.0	1.0	2.0	false	4	false	5	false
34,356	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	0.9	2.0	false	4	false	5	false
34,342	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	0.9	2.0	false	4	false	5	false
34,261	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	0	true	5	false
33,400	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	0.9	2.0	false	6	true	5	false
33,309	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	6	true	5	false
33,299	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	6	true	5	false
32,502	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	6	true	5	false
32,303	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	4	true	5	false
31,322	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	6	false	5	false

Table 2. Top ten combinations sorted by the Profit column:

Pass	Result	Profit	Total trades	Recovery factor	xtimeFrame	i0_zing	b1_zing	b3_zing	b5_zing	b7_zing	TP_ophult	SL_opaTR	SL_trTrngFac	SL_trATR	SL_negGap	SL_BAGbigBar	SL_ClosePos	SL_ConsOppb...	SL_posGap
0,452	-6744375.29	93861.95	170	3.56	3 Hours	6	false	false	false	false	0	1.0	0.9	3.0	true	0	false	3	false
0,11	-17137475.15	90945.80	262	1.85	3 Hours	2	false	false	false	true	0	0.5	0.1	3.0	false	2	true	5	false
5,475	-3519236.44	78029.62	183	3.34	3 Hours	2	false	false	false	true	6	1.5	0.6	1.5	true	0	true	1	true
1,485	-13470807.27	76982.17	251	1.41	2 Hours	5	false	true	false	false	0	1.0	0.9	3.0	true	0	false	3	false
19,289	-59095.53	65960.07	98	4.29	3 Hours	1	false	true	false	true	0	2.0	0.2	2.0	false	4	false	1	false
3,425	-24314758.42	65412.34	544	1.51	1 Hour	5	false	false	false	true	2	1.5	0.4	1.5	false	4	false	1	true
1,419	-2660536.45	65088.94	155	3.26	1 Hour	4	false	false	false	true	4	3.0	0.6	0.5	false	4	true	7	false
6,401	-1607532.49	65035.66	73	2.86	3 Hours	1	false	true	false	false	0	2.0	0.3	2.0	false	4	false	7	false
0,497	-7241212.30	64265.29	193	2.14	3 Hours	2	false	true	false	true	6	1.0	0.8	3.0	true	0	false	7	false
0,50	-2257448.45	62385.26	149	2.89	1 Hour	4	false	false	false	true	4	3.0	0.6	0.5	false	4	false	7	false

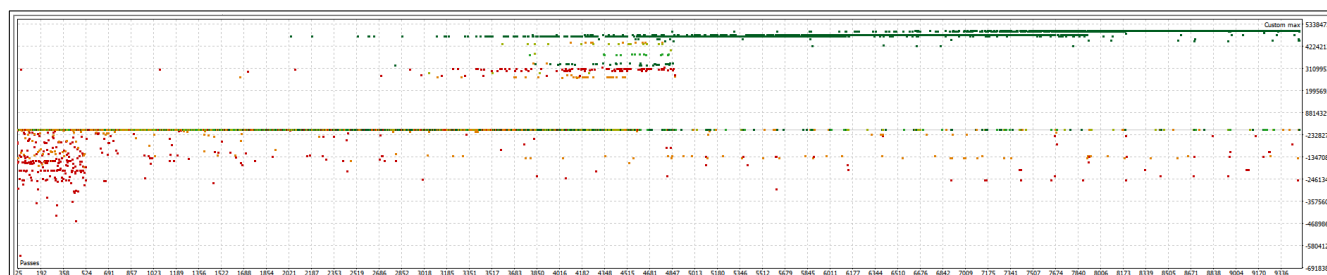
Table 3. Top ten combinations sorted by the Recovery Factor column:

Pass	Result	Profit	Total trades	Recovery factor	xtimeFrame	i0_zing	b1_zing	b3_zing	b5_zing	b7_zing	TP_ophult	SL_opaTR	SL_trTrngFac	SL_trATR	SL_negGap	SL_BAGbigBar	SL_ClosePos	SL_ConsOppb...	SL_posGap
12,278	-9633.53	52972.33	73	6.02	3 Hours	1	false	true	true	true	4	2.0	0.7	1.5	false	6	true	7	false
6,394	-662551.49	60732.67	130	5.77	3 Hours	1	false	true	true	true	2	2.0	0.3	1.5	true	4	false	3	false
9,287	-5233.51	49927.98	68	5.68	3 Hours	1	false	true	true	true	4	2.0	0.7	1.5	false	2	false	5	false
14,507	-9539.48	52336.91	58	5.66	3 Hours	1	false	true	true	true	4	2.0	0.7	1.5	false	2	false	1	false
35,466	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	6	2.0	1.0	2.0	false	4	false	5	false
34,356	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	0.9	2.0	false	4	false	5	false
34,342	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	0.9	2.0	false	4	false	5	false
34,261	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	0	true	5	false
33,400	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	0.9	2.0	false	6	true	5	false
33,309	49807701608.56	58076.03	59	5.66	3 Hours	1	false	true	true	true	0	2.0	1.0	2.0	false	6	true	5	false

As requested in the Input Tab (in the Misc Optimization Params section), the two decimal digits in the Result column represent the win rate of that combination (or “Pass”, as MetaTrade calls it). For instance, in Table 1, the combination 25,435 has a win rate of 63%.

In Table 2, sorted by Profit, shows that all combination have a negative Result. Combinations that have negative Results indicate that at least one hard constraint is violated. Running any of these combinations will show which constraints were violated as shown in the Journal Tab.

Metatrader 5 will also plots each combination as a dot (see figure below). A good optimization process will show a cloud of dots increasing to the right (see the green and red dots in the figure) with increasing positive values of the “Custom max.” Values that are negative are combinations that didn’t satisfy the constraints of the optimization problem, and they should be ignored. As you can see in the x-axis, there are more than 10,000 combinations that the optimization algorithm tested. This explains why it takes so long to finish the optimization process.

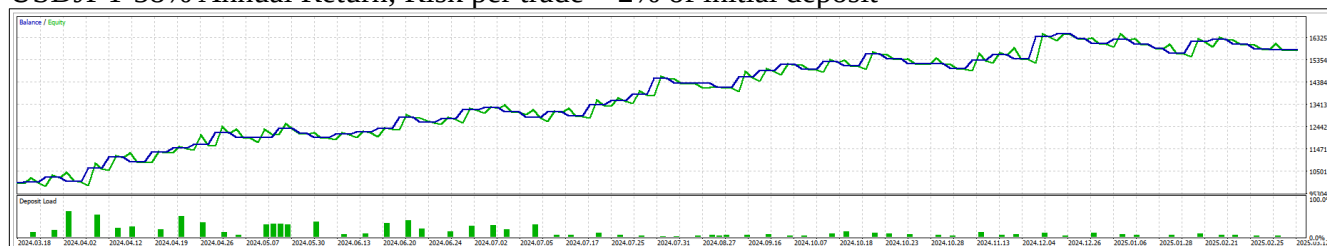


Simulating One of the Combinations

Graph Tab

If you double-click on the first row in the Optimization in Table 1 (sorted by Results column), you will get a plot of the balance & equity versus time as shown below. You also get a plot of the Deposit load. An up-trending curve of the balance curve is desirable. The curve below is a good one.

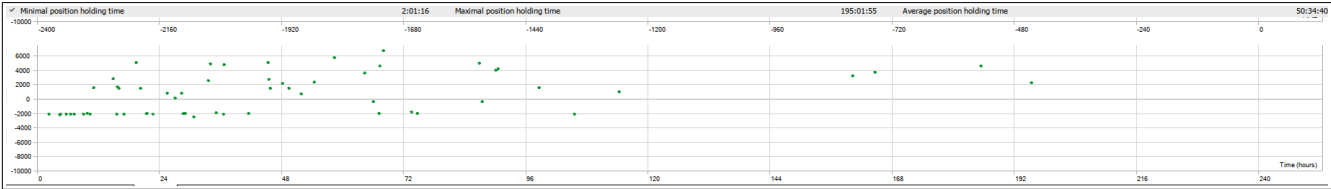
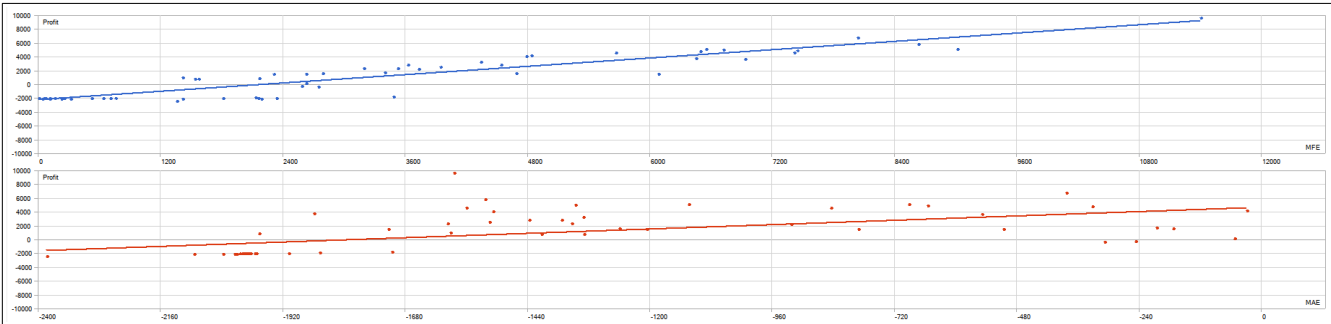
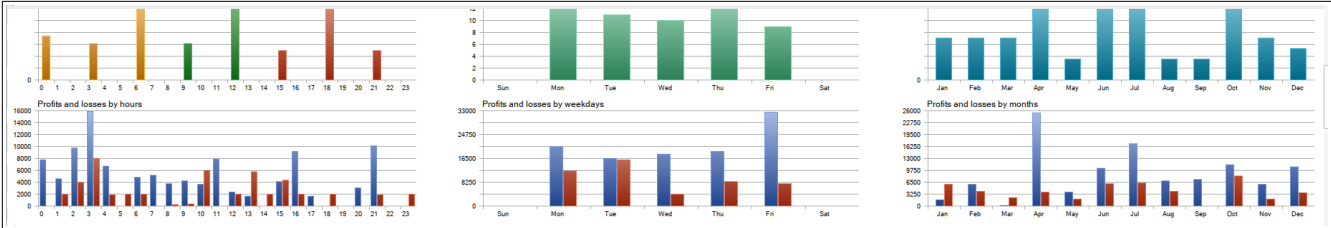
USDJPY 58% Annual Return; Risk per trade = 2% of initial deposit



Backtest Tab

Once the simulation is done, Metatrader 5 also gives you numerical and graphical summary of results for that one-year back test. Below is the summary provided. You should learn how to read this report by going to: https://www.metatrader5.com/en/terminal/help/algotrading/testing_report

✓ History Quality	100%	Ticks	18934157	Symbols	1
✓ Bars	3098				
✓ Initial Deposit	100 000.00				
✓ Total Net Profit	58 076.03	Balance Drawdown Absolute	0.00	Equity Drawdown Absolute	1 358.79
✓ Gross Profit	106 582.34	Balance Drawdown Maximal	8 350.27 (5.07%)	Equity Drawdown Maximal	10 269.10 (6.21%)
✓ Gross Loss	-48 506.31	Balance Drawdown Relative	5.07% (8 350.27)	Equity Drawdown Relative	6.21% (10 269.10)
✓ Profit Factor	2.20	Expected Payoff	984.34	Margin Level	151.92%
✓ Recovery Factor	5.66	Sharpe Ratio	3.63	Z-Score	0.11 (8.76%)
✓ A/RPR	1.0080 (0.80%)	LR Correlation	0.97	OnTester result	-49807701608.56
✓ G/RPR	1.0078 (0.78%)	LR Standard Error	4 623.48		
✓ Total Trades	59	Short Trades (won %)	20 (45.00%)	Long Trades (won %)	39 (61.54%)
✓ Total Deals	118	Profit Trades (% of total)	33 (55.93%)	Loss Trades (% of total)	26 (44.07%)
		Largest profit trade	9 716.29	loss trade	-2 386.34
		Average profit trade	3 229.77	loss trade	-1 865.63
		Maximum consecutive wins (\$)	4 (16 470.48)	consecutive losses (\$)	4 (-6 242.24)



Journal Tab

Along with the Metatrader 5 Summary in the Backtest tab, **ExpertAdvisor** prints a summary if you use the GOF optimizer (Custom Max). The Summary can be found in the Journal tab. Explanation of this summary can be found in the article <https://www.mql5.com/en/articles/14365>

===== OnTester SUMMARY =====									
--- PASR on XAUUSD - 2025.05.01 23:58:59 ---									
C100000	1.00		Init.Dep.	TestLength(Yrs)					
C119365	119.4	%	MetaTrader Profit,	Ann.Ret.%					
C101196	101.2	%	Prof(inc Expenses),	Ann.Ret.%					
C-1346.0	(-1.3%)	C-623.8	(-0.6%)		minEqty-IniDep	minBal-IniDep			
3.9%	C5420	C5851		mxBalDDrel%	mxBalDDrel	mxBalDD			
9.2%	C9997	C9997		mxEqDDrel%	mxEqDDrel	mxEqDD			
11.94	6.54	7.39		RecovFactor	PrfFct	ShrpeR			
62%	20/32	12		WinRate%	Wins/TotTrd	#Losses			
3.93	C3730		RRR	Exp.PayOff					
C7044.6	C-1793.9		AvgWinTrade	AvgLossTrade					
C3764.9	+/-	C5648.4		Test Trades: Mean	+/-	Std			
C18169.2	C-2139.7		BestTrade	WorstTrade					
2	3		#AvgLossTrd	#consqLossTrd					
C-2145	0.0	C2001		mxDailyLoss	#mxDailyLoss/Yr	avgRisk/trade			
0.00	6.06	158.07	%		RoRA%	Sortino	Prof/Risk%		
0.97	91973	3608.48	4.37		LR:corr	intercept	slope	std	
1.52	4.69	53%		AvgVol	LargestVol	GoodPred%			
1:33	149%	C-1112.6		AccLevrge	MinMargLv1%	TotSwap			
C33525.83		maxSimultPositionsMargin							
64	201.0	571.2	42.2		SLopen_pip:	n avg max min			
C119258.7	+/-	C17652.8		MCPredict	Trades: Mean	+/-	Std		
Objective Functions:									
Value	Target	Weight	Contribution%						
1.01e+02	100.00	100.00	84.8%		MAX_AnnRetPct				
6.25e+01	100.00	10.00	5.2%		MAX_WinRatePct				
1.19e+01	10.00	10.00	10.0%		MAX_RecovFact				
Constraints: (Actual vs Bound)									
Pass	:	MaxDailyLoss	=	-2.14%	vs	-5.00%			
Pass	:	MaxLossTrade	=	-2.14%	vs	-5.00%			
Pass	:	MaxAccLoss	=	-1.35%	vs	-10.00%			
Pass	:	WinRate	=	62%	vs	55%			
Pass	:	nbrConsecLossTrades	=	3	vs	5			
Pass	:	RecovFactor	=	11.94	vs	3.00			
Pass	:	# MaxDaiLossPerYear	=	0.00	vs	0.00			
Pass	:	Trades/Week	=	0.6	vs	0.5			
Pass	:	Eqty_DrawDown	=	9.19%	vs	10.00%			
Pass	:	MCPred(Prof/Std)	=	6.76	vs	2.00			

Custom Max Objective Functions & Constraints Available

The GOF optimizer (<https://www.mql5.com/en/articles/14365>) has been upgraded substantially since the article was written. Here is the complete list of objectives and constraints available in the latest version:

Custom Max Objectives (select up to 5 functions)

- 1] **Annual Return %:** annual return in percent
- 2] **Balance:** total balance at the end of the test
- 3] **Net Profit:** total net profit at the end of the test
- 4] **Sharpe Ratio:** Sharpe ratio
- 5] **Expect. Payoff/Ini.Dep*100:** Expected payoff as percent of the initial deposit
- 6] **Recovery Factor:** recovery factor (aka Calmar ratio)
- 7] **Profit Factor:** profit factor
- 8] **LRcorr^3:** Balance history linear correlation factor to the power of 3
- 9] **#Trades/week:** number of trades per week
- 10] **Win Rate %:** winning rate in percent
- 11] **Reward/Risk(RRR=AvgWin/AvgLoss):** average Win / average loss
- 12] **LRcorr/(LR std%):** balance history linear correlation standard deviation percent
- 13] **PredictionProb Next Bar:** positive prediction probability in the next bar of all trades
- 14] **100/(1+|WorstLoss/Init.Dep*100|):** as given by the formula
- 15] **LR:slope*corr/(1+std)-10|int-I.D./I.D.:** $LRslope * LRcorr / (1 + LRstd) - 10 * |LRintercept - IniDep| / IniDep$
- 16] **100/(1+EqtyMaxDD%):** $100 / (1 + equity\ maximal\ draw\ down\ %)$
- 17] **Seff=Profit/(TotalTrades*AvgLot):** Total Profit/(total trades*average lot size)
- 18] **Kelly Criterion:** Kelly criterion formula
- 19] **1/Max(0.01,RoRA %):** $1 / \text{Max}(0.01, \text{Risk of Ruin}\ %)$
- 20] **(Net Profit C)/(Tot Risk C)*100:** total net profit / Total risk *100
- 21] **Sortino ratio:** Sortino ratio formula
- 22] **1/maxLossEventsPerYear:** $1 / (\text{number of max daily loss per year})$
- 23] **100/(#Consec.Loss trades):** $100 / (\text{max number of consecutive loss trades})$
- 24] **(Profit-MaxEqtyDD)/IniDep in %:** as given by the formula
- 25] **(MCPredProf-MCPredStd)/I.D.*100:** Monte Carlo predicted (profit-Std)/InitialDeposit*100
- 26] **MCPredProf/MCPredStd:** Monte Carlo predicted Profit/Std

Custom Constraints (select up to 10 constraints)

- 1] **Daily Loss % InitDep (RM8 recommended):** max daily loss allowed as % of initial deposit
- 2] **Accnt Loss % InitDep (RM10 recommended):** max account loss allowed as % of initial deposit
- 3] **Equity DrawDown %:** max equity draw down allowed in %
- 4] **Consecutive losing trades:** max number of consecutive losing trades
- 5] **Win Rate %:** win trade rate in percent
- 6] **# trades/week:** number of trades per week
- 7] **Recov Factor:** recovery factor (aka Calmar ratio)
- 8] **Reward/Risk ratio:** average Win / average loss
- 9] **Annual Return in %:** total annual return in percent
- 10] **Profit Factor:** profit factor
- 11] **Sharpe Factor:** Sharpe factor formula
- 12] **Expected PayOff / IniDep*100:** Expected Pay off / Initial Deposit *100
- 13] **Smallest Margin Level:** as stated

- 14] **Max Loss trade in Currency**: max loss in any trade in the currency of the account
- 15] **Risk of Ruin %**: risk of ruin in percent
- 16] **Good Prediction %**: positive prediction probability in the next bar of all trades
- 17] **Sortino Ratio**: Sortino ratio formula
- 18] **# MaxDailyLoss Events/Year**: number of days with max daily loss per year
- 19] **(Net Profit C)/(Tot Risk C)*100**: as given by the formula
- 20] **(MCPredProf-2*MCPredStd)/IniDep*100**: Monte Carlo (Profit-2*Std)/Initial Deposit*100
- 21] **MCPredProf/MCPredStd**: Monte Carlo (Profit/Std)
- 22] **MaxEqtyDD/IniDep*100**: Max Equity draw down as percent of the initial deposit

2) ExpertAdvisor in a live account

The assumption is that you know the basics of Metatrader 5, and also know how to navigate its terminal. Every time you double-click on a row in the Optimization results table, the Input tab is populated with the values from the table, and a simulation is performed. Once you simulate several combinations and compare their profit, win rate, recovery factor, and any other metric you like, decide which combination to use in live trading. Proceed like this:

- Double-click on the combination you chose to simulate the back test.
- Go to the Input tab.
- Type in the first line on the input tab any the comment you like. Here is an example:

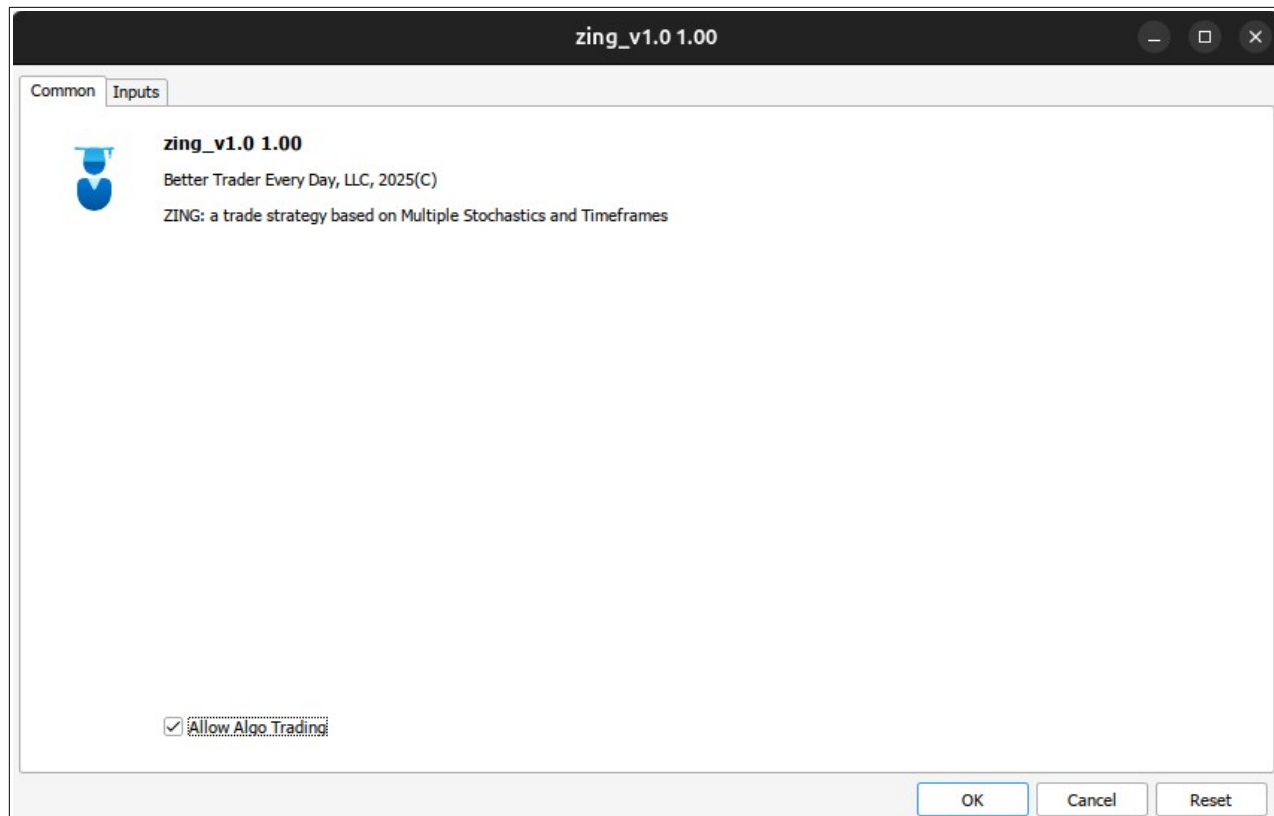
Variable <input type="checkbox"/> Add any comment for your reference	Value USDJPY_mar_14_H3_ar58%_wr56%_rf5.7_tt59_ZING	Start
---	---	-------

- Right-click on any input parameter and select “save”

Variable	Value	Start	Step	Stop	Steps
<input type="checkbox"/> SL_trTrigFac: [0,0,2,1]	0.5	0.5	0.05	5.0	
<input type="checkbox"/> SL_trFixPips [10,10,120]	20	20	1	200	
<input type="checkbox"/> SL_trATR: [0.5,0.5,] lower=>more aggressive SL	2	0.5	0.5	3	
<input type="checkbox"/> SL_trPrevBar: number of previous bars [3,3,10]	4	4	1	40	
<input checked="" type="checkbox"/> SL_trAccBE: BreakEven trigger [0.1,0.2,1.1]]>=1.1]	1.1	0.1	0.2	1.1	6
<input checked="" type="checkbox"/> SL_trAcc: [0.25,0.25,1.25]. Higher => more aggressi...	0.25	0.25		1.25	5
<input type="checkbox"/> SL_trPricePct: % [0.1,0.1,1]	0.5	0.5		5.0	
<input type="checkbox"/> SL_trFixMoney: [Currency amount]	0	0.0		0.0	
<input type="checkbox"/> SL_trBarCountOp: [3,1,5]	3	3		30	
-----SL PARAMS TO AVOID BIG LOSSES -----					
<input checked="" type="checkbox"/> SL_negGap: move SL when a negative Gap happens	false	false	Auto Arrange A	true	2
<input type="checkbox"/> SL_ClosePos (reduce SL if opp entry is better)	false	false	Grid G	true	
<input checked="" type="checkbox"/> SL_CloseX200 (reduce SL if cross MA200 & -trend)	true	false		true	2
<input checked="" type="checkbox"/> SL_ConsBars (reduce SL if several bars opp dir)	false	false		true	2

- Give an appropriate name to the file (it will be a file with extension .set)
- Go to the price chart of the symbol you optimized for, and load the **ExpertAdvisor** expert. An EA window will pop up.

- Make sure to activate “Allow Algo Trading” in the Common tab. Now go to the Inputs tab.
- When the EA is loaded, all parameters are filled with the default values inside the EA automatically. You now need to load the set file you saved to overwrite the default values.
- In the Input tab in the new window that popped up and click “Load”
- Select the set file you saved.



- Scroll down to “Risk Management (RM) at the ...” and select from the menu the option you like for risk management. We recommend any option that takes into account the actual money available for trading, not a fixed amount. The “Fixd % Free Margin” option is appropriate.

BO_v1.0 1.00

Common Inputs

Variable	Value
1/2 SL_GOODBigBar: ATR factor 0 [2,1,5]	2.0
1/2 SL_Gain2BE: trigger to move to B.E. 0 [0.5,0.5,TP]	1.5
1/2 SL_Gain2CL: added trigger to close %vol 0 [0.5,0.5,TP]	1.0
1/2 SL_GainVpct: % vol to close (==0 -> move to break even)	80.0
---- PROP FIRM INFORMATION ----	
Prop.Firm-like rules for daily & account DD	FTMO-like Rules
01 Current GMT off set (eg, Prague=2 when DST, 1 otherwise)	1
01 Roll over hour in PropFirm time (e.g., 17 for TFT)	24
----- RISK MANAGEMENT (RM) PARAMETERS -----	
1/2 Init. Deposit to calculate max loss allowed	10000.0
Risk Management (RM) method at the open	Fixd % Ini. Dep. (RM:1,2,6)
1/2 RM1: Initial % Risk (per trade)	Fixd % Free Margin (RM:1,2,6)
1/2 RM2: Max % Risk (per trade)	Fixd % Ini. Dep. (RM:1,2,6)
1/2 RM3: Fixed Lot Size (per trade)	Fixd % Allowed DailyLoss (RM:1,2,6,8)
1/2 RM4: Lot Size Per every 10k of free margin	Lin Grow % FreeMarg (RM:1,2,6)
1/2 RM5: Cum.mult.factor of gain % [0.1,0.1,1]	Cumltve Grow % FreeMarg (RM:1,2,5,6)
1/2 RM6: Max Lot Size per trade 0 [>0]	Fixd lot per order (RM:3,6,2)
1/2 RM7: Fixed Currency amount risked per trade	Fixd Lot/(10k FreeMarg) (RM:4,2,6)
	Fixd Currency Amount (RM:7,6)
	30.0
----- OTHER RISK PARAMETERS (FIXED) -----	
1/2 RM8: Prop.Firm MaxDailyLoss in % of Ini.Dep.	100.0
	5.0

Load Save

OK Cancel Reset

NOTE: the reason we don't like to optimize with "Fixd % Free Margin (RM: 1,2,6)" is because as the balance grows, the later part of the back test period (1 year) will have more importance than the initial part of the back test period, and the optimizer would find combinations that take advantage of the later price action in the test period. It is better to have even importance spread along the year which is accomplished by always risking a fixed amount (e.g., fixed percent of the Initial Deposit). However, once you are in the live trading mode, it is always recommended to risk a percentage of the available money as is the case of "Fixd % Free Margin."

You will know that **ExpertAdvisor** is ready to trade when you get a chart like this:



In your price chart you should see:

- The green triangle "Algo Trading" on the top part of the terminal above the chart
- The blue **ExpertAdvisor** icon in the top right corner of the chart

*** If the green triangle is not there, but you see a red square, you need to click on it to get the green triangle.

*** If the **ExpertAdvisor** icon is gray, you probably forgot to check “Allow Algo Trading” in the “Common” tab when you loaded the .set file.

You should also see in the top left corner inside the chart:

- The time window where the EA is allowed to trade. In the example above, it is between yesterday at 5pm to today at 5pm in local time. Similar information is shown in parenthesis in Server Time. In the example above: (Server: 0+24hr), which means start trading at midnight for 24 hours.
- The “Any Comment” line you entered in the .set file is also shown in the top left corner. Appended to this line there is the Magic number being used for that symbol.

WHEN TO PERFORM A MANUAL INTERVENTION IN AN OPEN POSITION?

Once a position is open, you can manually change its SL and/or TP, or close the position. Doing this manual intervention defeats the purpose of having an EA software running your trades. So, in what circumstances is a manual intervention acceptable?

- The EA may select a SL or TP that is too far from the opening price. This may happen due to slippage, spreads, or simply bad parameter values in the input file. In these cases, it is acceptable to manually tighten the SL or TP, but do not exaggerate. If this needs to be done too often, review the optimization process and fix the SL open parameters.
- Suppose you have a TP:SL of 6:1, and the position is in profit very close to, say, 5.9:1, and you see that the price is starting to retreat against your profit before touching the 6:1 TP. In this case, it is acceptable to close the position manually, and take the 5.9X profit. Remember, the purpose is to secure your wins, not to blindly let the EA to control your money when you are looking at the price chart.
- You can stop the Algo trading any time when there are no positions open. This is useful when you are on vacation and don't have the connection to check your trades. However, if you install Metratrader 5 in your cell-phone, you can monitor open positions, and intervene manually if needed.

THINGS GONE WRONG

Computer shuts down

The most likely problem you will encounter while running any EA is that your computer stops working (due to lack of power, freezing OS, etc.). In this case, restarting the Metatrader 5 terminal should restore all your settings as before the problem with your computer.

MT5 Updates

If you get a pop-up window from Metaquotes about updating your Metatrader 5 version, we recommend to close the pop-up window, and wait until your positions are closed. Then close Metatrader 5, re-start it and the pending update will happen automatically.

Passing Proprietary Firm Challenges

If you are using a Prop Firm to get funded, there are daily and account loss limits that you must satisfy. There are two possible scenarios of things gone wrong regarding such limits:

1) When the amount of losses increases, and the “max daily permitted loss” is about to be reached, the EA will close positions, suspend trading in all symbols, and go into hibernation (sleep mode) until the next day when it will wake up automatically. How close to the “max daily permitted loss” is hibernation activated? It depends on parameters RM9 through RM11 in the input (.set) file. The wake up time will be visually indicated on the chart by displaying a purple vertical line at the time the max daily permitted loss is reset based on the Prop Firm rules.

2) When the amount of losses increases, and the “max account permitted loss” is about to be reached, the EA will close positions, suspend trading, and remove the EA from all charts in the MT5 terminal. How close to the “max account permitted loss” is the suspension activated? It depends on parameters RM9 through RM11 in the input (.set) file. An Alert window will pop up indicating this important event. There will be instructions in the Expert tab on how to resume trading again. If you reload the EA, you will need to reduce the risk (RM1 parameter), and relax your safety factors (RM10, RM11) making them closer to 1. Be aware that a small loss could invalidate your prop firm account, and you will need to start over with a new challenge account.

OPTIMIZATION DECISIONS

Once you are familiar with the optimization tool in Metatrader 5, you can play around with more parameters. The following is a sequence of decisions that will guide you select which parameters to optimize.

- Select the symbol to optimize
- Decide what time frames to optimize (or pick one and fix it)
- Always select to optimize the Entry Strategy parameters (all of them)
- Decide which Take Profit method at the opening of the trade.
- Select to optimize parameters needed for that method
- Decide which Stop Loss method at the opening of the trade.
- Select to optimize parameters needed for that method
- Decide which Stop Loss method for trailing
- Select to optimize parameters needed for that method
- Select additional trailing SL parameters in sections “SL PARAMS TO AVOID BIG LOSSES” and “SL PARAMS TO PRESERVE GAINS.”
- Decide if you want to take partial gains in a trade. If yes, select SL_Gain2BE, SL_Gain2CL, SL_GainVpct to optimize them.
- Make sure RM0 is the initial deposit (this is used to compute max draw downs)
- Decide your Risk Management method. In the optimization phase, we recommend a method that gives equal importance to any trade during the test period. There are four of such methods:
 - Fixd % Ini. Dep. (RM:1,2,6)
 - Fixd % Allowed DailyLoss (RM:1,2,6,8)
 - Fixd lot per order (RM:3,6,2)
 - Fixd Currency Amount (RM:7,6)

The other methods shown in the menu are more suitable for the “live” trading phase, as the risk depends of the free margin available.

- There are RMxx parameters required for the method you selected. You may choose to have a fixed value, or to optimize them.
- Decide what type of entry orders you want: market, stop, or limit.

The rest of the input parameters can be left as the default values in the .set file supplied, but you are welcome to play with different settings.

- The Custom Max Optimization section is very important and affects the results substantially. We recommend to leave the default values as they provide good combinations of parameters. Later, as you become more used to the EA, you may play with the parameters in this section.

In total, you should have around 10 to 15 parameters to optimize: the entry strategy parameters, and the rest for the position management (TP, SL). Any number higher than 15 will slow down the optimization phase. You may get better results adding more than 15 variables, but they will be curve-fitting the back test price data, and will likely perform poorly in the real (live) use of the **ExpertAdvisor**.

Regarding News and Weekends

As you will read in the user manual ---later in this document--- there are features in **ExpertAdvisor** to handle important news and weekends. Select how you want to handle them.

WHEN TO PERFORM OPTIMIZATION?

Since the FOREX market is closed during weekends, the best time to start your optimization runs is Friday (after 5pm EST). You would have 48 hours to perform several optimization runs and be ready for Sunday (5pm EST) with all your optimized parameters.