LJSE XETRA T7 MARKET MODEL





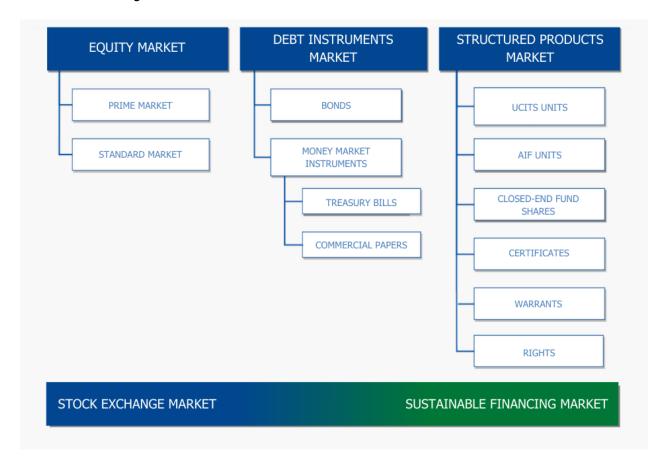
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1. Market segmentation

• LJSE market segments:



2. Trading models and classification of instruments

- Trading models used:
 - continuous trading (with opening and closing auction),
 - auction trading (one auction per day).
- Criteria for the classification of securities into trading models:
 - The following are traded in the continuous trading method:
 - open-end coupons
 - open-end fund investment coupons
 - closed-end fund shares
 - investment certificates
 - securities with a market maker
 - all debt securities.
 - The classification of all other securities depends on their meeting liquidity criteria.
- The classification of securities in Xetra is based on instrument groups as listed in <u>Appendix 1.</u>



3. Account types

- Account types used:
 - A1 (agent account, custody account, portfolio management account)
 - P1 (proprietary account)
 - M1 (market maker account)

4. Order types

- · Orders used:
 - market orders
 - limit orders
 - orders with execution restrictions: iceberg, stop, immediate-or-cancel, fill-or-kill, book-or-cancel:
 - iceberg order:
 - only in continuous trading
 - minimum overall value of order: EUR 10,000.00
 - peak size must be min. 5% of overall volume
 - stop orders stop market and stop limit:
 - stop market order: when the stop limit is reached, the stop order is automatically placed in the order book as a market order and may be executed immediately.
 - Stop limit order: when the stop limit is reached, the stop order is automatically placed in the order book as a limit order and may be executed immediately.
 - immediate-or-cancel order (IOC):
 - is executed immediately and in full to the furthest extent possible. Unfilled portions of an IOC order are not entered into the order book but deleted. IOC orders may trigger a volatility interruption, whereupon they are immediately deleted from market depth.
 - fill-or-kill order (FOK):
 - is either executed immediately and in full or not at all. If its immediate full execution is not possible, an FOK order is not entered into the order book but deleted. FOK orders do not trigger volatility interruptions.
 - book-or-cancel order (BOC):
 - is entered into the system only if its partial or full execution is not possible upon order entry.
 If partial or full execution is possible upon order entry, BOC is not executed, being deleted from the system.
 BOC orders do not trigger volatility interruptions.
 In case of a triggered volatility interruption, the system permanently deleted the order from market depth.
 - orders with trading restrictions (opening auction only, closing auction only, auction only).
 - orders with validity restrictions (good-for-day, good-till-date, good-till-cancelled).



Use of order types:

Not all order types are allowed in all trading methods and phases:

	CONTINUO	US TRADING	AUCTIO	ON TRADING
Order	INTERRUPTIONS EXTEND. VO INTERR. / MARKET OR INTERR.		WITH NO INTERRUPTIONS	WITH INTERRUPTIONS: VOLATIL. INTERR.
Market	Yes	Yes	No	No
Limit	Yes	Yes	Yes	Yes
Stop market	Yes	Yes	No	No
Stop limit	Yes	Yes	Yes	Yes
Iceberg	Yes	Yes	No	No
Immediate- or-cancel	Yes¹	Yes ¹	No	No
Fill-or-kill	Yes ¹	Yes ¹	No	No
Book-or- cancel	Yes	No	No	No

Notes:

- Mandatory order attributes:
 - type of order: »BUY or SELL«
 - instrument (ISIN or symbol): »Instr«
 - · volume: »Qty«
 - account identification code: »Act«
 - account number: mandatory for custody account and optional for other accounts
 - in trading for the custody account, capital "U" is required in front of the actual number of the account: »Text«
 - in trading for the portfolio account, capital "P" is required in front of the actual number of the account: »Text«
- Mandatory quote attributes (only market makers):
 - exchange: »Exch«bid limit: »Bid«ask limit: »Ask«
 - instrument (ISIN or symbol): »Instr«
 - bid volume: »BidQty«ask volume: »AskQty«
 - account identification code (M1): »Act«
- Custody account number verification:
 - LJSE checks custody accounts on the basis of data on active custody accounts from KDD.
 - If a trade is executed for a non-existing custody account number, LJSE changes the trade to the proprietary account within the data file sent to KDD.

¹ Order input is only possible if the limit is within the dynamic and static price corridor.



Order persistence:

- Xetra differentiates between persistent and non-persistent orders. After the »persistency«
 parameter has been set, it cannot be modified. The difference between persistent and nonpersistent orders is that persistent orders stay in the system after trading halts and non-persistent
 orders do not.
- A detailed description of order types is available in <u>Appendix 2.</u>
- Selected examples of order matching for orders with execution restrictions are given in **Appendix 7.**
- The effect of modified order parameters on the time stamps of orders (preservation of time stamp or designation of new time stamp) is given in <u>Appendix 3.</u>
- The permitted combinations of order attributes are given in <u>Appendix 4.</u>
- The permitted combinations of order types in different trading phases are given in Appendix 8.
- The obligatory order attributes for individual order types are given in **Appendix 10.**

5. Bond trading

• In bond trading quantity is not entered in lots but rather in multiples of the principle's nominal value of a bond. The smallest quantity that can be entered for a bond order is the nominal value of one bond's principal.



• In case of changes to the principle's nominal value of the bond, the system automatically deletes all sitting orders for the respective bond one day prior to the change taking effect. This is always communicated to the trading members in advance.

6. Continuous trading

In continuous trading the following trading phases occur:

- Book phase:
 - order management is possible¹,
 - trade execution is not possible,
 - order book is closed (no market depth), the only information shown, if available, is the close price.

¹ Order management includes the following actions: entering, changing or deleting orders.



- Opening auction:
 - call phase:
 - order management is possible,
 - total market depth is displayed² as well as the indicative auction price and volume to be executed at this price;
 - price determination phase:
 - auction price is determined at a random point and trades are matched;
- Main trading phase:
 - order management is possible,
 - · trade execution is possible,
 - total market depth is displayed.
- Closing auction:
 - the same 3 phases as in opening auction,
 - the duration of the call phase varies depending on the market segment.
- · Book phase:
 - · order management is possible,
 - trade execution is not possible,
 - no market depth.
- A detailed list of market data across trading phases is given in <u>Appendix 9.</u>

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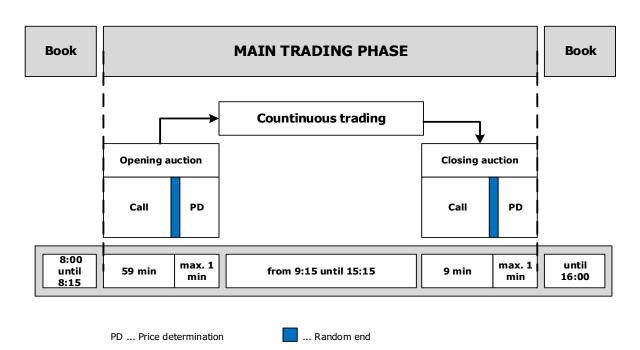
² Total market depth = total order volume at different prices.



• Trading phases in continuous trading:

COUNTIUOUS TRADING

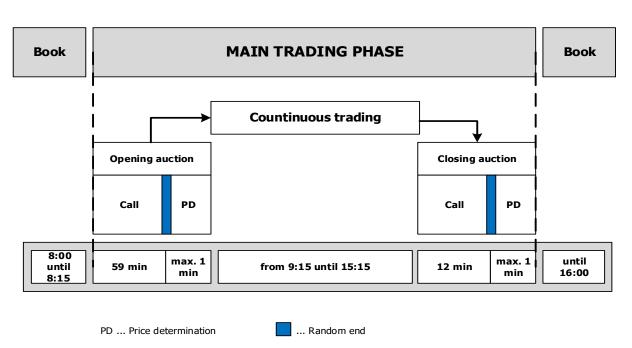
Prime Market



^{*} No time is reserved for preferential access for Market Markers/Specialists

COUNTIUOUS TRADING

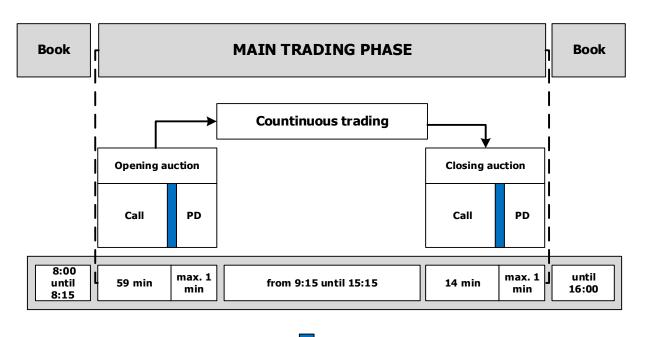
Standard Market



^{*} No time is reserved for preferential access for Market Markers/Specialists



All other Markets



PD ... Price determination ... Random end

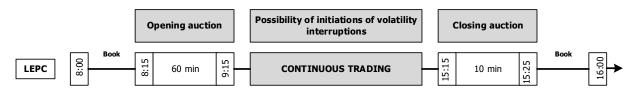
^{*} No time is reserved for preferential access for Market Markers/Specialists



· Trading schedules:

CONTINUOUS TRADING

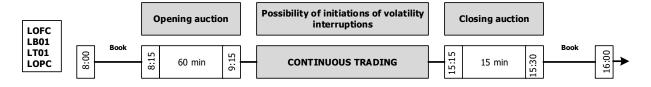
Prime Market



Standard Market



All other markets



Legend:

LEPC – Ljubljana Equity Prime Continuos LESC – Ljubljana Equity Standard Continuous LOFC – Ljubljana Open End Funds Continuous LBO1 – Ljubljana Bonds 01 Continuous LTO1 – Ljubljana Treasury Bills 01 Continuous

LOPC – Ljubljana Other Shorterm debt Products Continuos

7. Auction trading

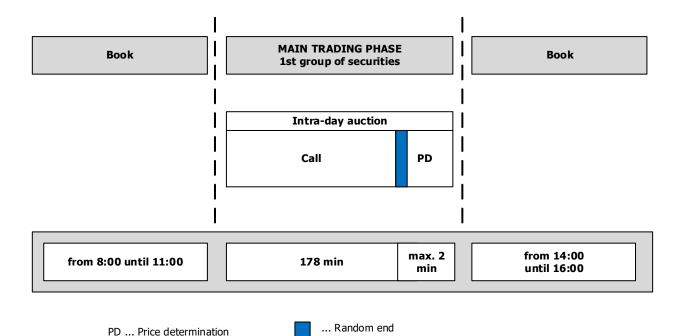
In auction trading the following trading phases occur:

- Book phase:
 - order management is possible,
 - trade execution is not possible,
 - order book is closed (no market depth), the only information shown if available is the close price.



- Auction
 - call phase:
 - order management is possible,
 - total market depth3 is displayed as well as the indicative auction price and volume to be executed at this price;
 - price determination phase:
 - auction price is determined at a random point and trades are matched;
- Book phase:
 - order management is possible,
 - trade execution is not possible,
 - no market depth.
- A detailed list of market data across trading phases is given in <u>Appendix 9</u>.
- Auction trading:

AUCTION TRADING



^{*} No time is reserved for preferential access for Market Makers/Specialist.

^{**} The schedules differ for groups of instruments.

³ Total market depth is a summary display of total order volume at different prices.



Trading schedules - groups of securities: shares from the Prime, Standard and Entry market

AUCTION TRADING



Legend:

LEPA – Ljubljana Equity Prime Auction
LESA – Ljubljana Equity Standard Auction

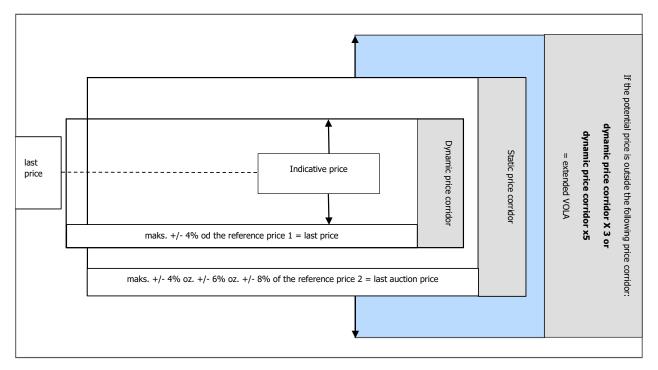
8. Securities prices and corridors

- Price determination in continuous trading is explained into more detail in <u>Appendix 5.</u>
- Price determination in auction trading is explained into more detail in <u>Appendix 6.</u>
- Close price:
 - auction price in the closing auction,
 - last trade price if no trades are executed in the closing auction,
 - last trade price if no trades are executed during the trading day.
- Opening price:
 - the price of the first trade in a day,
 - if no trades are matched in a day, the opening price is not calculated.
- Reference price:
 - Reference price 1:
 - last trade price.
 - Reference price 2:
 - the last price determined in any auction (opening auction, volatility interruption, extended volatility interruption, closing auction) in the auction trading method during the current trading session,
 - if the former price has not been determined yet, the most recent price determined on one of the previous trading days is used instead.
 - In case of stock splits or stock mergers the reference price is modified in the morning of the trading day with effective new split/merger ratios.



· Price corridors:

- Dynamic price corridor = 4% from reference price 1,
- Static price corridor = the following % form reference price 2:
 - 4% for securities from the Bond Market segment and securities traded in the auction trading method;
 - 6% for securities from the Prime Market, which are in continuous trading procedure;
 - 8% for securities from Standard Market and the Structured Products Market segment which are traded in the continuous trading method.
- Extended dynamic price corridor = the following % form reference price 1:
 - Three-times dynamic price corridor 12% for securities from the Prime Market and Bond Market segment;
 - Five-times dynamic price corridor 20% for securities from the Standard Market and Structured Products Market segment.

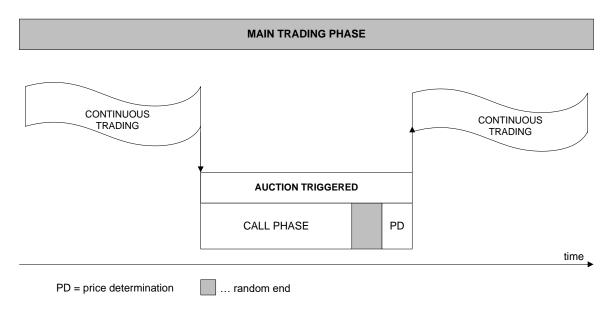


9. Automatic safeguards

- There are no price restrictions.
- There are 2 automatic safeguards which contribute to the prevention of price jumps and help increase price continuity: volatility interruption and extended volatility interruption during auction.
- Volatility interruption
 - is triggered if:
 - the indicative execution price is outside the dynamic price corridor,
 - the indicative execution price is outside the static price corridor;



- the price corridor is not displayed in the trading system;
- market participants are informed when a volatility interruption occurs;
- if, after a volatility interruption, the indicative auction price remains outside one of the two price corridors, price determination is still carried out;
- can be triggered both in the continuous and the auction trading method;
- volatility interruption in continuous trading:
 - incoming orders are executed until the next potential execution price leaves the static or dynamic price corridor (exception: fill-or-kill orders),
 - continuous trading is interrupted and auction begins,
 - only orders intended for continuous trading are considered,
 - min. duration of call phase: 5 mins,
 - price determination phase follows (max 60 sec.), which ends with market opening at a random moment,
 - diagram of a volatility interruption in continuous trading:



- Volatility interruption in an auction:
 - it results in a limited prolongation of the call phase,
 - min. duration of call phase: 10 mins,
 - price determination phase follows (max 120 sec.), which ends with market opening at a random moment.
- Extended volatility interruption
 - the price corridor is not displayed in the system,
 - triggered if a price is to be determined outside the three or five-fold dynamic price corridor,
 - market participants are informed of the volatility interruption being extended,
 - its phases are:
 - call phase in extended by min. 10 mins,
 - market opening is conducted in line with the LJSE "operational safeguards" (Chapter 10).
 - in case that the order, which caused the ex-vola in opening auction or in main trading phase in continuous trading, is deleted, the ex-vola phase ends immediately, before 10 min.



10. Operational safeguards

- During market opening in extended volatility interruptions LJSE performs various operational procedures
 in cases of greater price deviations, in order to ensure price continuity and market management (for
 details see <u>Appendix 11</u>).
- Temporary suspensions of trading
 - in the event of major price fluctuations or other unusual circumstances (e.g.: major volume variations, a market imbalance, etc.) at the beginning of or during trading, LJSE may change the trading schedule or suspend/halt trading in a security for a short period of time),
 - if the value of SBI TOP deviates from its closing value of the previous trading day by more than 10%, LJSE may temporarily suspend trading on the stock market.

11. Cross trades

Cross trades through simultaneous order entry from both sides are not possible.

12. Blocks

- Block trades are possible in Xetra. Vienna Stock Exchange facilitates the execution of the following types
 of block trades:
 - negotiated block trades executed by two members,
 - cross block trades executed by a single member.
- Block trade settlement is possible solely as T+2,
- The LJSE ensures the post-trade transparency for blocks (executed for securities), thus the LJSE disseminates the data onwards to vendors.
- Minimal block trade value with all shares and GDRs depends on the usual market value and is as follows:

Average Daily Turnover (ADT) in mio EUR	ADT < 25	25 ≤ ADT < 50	50 ≤ ADT < 100	ADT ≥ 100
Minimum Order Value with Block Trades in EUR	≥ 300,000	≥ 400,000	≥ 500,000	≥ 650,000

- Minimal block trade value with investment certificates and similar financial instruments equals to EUR 300,000.00.
- Minimal block trade value with ETF equals to EUR 3,000,000.00.



- Minimal block trade value for all debt securities, excluding ETC and ETN bonds, is determined annually by ESMA based on Commission Delegated Regulation (EU) 2017/583, and is established by the exchange management through a resolution within the framework of reviewing trading parameters in accordance with the Instructions for the Index, Liquidity Criteria, Price List and Other Statistics.
- Minimal block trade value, as regulated by Article 144 of the Rules, with ETC and ETN bonds equals to EUR 1,000,000. EUR.

13. Tick size

- Tick size for individual equity securities and proof of ownership, can be as follows:
 - For equities, proofs of ownership, whose price is expressed in a currency unit, tick size is
 determined based on the exchange rate and the scope of the liquidity of the bond in a manner as
 stated in the table below:

	Scope of Liquidity**						
Price Range*	0 ≤ avg. daily number of trades < 10	10 ≤ avg. daily number of trades < 80	80 ≤ avg. daily number of trades < 600	600 ≤ avg. daily number of trades < 2,000	2,000 ≤ avg. daily number of trades < 9,000	9,000 ≤ avg. daily number of trades	
0 ≤ price < 0.1	0.0005	0.0002	0.0001	0.0001	0.0001	0.0001	
0.1 ≤ price < 0.2	0.001	0.0005	0.0002	0.0001	0.0001	0.0001	
0.2 ≤ price < 0.5	0.002	0.001	0.0005	0.0002	0.0001	0.0001	
0.5 ≤ price < 1	0.005	0.002	0.001	0.0005	0.0002	0.0001	
1 ≤ price < 2	0.01	0.005	0.002	0.001	0.0005	0.0002	
2 ≤ price < 5	0.02	0.01	0.005	0.002	0.001	0.0005	
5 ≤ price < 10	0.05	0.02	0.01	0.005	0.002	0.001	
10 ≤ price < 20	0.1	0.05	0.02	0.01	0.005	0.002	
20 ≤ price < 50	0.2	0.1	0.05	0.02	0.01	0.005	
50 ≤ price < 100	0.5	0.2	0.1	0.05	0.02	0.01	
100 ≤ price < 200	1	0.5	0.2	0.1	0.05	0.02	
200 ≤ price < 500	2	1	0.5	0.2	0.1	0.05	
500 ≤ price < 1,000	5	2	1	0.5	0.2	0.1	
1,000 ≤ price < 2,000	10	5	2	1	0.5	0.2	
2,000 ≤ price < 5,000	20	10	5	2	1	0.5	
5,000 ≤ price < 10,000	50	20	10	5	2	1	
10,000 ≤ price < 20,000	100	50	20	10	5	2	
20,000 ≤ price < 50,000	200	100	50	20	10	5	
50,000 ≤ price	500	200	100	50	20	10	

^{*} Scope of price means the price of entered order.

- For ETF Funds, whose price is expressed in a currency unit and is traded on the stock exchange, tick size is determined based on the price and in accordance with the scope of liquidity that meets the highest average daily amount of trades of a security in a manner as stated in the table above;
- For securities the prices of which are given in per cents, tick size is 0.01 of a percentage point.

^{**}Scope of Liquidity means the scope of liquidity based on the table, that corresponds to the scope of average daily amount of trades on the most important market, which requires liquidity for the stated instrument.



14. Trade modifications

Trade modifications are not possible.

15. Trade cancellations

- A trade including a block trade can be cancelled upon agreement of both members.
- LJSE must receive the application for cancellation and consent to this cancellation within 60 minutes following the mistrade but not later than by 15:40 (for both actions).
- Cancellations and subsequent repetitions of auctions are not possible.

16. Stopping transactions by non-clearing members

- A clearing member may stop the trading activities of its non-clearing member for which it clears deals
 when this non-clearing member has not settled its obligations or if it has exceeded its agreed trading
 limits. Clearing members may declare that they no longer consent to process the transactions of their
 non-clearing members in two ways:
 - by asking the LJSE to suspend, for well-grounded reasons, the non-clearing member from trading;
 - in an automated manner, by using the "Stop Release" functionality in Clearer GUI.
- The application of the so-called "Stop Release" functionality causes that:
 - all orders and quotes of the non-clearing member concerned are immediately deleted;
 - entry of new orders and quotes is prevented;
- If the clearing member revokes the stop, all functionality can be used again by the released non-clearing member.

17. Corporate actions

- In the case of corporate actions (e.g. stock splits), the order book is treated in the following way:
 - automatic deletion of all existing orders in the course of the end-of-day processing before the trading day with the new stock split ratio taking effect;
 - alteration of the reference price in Xetra on the morning of the trading day with the new stock split ratio taking effect;
 - members are informed of the deleted orders in advance.

18. Emergency procedures

Trading interruption:



- trading is interrupted when a several trading members have technical problems with accessing the trading system.
- Trading on behalf:
 - possible in cases of technical problems experienced by a trading participant;
 - possibility to remove all member's existing orders in the system;
 - no possibility to remove single orders;
 - no possibility to place new orders via telephone;
 - possibility of remote access to trading system via internet;
 - no possibility to trade from another member's system.

19. Trading phase »HOL«

Closed trading phase is in case of a holiday introduced when there is a non-trading day at the LJSE and at the same time a trading day at min. one CEESEG stock exchange using the same trading system and is shown in trading system with a special trading phase "HOL".

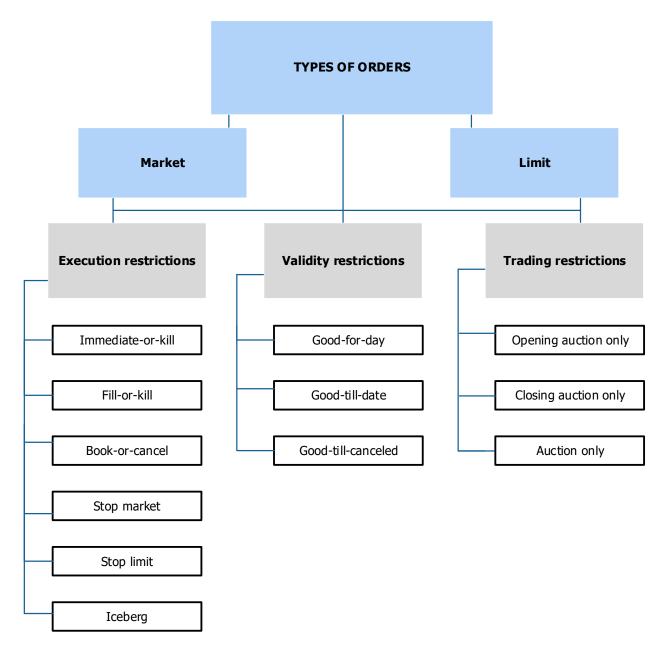


Appendix 1: Stock Group Codes

Stock group	Segment	Subsegment	Description	Trading method
LEPC	Equity market	Prime Market	Ljubljana Equity Prime Continuous	Continuous
LESC	Equity market	Standard Market	Ljubljana Equity Standard Continuous	Continuous
LB01	Bond market	Bonds	Ljubljana Bonds 01 Continuous	Continuous
LT01	Bond market	Money market instruments T-bills	Ljubljana Treasury Bills 01 Continuous	Continuous
LOPC	Bond market	Money market instruments (Commercial papers)	Ljubljana Other Short-term Debt Products Continuous	Continuous
LOFC	Structured products market	Funds	Ljubljana Open End Funds Continuous	Continuous
LEPA	Equity market	Prime Market	Ljubljana Equity Prime Auction	Auction
LESA	Equity market	Standard Market	Ljubljana Equity Standard Auction	Auction



Appendix 2: Order types and restrictions



ORDER TYPES

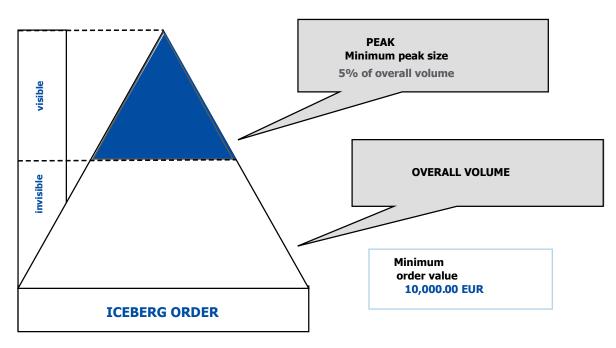
- MARKET ORDER
 - unlimited buy or sell orders (orders to buy or sell at the best available price) to be executed at the next price that is determined;
- LIMIT ORDER
 - limited buy or sell orders to be executed at the set limit price or better.



EXECUTION RESTRICTIONS

ICEBERG ORDER

- iceberg orders must have:
 - peak size must amount to min. 5% of the overall volume
 - minimal overall volume of order: EUR 10,000.00.
- the execution of orders with a hidden quantity is carried out gradually, so that a part of the
 order with a visible quantity is executed individually, and at the depth of the market, a gradual
 drawing of the visible quantity from the hidden quantity takes place until the entire execution
 of the order or the entire execution of the hidden quantity,
- the gradual withdrawal of the visible quantity from the hidden quantity is set by the stock trader in one of the following ways:
 - the new visible part is the same as the original visible part, if the rest in the hidden part is large enough, otherwise the new visible part is equal to the rest,
 - the new visible part is determined automatically and randomly within a predetermined interval, if the remainder in the hidden part is large enough, otherwise the new visible part is equal to the rest.
- in the execution of iceberg orders each new peak in market depth is given a new time stamp (the new peak is thus available for further execution after other orders in market depth at the same price have been executed first);



- IMMEDIATE-OR-CANCEL IOC
 - executed immediately and in full to the furthest extent possible;
 - unfilled portions of an IOC order are not entered into the order book but deleted.

• FILL-OR-KILL – FOK

- either executed immediately and in full or not at all;
- if its immediate full execution is not possible, a FOK order is not entered into the order book but deleted.



BOOK-OR-CANCEL – BOC

- entered into the system only if its partial or full execution is not possible upon order entry;
- if partial or full execution is possible upon order entry, BOC is not executed, being deleted from the system.

STOP MARKET

- not placed on the order book but onto a separate stop order book;
- stop market order is not visible on the market;
- stop limit of the sell stop market order must be lower than the best (lowest) price among the prices of orders on the ask side.
- stop limit of the buy stop market order must be higher than the best (highest) price among the prices of orders on the bid side;
- when the stop limit is reached, the stop order is automatically placed in the order book as a market order and may be executed immediately;
- stop limit is triggered by the price of an executed trade (and not best bid or best ask).

STOP LIMIT

- not placed on the order book but onto a separate stop order book;
- stop limit order is not visible on the market;
- stop limit of the sell stop limit order must be lower than the best (lowest) price among the prices of orders on the ask side;
- stop limit of the buy stop limit order must be higher than the best (highest) price among the prices of orders on the bid side;
- when the stop limit is reached, the stop order is automatically placed in the order book as a limit order and may be executed immediately;
- stop limit is triggered by the price of an executed trade (and not best bid or best ask).

VALIDITY RESTRICTIONS

- GOOD-FOR-DAY
 - valid only for the current trading day.

GOOD-TILL-DATE

 valid only up until a specified date (not later than 360 days after the time the order was entered).

GOOD-TILL-CANCELLED

valid until cancelled but not longer than 360 days.

TRADING RESTRICTIONS

- OPENING AUCTION ONLY
 - valid only for the opening auction;
 - order entry possible with or without limit.

CLOSING AUCTION ONLY



- valid only for the closing auction;
- order entry possible with or without limit.

AUCTION ONLY

- valid only for the opening and closing auction and auction in auction trading;
- order entry possible with or without limit.



Appendix 3: How order modifications affect time priority of orders

Time stamp changes in case of:	Time stamp does not change in case of:
changed price	changed account
increased quantity	decreased quantity
extended validity	shortened validity
changed stop order	changed reference
upon appearance in the trading condition of the trading phase or auction	

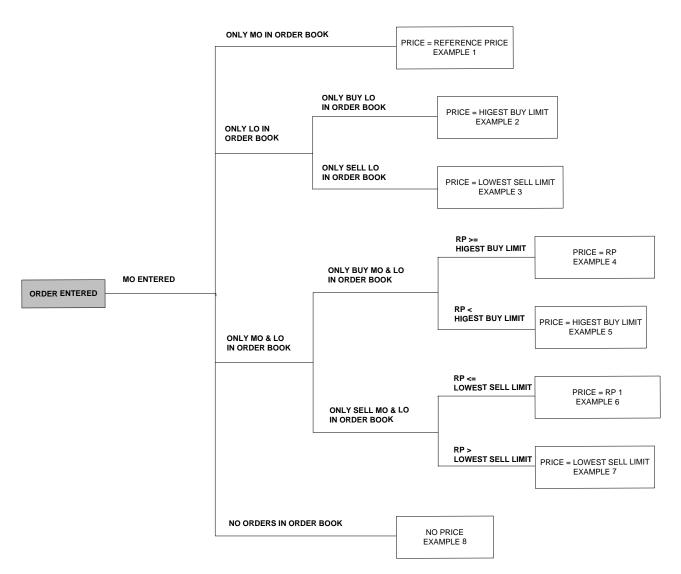


Appendix 4: Combination options of order attributes

Combination	Limit	Market	FOK	IOC	вос	STP	I	GFD	GTD	GTC	OA	AO	CA
Limit		×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Market	×		✓	✓	×	✓	×	✓	✓	✓	✓	✓	✓
Fill-or-kill	✓	✓		×	×	×	×	✓	×	×	×	×	×
Immediate-or-cancel	✓	✓	×		×	×	×	✓	×	×	×	×	×
Book-or-cancel	✓	×	×	×		×	×	✓	✓	✓	×	×	×
Stop	✓	✓	×	×	×		×	✓	✓	✓	×	×	×
Iceberg	✓	×	×	×	×	×		✓	✓	✓	×	×	×
Good-for-day	✓	✓	✓	✓	✓	✓	✓		×	×	✓	✓	✓
Good-till-date	✓	✓	×	×	✓	✓	✓	×		×	✓	✓	✓
Good-till-cancelled	✓	✓	×	×	✓	✓	✓	×	×		✓	✓	✓
Opening auction	✓	✓	×	×	×	×	×	✓	✓	✓		×	×
Auction only	✓	✓	×	×	×	×	×	✓	✓	✓	×		×
Closing auction	✓	✓	×	×	×	×	×	✓	✓	✓	×	×	

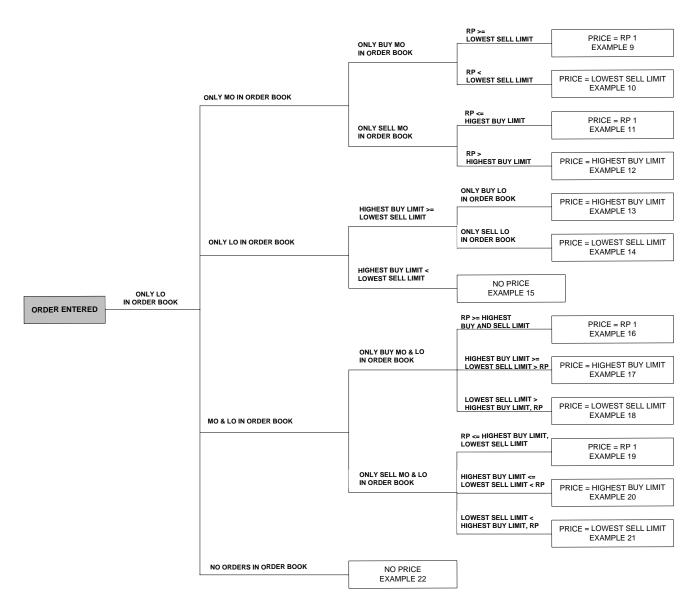


Appendix 5: Price determination in continuous trading



MO = MARKET ORDER LO = LIMIT ORDER RP = REFERENCE PRICE





MO = MARKET ORDER LO = LIMIT ORDER RP = REFERENCE PRICE



Examples of matching in continuous trading

Example 1: Input of market order when the order book contains only market orders on the other side

Buy Time 9:01	Volume 6,000	<u>Limit</u> market	Limit	Volume	Sell Time	Order input: sell market order, volume 6,000 shares
Buy Time	Volume	Limit	Limit	Volume	Sell Time	
9:01	6,000	market				

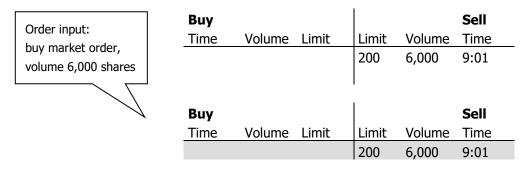
The reference price is \in 200. The two market orders are executed at the reference price of \in 200 (Principle No. 1).

Example 2: Input of market order when the order book contains only limit orders on the other side

Sell Time 9:01	Volume 6,000	Limit 200	Limit	Volume	Buy Time	Order input: sell market order, volume 6,000 shares
Buy Time	Volume	Limit	Limit	Volume	Sell Time	
9:01	6,000	200				

The two orders are executed at the highest buy limit of \in 200.

Example 3: Input of market order when the order book contains only limit orders on the other side



The two orders are executed at the lowest sell limit of \in 200.



Example 4: Input of market order when the order book contains market and limit orders on the other side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	_
9:01	6,000	market				Out of the state
9:02	1,000	195				Order input:
						sell market order,
Buy					Sell	volume 6,000 shares
Time	Volume	Limit	Limit	Volume	Time	. 7/
9:01	6,000	market				
9:02	1,000	195				

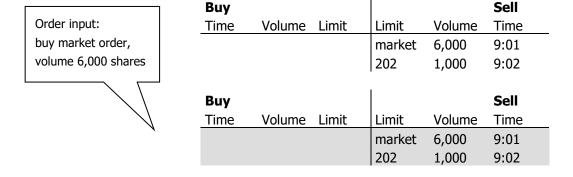
The reference price is \in 200. It is equal to or higher than the highest buy limit. The incoming sell market order is executed against the buy market order in the order book at the reference price of \in 200 (Principle No. 1).

Example 5: Input of market order when the order book contains market and limit orders on the other side

Buy Time 9:01 9:02	Volume 6,000 1,000	Limit market 202	Limit	Volume	Sell Time	Order input: sell market order, volume 6,000 shares
Buy Time	Volume	Limit	Limit	Volume	Sell Time	
9:01	6,000	market	Little	Volunic	Time	
9:02	1,000	202				

The reference price is \in 200. It is lower than the highest buy limit. The incoming sell market order is executed against the buy market order in the order book at the highest buy limit of \in 202 (Principle No. 2).

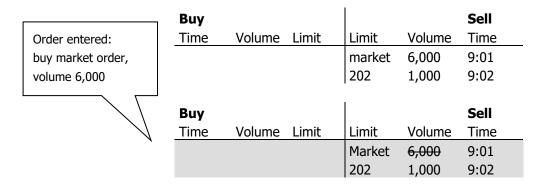
Example 6: Input of market order when the order book contains market and limit orders on the other side





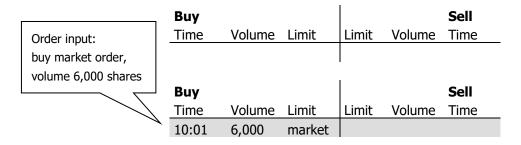
The reference price is \in 200. It is equal to or lower than the lowest sell limit. The incoming buy market order is executed against the sell market order in the order book and at the reference price of \in 200 (Principle No. 1).

Example 7: A market order is placed while the order book contains market orders and limit orders on the opposite side.



The reference price is \in 203. It is higher than the lowest sell limit. The incoming buy market order is executed against the sell market order in the order book at the lowest sell limit of \in 202 (Principle 2).

Example 8: Input of market order when there are no orders on the opposite side



The incoming buy market order is entered into the order book; no price is determined, and no orders are executed.

Example 9: Input of limit order when the order book contains only market orders on the opposite side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	_ Order input:
9:01	6,000	market				sell order, limit €
						195,
Buy					Sell	volume 6,000 shares
Time	Volume	Limit	Limit	Volume	Time	_
9:01	6,000	market				



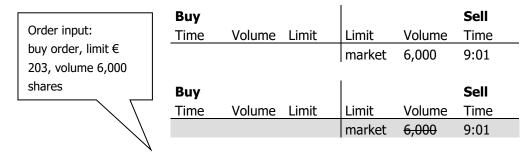
The reference price is \in 200. It is equal to or higher than the lowest sell limit. The two orders are executed at the reference price of \in 200 (Principle No. 1).

Example 10: Input of limit order when the order book contains only market orders on the opposite side

Buy Time	Volume	Limit	Limit	Volume	Sell Time	Order input: sell order, limit
9:01	6,000	market				€ 203,
						volume 6,000 shares
Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	
9:01	6,000	market				

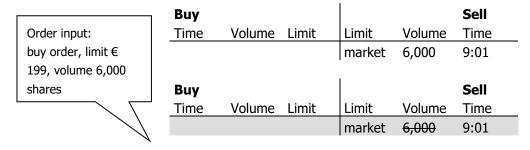
The reference price is \in 200. It is lower than the lowest sell limit. The two orders are executed at the lowest sell limit of \in 203 (Principle No. 2).

Example 11: Input of limit order when the order book contains only market orders on the opposite side



The reference price is \in 200. It is equal to or lower than the highest buy limit. The two orders are executed at the reference price of \in 200 (Principle No. 1).

Example 12: Input of limit order when the order book contains only market orders on the opposite side



The reference price is \in 200. It is higher than the highest buy limit. The two orders are executed at the highest buy limit of \in 199 (Principle No. 2).

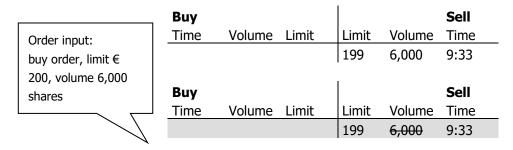


Example 13: Input of limit order when the order book contains only limit orders on the opposite side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	Order input:
9:33	6,000	199				sell order, limit € 198,
						volume 6,000 shares
Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	_
9:33	6,000	199				

The highest buy limit is equal to or higher than the lowest sell limit. The two orders are executed at the highest buy limit of \in 199.

Example 14: Input of limit order when the order book contains only limit orders on the opposite side



The highest buy limit is equal to or higher than the lowest sell limit. The two orders are executed at the lowest sell limit of \in 199.

Example 15: Input of limit order when the order book contains only limit orders on the opposite side

Buy Time	Volume	Limit	Limit	Volume	Sell Time	Order input:
9:01	6,000	199				sell order, limit € 200,
_			1		C-11	volume 6,000 shares
Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	

The highest buy limit is lower than the lowest sell limit. The incoming sell order is entered into the order book; no price is determined, and no orders are executed.



Example 16: Input of limit order when the order book contains market and limit orders on the other side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	Order input:
9:01	6,000	market				sell order, limit €
9:02	1,000	196				195,
			1			volume 6,000 shares
Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	7/
9:01	6,000	market				
9:02	1,000	196				

The reference price is \in 200. It is equal to or higher than the highest buy limit and the lowest sell limit. The incoming sell order is executed against the buy market order in the order book at the reference price of \in 200 (Principle No. 1).

Example 17: Input of limit order when the order book contains market and limit orders on the other side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	- Order input:
9:01	6,000	market				sell order, limit €
9:02	1,000	202				199,
						volume 6,000 shares
Buy					Sell	voidine 0,000 shares
Time	Volume	Limit	Limit	Volume	Time	_ //
9:01	6,000	market				
9:02	1,000	202				,

The reference price is \in 200. The highest buy limit is equal to or higher than the lowest sell limit and higher than the reference price. The incoming sell order is executed against the buy market order in the order book at the highest buy limit of \in 202 (Principle No. 2).

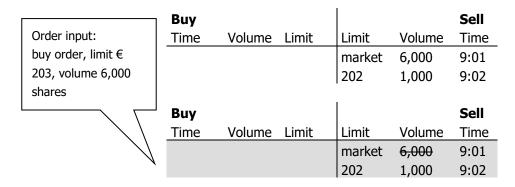
Example 18: Input of limit order when the order book contains market and limit orders on the other side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	Order input:
9:01	6,000	market				sell order, limit €
9:02	1,000	202				203,
						volume 6,000 shares
Buy					Sell	5
Time	Volume	Limit	Limit	Volume	Time	. //
9:01	6,000	market				
9:02	1,000	202				



The reference price is \in 200. The lowest sell limit is higher than the highest buy limit and higher than the reference price. The incoming sell order is executed against the buy market order in the order book at the lowest sell limit of \in 203 (Principle No. 2).

Example 19: Input of limit order when the order book contains market and limit orders on the other side



The reference price is \in 200. It is equal to or lower than the highest buy limit and the lowest sell limit. The incoming buy order is executed against the sell market order in the order book at the reference price of \in 200 (Principle No. 1).

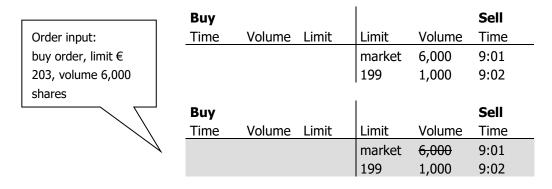
Example 20: Input of limit order when the order book contains market and limit orders on the other side



The reference price is \in 201. The highest buy limit is equal to or lower than the lowest sell limit and lower than the reference price. The incoming buy order is executed against the sell market order in the order book at the highest buy limit of \in 200 (Principle No. 2).

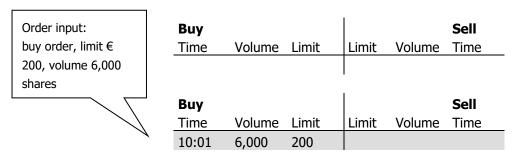


Example 21: Input of limit order when the order book contains market and limit orders on the other side



The reference price is \in 200. The lowest sell limit is lower than the highest buy limit and lower than the reference price. The incoming buy order is executed against the sell market order in the order book at the next sell limit of \in 199 (Principle No. 2).

Example 22: Input of limit order when there are no orders on the opposite side



The incoming buy order is entered into the order book; no price is determined, and no orders are executed.

Example 23: Partial execution of market order; input of limit order when the order book contains market and limit orders on the other side

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	Order input:
9:01	6,000	market				sell order, limit €
9:02	1,000	202				203,
			1			volume 1,000 shares
Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	_ //
9:01	5,000	market				
9:02	1,000	202				

The reference price is \in 200. The lowest sell limit is higher than the highest buy limit and higher than the reference price. The incoming sell order can be matched only with a part of the buy market order in the order book. The incoming sell order is executed in full, the buy market in the order book in part, at the lowest sell limit of \in 203 (Principle No. 2).



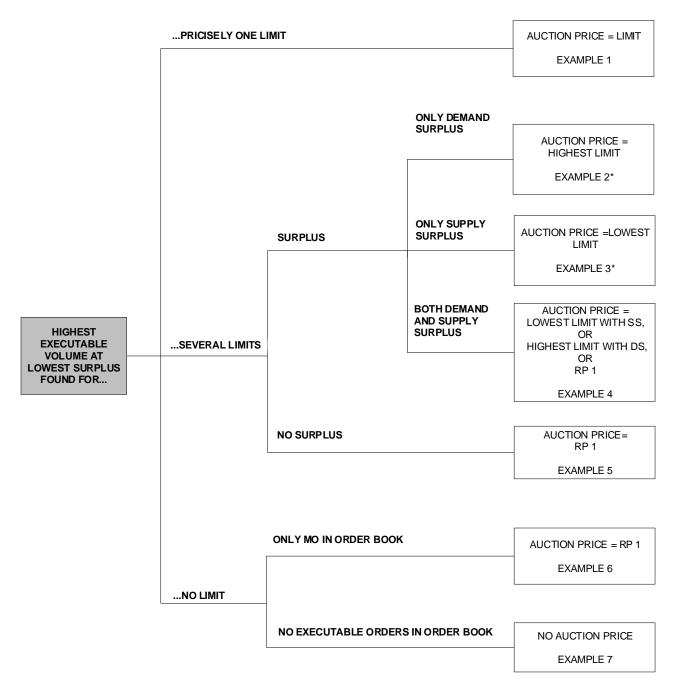
<u>Example 24:</u> Triggering a volatility interruption. A limit order is placed while the order book contains market orders and limit orders on the opposite side.

Buy			ĺ		Sell	
Time	Volume	Limit	Limit	Volume	Time	Order input:
9:01	6,000	market				sell order, limit €
9:02	1,000	202				220,
						volume 1,000 shares
Buy					Sell	\frac{1}{7}
Time	Volume	Limit	Limit	Volume	Time	. //
9:01	6,000	market				
9:02	1,000	202				

The reference price is \in 200, and the price corridor is +/- 2% on either side of the most recently determined price. The limit of the incoming sell order is outside the pre-defined price corridor; the order is not executed. The sell order is entered into the order book, continuous trading is interrupted, and an auction is started.



Appendix 6: Price determination in auction trading



^{*}in case of a surplus of a market order: auction price=price, closest to the reference price



Examples of trade matching in auctions

Example 1: There is exactly one limit at which a maximum order volume can be executed at a minimum order surplus.

Buy								Sell
	Volume	Cum.	Surplus	Limit	Surplus	Cum.	Volume	
-		volume				volume		
limit	200	200		202	500	700		
limit	200	400		201	300	700		
limit	300	700		200		700	100	limit
		700	100	198		600	200	limit
		700	300	197		400	400	limit

The auction price is fixed at € 200 in line with this limit.

Example 2: Several limits would be possible and there is a demand surplus.

Buy			·			Sell
Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
400	400		202	100	500	
200	600	100	201		500	
	600	100	199		500	300
	600	400	198		200	200

The auction price is fixed at € 201 in line with the limit.

<u>Example 2b: Several limits would be possible and there is a surplus on the bid caused by a market order.</u> Tick size is 1 EUR.

Buy			•	•		Sell
Volume	Cum.	Surplus	Limit	Surplus	Cum.	Volume
	volume				volume	
500	500	200	Market		300	
	500	200	202		300	
	500	200	201		300	
	500	200	200		300	
	500	200	199		300	300

The auction either equals the reference price or is fixed according to the limit nearest to the reference price:

- If the reference price is € 199 or below, the auction price will be € 199.
- <u>If the reference price is € 199 or above, the auction price will be the reference price.</u>



Example 3: Several limits would be possible and there is a supply surplus. *

Buy						Sell
Volume	Cum.	Surplus	Limit	Surplus	Cum.	Volume
	volume				volume	
300	300		202	300	600	
200	500		201	100	600	
	500		199	100	600	400
	500	300	198		200	200

The auction price is fixed at € 199, corresponding to the lowest limit.

<u>Example 3b: Several limits would be possible and there is a surplus on the ask caused by a market order.</u>
<u>Tick size is 1 EUR.</u>

Buy				-	-		Sell
V	/olume	Cum.	Surplus	Limit	Surplus	Cum.	Volume
		volume				volume	
3	300	300		202	200	500	
		300		201	200	500	
		300		200	200	500	
		300		199	200	500	
		300		Market	200	500	500

The auction either equals the reference price or is fixed according to the limit nearest to the reference price:

- If the reference price is € 202 or above, the auction price will be € 202.
- <u>If the reference price is below</u> € 202, the auction price will be the reference price.

Example 4a: Several limits would be possible and there are surplus orders on both, the demand and the supply side.

Bu	y						Sell
	Volume	Cum.	Surplus	Limit	Surplus	Cum.	Volume
		volume				volume	
	100	100		Market	100	200	
		100		201	100	200	
		100		200	100	200	100
	100	200		199		100	
		200	100	198		100	
		200	100	Market		100	100

The auction price is either equal to the reference price, or it is fixed in accordance with the limit which is the closest to the reference price:

- if the reference price = € 200 or above, the auction price = € 200.
- if the reference price = € 199 or below, the auction price = € 199.



Example 4b: Several limits would be possible, tick sizes are 0,1 and 0,2 EUR.

Buy	/				-		Sell
	Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
							_
	100	100		Market			
				50,0	100	200	100
	100	200	100	49,9			
				Market		100	100

The auction price is either equal to the reference price, or it is fixed in accordance with the limit which is the closest to the reference price:

- if the reference price = € 50,0 or above, the auction price = € 50.
- if the reference price = below € 50,0, the auction price = € 49,9.

Example 4c: Several limits would be possible, tick size is 0,2 EUR. Reference price is 56,0 EUR.

Buy				-		Sell
Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
400	100					
100	100		Market 54,0	100	200	100
100	200	100	51,0	100	200	100
			Market		100	100

The auction price is determined at 53,8 EUR.

• In case that reference price 1 is above or equal to the highest of the possible limit, the auction price is the price, which is a tick size lower than the highest possible limit.

Example 4d: Several limits would be possible, tick size is 0,2 EUR. Reference price is 49,9 EUR.

Buy			Ī	•		Sell
Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
100	100		Market			
100	200	100	53,0 51,0	100	200	100
			Market		100	100

The auction price is determined at 51,2 EUR.

• In case that reference price 1 is above or equal to the lowest of the possible limit, the auction price is the price, which is a tick size higher than the lowest possible limit.



Example 4e: Several limits would be possible, tick size is 0,2 EUR. Reference price is 55,0 EUR.

Βu	1 y				i		Sell
	Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
	100	100		Market			
				60,0	100	200	100
	100	200	100	51,0			
				Market		100	100

The auction price is determined at 55,0 EUR.

• In case that reference price 1 is between the highest and the lowest of the possible limit, the auction price is the reference price 1.

Example 4f: Only market orders are executable in the order book.

Buy				-		Sell
Volume	Cum.	Surplus	Limit	Surplus	Cum.	Volume
	volume				volume	
900	900	100	Market		800	
	900	100	Market		800	800

The auction price equals the reference price.

Example 5: Several limits would be possible and there is no surplus.

Buy						Sell
Volume	Cum.	Surplus	Limit	Surplus	Cum.	Volume
	volume				volume	
300	300		202	200	500	
200	500		201		500	
	500		199		500	300
	500	300	198		200	200

The auction price is either equal to the reference Price, or it is fixed in accordance with the limit which is the closest to the reference price:

- if the reference price = € 205, the auction price = € 201.
- if the reference price = € 200, the auction price = € 200.
- if the reference price = € 197, the auction price = € 199.



Example 6: The order book contains only matching executable market orders.

Buy			i	-		Sell
Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
900	900	100	market		800	
	900	100	market		800	800

The auction price is equal to the reference price.

<u>Example 7: There is no applicable limit, because the order book contains only non-matching orders which cannot be executed.</u>

Buy						Sell
Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Volume
80	80	80	201 200	80	80	80

No auction price can be determined. In this case, the highest buy limit, € 200, and the lowest sell limit, € 201, are disseminated.

Example 8: Execution of part of an order in an opening auction.

Buy	Volume	Cum. volume	Surplus	Limit	Surplus	Cum. volume	Sell Volume
9:00 9:01	300 300	600	200	200		400	400

As the buy side of the order book contains two orders limited at the auction price, time priority decides which of the two is executed in full and which in part. In this case, the order with the time stamp 9:00 is executed in full, and the order with the time stamp 9:01 is executed in part (100 shares), both at the auction price of \in 200. An order surplus for 200 shares, which remains after the partial execution of the original order, is transferred to continuous trading, unless execution is restricted to auction only.

Note: The specifics of auction price determination in auctions with strike match orders are given in examples 3-6 in *Appendix 7.*



Appendix 7: Selected examples of order matching for orders with execution restrictions

Example 1: Stop market order – execution scenario

Reference price = 48

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	
10:01	500	46	48	1,000	10:00	
10:02	2,500	43				
10:03	1,500	41				

Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	
10:01	500	46	market	1,000	10:10	
10:02	2,500	43	market	3,000	10:10	
10:02	2,000	43	48	1,000	10:00	
10:03	1,500	41				

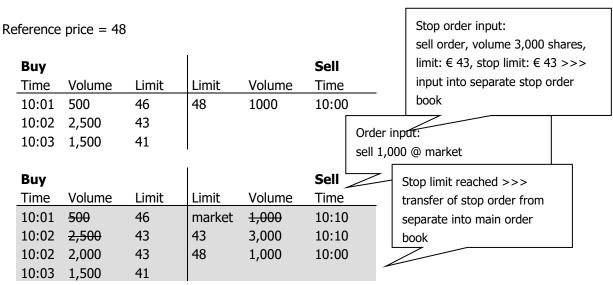
Buy					Sell	
Time	Volume	Limit	Limit	Volume	Time	
10:01	500	46	market	1,000	10:10	
10:02	2,500	43	market	3,000	10:10	
10:02	2,000	43	48	1,000	10:00	
10:03	1,500	41				
10:03	500	41				

Stop order input: sell market order, volume 3,000 shares, stop limit € 43 >>> input into separate stop order book

Order input: sell market order, volume 1,000

Stop limit reached >>> transfer of stop order from separate into main order book

<u>Example 2</u>: Stop limit order – execution scenario





Buy					Sell
Time	Volume	Limit	Limit	Volume	Time
10:01	500	46	market	1,000	10:10
10:02	2,500	43	43	3,000	10:10
10:02	2,000	43	43	1,000	10:10
10:03	1,500	41	48	1,000	10:00



Appendix 8: Permitted order entry across trading phases

Continuous trading:

Order	Book	OpnA	Cont	ClsA	Closed	ADD	DEL	VOLA	STOP	HOL
Market	✓	✓	✓	✓	*	x	×	✓	x	×
Limit	✓	✓	✓	✓	*	æ	×	✓	*	×
Stop market	✓	✓	✓	✓	*	*	×	✓	×	3 ¢
Stop limit	✓	✓	✓	✓	*	*	*	✓	*	*
Iceberg	✓	✓	✓	✓	*	*	×	✓	×	×
Immediate-or-cancel	,x	*	✓	sc .	*	*	*)x	×	*
Fill-or-kill	x	*	✓	sc .	*	*	*	*	*	*
Book-or-cancel	x	×	✓	sc	*	sc	×	×	×	×
Opening auction only	✓	✓	✓	✓	*	3¢	*	✓	æ	*
Auction only	✓	✓	✓	✓	*	sc	×	✓	3¢	*
Closing auction only	✓	✓	✓	✓	*	3¢	*	✓	×	*

Book – book phase	ADD – New instrument
OpnA – Call phase (opening auction)	DEL – Instrument in the system but cannot be traded
Cont – Main trading phase	VOLA – Volatility interruption, market order interruption, extended volatility interruption
ClsA – Call phase (closing auction)	STOP – Security "halted"
Closed – End of trading	HOL – Holiday, non-trading day
Closed – End of trading	



Auction trading:

Order	Book	Auction Intraday	Closed	ADD	DEL	VOLA	STOP	HOL
Market	×	*	*	*	×	×	×	*
Limit	✓	✓	×	×	sc .	✓	*	æ
Stop market	*	*	*	*	æ	*	*	*
Stop limit	✓	✓	×	*	×	✓	*	*
Iceberg	×	*	*	*	*	*	*	*
Immediate- or-cancel	*	*	*	×	×	*	*	×
Fill-or-kill	×	æ	*	*	æ	*	*	æ
Book-or- cancel	*	*	*	*	×	*	*	*
Opening auction only	×	*	×	×	sc	*	*	×
Auction only	✓	✓	*	*	æ	✓	*	×
Closing auction only	*	*	*	*	×	*	*	*





Appendix 9: Disclosure of market data

Continuous trading:

Market data	Book	OpnA	Cont	ClsA	Closed	ADD	DEL	VOLA	STOP	HOL
Close price	✓	✓	✓	✓	✓	\$ ¢	\$6	✓	✓	✓
Indicative auction price	×	✓	×	✓	×	*	×	√	*	*
Volume potentially executed at indicative	*	✓	*	~	×	*	×	√	×	×
Surplus orders and side of order book + auction price +	k	×	×	×	×	x	se .	se .	×	×
Market depth	*	✓	✓	✓	*	*	×	✓	×	×
Best bid / ask	\$ c	✓	✓	✓	*	*	*	✓	*	×





Auction trading:

Market data	Book	Auction Intraday	Closed	ADD	DEL	VOLA	STOP	HOL
Close price	✓	✓	✓	×	×	✓	✓	✓
Indicative auction price	×	✓	×	×	×	✓	×	×
Volume potentially executed at indicative	×	✓	×	×	×	✓	×	×
Best bid / ask	×	✓	×	×	×	×	×	×
Surplus orders and side of order book + auction price	×	×	×	×	×	×	×	×
Market depth	×	√	×	×	×	×	×	×

Book – book phase Auction Intraday - call phase Closed – End of trading	ADD – New instrument DEL – Instrument in the system but cannot be traded VOLA – Volatility interruption, market order interruption, extended volatility interruption STOP – Security "halted"
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Appendix 10: Obligatory order entry attributes

Order attributes	Buy/Sell	Instr	Ohy	Limit	Stop /	OrdT	Validity	ExR	PeakQty	TrR	Text	Act
Order types	Buy/Sell	Ilisti	Qty	Lillie	2 nd limit	Olui	Validity	EXK	PeakQty	IIK	Text	ACC
Market	✓	✓	✓	×	×	0 M	✓ GFD, date, GTC	×	×	O OA, AU, CA	0	✓ A1, P1, M1
Limit	✓	✓	✓	✓	×	O L	✓ GFD, date, GTC	×	×	O OA, AU, CA	0	✓ A1, P1, M1
Stop market	✓	✓	✓	×	✓	0 M	✓ GFD, date, GTC	✓ STP	×	×	0	✓ A1, P1, M1
Stop limit	✓	✓	✓	✓	✓	O L	✓ FD, date, GTC	✓ STP	×	×	0	✓ A1, P1, M1
Iceberg	✓	✓	✓	✓	×	✓ I	✓ GFD, date, GTC	×	✓	×	0	✓ A1, P1, M1
Immediate-or-cancel	✓	✓	✓	0	×	×	✓ GFD	✓ IOC	×	×	0	✓ A1, P1, M1
Fill-or-kill	✓	✓	✓	0	×	×	✓ GFD	✓ FOK	×	×	0	✓ A1, P1, M1
Book-or-cancel	✓	✓	✓	✓	×	×	✓ GFD, date, GTC	✓ BOC	×	×	0	✓ A1, P1, M1
Opening auction only	✓	✓	✓	0	×	0	✓ GFD, date, GTC	×	×	✓ OA	0	✓ A1, P1, M1
Auction only	✓	✓	✓	0	×	0	✓ FD, date, GTC	×	×	✓ AU	0	✓ A1, P1, M1
Closing auction only	✓	✓	✓	0	×	0	✓ FD, date, GTC	×	×	✓ CA	0	✓ A1, P1, M1

- ✓ obligatory attributes
- restricted attributes
- option attributes
- * entry allowed, but in this case the order functions as FOK or IOC

	FOK – fill-or-kill
GFD – good-for-day	BOC – book-or-cancel
GTD – good-till-date	OA – opening auction
GTC – good-till-cancelled	AU – auction
IOC – immediate-or-cancel	CA – closing auction



Appendix 11: Detailed overview of LJSE actions in extended volatility interruptions

Trading method	Action
Auction	Order management phase extended until at least 15.15 and no later than 15.35. Resumption of auction.
Continuous	Resumption of auction after 10 minutes.

^{*} Note: If the extended volatility interruption is triggered within the last 10 minutes before the start of the closing auction, the order management phase is extended for 10 minutes.