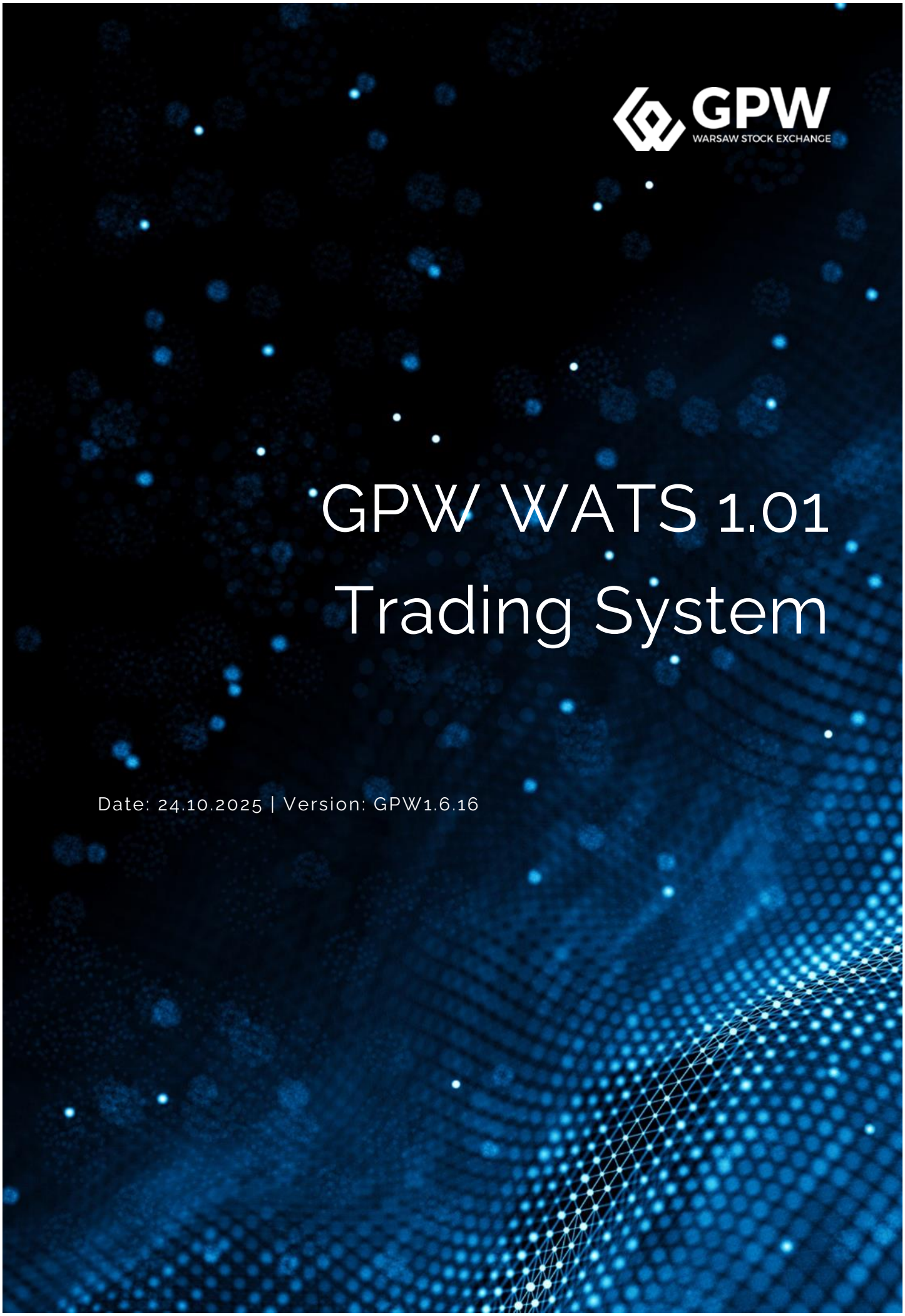

GPW
WARSAW STOCK EXCHANGE
GPW WATS 1.01
Trading System
Date: 24.10.2025 | Version: GPW1.6.16
Fundusze Europejskie
Rzeczpospolita Polska
Unia Europejska
Europejskie Fundusze Strukturalne i Inwestycyjne
NCBR
Narodowe Centrum Badań i Rozwoju

CONTENTS

1. DISCLAIMER

This document is for information purposes only and does not form any part of contractual documentation.

Reasonable care has been taken to ensure details contained within are accurate and not misleading at the time of publication. Warsaw Stock Exchange is not responsible for any errors or omissions contained in this document.

Warsaw Stock Exchange reserves the right to treat information contained in this document subject to later change without prior notice.

This document contains confidential information to Warsaw Stock Exchange and may not be reproduced, disclosed, or used in whole or part, in any manner, without prior written consent from the owner of this document. Information included in this document shall be maintained and exercised with adequate security measures necessary to protect confidential information from unauthorized access or disclosure.

In case of sections of documentation at a **High** level work progress according to the current version of *GPW WATS Advancement of Documentation*, Warsaw Stock Exchange will endeavor to limit changes to these sections of documents to those related to:

1. correcting errors in the documentation or in the software;
2. clarification of the documentation content or removing ambiguity;
3. implementation of approved change requests or;
4. regulatory changes.

2. PREFACE

This document has been prepared by Warsaw Stock Exchange to help in the implementation process of GPW WATS trading platform.

2.1. TARGET AUDIENCE

This document has been prepared for development staff, Independent Software Vendors who produce software integrated with GPW WATS, analysts, market Participants, and all clients who want to deepen their knowledge about GPW WATS.

2.2. DOCUMENT PURPOSE

The purpose of this document is to provide a full description of GPW WATS services.

2.3. ASSOCIATED DOCUMENTS

GPW WATS 1.01 Trading System is a part of GPW WATS documentation set.

Please check the following documents to learn about the construction of Trading System.

- **GPW WATS 1.01 Trading System** (this document).

Please check the documentation of the trading protocols supported by GPW WATS.

- GPW WATS 2.01 Native Order Gateway Specification (this document),
- GPW WATS 2.02 FIX Order Gateway Specification.

Please check the description of the communication with Data Distribution Service.

- GPW WATS 3.01 Market Data Protocol.

Please check the description of the communication with Internet Data Distribution System.

- GPW WATS 3.02 Internet Data Distribution System,
- GPW WATS 3.03 Streaming Messages for IDDS,
- GPW WATS 3.04 Rest API Messages for IDDS.

Please check the additional documentation, which explains other services provided within GPW WATS.

- GPW WATS 4.01 Drop Copy Gateway,
- GPW WATS 4.02 Post Trade Gateway,
- GPW WATS 5.01 Risk Management Gateway.

Please check the additional documentation describing the following:

- GPW WATS 2.03 Rejection Codes,
- GPW WATS 2.04 BenDec Message Definition Format,
- GPW WATS 4.03 Contract Notes,
- GPW WATS 6.01 Connectivity,

- GPW WATS 6.02 (ENG) Short Code Record Keeping,
- GPW WATS 6.02 (PL) Mapowanie Short Code,
- GPW WATS 6.03 Short-Long Mapper User Guide.

It is recommended to read ***GPW WATS 1.01 Trading System*** document first.

3. Document History

Version	Date	Description
0.51	29.06.2023	The initial publication of the documentation.
0.52	26.07.2023	Publication of v0.52.
0.53	16.08.2023	Publication of v0.53.
0.54	19.09.2023	Publication of v0.54.
0.55	11.10.2023	Validities for Tender Offer orders have been corrected according to regulations from GTD and GTC to D and GTD.
0.56	08.11.2023	Publication of v0.56.
0.57	30.11.2023	The following sections have been updated comparing to the previous version: • 5.4.1 Instrument Code - clarification of the Instrument code creation, • 6.2. Trading Schedule - minor adjustment of a description concerning number of unscheduled phases, • 8.1.1 Auction - minor amendments regarding the description of Auction procedure, • 8.1.2 Continuous Trading - minor amendments regarding the description of Fixed Price Matching, • 8.1.5 Random Opening – updated by information about this functionality as optional one, • 9.4. Market Phases for Block Trades – information about the split of a Market Phase to cover the settlement process added. Expanding the settlement date from 2 to 30 for Block Trades, • 9.6.1 Block Trades - removal of VWAP as one of the reference price to be used for Block Trades.
0.58	15.12.2023	Publication of v0.58.
0.59	20.01.2024	Publication of v0.59.
0.62	25.03.2024	The following sections have been updated comparing to the previous version: 9.2 Block Trade features changed, 9.3 Cross Trade features changed, 9.4.1 Continuous trading – concluding criteria for Off-book trading added 9.5 Trade Capture Report has been removed as it is explicitly described in FIX and Native Order Gateway Specifications. 10. Hybrid Model – the whole chapter has been reviewed and elaborated on.
1.0	30.04.2024	The following sections have been updated comparing to the previous version: 4.4 Connectivity 4.4.1 Cancel on Disconnect 4.4.2 Throttling 5.2 Market Segments 5.3 Product 5.3.1 Product Type 5.4 Instrument 5.4.1 Instrument Description Convention for Instrument in Trading 5.5 Instrument Status 5.5.1 Active 5.5.2 Regulatory Suspension 5.5.3 Market Operations Suspension 5.5.4 Outside Static Collars

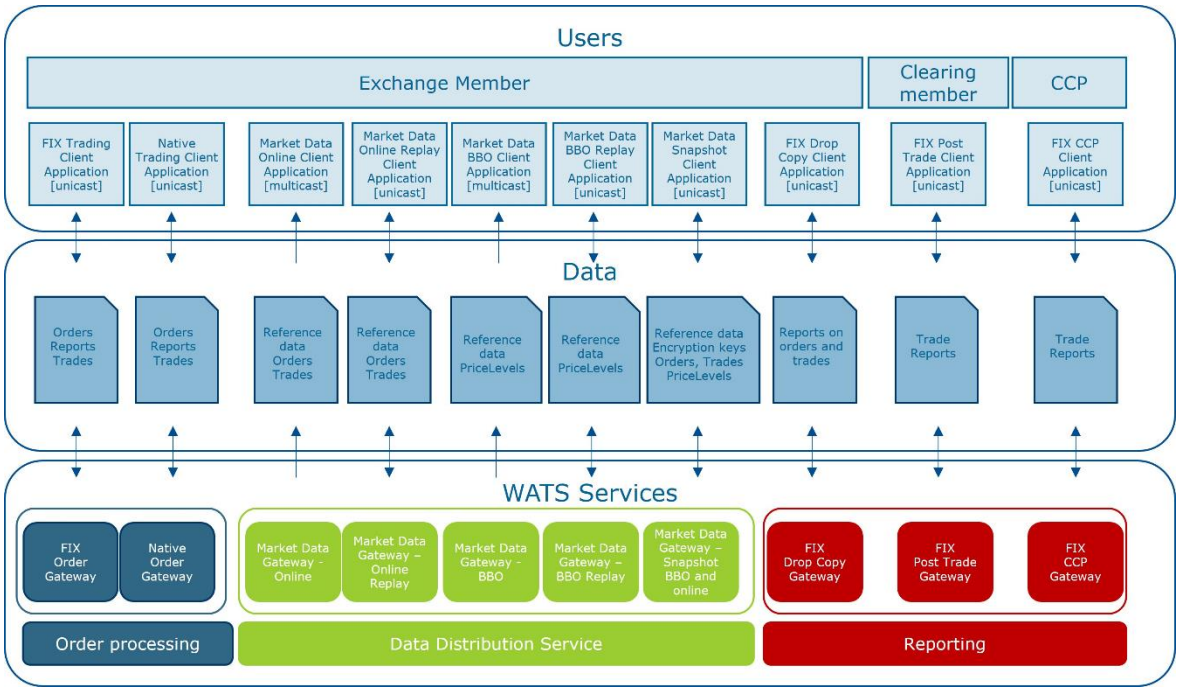
Version	Date	Description
		5.5.5 Outside Dynamic Collars 6.2 Trading Schedule 8.1 Market Phases 8.1.1 Early Monitoring (No Trading) 8.1.4 Late Monitoring (No Trading) 8.1.6 Random Opening 8.2 Orders 8.2.3 Order Modifications 11. IPO/SPO Model 11.2 Market Phases 12.1 Tender Offer Process 12.3 Market Phases The following sections have been added: 5.3 Product 5.3.2 Product Sub Type 7.4 Trade Cancellation 9.1 Block Trading Model 9.1.1 Market Phases 10 Hybrid Model
1.1	28.06.2024	In 5.3.1 Product Type section two new types have been added: Index and Currency. New values have been added 5.3.2 Product Subtype section: Reference Rate • Interest Rate • Exchange Rate • Price Index • Total Return Index • Sector Price Index • Sector Total Return Index • Dividend Index • Strategy Price Index • Strategy Total Return Index • Commodity Index • Bond Total Return Index
1.1.2	9.08.2024	8.4.3 Order Value section has bee updated. 10.7.1.1 Order Queue Release process has been updated. Clearing Firm modification has been deleted from the document as it was not consistent with the System.
1.2	18.09.2024	Minor editorial changes.
1.3	17.10.2024	GTD validity condition is no longer used for IPO and Tender Offer Market models.
1.4	6.12.2024	Unpublished version. All changes in this version have been documented in v1.5.
1.5	2.02.2024	10.1.4. Hybrid Buy Only Phase: Clarification of the description outlining the transition process from the Hybrid phase to the HybridBuyOnly phase. 5.5.2. Regulatory Suspension definition has been redefined. Minor editorial changes..
1.5.4	30.04.2025	No changes in the document. Publication of v1.5.4.
1.6	26.05.2025	**4.4.1. Cancel on Disconnect**: clarification on CoD feature in Early/Late Monitoring market phases.

Version	Date	Description
		5.3.1Product Type: Added two product types: Rate and Tracker. **5.3.2 Product Subtype:** Table updated.
1.6.5	18.06.2025	No changes in the document. Publication of v1.6.5.
1.6.6	10.07.2025	No changes in the document. Publication of v1.6.6.
1.6.7	7.08.2025	No changes in the document. Publication of v1.6.7.
1.6.8	14.08.2025	Minor editorial changes
1.6.12	12.09.2025	No changes in the document. Publication of v1.6.9
1.6.15	29.09.2025	No changes in the document. Publication of v1.6.12
1.6.16	24.10.2025	No changes in the document. Publication of v1.6.16

4. GPW WATS SERVICES (INTERFACES)

GPW WATS provides the following groups of IT services:

- order processing via FIX and Native Order Gateways,
- market data distribution via Market Data services,
- reports on orders and transactions via Drop Copy, Post-Trade and CCP Gateways.



4.1. USERS

GPW WATS provides tailored services to users based on assigned roles, which determine their specific interactions with different services and products in the Trading System.

4.1.1. EXCHANGE MEMBER

An Exchange Member is typically an entity whose business is directly related to trading financial instruments. Exchange Members may subscribe to one or more markets through one or more connections.

4.1.1.1. Market Maker

A Market Maker is usually a financial institution, often an Exchange Member, who agrees to act as an intermediary between buyers and sellers. In an order driven market, a Market Maker provides additional liquidity by submitting and maintaining bid and ask prices for particular securities. A Market Maker enters into an agreement with the exchange that establishes the terms and conditions under which the market maker provides liquidity. Usually, an agreement defines the inventory of instruments to be maintained together with quoting requirements with regards to spread, order size or quoting timeframe.

Orders or quotes submitted by Market Makers are flagged in order to distinguish them from the other orders and facilitate validations as per Market Maker's agreement conditions.

There are two types of Market Makers:

- Exchange Market Maker – operating on an agreement with Exchange,
- Issuer Market Maker – operating on an agreement between an issuer and Market Maker.

4.1.1.2. Direct Electronic Access

Direct Electronic Access (DEA) is a functionality (service provided by Exchange Member where Exchange Member enables its clients to electronically transmit orders directly to Market. Orders are submitted to Trading System under Exchange Member's trading code.

DEA is subdivided into:

- Direct Market Access (DMA), and
- Sponsored Access (SA).

In both cases Exchange Member (DEA provider) is fully responsible for order flow submitted by its clients (DEA clients). DEA provider is obliged to carry out due diligence on its DEA clients to ensure that they are familiar with Trading System and with the exchange rules.

DEA provider shall ensure that there is a:

- pre-trade check on order entry,
- post-trade control,
- surveillance system to detect market manipulation,
- real-time monitoring of DEA client activity.

Direct Market Access

DMA functionality offers Exchange Members' Clients direct access to Trading System by using the Member's infrastructure. Orders submitted by the DMA client are subject to passing through the Member's order management system where appropriate risk controls are performed.

Sponsored Access

Sponsored Access offers Exchange Members' Clients direct access to Trading System without passing through Exchange Member's infrastructure. Sponsoring firm is Exchange Member that provides their Clients (Sponsored Client) Sponsored Access. A Sponsoring Firm shall ensure that Sponsored Clients' order flow is subject to appropriate pre- and post-trade checks by using the exchange's Risk Management Gateway.

Only the Sponsoring Firm is entitled to set trading limits for their Sponsored Clients. Sponsoring Firm receives Drop Copy for orders and trades of their Sponsored Clients.

4.1.2. CLEARING MEMBER

Clearing Member is a financial institution or a firm that acts as an intermediary between buyers and sellers to facilitate the settlement of transactions. Clearing Member can be an active Exchange Member of Market.

Clearing Member can subscribe to additional services e.g. Post Trade Gateway.

4.1.3. CLEARING COUNTERPARTY AND SETTLEMENT INSTITUTION

Clearing Counterparty and Settlement Institution is a financial entity that facilitates the clearing and settlement of financial transactions between different parties. The primary function is to ensure that trades executed on financial markets are settled accurately, securely and in a timely manner.

Clearing Counterparty and Settlement Institution may subscribe to CCP Gateway.

4.1.4. DATA VENDOR

Data Vendor collects, processes and disseminates data received from various sources including exchanges. They provide data to customers who use them for various purposes, such as trading, research and analysis.

4.2. ORDER GATEWAYS

GPW WATS Order Gateways are customer-facing services. Through Order Gateways, firms connect to submit orders and receive order confirmation reports and trade information.

GPW WATS implements two Order Gateway interfaces: Native (also known as Binary) and FIX interface following the FIX 5.0 SP2 standard. Native Order Gateway is optimized for high-frequency trading, whereas FIX Order Gateway enables standardized connections.

See ***GPW WATS 2.01 Native Order Gateway Specification*** and ***GPW WATS 2.02 FIX Order Gateway Specification*** for more details.

Order Gateway service provides the following additional functionalities for each connection:

- Cancel on Disconnect (CoD) is a sub-service that automatically cancels orders from the order book in the event of loss of connection with Order Gateway,
- Risk management is a sub-service that allows Clearing and Exchange Members to set limits on their order parameters such as quantity or value. As for sponsored access, a sponsoring firm may set risk management parameters for a sponsored client.

4.2.1. MARKET DATA GATEWAY

Market Data Gateway includes the following complementary services: Online, Online Replay, BBO (Best Bid and Offer), BBO Replay, Snapshot. Each of the services implements a proprietary binary protocol:

- Online Market Data Gateway delivers a real-time stream of market information to subscribers over a multicast connection. Market data includes reference data, orders and transaction details. Certain message fields can be encrypted (e.g. a price in an OrderAdd message). Access to the above fields is subject to authorization. Participants receive appropriate decryption keys (see Snapshot service) to access certain information. The session day begins with the distribution of Reference Data to market Participants. Subsequently, the system publishes data regarding instrument statuses and trading phases, as well as ongoing orders and transactions.
- Online Replay service allows users to request information about messages that were lost due to possible gaps in multicast Online Market Data stream transmission.
- BBO provides a real-time stream of market information to subscribers over a multicast connection. The BBO data contains reference data and the best price levels for the buy and sell sides. Certain message fields can be encrypted (e.g. a price in the PriceLevelSnapshot message). Access to the fields is provided in the same manner as in the Online service. The session day starts with sending

Reference Data to Market Participants. Subsequently, data regarding instrument statuses and trading phases, as well as best price levels are transmitted.

- BBO Replay service allows users to request information about messages that were lost due to possible gaps in multicast BBO Market Data stream transmission.
- Snapshot enables users to download the current status of an order book any time during the trading session. The important functionality of the service is the ability to download keys to decrypt market data. Each Exchange Member only receives the keys that allow them to access the permitted data. The Snapshot service is dedicated to both Online and BBO Market Data subscribers.

See ***GPW WATS 3.01 Market Data Protocol*** for more details.

4.2.2. FIX DROP COPY GATEWAY

Drop Copy service sends a copy of executions including details on orders and/or trades. It is used in order to facilitate real time trading activity monitoring.

4.2.3. FIX POST TRADE GATEWAY

Post Trade Gateway's purpose is to confirm transactions concluded by Exchange Member. With the consent of Exchange Member, confirmation of transactions can be forwarded to their clearing members. FIX Post Trading Gateway is based on the FIX 5.0 SP2 protocol. The transaction confirmation is sent as a TradeCaptureReport (AE) message.

4.2.4. FIX CCP GATEWAY

The purpose of the CCP Gateway is to report transactions concluded by Exchange Member to CCP (Central Clearing Counterparty). FIX CCP Gateway is based on the FIX 5.0 SP2 protocol. The transaction report is sent as a TradeCaptureReport (AE) message.

4.3. Additional Functionalities

Additional functionalities provided by GPW WATS are briefly mentioned below and further described in a separate document GPW WATS Risk Management Gateway. To become further acquainted with risk management and self-trade prevention, please check the above-mentioned document.

4.3.1. RISK MANAGEMENT

Risk Management is a service that enables Trading and Clearing Members to control orders with the help of pre and post-trade risk controls.

The Risk Management service enables:

- Clearing Members to define risk controls for orders submitted by Exchange Members,
- Exchange Members to configure active filters to control their own and their Clients' order flow.

Risk Management implements pre and post-trade limits.

Pre-trade limits prevent orders not meeting specific parameters from entering the order book. These parameters are:

- order price collar - defines a price range for order prices,
- maximum order quantity - prevents unusually large orders from entering the order book,
- maximum order value - prevents orders with unusually high value from entering the order book.

Post-trade controls manage a client's overall pattern of trading activity. When Participant exceeds a given post-trade involvement threshold, the risk management service can block further submission of orders.

Examples of post-trade limits are:

- total traded value – total value of buy and sell transactions executed during a session,
- total open order value – total value of buy and sell orders awaiting execution,
- total risk value - total traded value + total open orders value.

See ***GPW WATS 5.01 Risk Management Gateway*** for more details.

4.3.2. SELF-TRADE PREVENTION

Self-Trade Prevention (STP) functionality enables Exchange Members to avoid unintentional internal order execution with their orders. Exchange Member should provide the STP ID value at the order entry level to enable Trading System to activate the STP functionality. Both order gateways (FIX and Native (Binary)) contain the STP ID field. There is no need to set any additional configuration on Trading System level. The exchange does not provide or validate the STP ID, provided it complies with the field format. Allocation of the STP ID is at the sole discretion of Exchange Member. Each Exchange Member can freely encode the value of STP ID, which meets their needs to protect a specific order against self-trade.

Main STP functionalities:

- STP only applies to orders executed in the Central Limit Order Book,
- STP is active in the Continuous at Variable Price and Continuous at Reference (Fixed) Price,
- STP is inactive in auction phases (scheduled auctions - Opening, Closing, Intraday Auctions), unscheduled auctions (Dynamic, Static Volatility Auctions).

Currently one STP logic is applied. Whenever an incoming order may match an order that rests in the order book sharing the same STP ID, a passive order is deleted in favor of an aggressive order to prevent self-match trade.

The STP action is triggered only if:

- both orders are submitted for the same financial instrument,
- both orders are submitted by one Participant,
- both orders have the same STP ID,
- both orders may potentially match against each other in whole or in part.

In the event of STP activation, Exchange Member receives the relevant message which contains the reason for order cancellation.

4.4. CONNECTIVITY

4.4.1. CANCEL ON DISCONNECT

Cancel on Disconnect (CoD) is an optional functionality that prevents orders from remaining in the order book when there is a connection loss between Exchange Member and System.

Cancel on Disconnect feature is available on both FIX and Native connections. If Exchange Member utilizes more than one connection (whether it is FIX or Native), the CoD mechanism may be enabled selectively for each or only some of them.

GPW Exchange is responsible for CoD configuration on behalf of Exchange Member to activate CoD in the connection setup. Additionally, there is a CoD flag in the order entry message, which enables the Exchange Member to specify whether the order should be subject to cancellation upon disconnection.

If the CoD is enabled for an Exchange Member's connection, then Exchange Member has the ability to decide for each single order, whether it should be cancelled by the CoD if the disconnection has been detected.

If the CoD is not enabled for a connection, then CoD flag in the order entry message is disregarded by the CoD mechanism and such order will never be cancelled upon connection loss.

The CoD mechanism described above applies also to Early/Late Monitoring market phases.

CoD rules for specific types of trading flow:

- Single Order – CoD flag available (Exchange Member decides whether an order should be cancelled upon disconnection),
- Order Modification – CoD flag not available (cannot modify CoD behavior once the order is submitted),
- Mass Quote – CoD flag not available (Mass Quotes are always subject to CoD by default),
- Trade Capture Reports (Block/Cross) – CoD flag not available (TCRs are never impacted by CoD).

The CoD mechanism takes effect (for the selected orders) once the disconnection from the Gateway is detected. The disconnection is understood as breaking the TCP/IP connection or lack of communication from the client, including the lack of Heartbeat messages. If Heartbeat messages are not being received, an additional grace period is granted before CoD activation.

4.4.2. THROTTLING

4.4.2.1. Business Throttling

Business Throttling mechanism is designed to guarantee and limit number of operations to the level of service provision agreed upon between GPW WATS System Operator and Exchange Member. Business Throttling Limit is configured on each connection level independently. Once business limit is exceeded each subsequent message is rejected. Traffic volume is recalculated on each incoming message and as soon as it decreases below calculated limit messages are accepted again.

4.4.2.2. Technical Throttling

Message Throttling mechanism secures FIX and Native Gateways users from being overloaded by excessive incoming message traffic in a short time. Once the defined technical throttling limit is exceeded, a message is rejected and, the connection is logged out and closed down. In addition after exceeding the technical limit level, it is not possible to log into System for 10 seconds.

Logout and order cancel messages are not taken into the throttling rate calculation.

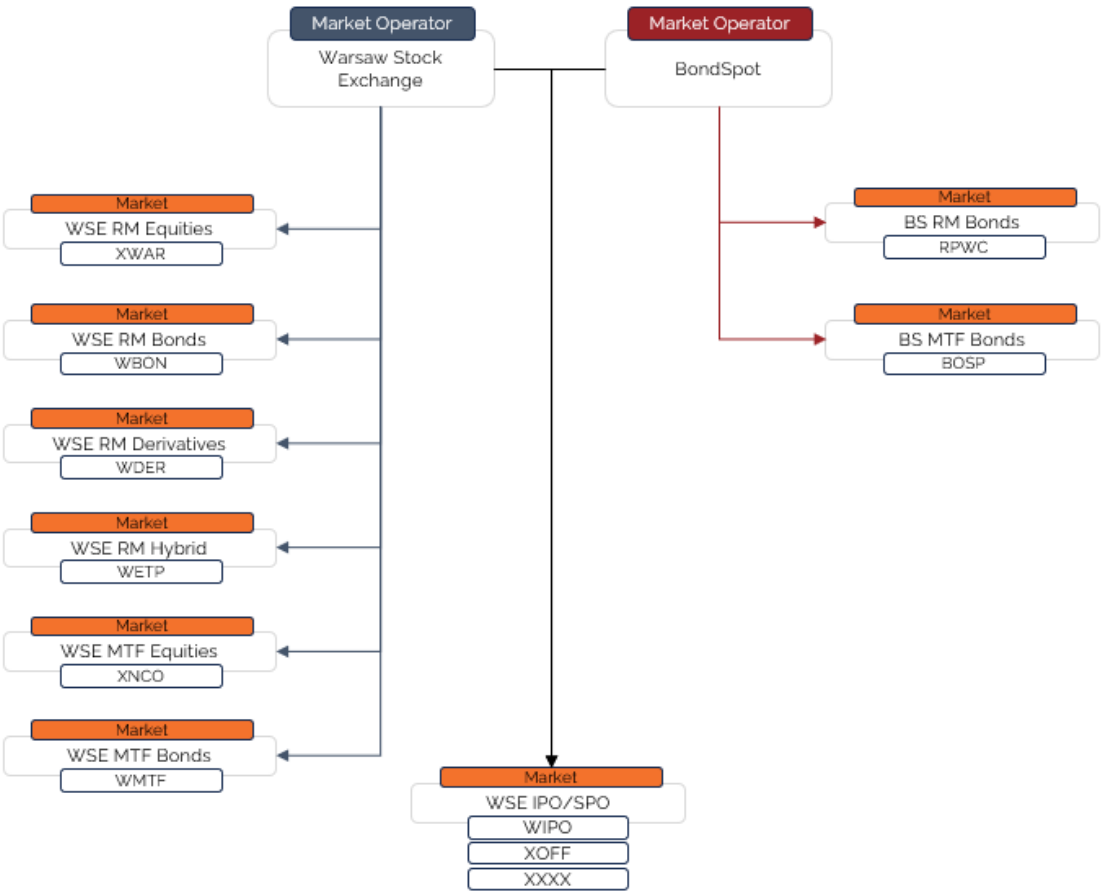
5. Market Structure

Market structure consists of layers that construct the final product such as Instrument. Each level of Market structure represents some dedicated parameterization details and carries specific trading rules or a given behavior. All components might be transferable across the structure and set on various market layers. A given parameter set on a specific market structure layer applies to all instruments that are part of this segment (exception: lower layers can be overwritten if a parameter is parameterized differently than the whole segment). The same rule applies to any other common definitions within a given structure.

5.1. Market

Market represents an entity with the legal status of an organized Regulatory or Multilateral Trading Facility market or any other exchange structure e.g. usually following the MIC — Market Identifier Code (ISO 10383)..

An example of this structure is presented below:

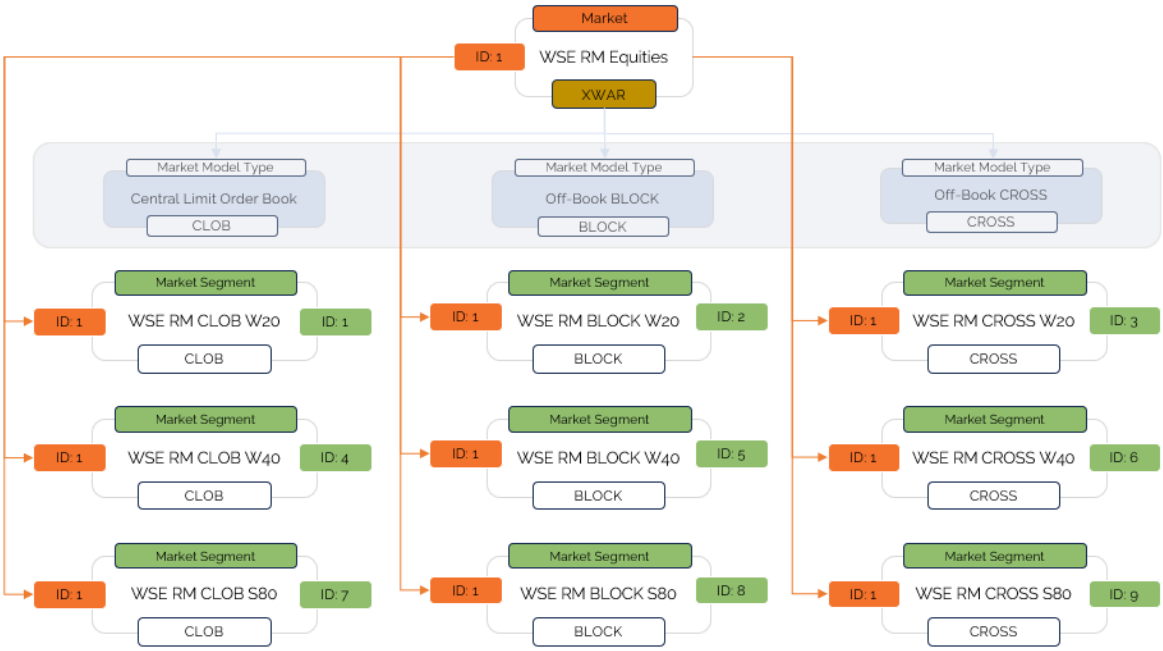


5.2. Market Segments

Market Segment represents a multi-level market structure built to group instruments in terms of their trading rules or specific allocations (Market Model). In GPW WATS the following Market Segments are recognized:

- Central Limit Order Book,
- Block,
- Cross,
- Hybrid,
- Tender Offer,
- IPO,
- Redistribution.

An example of this structure is presented below:



Note:

The values used in the diagram to represent a given ID of a market or market segment data are for presentation purposes only.

5.3. Product

Product represents a base structure for instrument creation. It carries the set of reference data common for instruments that belong to a given product (ISIN, FISN, CFI, number of instruments, nominal value, multiplier, or accrued interest). One Product can have more than one Instrument linked. Instruments associated with the same Product can be listed on more than one Market. Product is mainly used to facilitate instrument management by incorporating reference details on one level and passing them down to the instrument layer. Product is not a subject of trade execution or order submission. It carries some of the reference data common for associated instruments.

5.3.1. PRODUCT TYPE

Each product is allocated to its category. The list of available product types for instruments in trading is currently defined as follows:

- Equity,
- Fixed Income,
- Derivative Futures,
- Derivative Options,
- Index,
- Currency (does not refer to listed instruments),
- Structured Product,
- Rate (does not refer to listed instruments),
- Tracker

5.3.2. PRODUCT SUBTYPE

Numerous product subtypes may be created under each product type.

The table presents the list of Product subtypes together with their Product type in alphabetical order by product type:

Product subtype	Product type
Share	Equity
Allotment Right	Equity
Tender Offer	Equity
Issue Right	Equity
Subscription Warrant	Equity
Investment Certificate	Equity
Subscription right	Equity
Bank Securities	Fixed Income
Bond	Fixed Income
Treasury Bond	Fixed Income
Municipal Bond	Fixed Income
Corporate Bond - bank	Fixed Income
Corporate Bond - firm	Fixed Income
Convertible Bond	Fixed Income
Mortgage Bond	Fixed Income
Mortgage Backed Bond	Fixed Income
Public Mortgage Bond	Fixed Income
Bill	Fixed Income

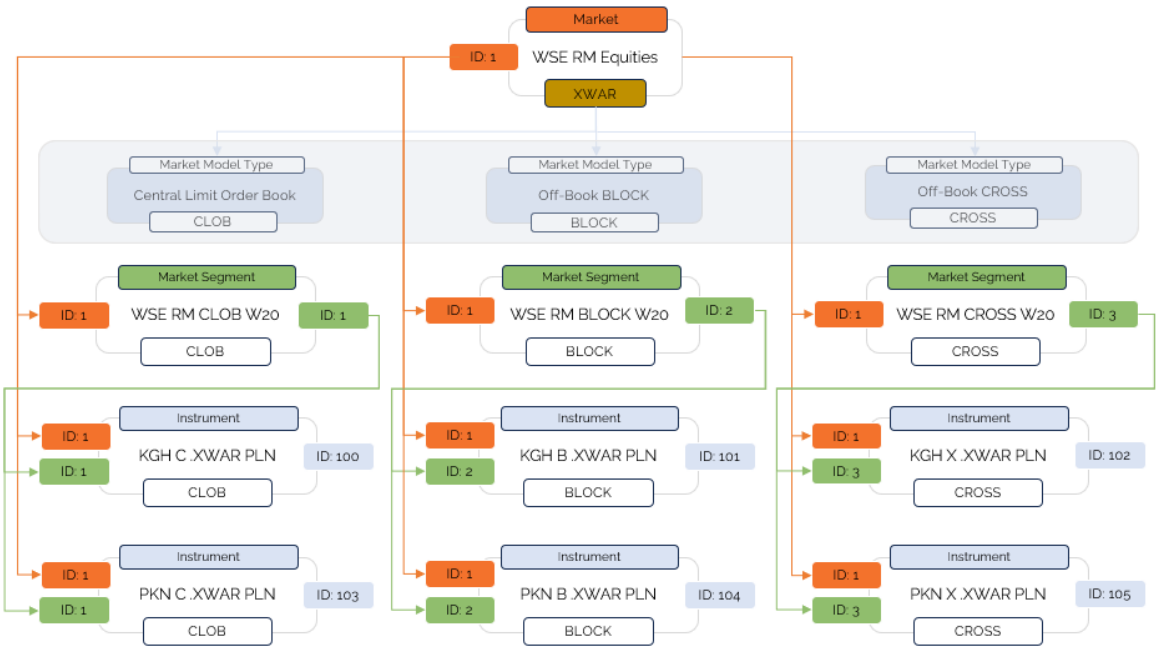
Product subtype	Product type
Treasury Bill	Fixed Income
Commercial Bill	Fixed Income
Bond issued by a government institution	Fixed Income
Supranational Bond	Fixed Income
Index Futures	Derivative Futures
Stock Futures	Derivative Futures
Currency Futures	Derivative Futures
Bond Futures	Derivative Futures
Interest Rate Futures	Derivative Futures
Index Options	Derivative Options
Stock Options	Derivative Options
Price index	Index
Total return index	Index
Sector price index	Index
Dividend index	Index
Strategy price index	Index
Strategy total return index	Index
Commodity index	Index
Bond total return index	Index
Sector total return index	Index
Exchange rate	Currency
Option warrants	Structured Product
Factor certificates	Structured Product
Turbo certificates	Structured Product
Capital protection certificates	Structured Product
Bonus certificates	Structured Product
Reverse convertible certificates	Structured Product
Express certificates	Structured Product
Discount certificates	Structured Product
Index/tracker certificates	Structured Product
Other investment certificates (non leveraged)	Structured Product
Structured notes	Structured Product
Warrant with Knock Out	Structured Product
Reference rate	Rate

Product subtype	Product type
Interest rate	Rate
ETF - Exchange Traded Fund	Tracker
ETN - Exchange Traded Note	Tracker
ETC - Exchange Traded Commodity	Tracker

5.4. INSTRUMENT

Instrument represents a tradable entity i.e., instrument that can be bought and sold. Instruments of the same characteristics are grouped as a Market Segment. Every Instrument must be a part of a Market Segment.

Example of such structure is presented below:



Note:
The values used in the diagram to represent a given ID of a market, market segment or instrument data are for presentation purposes only.

5.4.1. INSTRUMENT DESCRIPTION CONVENTION FOR INSTRUMENTS IN TRADING

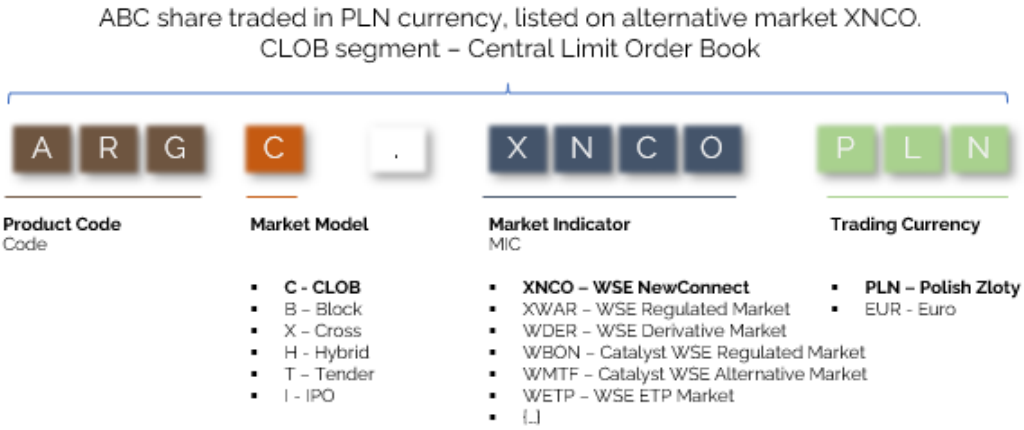
Instrument Description represents a financial instrument that can be traded in GPW WATS Trading System. It is a naming convention that relates to a Market and Market Model that allows to uniquely identify a particular entity.

Instrument Code is created based on the following components:

- **Product Code** - a code representing the name of the product to which the instrument applies. For stocks it is represented by the ticker of the instrument, for other types of instruments it is its name,
- **MIC** - Market Instrument Code (ISO 20022) to which the instrument belongs,

- **Market Model** - a definition that defines the trading rules. The list of available Market Model definitions is defined at the Market Structure (Market Segment) level,
- **Trading Currency** - the currency in which the instrument is listed.

Figure 1. Instrument Description



Below are some examples of how instrument description looks like across various types of instruments and market models:

Example	Type	Market Model Type
KGH C.XWAR PLN	Share	CLOB
KGH B.XWAR PLN	Share	BLOCK
KGH X.XWAR PLN	Share	CROSS
DS0432 C.WBON PLN	Treasury Bonds	CLOB
DS0432 B.WBON PLN	Treasury Bonds	BLOCK
DS0432 X.WBON PLN	Treasury Bonds	CROSS
FW20H2520 C.WDER PLN	DerivativeFutures	CLOB
FW20H2520 B.WDER PLN	DerivativeFutures	BLOCK
FW20H2520 X.WDER PLN	DerivativeFutures	CROSS
RCLGAMESAOPEN H.WETP PLN	StructuredProduct	HYBRID

5.5. Instrument Status

GPW WATS operates statuses that are related to events during a business day and the trading phase for all instruments traded in. Each change of the instrument status is populated to the Market Data via InstrumentStatusChange. The instrument status informs if trading activities are possible in the current trading phase.

The following statuses exist within GPW WATS:

- Active,
- Regulatory Suspension,
- Market Operations Suspension,

- Outside Collars Static,
- Outside Collars Dynamic,
- Hybrid No Quotes,
- Knock-Out.
- Knock-Out By The Issuer

Bear in mind that each financial instrument can be assigned to each status listed above, no matter what status it is at. No additional limitations exist.

5.5.1. ACTIVE

Trading is allowed. Order placement and execution may take place as long as Market Phase conditions allows for such activity.

Status Active applies to the following market models:

- CLOB – Central Limit Order Book,
- Off-Book – including Block Trading and Cross Trading,
- Hybrid,
- IPO/SPO,
- Tender.

5.5.2. REGULATORY SUSPENSION

A status is reserved for decisions made by the **Exchange** or the **Financial Supervisory Authority (FSA)** and is applied when a formal decision to suspend an instrument has been issued. In such cases, the Exchange assigns the status **Regulatory Suspension** to the instrument. This status may be enforced during any Market Phase for the duration specified in the formal decision of the relevant authorities.

When an instrument is restored during a day and is supposed to be back to trading, there will be an obligatory Auction Phase with its duration to adjust orders' limits before transitioning to trading. Instrument can also move to Volatility Auction if, at the end of Auction, IMP exceeds the defined applied limits. Status Regulatory Suspension applies to the following market models:

- CLOB – Central Limit Order Book,
- Off-Book – including Block Trading and Cross Trading,
- Hybrid,
- IPO/SPO,
- Tender.

5.5.3. MARKET OPERATIONS SUSPENSION

A status can only be activated following the decision by the Exchange. The Exchange can decide to suspend an Instrument when there is an extraordinary event that impacts the rules of trading. The status can be enforced during each Market Phase

When an instrument is restored during a day and is supposed to be back to trading, there will be an obligatory Auction phase with its duration to adjust orders' limits before transitioning to trading. Instrument may move to a Volatility Auction if, at the end of the auction, the IMP exceeds the defined limits applied.

Status Market Operations Suspension applies to the following market models:

- CLOB – Central Limit Order Book,
- Off-Book – including Block Trading and Cross Trading,
- Hybrid,
- IPO/SPO,
- Tender.

5.5.4. OUTSIDE STATIC COLLARS

A status is activated automatically whenever an attempt is observed to conclude a trade outside the limitations imposed by static collars. Once a status is triggered, an adequate type of Volatility Auction takes place. Outside Collars status is set to indicate static collars have been exceeded.

Status Outside Static Collars applies to the following market models:

- CLOB – Central Limit Order Book (if static collars are defined).

5.5.5. OUTSIDE DYNAMIC COLLARS

A status is activated automatically whenever an attempt is observed to conclude a trade outside the limitations imposed by dynamic collars. Once a status is triggered, an adequate type of Volatility Auction takes place. Outside Collars status is set to indicate dynamic collars have been exceeded.

Status Outside Dynamic Collars applies to the following market models:

- CLOB – Central Limit Order Book (if dynamic collars are defined).

5.5.6. HYBRID NO QUOTES

A status is triggered when Market Maker does not provide the Quotes and trading cannot be continued.

Status Hybrid No Quotes applies to the following market models:

- Hybrid.

5.5.7. KNOCK-OUT BY THE ISSUER

A status is activated solely by Market Maker to indicate an instrument to be knocked out.

Status Knock-Out by the Issuer applies to the following market models:

- Hybrid.

5.5.8. KNOCK-OUT

A status is activated by the Trading System whenever a threshold set on a hybrid instrument is reached.

Status Knock-Out applies to the following market models:

- Hybrid.

6. Trading Parameters

6.1. Trading Calendar

A trading calendar consists of a list of trading and non-trading days. The main focus of a trading calendar is to provide information on non-trading days and provide alternative trading schedules. The calendar incorporates two pieces of information:

- a weekly plan with the following days of the week specifying whether trading is allowed on those days,
- the exceptions when trading is closed or falls into an alternative trading schedule.

In most cases, a trading calendar is specific to Market, however, it can also be assigned to a particular segment or Instrument.

6.2. Trading Schedule

Trading schedule defines the pre-determined time frame or set of hours during which trading activities may be conducted. Trading schedule consists of Market Phases that define an exact time when a given phase is initiated.

Some Market Phases may be randomized to introduce a level of randomness or uncertainty regarding the exact opening or closing time. Information about trading schedule becomes part of the reference data for each Instrument in trading. The trading schedule consists of a list of Market Phases used to organize the trading day. Market Phase determines the following trading characteristics:

- the type of Market Phase (no Market Phase is also possible),
- allowed order types,
- allowed order validity conditions,
- actors that can perform operations on orders (i.e. Exchange Members and/or Market Operations).

There are two types of Market Phases:

- scheduled Market Phases,
- unscheduled Market Phases.

Most of the Market Phases are scheduled, thus they have a predefined start time (with randomization or not). An instrument sharing a scheduled Market Phases should go through each Market Phase during a day.

Market Phases known as unscheduled are automatically triggered when certain conditions are met. Some examples of unscheduled Market Phases are:

- Phase resulted from an attempted trade outside Dynamic or Static trading price Collars. In such a scenario, an unscheduled Phase is triggered and supersedes the actual Market Phase. Static and Dynamic Volatility Auctions as well as Extended Static and Dynamic Volatility Auctions are examples of unscheduled Market Phases,
- Phase resulted from the successful uncross event at the end of Closing Auction. Such a phase is triggered automatically as soon as the successful price determination is completed. If this results in a transaction at the end of Closing Auction, unscheduled Market Phase is called up and further

trading may occur. Continuous Trading at Closing Price Market Phase is an example of such a Market Phase.

Unscheduled Market Phases may have a defined duration after which there is either a transition to the next unscheduled Phase, transition to scheduled phase or no transition at all. Unscheduled phase may also be skipped if a condition triggering such a Phase is not met. In a such scenario, the potential Phase will simply not occur.

There is no limitation regarding the maximum number of Market Phases or transitions that constitute a trading schedule.

Various instruments can have different trading schedules assigned in Trading System, or even may use different trading schedules during particular trading days. For instance, one trading schedule can be applied for the first trading day, while for the following days, another one is used. For some instruments (usually derivatives) an exceptional trading schedule can be set to handle the expiration process and run the calculation of final settlement prices. Various trading schedules can be assigned to different weekdays too.

When creating a new trading schedule, the allowed Market Phase transition rules must be followed:

From (rows) / To (columns)	Continuous Trading at Variable Price	Continuous Trading at Fixed Price	Continuous Trading at Closing Price	Auction	Monitoring	Market Closed
Continuous Trading at Variable Price	yes	yes	no	yes	yes	yes
Continuous Trading at Fixed Price	no	yes	no	yes	yes	yes
Continuous Trading at Closing Price	no	yes	no	no	yes	yes
Auction	yes	yes	yes*	yes	yes	yes
Monitoring	yes	yes	no	yes	yes	yes
Market Closed	yes	yes	no	yes	yes	no

* The transition to Continuous Trading at Closing Price is possible from Closing Auction only.

6.3. Price

Instruments may be quoted in currency or percentage of a nominal value. Information about how they are traded depends on their characteristics.

6.4. Tick Size

Tick size is the smallest price movement allowed by System. Any Limit Order must follow the definition of a tick size. In other cases, it will be rejected.

More than one tick size can be allocated to Instrument, Market Segment, or Market. Tick size is located in a tick table with consecutive limits (price levels) and corresponding quotation steps. The lower bounds of a tick table always correspond to a valid price.

A tick table always starts with 0, which can be set as the price limit.

A tick size table can be assigned to any layer of market structure. On equity instruments, tick tables are typically allocated to individual instruments rather than any other layer of an existing market structure. For other types of instruments, the same tick table can be assigned for the upper market structure layers and serve all instruments of a given type.

Whenever order and trade price collars are defined, their limits must follow price levels and quotation steps which correspond to those being applied to an instrument.

6.5. Lot Size

Instrument lot size defines the number for one unit of quantity in order. Lot size is defined by the exchange for each instrument. Lot size is an integer number.

The order volume of a given lot size is calculated as:

Order Volume Calculation

$$Order\ Volume = Lot\ Size \times Order\ Quantity$$

6.6. Corporate Actions

Corporate action refers to any significant event or decision taken by a company that may impact its existing shareholders. These actions include dividends, splits, re-splits, spin-offs, issue rights, and any other events that affect the company's structure, ownership, or financial situation.

GPW WATS Trading System supports the following Corporate Events:

Corporate Action Type:

- dividend,
- bonus issue,
- rights issues,
- split,
- reverse split,
- spin-off.

6.6.1. ORDER PROCESSING DUE TO CORPORATE EVENT

If a corporate event is observed, all orders remaining in the order book are automatically deleted after the last trading day before a corporate event takes place. Orders which are deleted due to corporate events are flagged to indicate the reason for cancellation.

6.6.2. REFERENCE PRICE PROCESSING DUE TO CORPORATE EVENT

To minimize the effect of a corporate action, Exchange will amend the reference price to mitigate the risk of trading based on outdated information. Whenever a reference price is updated due to a corporate event, processing additional information is accompanied to inform recipients of the reasons for such amendment.

6.6.3. OTHER CHANGES DUE TO CORPORATE EVENT

A corporate event may also affect other values such as nominal (par-value), issue size or multiplier for derivatives. Reference data distributed by Exchange will reflect all these modifications to assure the accuracy of data before the start of trading on the next day after a corporate event took place.

Some of the corporate events, especially re-splits and splits may require assigning a new ISIN code and transferring shares to this ISIN code to begin trading on the next day.

7. Settlement and Clearing Parameters

7.1. Settlement Calendar

Settlement calendar consists of a list of days that specify the settlement date for post-trade functionalities. The majority of settlement days fall on trading days. The main focus of a settlement calendar is to ensure the accuracy of the settlement process. Similarly, to a trading calendar, there are two sets of information that present a current picture of the settlement timing:

- a weekly plan,
- exceptions, when a settlement falls into an alternative settlement schedule.

Usually, one settlement calendar applies to the whole market.

7.2. Settlement Cycle

The settlement cycle represents the time it takes from the day of executing a transaction to the date when a transfer of securities bought or sold occurs. The settlement cycle may vary depending on Market, Market Model, or Instrument type. Usually, the settlement cycle follows T+2 standard where a trade date is followed by two business days until the transaction is considered settled, while for instruments representing derivatives T+0 may apply. For transactions done through Block Trade Facility, the settlement process may be set from T+0 to T+X (market decision as a maximum).

7.3. Clearing Data

Exchange transmits all executed orders (transactions) to the clearing and settlement system. To properly allocate details of each transaction, Exchange Members may indicate on the order level a set of details including Account, Account Type and Clearing Firm.

7.4. Trade Cancelation

Exchange may cancel a trade or trades following Exchange Member's request. Exchange reserves the right to decide whether a trade should be canceled or not. Additional regulations may be established to define the cancelation range or any other restrictions regarding the trade cancellation process.

Trade cancellations may be performed during all trading phases but not longer than Late Monitoring phase ends.

8. Central Limit Order Book Model

Central Limit Order Book (CLOB) is an order-driven market model, where all trading interests (both orders and quotes) of buyers and sellers are matched against each other according to a predefined algorithm (usually price/time priority). Orders with better prices (i.e. higher for buy and lower for sell side) are ranked with higher priority for matching. Orders at the same price level are usually ranked according to their time priority (the oldest order has the highest priority). Other priorities are also possible (e.g. Time priority only for Continuous Trading at Fixed/Closing Price).

8.1. Market Phases

Market Phases are the basic building blocks for trading schedules.

GPW WATS for Central Limit Order Book supports the following Market Phases:

- Early Monitoring (No Trading),
- Auction, including scheduled Auctions (i.e. Opening, Intraday, Closing) and unscheduled Auctions (i.e. Auctions following Volatility Halt or Auctions following Unsuspension of an instrument),
- Continuous Trading at Variable Price,
- Continuous Trading at Fixed Price,
- Continuous Trading at Closing Price,
- Late Monitoring (No Trading),
- Market Closed (No Trading).

8.1.1. EARLY MONITORING (NO TRADING)

The first Market Phase allows the Exchange to verify the data integrity before trading begins. During this Phase, any operation on orders including order entry, modification, or cancellation is impossible by Exchange Members. Market Operations may, however, perform some tasks resulting in amending the reference prices, collars levels, and order cancellations but only if necessary.

8.1.2. OPENING AUCTION

The main goal of Opening Auction is to concentrate liquidity before the Continuous Phase begins and gets the best possible valuation of the financial instrument.

Opening Auction is a market phase in which all executable orders are matched at one fixed price (i.e. last Indicative Matching Price calculated at the end of the Auction Phase).

During Auction, System calculates and provides continuous information about potential matching price and matched volume of orders, which would be executed at the time of calculation. This applies to the crossed order book only. For uncrossed order book, no matching price and volume are calculated, so only the best bid and ask with accumulated quantities are provided instead.

Auction phase can be ended with the order matching procedure (Uncrossing) if market conditions enable it or can be ended without orders matching procedure depending on trading schedule or Market Model .

There are 3 types of scheduled Auctions that can be distinguished in a trading schedule:

1. Opening Auction (first Auction during the day),
2. Intraday Auction (all Auctions during the day between Opening and Closing Auction),
3. Closing Auction (last Auction during the day).

In terms of matching, all three Auction types listed above behave the same way. The only difference is how orders with VFA/VFC validity are activated:

- orders with Valid For Auction (VFA) validity are activated by any type of Auction (Opening/Intraday/Closing),
- orders with Valid For Closing (VFC) validity are activated by the Closing Auction only.

Another difference is that in most cases the price resulting from the Closing Auction is taken as the official Closing Price for the instrument traded.

Apart from three scheduled Auction types mentioned above, there also exist unscheduled Auctions that are triggered:

- automatically, each time a trade price collar is breached (so called Volatility Auction),
- when an instrument is manually halted by Market Operations (e.g. due to regulatory reasons) and it is restored afterwards a dedicated Auction phase is triggered before it goes back to trading,
- when an instrument is automatically halted by Trading System (e.g. due to technical malfunction) and it is restored afterwards a dedicated Auction phase is triggered before it goes back to trading.

Auction procedure

During Auction phase orders are accumulated in the order book. Full order management is allowed (i.e. orders may be submitted, modified and canceled) but no matching occurs yet (even if the order book is crossed). Orders are executed at the end of the Auction phase.

As a rule, any unexecuted orders submitted in the previous Market Phases, are transferred to Auction Market Phase and retain their time priority in the order book. All inactive orders with Valid For Auction validity are triggered as soon as Auction begins. These orders are inserted into the order book.

Note:
Valid For Closing orders are triggered during Closing Auction only).
The following rules apply to orders entry during Auction:

- orders with IOC/FOK validity are not accepted,
- Limit Orders are accepted,
- Market Orders and Market To Limit Orders are accepted with VFA/VFC validities only,
- Stop Limit, Stop Loss and Iceberg Orders are accepted with DAY, GTD, GTT, GTC validities only.

The Auction phase is ended at the time predefined in a trading schedule or after switching to the next phase (e.g. continuous trading) in case of unscheduled Auctions (with possible randomization range).

At the end of the Auction phase in the Uncrossing procedure all eligible orders are allocated and matched at the same single Auction Price. Auction price and aggregated execution quantity are equal to the last Indicative Matching Price (IMP) and Indicative Matching Volume (IMV) calculated during the Auction phase.

As a result of uncrossing procedure all orders with the price strictly better than Auction Price (i.e. buy orders with the higher limit, sell orders with the lower limit) must be fully executed. Orders with the price equal to the Auction Price can be executed fully, partially or not executed at all. Orders not executed during Auction phase are carried over to the next Market Phase in the trading schedule, unless order validity stipulates otherwise (e.g. VFA/VFC orders get expired after Auction phase).

If at the end of the Auction phase order book is uncrossed (i.e. highest Bid<lowest Ask), IMP and IMV are not calculated and the Auction ends with no matching (no trades are generated).

Market Data publication

At the start of the Auction phase, public order book is cleared by sending the OrderBookClear message.

During Auction phase, order-by-order/order-by-price view of the order book is not revealed to the general market via Market Data. Order book view is hidden.

In the case of crossed order book (i.e. Highest Bid >= Lowest Ask), Indicative Matching Price (IMP) and Indicative Matching Volume (IMV) are continuously calculated and published in Auction Update messages. IMP and IMV are re-calculated after each submission, modification and cancellation of an order. For crossed order book the Auction Update message specifies the following data:

- Indicative Matching Price (IMP),
- Indicative Matching Volume (IMV),
- Total Bid Quantity at IMP,
- Total Ask Quantity at IMP.

In case of uncrossed order book (i.e. highest Bid < lowest Ask), Best Bid and Best Ask along with aggregated quantities at these price levels are published in Auction Update messages. Auction Update message conveys the following values:

- Best Bid Price,
- Best Bid Quantity (aggregated),
- Best Ask Price,
- Best Ask Quantity (aggregated).

Once at the end of the Auction phase the uncrossing is completed, an Auction Summary message is published providing Auction Price and Auction Quantity (i.e. total quantity of orders executed during Auction). Trades generated during Auction are published via Market Data Trade Enriched messages as soon as the next Market Phase begins.

8.1.3. CONTINUOUS TRADING

During Continuous Trading, Market Phase orders are checked against potential execution immediately upon submission (except for Stop orders and orders with VFA/VFC validity conditions). Matching orders take place continuously. Unexecuted or partially executed orders are added to the order book (if the validity condition allows) and ranked according to Price/Time priority (in Continuous Trading at Variable Price) or Time priority (in Continuous Trading at Fixed Price / at Closing Price).

There are 3 types of Continuous Trading:

- Continuous Trading at Variable Price,

- Continuous Trading at Fixed Price (when all consecutive executions are completed at the same Reference (fixed) price set by preceding Auction, or failing this, set by the Last Trade Price,
- Continuous Trading at Closing Price (when all consecutive executions are completed at the same fixed price, resulting from Closing Auction).

During Continuous Trading, Limit Orders are accepted with all validities. Market and Market To Limit Orders are accepted with VFA, VFC, IOC, FOK validities only. Stop Limit, Stop Loss and Iceberg Orders are accepted with DAY, GTT, GTD, GTC validities only.

Market Data publication:

During Continuous Trading, order book is published via Market Data with order-by-order granularity. Each order submission, modification and cancellation is published on a real-time basis. Executed trades are revealed to Market Participants.

8.1.3.1. Variable Price Matching

During Continuous Trading at Variable Price execution, prices may vary from trade to trade. The execution price is determined by the limit of order(s) resting in the order book. A limit price of incoming aggressive order (i.e. an order hitting or lifting an opposite price level) does not affect the execution price. Incoming order may be executed in multiple trades at various price levels.

An incoming aggressive order is executed at the price(s) of Limit Orders awaiting execution on the opposing side of the order book. Passive orders (i.e. Limit Orders awaiting execution in the order book) are matched according to their Price/Time priority. Thus when there is an incoming buy order, sell orders with the lowest price limits are executed at first, increasing to higher limits, depending on incoming buy order quantity. When there is an incoming sell order, buy orders with the highest price limits are executed first, reducing to lower limits, depending on incoming sell order quantity. Orders resting at the same price level are executed according to their priority timestamps (i.e. orders that entered the order book earlier, are executed at first among orders with the same price limit).

Market Data publication:

During Continuous Trading at Variable Price, all orders in the order book are published via Market Data with their "real" prices (i.e. with the price limits that were specified by Exchange Member in the order entry message). This also applies to any price modifications.

8.1.3.2. Fixed Price Matching

Two sub-types of Continuous Trading support Fixed Price Matching in Trading System:

- Continuous Trading at Ref Price equal to the Last Trade Price,
- Continuous Trading at Closing Price.

During Continuous Trading at Reference Price/Closing Price the execution price is constant throughout the entire Market Phase. Limit prices of resting/incoming orders do not affect the execution price.

When there is Continuous Trading at Fixed Price, all orders (with prices better or equal to the reference price) are matched at the same reference price, irrespective of their actual price limits. The reference price may be established internally (e.g. the Last Traded Price from the preceding Market Phases) or injected from independent external sources. If Continuous Trading at Reference Price Market Phase is scheduled in Trading Schedule, it is never skipped during the trading day.

Continuous Trading at Closing Price is a conditional Market Phase that only occurs after the Closing Auction, and only if there were any trades executed during Uncrossing. Otherwise, Continuous Trading at Closing Price is skipped and the scheduler triggers the following Market Phase. When there is Continuous Trading at Closing Price all orders (with prices better or equal to the reference price) are matched at the same Closing Auction price, irrespective of their actual price limits.

During Continuous Trading at Reference Price/Closing Price resting orders are executed according to their Time priority only (i.e. orders that entered the order book earlier are executed first, irrespective of their price limits). Any incoming order is checked against potential execution upon entry. Unexecuted or partially executed orders are added to the order book.

Market Data publication:

During Continuous Trading at Reference Price/Closing Price orders in the order book are published via Market Data according to the following rules:

- orders with limits worse than the established reference price (i.e. buy orders with lower limits, sell orders with higher limits) are published with their *real* prices (i.e. with the price limits that were specified by Exchange Member in the order entry message),
- orders with limits equal or better than the established reference price (i.e. buy orders with limits equal or higher, sell orders with limits equal or lower) are published with the limit equal to the reference price (i.e. their "real" limits are not visible in Market Data).

Order modifications that do not alter the price published in Market Data (for prices better than the Reference Price) are omitted in the MD feed (i.e. in such cases MD OrderModify messages are suppressed, as if the modification would not happen at all).

8.1.4. LATE MONITORING (NO TRADING)

The last Market Phase when the Exchange may still interact with Trading System and perform some necessary tasks before the trading is done for a day. While Exchange Members are not able to operate on their orders, the Exchange may still interact with System to prepare it for the next trading day. Some activities related to orders or trades may be observed, in case of trade cancel procedure.

During this Phase, orders maturing on the current day, as well as orders following Corporate Action procedure can automatically be canceled by Trading System.

8.1.5. MARKET CLOSED (NO TRADING)

When Market is closed no operations on orders are possible, neither by Exchange Members nor the Exchange, although some system components may still be available (e.g. Market Data Gateway).

8.1.6. RANDOM OPENING

Random Opening is a mechanism that adds a random time element to the Uncrossing procedure, introducing uncertainty to the exact time an instrument moves to the next Market Phase. The main goal of randomization is to avoid possible market manipulation caused by orders which influence Indicative Matching Price discovery process, especially close to the end of an Auction. A random element which is added to the Auction process may eliminate all such attempts by adding the risk that a given order may be included in the Auction Uncrossing.

Although start times of all Market Phases in a trading schedule are explicitly defined, it is possible to set up a Random Opening Period (in seconds) for each Auction which occurs in that trading schedule (including unscheduled Volatility Auction). This will result in an Auction Uncrossing being triggered in a random point during Random Opening Period. Depending on the Auction, the Random Opening Period can occur before or after the scheduled Uncrossing time. Immediately after Uncrossing, the following Market Phase scheduled in the trading schedule begins (disregarding its scheduled start time).

Please check out Example: Random Opening for details.

Example

The following table provides an example of a trading schedule commonly used for equities trading:

Market Phase	Start Time	Scheduled	Random End	Conditional
Early Monitoring	07:45	yes		
Opening Auction	08:30	yes	yes (if defined)	
Continuous Trading at Variable Price	09:00	yes		
Closing Auction	16:50	yes	yes (if defined)	
Continuous Trading at Closing Price	17:00	yes		yes
Late Monitoring	17:05	yes		
Market Closed	17:30	yes		
Static Volatility Auction	n/a		yes (if defined)	yes
Dynamic Volatility Auction	n/a		yes (if defined)	yes

Example: Random Opening

Trading Schedule	Start Time	ROP*	Effective Uncrossing Period
Market Closed	12:00 am		
Early Monitoring	7:00 am		
Opening Auction	8:30 am	+ 5 sec.	between 9:00:00 - 9:00:05 am
Continuous Trading at Variable Price	9:00 am		
Intraday Auction Intraday	11:30 am	+ 10 sec.	between 12:00:00 - 12:00:10 pm
Continuous Trading at Fixed Price	12:00 pm		
Closing Auction	4:30 pm	- 15 sec.	between 4:59:45 - 5:00:00 pm
Continuous Trading at Closing Price	5:00 pm		
Late Monitoring	5:30 pm		
Market Closed	6:00 pm		

* ROP - Random Opening Period (in seconds)

Note:

The hours representing Start time of a given phase are for presentation purposes only.

8.2. ORDERS

Market Participants can choose between the following order types to buy or sell assets:

- Limit Order,
- Market Order (MO),
- Market To Limit (MTL),
- Stop Limit,
- Stop Loss,
- Iceberg (Hidden) Order.

Each order type can have one of the following validities assigned that define when and for how long an order remains in the order book:

- Day (DAY),
- Good Till Time (GTT),
- Good Till Date (GTD),
- Good Till Cancel (GTC),
- Immediate or Cancel (IOC),
- Fill or Kill (FOK),
- Valid for Auction (VFA),
- Valid for Closing (VFC).

8.2.1. ORDER TYPES

Order type defines the behavior of an order in the order book and how it is executed.

The following section describes order types available in GPW WATS Trading System.

8.2.1.1. Limit Order

Limit Order type allows one to buy or sell at a specified price. Limit Order execution happens at a price equal to or better than its limit price (at its limit or a lower price for a buy order and its limit or higher price for a sell order). An unexecuted Limit Order is added to the order book unless other order attributes specify otherwise. An unexecuted Limit Order that enters the order book is prioritized according to the price/time priority. The limit price must be specified according to the tick size defined by the Market Operator for the Instrument in question. If not, an order is rejected.

8.2.1.2. Market Order (MO)

Market Order type allows one to buy or sell without a specified price.

During the Continuous Trading phase, Market Orders can be submitted with IOC, FOK, VFA, and VFC validity types. Market Order is executed with counterpart orders at the best opposing price levels (one or more). Market Order with IOC or FOK validity type must be executed immediately within trade price collars (TPC). If not, an unexecuted part is canceled by Trading System.

During the Auction phase, Market Orders can be submitted with VFA and VFC validity types. During Auction, Market Orders have higher priority than any Limit Order. Market Orders and Market To Limit Orders have the same price priority and are ranked according to their timestamps (time priority).

8.2.1.3.Market To Limit (MTL)

Market To Limit Order type allows one to buy or sell without a specified price.

During the Continuous Trading phase, Market To Limit Orders can be submitted with IOC, FOK, VFA, and VFC validity types. Market To Limit Order is executed with counterpart orders at the best opposing price level (i.e. only at the first price level). Market To Limit Order with IOC or FOK validity types must be executed immediately within trade price collars (TPC). If not, Trading System cancels an unexecuted part.

During the Auction phase, Market To Limit Orders can be submitted with VFA and VFC validity conditions. During Auction, Market To Limit Orders have higher priority than any Limit Order. Market To Limit Orders and Market Orders have the same price priority and are ranked according to their timestamps (time priority).

8.2.1.4.Stop Limit

Stop Limit Order is an order to buy or sell, which is activated and inserted into the order book after reaching or exceeding a pre-defined price namely trigger price. Stop Limit remains inactive and is not displayed to the general market via Market Data until trigger price is reached. Once activated, Stop Limit is processed as a regular Limit Order and retains its original order type.

At the point of Stop Limit Order submission and modification, the following conditions must be met:

- for buy order: limit price > = trigger price > last traded price,
- for sell order: limit price < = trigger price < last traded price.

otherwise, the order is rejected.

Stop Limit Orders can be submitted with the following validity conditions:

- Day (DAY),
- Good Till Time (GTT),
- Good Till Date (GTD),
- Good Till Cancel (GTC).

Selected validity applies to the inactive Stop Limit Order awaiting activation, as well as to the triggered order awaiting execution in the order book.

The Stop Limit Order trigger price may be modified by Exchange Member as long as the order remains inactive.

8.2.1.5.Stop Loss

Stop Loss Order is an order to buy or sell without a specified limit price, which is activated and inserted into the order book after reaching or exceeding a pre-defined price called trigger price. Stop Loss remains inactive and is not displayed to the general market via Market Data until trigger price is reached. Once activated, Stop Loss is processed as a regular Market Order and retains its original order type.

When Stop Loss Order submission and modification occur the following conditions must be met:

- for buy order: trigger price > last traded price,
- for sell order: trigger price < last traded price.

otherwise the order is rejected.

Stop Loss Orders can be submitted with the following validity conditions:

- Day (DAY),
- Good Till Time (GTT),
- Good Till Date (GTD),
- Good Till Cancel (GTC).

Selected validity only applies to the inactive Stop Loss Order awaiting activation. Once activated, Stop Loss Order is processed as a Market Order with Immediate Or Cancel (IOC) validity condition, regardless of its original validity.

The Stop Loss Order trigger price may be modified by Exchange Member as long as the order remains inactive.

8.2.1.6. Iceberg Order

Iceberg Order is a Limit Order, in which only a predefined part of the total order quantity is displayed on the market via Market Data. The remaining quantity remains hidden (not visible) from the market.

When submitting Iceberg Order, Exchange Member must additionally specify the initial display quantity, which is lower than the total order quantity. Only the initial display quantity is visible to the market via Market Data in the order book.

While submitting or modifying the total value (price x quantity) of an Iceberg Order, it must be equal to or greater than the Minimum Iceberg Value parameter defined by the exchange (e.g. 10 000 EUR).

Refills

When Iceberg Order enters the order book, only the initial display quantity is revealed via Market Data. The initial display quantity may be randomized within a setup range if this feature is enabled by the exchange. Once the display quantity is filled, the next quantity is revealed (order refill) to the market with a new timestamp. At the same time, the hidden quantity is decreased proportionally. When the hidden quantity drops below the initial display quantity, the last refill will be equal to the remaining quantity.

Iceberg Order is refilled in the following cases:

- new Iceberg Order enters the order book,
- display quantity is filled,
- price is modified,
- initial displayed quantity is modified,
- multi-day Iceberg Order is restated to the order book on the following day.

Modifications

Exchange Member is allowed to modify Iceberg Order's:

- total quantity,
- initial display quantity,
- price.

Modifications of the total quantity does not result in the refill of the display quantity.

When modifying the initial display quantity only (with other order attributes unchanged), the iceberg value is not validated against the Minimum Iceberg Value set by the exchange.

When modifying the price of Iceberg Order during Continuous Trading at Reference (Fixed) Price or Continuous Trading at Closing Price phases, the orders keep their priority when the price is changed within the range of better or equal to Reference/Closing prices (for Buy orders higher and for Sell orders lower than Reference Price), otherwise the orders lose their execution priority.

Executions

An aggressive incoming Iceberg Order is executed in the same manner as a regular Limit Order (i.e. the system ignores the initial display quantity for matching purposes).

When Iceberg Orders are parked at the same price level (i.e. passive orders) and are hit or lifted by an incoming aggressive order, the display quantities are executed in their timestamp order and the rest of the incoming order is matched with the total hidden quantity of Iceberg Orders in their original timestamp order.

The quantity of an incoming aggressive order must be greater than the display quantity of all icebergs awaiting execution. In such cases, hidden quantities of parking Iceberg Orders are processed as regular Limit Orders awaiting execution at one price level.

Validity Conditions

Iceberg Orders can be submitted with the following validity conditions:

- Day (DAY),
- Good Till Time (GTT),
- Good Till Date (GTD),
- Good Till Cancel (GTC).

8.2.2. VALIDITY CONDITIONS

Order validity condition defines:

- when an order becomes activated (VFA, VFC),
- for how long an order remains in the order book (DAY, GTT, GTD, GTC),
- how the order is processed upon entry into the order book (IOC, FOK).

GPW WATS Trading System supports the following validity conditions:

8.2.2.1.Day (DAY)

Day order is valid for the current trading day only. Trading System expires Unexecuted Day orders at the end of the trading day during the post-session processing.

8.2.2.2. Good Till Time (GTT)

Good Till Time order is valid until the specified time of the current trading day.

Expire time for GTT orders may be specified with 1 second granularity when Exchange Member submits an order.

8.2.2.3. Good Till Date (GTD)

Good Till Date order is valid until the end of the specified day and it expires at the end of that date during the post-session processing.

The exchange defines the maximum GTD expiration delay that is allowed to be used when submitting an order. If Exchange Member requests an expiry date that exceeds set up delay, the order will be rejected. If the requested expiry date falls on a non-trading day, the order expires at the end of the previous trading day.

8.2.2.4. Good Till Cancel (GTC)

Good Till Cancel order is valid until it is fully executed or canceled by the submitter or Trading System.

Market Operator defines the maximum GTC expiry delay that is the maximum number of days that a GTC order is allowed to park in the order book. After that period, a GTC order expires during the post-session processing. If the calculated expiry date falls on a non-trading day, the order expires at the end of the previous trading day.

8.2.2.5. Immediate Or Cancel (IOC)

An order with Immediate Or Cancel validity condition must be executed immediately in full or at least partially upon entry into the order book. To be executed, IOC order must be matched with one or more opposing orders which have prices within trade price collars. The unexecuted part of IOC order is automatically canceled by Trading System.

IOC orders may only be submitted during the Continuous Trading Market Phases.

IOC validity condition cannot be used with Stop Limit, Stop Loss and Iceberg Orders.

8.2.2.6. Fill Or Kill (FOK)

An order with Fill Or Kill validity condition must be fully executed immediately upon entry into the order book. To be executed, FOK order must be matched with one or more opposing orders which have prices within trade price collars. Unexecuted FOK order is automatically canceled by Trading System.

FOK orders may only be submitted during the Continuous Trading Market Phases.

FOK validity condition cannot be used with Stop Limit, Stop Loss and Iceberg Orders.

8.2.2.7. Valid For Auction (VFA)

An order with Valid For Auction validity condition, submitted during Continuous Trading Market Phase, remains inactive and invisible to the general market via Market Data feed. It activates at the start of the next Auction Market Phase (whether scheduled or unscheduled, including instrument unhalt Auction). It is inserted into the order book when the Auction stage begins. If a VFA order is submitted during Auction period, it is activated immediately upon entry. Once activated, VFA order retains its original priority timestamp initially set by Exchange Member.

Inactive VFA order remains valid until the end of the current trading day and it expires during post-session processing. Activated and unexecuted VFA order expires just after Auction (when the Uncrossing stage is complete and before the next trading phase begins).

8.2.2.8. Valid For Closing (VFC)

An order with Valid For Closing validity condition, submitted during Continuous Trading Market Phase, remains inactive and invisible to the general market via Market Data feed. It activates at the start of the Closing Auction Market Phase only. It is inserted into the order book when Auction stage begins. If a

VFC order occurs during Closing Auction period, it activates immediately upon entry. Once activated, VFC order retains its original priority timestamp initially set by Exchange Member.

Inactive VFC order remains valid until the end of the current trading day and it expires during the post-session processing. Activated and unexecuted VFC order expires just after the Closing Auction (when Uncrossing stage is over and before the next trading phase begins).

8.2.3. ORDER MODIFICATIONS

Exchange Members are allowed to modify their orders during the following Market Phases:

- Continuous Trading at Variable Price,
- Continuous Trading at Fixed Price,
- Continuous Trading at Closing Price,
- Auction (Opening/Intraday/Closing).

Exchange Members are allowed to modify the following order characteristics:

- total quantity,
- initial displayed quantity (in case of Iceberg Orders only),
- price,
- trigger price (in case of Stop Orders only),
- GTD expiry date,
- Short code.

Modified parameters including Parties fields are subject to the same validation rules as for submitting a new order.

When order is modified in such a way that:

- price in Limit Order is changed,
- Trigger Price in Stop Order is changed,
- volume of Limit Order is increased,
- displayed quantity of Iceberg Order is changed

the order priority is lost.

Order type, validity and remaining order attributes cannot be modified during the order lifetime.

When decreasing an order total quantity, the new total quantity requested in modification must be strictly greater than the current cumulative executed quantity of the order.

8.2.3.1.Limit Order

Modification of Limit Order's price (both increase and decrease) may result in losing time-based priority in the order book depending on the current Market Phase:

- during Continuous Trading at Variable Price, Auction (Opening/Intraday/Closing) - modification of Price always results in losing priority (i.e. an order is assigned a new priority timestamp when it is modified),
- during Continuous Trading at Reference (Fixed) Price, Continuous Trading at Closing Price - the order loses its priority timestamp only if the modification results in amending the order price

published in Market Data feed (where worse prices are not compressed to the reference price level during above mentioned Market Phases).

Increasing the order total quantity results in losing time-based priority in the order book (i.e. the order is assigned a new priority timestamp when it is modified).

Decreasing the order total quantity does not affect time-based priority of an order in the order book (i.e. an order retains its original priority timestamp and maintains its ranking in the order book).

8.2.3.2. Iceberg Order

Exchange Member is allowed to modify Iceberg Order:

- total quantity,
- initial display quantity,
- price.

Modifications of the initial display quantity and/or price results in refilling current display quantity. Each refill results in losing the Iceberg Order's time-based priority. Each refill is immediately shown in the Market Data feed. Modification of the total quantity does not result in refilling the current display quantity and order retains its time-based priority.

Minimum Iceberg Value

Iceberg's unexecuted value (i.e. price x remaining quantity) upon submitting the order or any modification of price and/or total quantity must be equal or greater than the Minimum Iceberg Value parameter defined by the Market Operator (e.g. 10 000 EUR).

When modifying only the initial display quantity (with other order characteristics remaining unchanged), Iceberg value is not re-checked against Minimum Iceberg Value set by the Market Operator.

Price and Total Quantity

Modification of Iceberg Order price (both increase and decrease) may result in losing time-based priority in the order book depending on the current Market Phase:

- during Continuous Trading at Variable Price, Auction (Opening/Intraday/Closing) – modifying the price always results in losing priority (i.e. the order is assigned a new priority timestamp when it is modified),
- during Continuous Trading at Fixed Price, Continuous Trading at Closing Price - the order loses its priority timestamp only if the modification results in amending the order price published in Market Data feed (In which prices are compressed to the reference price level during the above-mentioned Market Phases).

Modifying Iceberg Order total quantity (both increase and decrease) does not affect time-based priority of an order in the order book (i.e. an order retains its original priority timestamp and maintains its ranking in the order book).

8.2.3.3. Stop Limit, Stop Loss

Any modification of execution price and/or total quantity, for inactive Stop Order, does not result in losing priority in the stop order book.

Modification of price and/or total quantity for an activated Stop Order follows priority loss rules described above for Limit and Market Orders.

Modifying trigger price is only allowed before Stop Order activation. It always results in losing priority in the stop order book.

8.2.4. COMPATIBILITY MATRIX

The tables below present the compatibility of specific validity conditions with various order types in each Market Phase.

8.2.4.1.Continuous Trading at Variable Price

	DAY	GTT	GTD	GTC	VFA	VFC	IOC	FOK
Limit Order	yes	yes	yes	yes	yes	yes	yes	yes
Market Order	no	no	no	no	yes	yes	yes	yes
Market To Limit	no	no	no	no	yes	yes	yes	yes
Stop Limit	yes	yes	yes	yes	no	no	no	no
Stop Loss	yes	yes	yes	yes	no	no	no	no
Iceberg Order	yes	yes	yes	yes	no	no	no	no

8.2.4.2. Continuous Trading at Fixed Price

	DAY	GTT	GTD	GTC	VFA	VFC	IOC	FOK
Limit Order	yes	yes	yes	yes	yes	yes	yes	yes
Market Order	no	no	no	no	yes	yes	yes	yes
Market To Limit	no	no	no	no	yes	yes	yes	yes
Stop Limit	yes	yes	yes	yes	no	no	no	no
Stop Loss	yes	yes	yes	yes	no	no	no	no
Iceberg Order	yes	yes	yes	yes	no	no	no	no

8.2.4.3. Continuous Trading at Closing Price

	DAY	GTT	GTD	GTC	VFA	VFC	IOC	FOK
Limit Order	yes	yes	yes	yes	yes	yes	yes	yes
Market Order	no	no	no	no	yes	yes	yes	yes
Market To Limit	no	no	no	no	yes	yes	yes	yes
Stop Limit	yes	yes	yes	yes	no	no	no	no
Stop Loss	yes	yes	yes	yes	no	no	no	no
Iceberg Order	yes	yes	yes	yes	no	no	no	no

8.2.4.4. Auction

	DAY	GTT	GTD	GTC	VFA	VFC	IOC	FOK
Limit Order	yes	yes	yes	yes	yes	yes	no	no
Market Order	no	no	no	no	yes	yes	no	no
Market To Limit	no	no	no	no	yes	yes	no	no

	DAY	GTT	GTD	GTC	VFA	VFC	IOC	FOK
Stop Limit	yes	yes	yes	yes	no	no	no	no
Stop Loss	yes	yes	yes	yes	no	no	no	no
Iceberg Order	yes	yes	yes	yes	no	no	no	no

8.2.4.5. Monitoring

During Monitoring Market Phase, market Participants cannot perform any operations on orders.

Only the exchange can cancel orders if necessary.

8.2.4.6. Market Closed

When Market is closed, order book is not accessible. No operations on orders are allowed.

The exchange cannot cancel orders.

8.3. Matching Algorithms

GPW WATS Trading System supports three types of trading phase matching algorithms:

1. Variable Price matching (applied during Continuous Trading at Variable Price Market Phase),
2. Fixed Price matching (applied during Continuous Trading at Fixed Price and Continuous Trading at Closing Price Market Phases),
3. Auction matching (applied during Auction Market Phase).

8.3.1. AUCTION

During the Auction phase, System calculates and provides continuous information on potential matching prices and order volumes, which would be executed at the time of calculation. This applies to the crossed order book only. There is no matching price and volume for uncrossed order book, so only best bid and ask are provided instead.

Please, check out ***13.1 Example: Auction*** for details.

8.3.1.1. Indicative Match Price (IMP)

The calculation of IMP and IMV is based on all active orders held in the order book.

The IMP/IMV calculation is based on the following principles:

1. Maximum executable quantity - the IMP price maximizes the number of shares traded,
2. Minimum surplus - if more than one limit meets the maximum executable volume, then IMP minimizes the volume surplus between Buy and Sell orders at the IMP level.

If more than one price level meets the two first principles then the *market pressure* principle is applied:

- if surplus exists on the buy side, only then is the highest price with the same surplus is the IMP price,
- if surplus exists on the sell side, only then the lowest price with the same surplus is the IMP price.

If identical surplus is on both sides, then IMP price is the nearest or equal to the reference price:

- if reference price is equal to or higher than the highest price limit with the same surplus on the buy side, the highest price is the IMP price,
- if reference price is equal to or lower than the lowest price limit with the same surplus on the sell side, the lowest price is the IMP price,
- if reference price is between the highest and lowest prices with the same surplus - the reference price is the IMP price.

Special cases:

- only when unpriced orders are on both sides (Market Orders and/or Market To Limit Orders), the IMP price is equal to the reference price,
- only when unpriced orders are on one side without any orders on the opposite side, no IMP price is determined and unpriced orders expire due to VFA/VFC validity restrictions.

Stop Orders are not triggered during the Auction phase therefore they do not take part in the calculation of IMP and IMV values. Stop Orders triggered at the end of the Auction phase (after uncrossing) are added and processed at the beginning of the next trading phase.

The total volume of Iceberg Orders is included when calculating the IMP and IMV values.

Orders Matching

At the end of the Auction phase, all eligible orders are matched at the last calculated IMP price.

As a result of order matching (uncrossing) all orders with the price strictly better than indicative matching price (i.e. buy orders with the higher limit and sell orders with the lower limit) must be fully executed. Orders with the price equal to the indicative matching price can be executed fully, partially or not executed at all. Unexecuted orders are moved to the next Market Phase unless order validity indicate otherwise (e.g. VFA/VFC). Orders moved to next Market Phase preserve their original time priority.

8.3.2. UNCROSSING ALGORITHM

At the start of the uncrossing process, the system has the following data:

- Auction price equal to the last calculated indicative matching price at the end of Auction,
- indicative matching volume.

Uncrossing process consists of three steps:

1. selection of orders being matched,
2. order quantity allocation,
3. order matching (trades generation).

Selection of orders:

- based on IMP and IMV data a Buy auction list and a Sell auction list are created,
- buy auction list includes all Buy orders with price limits higher than and equal to IMP,
- sell auction list includes all Sell orders with price limits lower than and equal to IMP.

Order quantity allocation:

- on the short side where total quantity is equal to the IMV, all orders are allocated for their entire quantity,
- on the long side where total quantity is higher than IMV thus some orders with prices strictly worse than the IMP (Auction price) are not executed and orders with the price equal to the IMP can be executed fully, partially or not executed at all. Orders are executed according to price/time priority rule.

See ***13.2 Example Uncrossing Algorithm*** for more details.

8.3.3. CONTINUOUS TRADING

In Continuous Trading the incoming orders are matched and executed continuously.

GPW WATS Trading System supports two matching algorithms:

- Continuous Price and Time, in which orders are executed at different prices depending on the current order book situation,
- Continuous at Reference Price, in which orders are executed at a fixed price.

8.3.3.1. Price and Time Matching

Processing incoming orders

An incoming aggressive order is processed in three steps:

1. selecting matching orders,
2. allocating order quantity,
3. matching orders (trade generation).

Selecting matching orders

Limit Orders

All orders with price limits greater than or equal to price limit of the incoming order are selected to the matching list. If the incoming order is a buy order the matching list includes sell orders with price limits equal to and lower than the buy order limit. If the incoming order is a sell order, then the matching list includes the buy orders with the price limit equal to or greater than the sell order limit.

Market Orders (MO)

Market Order as an unpriced order can be matched with any Limit Orders at different price levels. Selecting the orders depend only on the volume of the incoming Market Order. If the total volume of orders in the order book is higher than the volume of MO order then the MO order is fully executed.

Market To Limit Orders (MTL)

Market To Limit Order as an unpriced order can be matched with the Limit Orders at the best price level. Selecting orders depend only on the volume of the incoming MTL order. If the total volume of orders in the order book at the best opposing price level is greater than the volume of MTL order then MTL order is fully executed.

Orders quantity allocation

Allocation of the passive orders must follow Price/Time priority principle.

Limit Orders

If the total volume of selected orders is lower than the volume of the incoming Limit Order then the incoming order is partially filled and the unexecuted part of the order is booked in the order book. Thus all selected orders are fully executed. If the total volume of selected orders is greater than the volume of the incoming order then the incoming order is executed in full. If so, not all selected orders are fully filled. Allocation of orders at the last limit touched by incoming order is processed according to the Time priority

Market Orders (MO)

If the total volume of selected orders is lower than the volume of the incoming Market Order with IOC validity, the incoming order is partially filled and the unexecuted part is canceled. If the total volume of selected orders is lower than the volume of the incoming Market Order with FOK validity, the incoming order is canceled according to processing a FOK order. If the total volume of selected orders is higher than volume of the incoming MO then incoming order is executed in full.

Market To Limit Orders (MTL)

MTL order is processed in the same manner as MO with the exception that the total volume of selected orders is calculated for the orders at the best opposing price limit.

Orders matching

Selected orders are matched and trades are generated. After matching, process order book is uncrossed.

Please check out Example: Price and Time Matching for details

8.3.3.2. Reference Price Matching

All orders are executed at the same reference price. During the trading day, when the Continuous at Reference Price phase follows the Auction phase then the Auction price is adopted as the reference price. Orders awaiting execution in the order book are matched according to the time priority only and price limits of such orders are disregarded. The orders with the price limits better than the reference price are displayed in the order book with the price limits suppressed to the reference price.

8.4. Pre-Trade Controls

To ensure market integrity and to prevent disorderly trading, regulated markets should have effective systems, procedures and arrangements to reject orders that exceed a pre-determined volume and price thresholds or are clearly erroneous. Markets should conduct the following pre-trade controls adapted for each financial instrument traded:

- price collars automatically block orders that do not meet preset parameters,
- maximum order value automatically prevents orders with uncommonly large order size from entering the order book,
- maximum order volume automatically prevents orders with an uncommonly large order.

Orders are validated upon order entry/modification, and are rejected if they do not meet the criteria set by the exchange. Pre-trade controls are performed during any Market Phase when order management is

allowed. Each incoming order or modification is subject to all three pre-trade checks in the following sequence:

- order price collar,
- maximum order value,
- maximum order quantity.

If one parameter is exceeded then next pre-trade checks are not performed and the order is rejected with the appropriate reject reason.

Order price collar, maximum order value, maximum order quantity is provided in reference data.

8.4.1. ORDER PRICE COLLAR

Order price collar mechanism prevents orders from entering the order book whenever their limits exceed predefined limit thresholds (upper and lower limits). Orders which exceed thresholds are rejected with the appropriate reason for rejection. Upper and lower collar (for both bid and ask) are calculated in relation to reference price (see section 8.5.2). Order price collar can be expressed in percentage or absolute values and must comply with the respective tick size rules. Upper and lower collar can be calculated and set up symmetrically or asymmetrically against the reference price for both passive orders and aggressive orders separately. In addition, the order price collar can be defined independently for bid and ask orders.

The following order collar values can be setup:

- lower ask - lower order limit for aggressive orders,
- upper ask - upper order limit for passive orders,
- lower bid - lower order limit for passive orders,
- upper bid - upper order limit for aggressive orders.

Asymmetrical setup of order price collars enables Market Operator to define wider limits for passive orders (necessary for orders with long-term validity) and narrower limits for aggressive orders. This logic is shown in an example below:

- lower ask: 10%,
- upper ask: 30%,
- lower bid: 30%,
- upper bid: 10%.

Generally, static order price collars are wider than static trade price collars for the same financial instrument.

When the calculated order price collars do not meet tick size rules (e.g. the end result is at half tick) then calculated collars are calculated according to the following rules:

- upper limits (upper ask and upper bid) are rounded down to the nearest tick size,
- lower limits (lower ask and lower bid) are rounded up to the nearest tick size.

8.4.2. ORDER QUANTITY

Maximum order quantity pre-trade check prevents orders from entering the order book if the size exceeds a predefined quantity. Orders which exceed maximum order quantity, which is set up for instruments, are rejected with the appropriate reason for rejection.

8.4.3. ORDER VALUE

Maximum order value pre-trade check prevents orders and quotes from entering the order book whenever the value exceeds a predefined value of an order or quote. Orders exceeding maximum order value set up for instruments are rejected with the appropriate reason for rejection.

For the purpose of maximum order value check, incoming order value is calculated as follows:

Equities

- Limit Order (including Stop Limit Orders): total order quantity x lot size x order price,
- Market Orders (including Stop Loss Orders)/Market To Limit: total order quantity x lot size x upper static trade price collar.

Bonds

- Limit Order (including Stop Limit Orders): total order quantity x lot size x order price x nominal value,
- Market Orders (including Stop Loss Orders)/Market To Limit: total order quantity x lot size x upper static trade price collar x nominal value.

Futures

- Limit Orders (including Stop Limit Orders): total order quantity x lot size x order price x multiplier,
- Market Orders (including Stop Loss Orders)/Market To Limit: total order quantity x lot size x upper static trade price collar x multiplier.

Options

- Limit Orders (including Stop Limit Orders)/Market Orders (including Stop Loss Orders)/Market To Limit: total order quantity x lot size x strike price x multiplier.

Structured Products

- Limit Order (including Stop Limit Orders): total order quantity x lot size x order price,

Hybrid

- Limit Order (including Stop Limit Orders) total order quantity x lot size x order price.

8.5. Circuit Breakers

Circuit Breakers is a mechanism that is applied during trading phases for the Central Limit Order Book (Continuous Phase with variable price and Auction Phases). It prevents large deviations in execution prices. Circuit Breakers mechanism checks if the potential trade price is within Trade Price Collar (price range within orders can be executed). If not, trading is interrupted by a Volatility Auction.

Trade Price Collars are calculated as the price deviates up and down the Reference Price. They are expressed in absolute or percentage values.

Static Trade Price Collar (Static TPC) is wider than Dynamic Trade Price Collar (Dynamic TPC). Static TPC has priority over Dynamic TPC. Thus if the potential trade price simultaneously goes beyond Static and Dynamic TPCs, then a Volatility Auction is triggered, but only for Static TPC.

8.5.1. CONFIGURATION PARAMETERS

8.5.1.1. Trade Price Collar Table

Trade Price Collar table defines the value of price deviation up and down the Reference Price. It can be expressed in absolute or percentage value.

8.5.1.2. Trade Price Collar Value

The value of Upper and Lower Trade Price Collars are calculated using the following formulas:

Collar Expression	Calculation method
absolute value	Upper TPC = Reference Price + absolute value Lower TPC = Reference Price - absolute value
percentage	Upper TPC = Reference Price x (1 + percentage deviation) Lower TPC = Reference Price x (1 - percentage deviation)

Trade Price Collar value is rounded to the nearest value within the tick size of the Instrument. The Upper TPC value is rounded down while the Lower TPC value is rounded up.

8.5.1.3. Collar Reference Price

Reference Price Sources

Adjusted Closing Price (ACP)

Type of Instrument	ACP method
Shares	ACP is the Closing Price that is adjusted by the value of corporate action. The calculation method depends on the type of corporate action. Adjusted Closing Price is rounded to the nearest value within the tick size of the Instrument. The Closing Price is the price of the last trade in a Central Limit Order Book session. If there is no trade in the session, the Closing Price is the Adjusted Closing Price from the last trading day.
Bonds	ACP = Closing Price.
Futures Contracts	for Index Futures and Currency Futures ACP = Daily Settlement Price* for Single Stock Futures ACP = Daily Settlement Price* adjusted by the value of corporate action. The calculation method depends on the type of corporate action. Adjusted Closing Price is rounded to the nearest value within the tick size of the Instrument. * Daily Settlement Price is set after each session, starting when the first transaction of a Futures Contract series was made, with the exception of the expiry date. The calculation method is specified in Standard Specification for a given futures contract class (available on the WSE website). Until the first transaction is concluded, ACP = Fair Value for a given futures contract series (Instrument).
Options Contracts	ACP = Fair Value for a given option contract series (Instrument).

8.5.1.4. Scheduled Auction Price

The scheduled auction price is a price determined in the following trading phases:

- Opening Auction,
- Intraday Auction,
- Closing Auction.

8.5.1.5.Last Traded Price

Last traded price (LTP) is the price of the last trade during the session considering the following rules:

If an incoming (aggressive) order is executed in more than one trade, then the price of the last one is set as an LTP. Thus LTP is not updated with the price of each trade resulting from the execution of an order, but only with the price of the last trade.

8.5.2. STATIC COLLAR REFERENCE PRICE

The rules for determining the Static Collar Reference Price are:

- at the start of a trading session, Static Collar Reference Price is the Adjusted Closing Price,
- new Static Collar Reference Price can be set as Scheduled Auction Price,
- when there is a Volatility Auction, resulting from a Static Trade Price Collar breach, a new Static Collar Reference Price can be set if Static Volatility Auction Price is:

    a) greater than the Upper Static TPC determined before the start of the Static Volatility Auction,

or

    b) lower than the Lower Static TPC determined before the start of the Static Volatility Auction.

If the condition indicated in point a) is met then Static Collar Reference Price is determined by the **equation**:

Calculating Static Collar Reference Price when Static Volatility Auction Price is greater than Upper Static TPC

$$Last\ Static\ Collar\ RP + (Last\ Upper\ Static\ TPC - Last\ Static\ Collar\ RP) \times RP\ Step$$

RP stands for Reference Price,
TPC stands for Trade Price Collar.

The result is rounded down to the nearest value within the tick size of the Instrument.

If the condition indicated in point b) is met then Static Collar Reference Price is determined by the **equation**:

Calculating Static Collar Reference Price when Static Volatility Auction Price is lower than Lower Static TPC

$$Last\ Static\ Collar\ RP - (Last\ Static\ Collar\ RP\ - Last\ Lower\ Static\ TPC) \times RP\ Step$$

RP stands for Reference Price,
TPC stands for Trade Price Collar.

The result is rounded up to the nearest value within the tick size of the Instrument.

8.5.3. DYNAMIC COLLAR REFERENCE PRICE

The rules for determining the Dynamic Collar Reference Price are:

- Adjusted Closing Price becomes Dynamic Collar Reference Price at the start of a trading session until the first transaction is concluded,
- after the first transaction is concluded, Last Traded Price becomes Dynamic Collar Reference Price.

8.5.4. CIRCUIT BREAKERS APPLICATION METHOD

During the Continuous Phase or Auction Phase, System checks whether the potential trade price is within Static or Dynamic TPCs. If only one of the conditions is not fulfilled, trading is interrupted and Volatility Auction begins. A Volatility Auction is announced to public specifying breached Static/Dynamic TPCs.

Note:
Volatility Auction caused by a Static TPC breach has priority over Volatility Auction caused by a Dynamic TPC breach. Thus if the potential execution price is simultaneously beyond Static and Dynamic Collars then a Volatility Auction caused solely by Static Collar breach begins.

The following principles apply when an incoming order attempts to be traded beyond Dynamic or Static TPCs:

- an order may be partially executed within collars (if it matches the orders inside the collars),
- unexecuted part of the order that matches beyond collars is added to the order book,
- the Volatility Auction begins.

Note:
Incoming FOK and IOC orders do not trigger Dynamic Collars. If FOK order which matches quantity include orders outside Dynamic Collars, then the FOK order is rejected. If IOC order which matches quantity include orders outside Dynamic Collars, then the IOC order is partially executed within Dynamic Collars, and the unexecuted part of the order is canceled.

8.5.5. VOLATILITY AUCTION PROCEDURE

The Volatility Auction procedure is identical both for Dynamic and Static Collars. The same principles as for Scheduled Auctions are applied, therefore:

- during the Volatility Auction, trades are not concluded,
- order book is open,
- Indicative Matching Price (IMP) and Indicative Matching Volume (IMV) are calculated,
- the Volatility Auction ends after the predetermined duration elapses (including random end).

Volatility Auction Collars are calculated during the Volatility Auction:

For the Dynamic Volatility Auction, Volatility Auction Collars are calculated using Extension Ratio (collars are extended by multiplying by Extension Factor).

8.5.6. STRESSED MARKET CONDITION

GPW WATS detects situations resulting from the stressed market condition and triggers appropriate actions to inform the market. Stressed market conditions apply to ESMA liquid instruments only and affects those where market making scheme applies.

Stressed market condition is usually triggered if following a volatility auction an instrument moves to another phase and new reference price to determine the new price static collars levels have been set

successfully. Additionally, the difference between new static collar reference price and previous static collar reference price is verified in order to define whether a change is significant enough to fall under stressed market requirement.

- if a stressed market condition is observed on an instrument that is also an underlying:
    a) stressed market conditions are automatically declared on stock futures contract (if they are recognized as ESMA liquid instruments).
- if for index futures contract on WIG20 or mWIG40 indices a new reference price to determine the new price static collars levels is set:
    b) stressed market conditions are automatically declared on all instruments of this contract series.
- if for index futures contract on WIG20 index a new reference price to determine the new price static collars levels is set triggering stressed market condition:
    c) stressed market condition is automatically declared on all index options on WIG20 index.

Information about stressed market condition will be part of reference data message.

9. Off-Book Trading Models

Off-book trading is a market model where pre-arranged trades are executed on the exchange. Off-book trades must comply with the exchange rules.

Trading System supports two types of off-book trades (market models) :

- Block trading model,
- Cross trading model.

Note:
Block trading model and Cross trading model are two separate Market Segments.

9.1. Block Trading Model

Block trading is a market model in which trades are concluded bilaterally in the process of the negotiations between the counterparties (beneficiary clients). The beneficiary clients may belong to one Exchange Member or to different ones. The negotiations usually take place beyond Trading System infrastructure. Block trading is concluded when the respective trade entry is recorded in Trading System based on the Trade Capture Report message/messages submitted by Exchange Members.

Block Trade facility enables Exchange Members to report pre-arranged large trades through the Market Operator Trading System.

The value of Block Trades must not be lower than the value e.g. Large In Scale (LIS) value. The price of the Block Trade must be within thresholds set by the exchange. Price thresholds can be set on different levels depending on the session phase of the same instrument in the Central Limit Order Book. Only instruments traded in the Central Limit Order Book are subject to Block Trades.

Block Trade is reported to the exchange by entering "one-party" or "two-party" Trade Capture Report. In the "one-party for pass-through" Block Trade the beneficiary clients belong to different Exchange Members. The initiator who enters one-party Block Trade requires confirmation by the counterparty to achieve the Block Trade. In "two-party" Block Trade both beneficiary clients belong to the same Exchange Member. "Two-party" Block Trade is used to report internal trade where the trade can be concluded and reported between two clients of Exchange Member (Order Capacity; Agency vs Agency) or between the firm and the client (order Capacity: Principal vs Agency).

Block Trade features:

- MiFID 2 tick size regime does not apply to Block Trades,
- both parties to the Block Trade must be Exchange Members,
- Block Trades are reported by using the Trade Capture Reports messages.
- Block Trades do not update the Last Trade Price,
- Block Trades are not taken into account when calculating the opening price or the closing price.

9.1.1. MARKET PHASES

Market Phases are based on a Trading Schedule.

Trading System supports the following Market Phase types:

- Early Monitoring (No Trading),
- Block Exact Matching,
- Late Monitoring (No Trading),
- Market Closed (No Trading).

9.1.1.1. Early Monitoring (No Trading)

The first Market Phase that allows the Exchange to verify the data integrity before trading begins. During this Phase any operation on orders including order entry, order modification or order cancellation is not possible by Exchange Members. Market Operations may however perform some tasks resulting in amending the reference prices, collars levels as well as order cancellations but only if necessary.

9.1.1.2. Block Exact Matching

During Block Exact Matching Market Phase:

- Trade Capture Reports can be submitted, canceled, accepted or declined by Exchange Members,
- Trade Capture Reports must pass the pre-trade controls,
- Trade Capture Reports are processed by Trading System in real time,
- Trades are immediately published to the market via Market Data.

For Block Trades depending on the settlement date the Block Exact Matching Market Phase can be divided into two or more sub-phases:

- first - from the start of the trading day up to X time - for trades with the settlement date T+0, T+1 and T+30,
- second - from X time up to the end of the trading day - for trades with the settlement date T+1 and T+30,
- where X is the deadline for forwarding matched trades to the settlement system for trades settled in T+0.

Off-book trade is concluded when the following matching criteria are met, including:

- the same instrument,
- the same trade quantity,
- the same trade price.
- the same settlement date,
- the same trade type (Block trade),
- the opposing executing firm and counterparty firm,
- opposite sides (buy vs. sell).

Each unmatched Trade Capture Reports expires at the end of trading day.

9.1.1.3. Late Monitoring (No Trading)

The last Market Phase when the Exchange may still interact with Trading System and perform some necessary tasks before the trading is done for a day. While Exchange Members are not able to operate on

their orders, the Exchange may still interact with System to prepare it for the next trading day. Some activities related to orders or trades may be observed, in case of trade cancel procedure.

During this Phase, not-matched one-sided trade capture reports are automatically expired.

9.1.1.4. Market Closed (No Trading)

When the market is closed no operations on the trade capture reports are possible, neither by Market Participants nor the exchange. Some system components may still be available (e.g. Market Data Gateway).

9.2. Cross Trading Model

Cross trading is a separate market model in which trades are concluded bilaterally in the process of the private negotiations between the counterparties (beneficiary clients). The beneficiary clients must belong to one Exchange Member only.

Exchange Member can:

- act on behalf of both the buyer and the seller,
- deal on their own account against their client.

Cross trading is concluded when the respective trade entry is recorded in Trading System based on the Trade Capture Report message submitted by Exchange Members.

The Cross Trades functionality enables Exchange Members to report pre-arranged trades through the Market Operator Trading System (defined as Off-book On-exchange trade).

Only financial instruments traded in the Central Limit Order Book (CLOB) are subject to Cross Trades.

Cross Trades are only available whenever underlying CLOB instrument is in Continuous Trading at Variable Price and during the Continuous Trading at Fixed Price phases. Whenever for underlying CLOB instrument Auction price is observed, Cross Trades are not allowed.

The value of Cross Trades must be no lower than the minimum value established by the Market Operator. The price of Cross Trades are within the current Best Bid and Best Offer price limits in the CLOB (boundary included). When there is absence of the Best Bid and/or Best Offer in the CLOB for that instrument the price of the Cross Trade shall be within pre-trade check price limits for order price collars.

Cross Trades are reported by Exchange Member to the Market Operator by entering "two-party" Trade Capture Report where both beneficiary clients belong to the same Exchange Member. Cross Trade is used to report internal trade where the trade can be concluded and reported between two clients of Exchange Member (Order Capacity; Agency vs Agency) or between the firm and the client (order Capacity: Principal vs Agency).

Cross Trade features:

- MiFID 2 tick size regime does not apply to Cross Trades.
- Cross Trades are reported by using the Trade Capture Report messages.
- Cross Trades do not update the Last Trade Price
- Cross Trades are not taken into account when calculating the closing price or the opening price.

9.2.1. MARKET PHASES

Cross Trades do not own trading schedule and individual Market Phases. Due to their close interaction with CLOB market model, Cross Trades inherit Market Phases directly from the CLOB.

9.3. PRE-TRADE CONTROLS

The exchange can require the off-book trades to undergo pre-trade controls. The Pre-Trade Controls are defined on the instrument level. The trade capture report is rejected when it fails to pass the pre-trade control validation. The pre-trade controls for off-book trades cover:

- trade price,
- minimum and maximum trade value.

Trade Price Collars

The Block Trade price must be within the trade price collars set up for the Block trades. Trade price collars are calculated in relation to the Reference Price. The Reference Price is based on the trade prices for the instrument with the same ISIN code concluded in the Central Limit Order Book. Trading System supports the calculation of different Reference Prices depending on the trading phase in the CLOB for that instrument, e.g. Last Trade Price.

The table below provides an example of how trading price collars can be set for cash instruments. Detailed information are provided in the Reference Data

Off-book trade	Price
Block trades: equities	During CLOB trading hours: +/- X* % from LTP After CLOB trading hours: +/- X* % from LTP
Block trades: non-equities	During CLOB trading hours: +/- X* % from LTP After CLOB trading hours: +/- X*% from LTP
Cross Trades: **Liquid equities** **Illiquid equities** **Illiquid non-equities**	Within current CLOB spread (Boundaries included) otherwise within static order price collars for CLOB orders

*deviation value

Minimum and maximum value

The trade value cannot be lower than the value defined by the Exchange (e.g. the Large In Scale value calculated for that ISIN code on the European level).

The trade value cannot be higher than the maximum value set up on the exchange level.

The below table displays the minimum trade value for off-book trades.

Off-book trade	Minimum value
Block trades: equities	Larger than LIS threshold
Block trades: non-equities	Larger than LIS threshold
Cross Trades: liquid equities	Larger than LIS threshold

Off-book trade	Minimum value
Cross Trades: illiquid equities	1 trading Lot Size
Cross Trades: illiquid non-equities	1 trading Lot Size

9.4. Market Data

- Block Trades and Cross Trades are not pre-transparent, thus Trade Capture Reports are not disseminated in the market data stream,
- Block Trades and Cross Trades are post-trade transparent, thus confirmed and matched trades are immediately disseminated in the market data stream.

All off-book trades benefit from MiFID pre-trade transparency waivers.

When off-book trades are larger than Large In Scale (LIS) threshold then such trades benefit from LIS waiver.

Off-book trades which are below LIS threshold benefit from negotiated waiver (for equities) and waiver for illiquid instruments (for non-equity instruments).

The negotiated trades in liquid equity instruments should be larger than LIS threshold and are treated as LIS trades. They are not counted towards Double Volume Cap Mechanism restrictions.

Each off-book trade which is below LIS trade is assigned MIFID post-trade flag in the MD enriched trade message.

The below table displays the MIFID post-trade flags for off-book trades. When off-book trades are larger than Large In Scale (LIS) threshold then for such trades no negotiated post-trade flag is published.

Off-book trade	MIFID post-trade flags	MMT incorporating MIFID flags
Block trades: equities and non-equities	No MIFID post trade flag is set (LIS trade)	Market Mechanism = 4 (Off Book) Trading Mode = 5 (Trade Reporting On-Exchange) Negotiation Indicator = -
Cross Trades: Liquid equities	No MIFID post trade flag is set (LIS trade)	Market Mechanism = 4 (Off Book) Trading Mode = 5 (Trade Reporting On-Exchange) Negotiation Indicator = -
Cross Trades: illiquid equities	OILQ	Market Mechanism = 4 (Off Book) Trading Mode = 5 (Trade Reporting On-Exchange) Negotiation Indicator = 2 (OILQ)
Cross Trades: illiquid non-equities	ILQD	Market Mechanism = 4 (Off Book) Trading Mode = 5 (Trade Reporting On-Exchange) Negotiation Indicator = 4 (ILQD)

10. Hybrid Model

Hybrid Market Model is a type of financial market that combines features of both exchange order driven market e.g. Continuous matching with Price/Time execution priority and some functionalities typical for a price driven market such as: facility to conclude trades only if there is Market Maker's Valid Quote in the order book. MM Valid Quote is usually two – sided quotes placed by Market Maker unless HybridBuyOnly Market Phase takes place where buy only quote is allowed. While Market Maker Quote's presence is essential for trades, Market Maker's quote does not have to be part of each transaction. Transaction can be concluded between clients themselves. Market Makers Quotes act as thresholds mechanism to manage volatility as they restrict sudden price movement while no transaction can be made beyond the limits set by these quotes.

In Hybrid Market Model, Participants can choose between the following order types:

- Limit Order,
- Stop Limit (on Quote activation).

10.1. Market Phases

10.1.1. EARLY MONITORING (NO TRADING)

The first Market Phase that allows the Exchange to verify the data integrity before trading begins. During this Phase any operation on orders including order entry, order modification or order cancellation is not possible by Exchange Members. Market Operations may however perform some tasks resulting in amending the reference prices, collars levels as well as order cancellations but only if necessary.

10.1.2. HYBRID PRE-MARKET PHASE (NO TRADING)

A Market Phase directly preceding Hybrid Market Phase.

The main goal of a Hybrid Pre-Trade Phase is to allow Market Participants to adjust limits of their orders to the actual valuations before continuous trading takes place

Unexecuted orders from the previous sessions are automatically placed in the Order Queue. Any new order submitted during this phase joins an Order Queue. During this Phase an order book information is not released to the market.

If Market Maker provides quote, it is becoming visible in the public Order Book.

10.1.3. HYBRID PHASE

A continuous Market Phase where orders are accepted and trades are executed only if Market Maker provides two – sided valid quotes.

During Hybrid phase orders are checked against potential execution immediately upon submission. Matching orders take place on a continuous basis. Unexecuted or partially executed orders are added to the order book and ranked according to Price/Time priority. During this phase, Limit Orders are accepted with all order's validities allowed for Hybrid market.

Lack of at least one side of the quote results in an automatic suspension of an instrument with *HybridNoQuotes* status.

Market Maker can change the Hybrid Phase to HybridBuyOnly phase. Hybrid Sell Only phase is not allowed.

10.1.4. HYBRID BUY ONLY PHASE

A Market Phase initiated by Market Maker once he decides to provide one – sided valid quote. A HybridBuyOnly phase may be initiated by Market Maker when there is a shortage of instruments for sale and there is a need to purchase them from the market. During this Phase Market Maker may only place a quote on a buy side of an order book.

To initiate this Phase Market Maker may

- leave their active quotes and send information to Trading System about their intention to quote on buy side only (during transition to HybridBuyOnlyPhase, the Market Maker's sell quote will be cancelled automatically). Instrument status will remain Active during the transition period,
- cancel their active quotes (resulting in the transition of the instrument from Active status to the status HybridNoQuotes.) and send information to Trading System about their intention to quote on buy side only. Once an instrument is in HybridBuyOnlyPhase, it is enough to send one-sided Market Maker's Quote to change the instrument's status from HybryidNoQuotes to the status Active,
- in the scenario when Market Maker decides to move to HybridBuyOnlyPhase having buy quote only, such transition will be successful but an instrument remains in the HybridNoQuotes status.

In the event of transition from Hybrid phase to HybridBuyOnly phase:

- In the event of an instrument's transition from the Hybrid phase to the HybridBuyOnly phase:
- all active buy orders entered by the Participants (Non-Market Makers) into the Order Book are automatically deleted,
- Stop buy Orders that have not been triggered are deleted,
- all buy orders if stored in the Order Queue are deleted,
- during the HybridBuyOnly phase Participants (Non-Market Makers) can only add, modify, and cancel sell orders,
- during the HybridBuyOnly phase buy orders placed by the Participant (Non-Market Maker) including Stop buy Orders are rejected when attempting to enter them in this phase.

If during HybridBuyOnly phase Market Maker submits two-sided MM Valid Quote the phase is automatically changed to the Hybrid phase.

Diagram no 1 - Visualization of the Market Maker changes the trading phase from Hybrid to HybridBuyOnly phase. Market Maker decides to keep their quotes during transition to HybridBuyOnly phase.

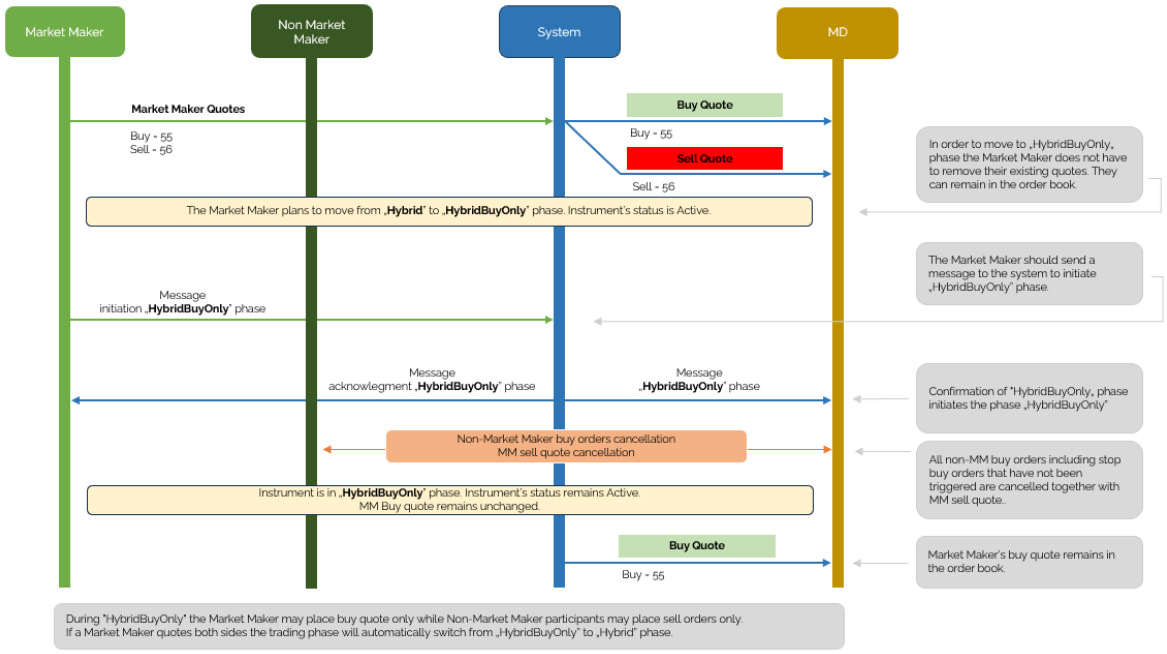


Diagram no 2 - Visualization of the Market Maker changes the trading phase from Hybrid to HybridBuyOnly phase. Market Maker decides to cancel their quotes before transition to HybridBuyOnly phase.

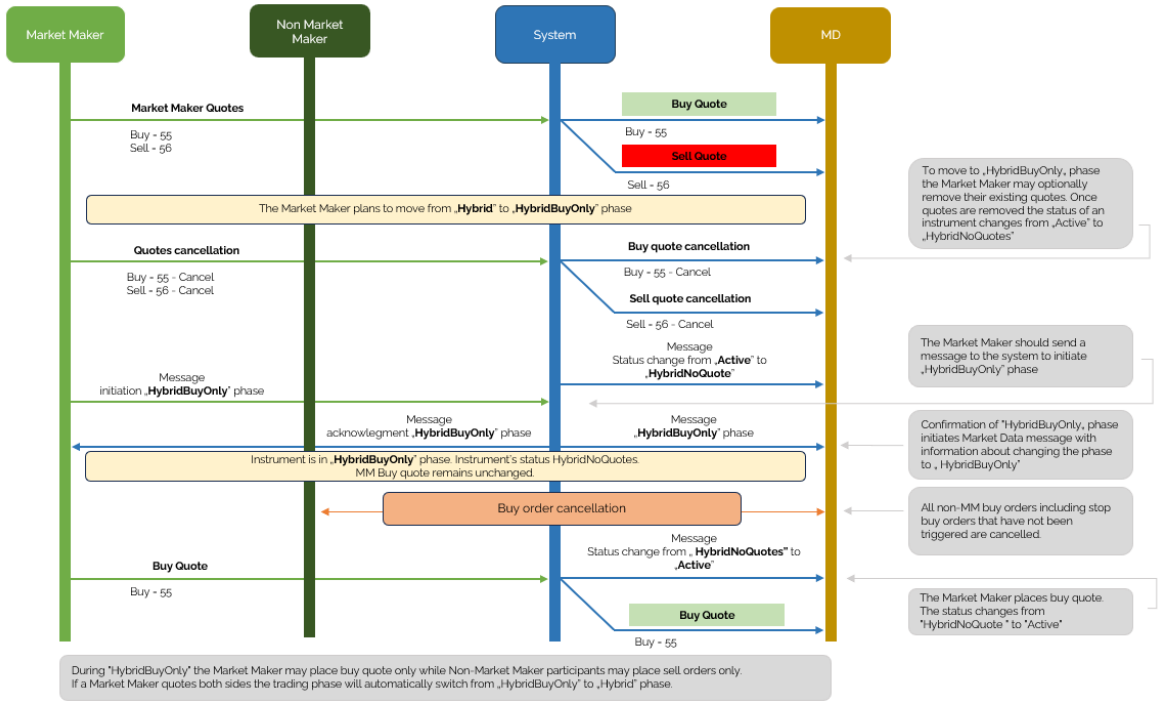
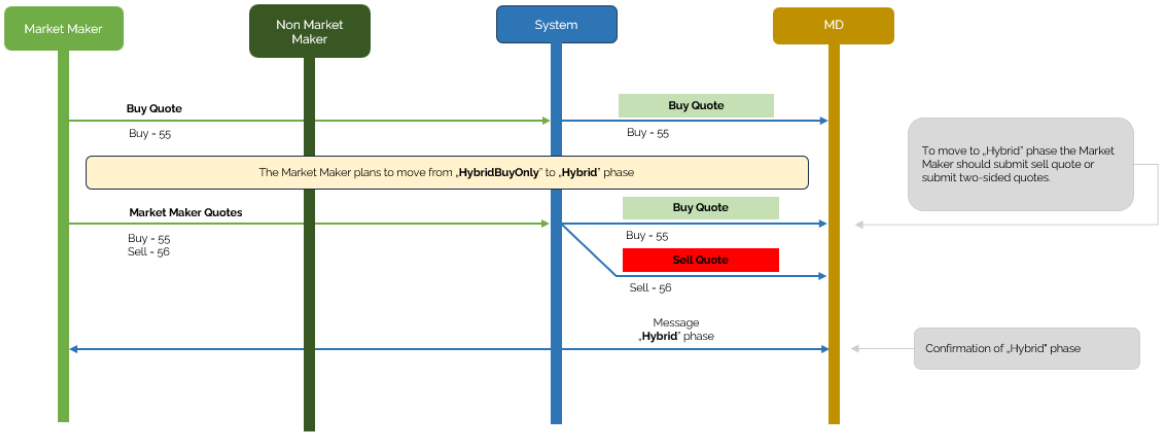


Diagram no 3 - Visualization of the Market Maker changes the trading phase from HybridBuyOnly to Hybrid phase



10.1.5. LATE MONITORING (NO TRADING)

The last Market Phase when the Exchange may still interact with Trading System and perform some necessary tasks before the trading is done for a day. While Exchange Members are not able to operate on their orders, the Exchange may still interact with System to prepare it for the next trading day. Some activities related to orders or trades may be observed, in case of trade cancel procedure.

During this Phase, orders maturing on the current day are automatically be canceled by Trading System. It also includes Market Maker's quotes.

10.1.6. MARKET CLOSED (NO TRADING)

When Market is closed no operations on orders are possible, neither by Exchange Members nor the Exchange, although some system components may still be available (e.g. Market Data Gateway).

10.2. Trading Schedule Example

Example of a trading schedule for Hybrid Market Model is as follows:

Market Phase	Start Time	Scheduled
Early Monitoring	07:45	yes
Pre-Trade	08:30	yes
Hybrid	09:05	yes
Late Monitoring	17:05	yes
Market Closed	17:30	yes

Note:
The hours representing Start time of a given phase are for presentation purposes only.

10.3. Order Queue

An Order Queue is an additional mechanism for keeping orders hidden before releasing them to the Order Book.

An Order Queue is a dedicated storage place where orders are kept when the following conditions are met:

- an instrument is in HybridPreTrade Phase - all the orders with GTC and GTD validities are stored in the Order Queue. Any new order placed during HybridPreTrade Phase joins Order Queue ,
- an instrument is moved to HybridNoQuotes status due to no MM Valid Quote – any new order joins an Order Queue while existing orders remain visible in the Order Book,
- Delay Period is activated by RFE message – if there is a potential execution of an order against Market Maker Quote, then before a potential trade an order hitting an opposite side is parked in the Order Queue. Any new order placed during Delay Period joins an Order Queue. Existing orders remain visible in the order book.

All existing orders, left in the visible order book, keep their time priority. An order stored in Order Queue can be only cancelled, not modified. Any new order joins the Order Queue with new time priority.

All the orders stored in the Order Queue are not visible in the public Order Book.

10.4. Request For Execution (RFE)

Request for Execution is a dedicated message sent by Trading System to Market Maker in case of possible execution of an order against Market Maker's quote.

Due to the nature of the Hybrid Market model where the Market Maker plays a significant role, the Request for Execution message is sent, whenever there is a possible interaction of a Participant's (non- Market Maker) order with a Market Maker quote.

RFE message is sent when:

- a MM Quote may be matched with the incoming aggressive order;
- a Market Maker's aggressive quote may interact with an opposite order (potential trade).

When a potential interaction of a Market Maker's quote with opposite order may lead to transaction then before the final execution the following steps take place:

- the execution of transaction is temporarily suspended;
- RFE message is sent to Market Maker

The Market Maker upon receipt of RFE message, may:

1. confirm their current quotes by sending them again,
2. modify their current quotes by sending new Mass Quote message,
3. cancel their current quotes,
4. do not take any action against incoming RFE.

In case of the option:

No 1 – confirmation of his current quotes by sending MM Quote message including the same quote limits automatically initiate matching process (Delay Period state is automatically cancelled),

No 2 – modification of his current quotes by sending Mass Quote message including new quote limits may result in:

a. avoiding execution,
b. immediate execution – in this case no new RFE message is sent out.

No 3 – cancellation of existing quotes results in changing an instrument's status to HybridNoQuotes and no execution takes place. Delay Period state is also automatically revoked.

No 4 – no reaction to RFE message results in orders' execution after the expiration of Delay Period.

Diagram no 1 – presentation of scenario no 1 – where the Market Maker confirms his quotes after RFE message dissemination

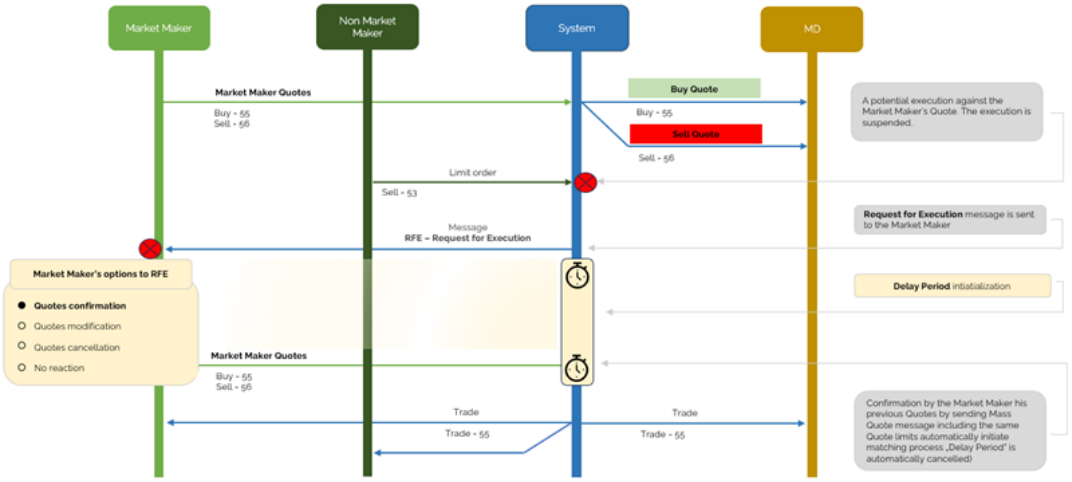
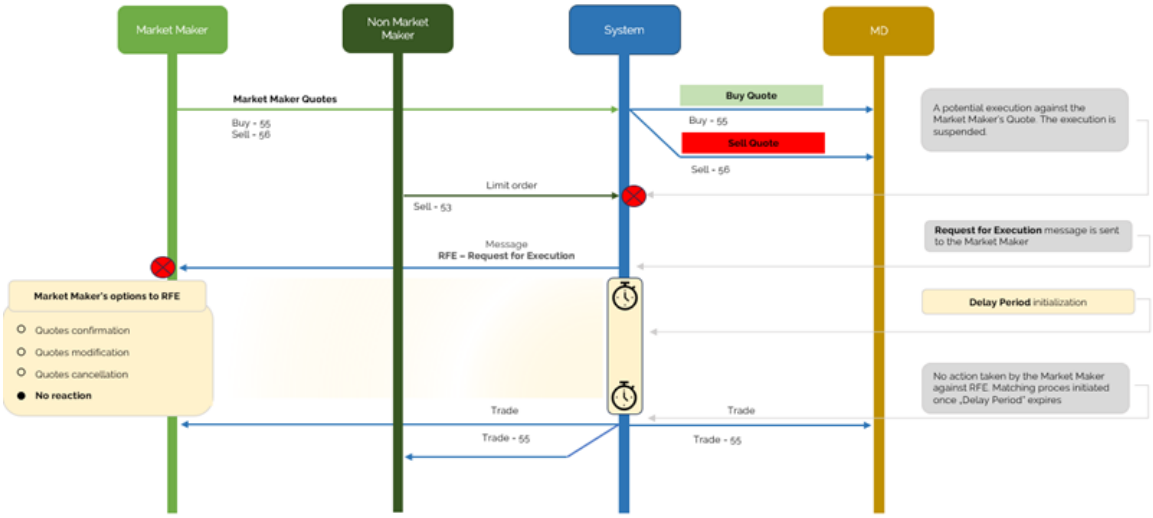


Diagram no 2 - presentation of scenario no 4 – where the Market Maker does not take any action against incoming RFE message



10.4.1. DELAY PERIOD

A period time initiated by the possible execution (potential transaction) of an order with the opposite Market Maker Quote. It is counted from the moment the RFE message is sent out. The Delay Period lasts for a strictly defined time through the Delay Time parameter which usually is expressed in seconds. It allows Market Maker to react within the rules of the Request for Execution operation.

For example, a parameter set to 2 seconds means that from the moment Trading System sends a Request for Execution message, the Market Maker has 2 seconds to react within the 4 possibilities (described in the previous section).

10.5. ORDERS

Market Participants can choose between the following order types to buy or sell assets:

- Limit Order,
- Stop Limit on Quote.

10.5.1. ORDER TYPES

Order type defines the behavior of an order in the order book and the manner in which it is executed.

Limit Order

Limit Order type allows one to buy or sell at a specified price. Limit Order is executed at a price equal to or better than its limit price (at its limit or a lower price for a buy order and its limit or higher price for a sell order). Limit Order that enters the order book is prioritized according to the price/time priority. The limit price must be specified according to the tick size definition. If not, an order is rejected.

Stop Limit on Quote

Stop Limit Order is an order to buy or sell, which is activated and placed in the order book after reaching or exceeding a pre-defined price namely trigger price. In Hybrid Market Model, Stop Orders are activated based on the Market Maker Quote.

Stop Limit Order remains inactive and is not displayed to the general market via Market Data until trigger price is reached. Once activated, Stop Limit is processed as a regular Limit Order and retains its original order type.

At the point of Stop Limit Order submission and modification, the following conditions must be met:

- for buy order: limit price > = trigger price > Market Maker Sell Quote,
- for sell order: limit price < = trigger price < Market Maker Buy Quote.

otherwise, the order is rejected.

10.5.2. VALIDITY CONDITIONS

GPW WATS Hybrid Market Model supports the following validity conditions:

- Day (DAY),
- Good Till Time (GTT),
- Good Till Date (GTD),
- Good Till Cancel (GTC).

See **section 8.2.2** of this document for more details.

10.5.3. ORDER MODIFICATIONS

Trading Participants are allowed to modify the following order characteristics:

- total quantity,
- price,
- trigger price (in case of Stop Orders only),

- GTD expiry date,
- Short code.

See **section 8.2.3** of this document for more details.

Order type, other validities and remaining order attributes cannot be modified during the order lifetime.

When decreasing an order total quantity, the new total quantity requested in modification must be strictly greater than the current cumulative executed quantity of the order.

Whenever an Order Queue is triggered an order's modification is done by deleting it and entering a new order instead with a new time priority.

10.6. Pre-Trade Controls

In GPW WATS Hybrid Market Model, all the incoming orders are subjected to the following Pre-Trade checks:

- order limits – protection against the entry of an order with a price significantly deviating from the instrument's valuation,
- maximum order volume – protection against the entry of an order with significant volume,
- maximum order value - protection against the entry of an order with significant value.

See **section 8.4** of this document for more details.

10.7. Instrument Status

Active

Used when Market Maker provides an MM Valid Quote.

Trading is allowed. Status Active is a default state of an instrument ready to trading. This status applies in both in Hybrid and in HybridBuyOnly phases as long as Market Maker's Quotes reside in the order book.

HybridNoQuotes

Used when Market Maker does not provide the MM Valid Quote and Continuous trading is stopped. This status is activated when there is a lack of at least one side of the quote in Hybrid phase or the lack of buy side quote in HybridBuyidOnly phase.

Knock-out

A status is triggered when a hybrid instrument has a defined:

- code of the underlying instrument,
- upper or lower barrier levels;

and at the same time the underlying instrument is listed on the same trading platform as hybrid instrument.

If a transaction price of the underlying instrument is:

- in the case of an upper barrier - the transaction price of the underlying >= the upper barrier,
- in the case of the lower barrier - the transaction price of the underlying =< lower barrier;

the trading is automatically stopped while an instrument moves to Knock-Out status. All active orders including also hidden orders are cancelled and order book becomes unavailable for new orders.

Knock-out by the Issuer

A status occurs when by the decision of Market Maker an instrument is marked as Knock-Out. This functionality allows an issuer itself to knock-out an instrument.

Regulatory Suspension

A status is reserved for suspensions imposed by the Financial Supervisory Authority's decision. Once FSA assesses that the instrument should be suspended, the exchange will set the status of an instrument to regulatory suspension. The status can be adjusted during the whole trading day and for each Market Phase.

Market Operations Suspension

A status can only be activated following the decision by the exchange. The exchange can decide to suspend an instrument when there is an extraordinary event which impacts on the rules of trading. The status can be released during the entire trading day.

10.7.1. MATCHING EXAMPLES

Example 1 – Two client orders are matched

Trading phase - Hybrid

Initial Order Book

BUY			SELL		
	Vol	Price	Price	Vol	
MMQ	100	55	56	100	#2
#1	40	55	56	60	MMQ

An aggressive Buy order #3 70@57 is submitted and is immediately executed with the opposite Sell order #2. Trade: 70@56.

Example 2 – MM Quote may be executed by incoming client's aggressive order.

Trading phase - Hybrid

Initial Order Book as in the example 1

An aggressive Buy order #3 120@57 is submitted.

Order #3 is immediately matched with the order #2 – trade 100@56.

RemainingQty of the Buy Order #3 20@57 is going to be matched with the opposite MM Quote Sell 60@56 triggering RFE message and Delay Period.

Assuming that MM Quote are kept unchanged and after Delay Period elapsing MM Quote Sell is matched with the Buy order #3 – trade 20@56.

Final Order Book

BUY			SELL		
	Vol	Price	Price	Vol	
MMQ	100	55	56		
#1	40	55	56	40	MMQ

Hybrid market is still in Hybrid phase with the Instrument status Active.

Example 3 – MM Quote is hit by incoming client's aggressive order – MM Quote totally filled.

Trading phase - Hybrid

Initial Order Book

BUY			SELL		
	Vol	Price	Price	Vol	
MMQ	100	55	56	100	#2
#1	40	55	56	60	MMQ

An aggressive Buy order #3 200@57 is submitted.

Order #3 is immediately matched with the order #2 – trade 100@56

RemainingQty of the Buy Order #3 100@57 is going to be matched with the opposite MM Quote Sell 60@56 triggering RFE message and Delay Period.

Assuming that MM Quote are kept unchanged and after Delay Period elapsing MM Quote Sell is matched with the Buy order #3 – trade 60@56. RemainingQy of the aggressive Buy order #3 is added to the Order Book

Final Order Book

BUY			SELL		
	Vol	Price	Price	Vol	
#3	40	57			
MMQ	100	55			
#1	40	55			

Hybrid market is still in Hybrid phase with the Instrument status HybridNoQuotes

Example 4 – MM Quote may be executed by incoming client's aggressive order – Market Maker modify Quotes during the Delay Period

Trading phase - Hybrid

Initial Order Book

BUY			SELL		
	Vol	Price	Price	Vol	

BUY			SELL		
MMQ	100	55	56	100	#2
#1	40	55	56	60	MMQ

An aggressive Sell order #3 65@53 is submitted and is matched with the opposite MM Quote. That triggers sending the RFE to the Market Maker and Delay Period counter starts. Order #3 is added to the Order Queue. During the Delay Period the Market Maker updates its Quote to Buy 150@54 and Sell 150@56 and Delay Period is finished and orders are executed.

After releasing the Order Queue two trades are generated:

1. Order #3 with order #1 – trade 40@55
2. Order #3 with MM Quote Buy – trade 25@54

Final Order Book

BUY			SELL		
	Vol	Price	Price	Vol	
MMQ	125	54	56	100	#2
			56	150	MMQ

Hybrid market is still in Hybrid phase with the Instrument status Active

10.7.1.1. Order Queue Release

Orders stored in the Order Queue are released to the Order Book according to the time priority they were submitted to the Trading System (FIFO).

Orders are released when:

- Delay Period elapsed,
- Market Maker provides MM Valid Quote during the Delay Period (before ending Delay Period),
- Market Maker provides MM Valid Quote after Pre-trade phase at the beginning of Hybrid phase,
- Market Maker provides MM Valid Quote coming back to the Market during the HybridNoQuotes status.

During the Order Queue Release process:

- when MM Quote is aggressed the new RFE is sent to the MM triggering the new Delay Period,
- HybridNoQuotes status may be triggered when MM Quote is totally filled.

Example

Order Queue processing
Trading phase - Hybrid

Initial Order Book

BUY			SELL		
	Vol	Price	Price	Vol	

BUY			SELL		
MMQ	100	55	56	100	#2
#1	40	55	56	60	MMQ

An aggressive Sell order 70@54 is submitted and is matched with the opposite MM Quote. That triggers sending the RFE to the Market Maker and Delay Period counter starts. Sell order is added to the Order Queue. During the Delay Period the MM Quote are kept unchanged. After elapsed Delay Period time the Order Queue is released to the Order Book sequentially.

During Delay Period the following orders are coming sequentially to the market and are added to the Order Queue: SELL 90@55; BUY 100@55; Sell 20@55.

Order Queue is segregated according to time priority and is released to the Order Book:

- #3 - Sell order 70@54 (order triggering RFE),
- #4 - Sell 90@55,
- #5 - Buy 100@55,
- #6 - Sell 20@55.

Orders from the Order Queue are released to the order book according to time priority as they were sent to the Trading System and immediately are matched or added to the Order Book.

First order #3 released - Sell 70@54 is matched with MMQ Buy 100@55 (MMQ Buy partial fill) - trade 70@55.

Order Book after processing the order #3

BUY			SELL		
	Vol	Price	Price	Vol	
MMQ	30	55	56	100	#2
#1	40	55	56	60	MMQ

Second order #4 released - Sell order 90@55 is matched with MMQ Buy 30@55. MMQ Buy is totally filled and the Instrument status is switched to HybridNoQuotes as the MM Quote Buy is totally filled. Partially filled Sell order #4 (60@55) remains in the Order Queue at first place followed by order #5 and order #6 waiting for providing the Valid Quote by the Market Maker which will result in the next Order Queue processing.

11.IPO/SPO Model

Both Initial Public Offering (IPO) and Secondary Public Offering (SPO) represent a single trading model which supports the allocation process resulted from IPO/SPO process.

IPO/SPO Model does not support a price discovery mechanism allowing to perform book building procedure before final allocation process.

IPO/SPO market model allows to allocate the instruments according to the specific allocation methodology.

The following allocation method is supported:

- Proportional reduction – each order is reduced proportionally using the same percentage rate.

The allocation of volume may start:

- from the order with the highest volume to the lowest volume,
- from the order with the lowest volume to the highest volume,

Two types of rounding types may be applied to deal with remaining volume after reduction:

- round down,
- round,

The remaining bids if exist after the first allocation phase are also distributed according to the descending or ascending volume methodology. However here the process allocates one lot to the each order until all the sell volume is exhausted.

Additionally, the remaining volume may be allocated in random manner especially when there are more than a single order with an equal volume. Then a mechanism additionally verifies in advance how many volumes to distribute left. If there is a group of orders sharing the same volume and allocation volume might be exhausted in the middle of such group of orders then instead of allocation of one lot taking order time priority, it allocates shares randomly within this group of orders.

11.1. Market Segments

In order to properly distinguish instruments to meet all the necessary obligations to report transactions:

- for financial instruments admitted to trading or traded on Market or for which a request for admission has been made,
- for financial instruments for which no request for admission to trading has been made.

Separate Market Segment will be created as well as appropriate MIC codes will be allocated to Market Segments and associated instruments.

Market Data publication:

Information about market segments and IPO/SPO instruments are available in the Market Data.

11.2. Market Phases

GPW WATS for IPO/SPO market model supports the following Market Phases:

- Early Monitoring (No Trading),
- IPO
- Late Monitoring (No Trading),
- Market Closed (No Trading).

Market Data publication:

- Information about the Trading Schedule together with list of market phases is available in the Market Data.

11.2.1. EARLY MONITORING (NO TRADING)

The first Market Phase that allows the Exchange to verify the data integrity before trading begins. During this Phase any operation on orders including order entry, order modification or order cancellation is not possible by Exchange Members. Market Operations may however perform some tasks affecting reference prices or order but only if necessary.

11.2.2. IPO

During this phase Exchange Members can submit their GTC Limit orders. Each order may be verified in order to meet IPO/SPO requirements regarding the lot size, price, volume or value if necessary.

IPO phase can be divided into two IPO's separate sub-phases. During the first IPO phase Exchange Members having the appropriate rights can place buy orders. An appointed Exchange Member can place sell order.

Once the first IPO phase ends, the second IPO phase starts and during this phase sell order book is accessible for appointed Exchange Member only who can input or amend the details of their sell order if necessary. No operation is allowed on buy side during this phase.

At the end of this phase an order book is uncrossed and buy orders are executed against sell order following the appropriate allocation algorithm.

Unexecuted or partially executed orders are cancelled during the transition to the next trading phase.

If the collection of orders lasts more than one trading day, only one IPO phase may be defined during this period in the trading schedule where only buy and sell orders may be entered and the phase itself does not end with an uncross mechanism.

Market Data publication:

No publication of orders and trades is public.

11.2.3. LATE MONITORING (NO TRADING)

The last Market Phase when the Exchange may still interact with Trading System and perform some necessary tasks before the trading is done for a day. While Exchange Members are not able to operate on

their orders, the Exchange may still interact with System in order to prepare it for the next trading day. Some activities related to orders or trades may be observed, in case of trade cancel procedure.

11.2.4. MARKET CLOSED (NO TRADING)

When Market is closed no operations on orders are possible, neither by Exchange Members nor the Exchange, although some system components may still be available (e.g. Market Data Gateway).

11.3. ORDERS

Market Participants can use the following order type to buy or sell assets:

- Limit Order

11.3.1. ORDER TYPES

Order type defines the behavior of an order in the order book and the manner in which it is executed.

The following section describes order types available in IPO/SPO Market Model.

Limit Order

Limit Order is an order to buy or sell at a stipulated price.

11.3.2. VALIDITY CONDITIONS

IPO/SPO Market Model supports the following validity condition:

Good Till Cancel (GTC)

Order is valid until it is totally executed or canceled by the submitter or Trading System. Additional limitations may be imposed regarding the maximum length of an order.

11.3.3. COMPATIBILITY MATRIX

The table below presents the compatibility of specific validity conditions with an order type available for IPO:

Order Type / Validity	GTC
Limit Order	yes

12. Tender Offer Model

Tender Offer Model represents a trading model which supports a Tender Offer.

Tender Model does not support a price discovery mechanism allowing to perform tender offer process.

Tender Model allows to allocate the instruments of those investors who have already decided to tender their shares.

12.1. Tender Offer Process

In general, a Tender Offer process is similar to any other auction process where orders are subsequently collected and matched.

The basic scenario where the final price is previously settled and the over-subscription process is made outside the exchange is similar to any other auction. During the auction - all the sell orders of Participants accepting the price are entered into the system by their intermediaries and must follow the same price limit – tender price. On the other hand, a single buy order is entered with a tender offer limit price. Basic order validation is carried out at the order entry stage and an order may be rejected if it does not meet specific criteria.

During this stage orders previously entered may be cancelled or modified.

No indicative matching price nor indicative matching volume is distributed through market data. The distribution of the order book is closed, however it remains under Market discretion and regulations.

In this scenario both sum of sell and bid volumes are always equal. No under or over-subscription exists. All orders are completed during the auction uncross process at the same price and the whole supply and demand is matched.

Final trades are distributed via market data.

Usually, the process of allocating orders within Tender Offer procedure lasts no longer than one day, yet it is technically possible to keep an order book open for more than one single day.

12.2. Market Segment

In order to properly distinguish instruments subjected to Tender Offer procedure a dedicated Market Segment will be created based on a separate Trading Schedule.

12.3. Market Phases

GPW WATS for Tender Market Model supports the following Market Phases:

- Early Monitoring (No Trading),
- Tender
- Late Monitoring (No Trading),
- Market Closed (No Trading).

Market Data publication:

- Information about the Trading Schedule together with list of market phases is available in the Market Data.

12.3.1. EARLY MONITORING (NO TRADING)

The first Market Phase that allows the Exchange to verify the data integrity before trading begins. During this Phase any operation on orders including order entry, order modification or order cancellation is not possible by Exchange Members. Market Operations may however perform some tasks affecting reference prices or order but only if necessary.

12.3.2. TENDER

During this phase Exchange Members can submit their GTC Limit orders. Limit of each and every order is fixed and equal to the tender offer. Orders with limits not equal to the tender price are rejected at order entry.

Tender phase can be divided into two Tender's separate sub-phases. During the first Tender phase Exchange Members having the appropriate rights can place sell orders. An appointed Exchange Member can place buy order.

Once the first Tender phase ends, the second Tender phase starts and during this phase buy order book is accessible for appointed Exchange Member only who can input or amend the details of their buy order if necessary. No operation is allowed on sell side during this phase.

At the end of this phase an order book is uncrossed and sell orders are executed against buy order at fixed price. All the orders must be fully executed, no partial fills are expected.

Irrespective of the duration of this scheduled phase, if the volume of orders on the buy and sell side is equal, the Market Operator may force the shortening of this phase and the execution of orders will take place immediately.

If the collection of orders lasts more than one trading day, only one Tender phase may be defined during this period in the trading schedule where only sell and buy orders may be entered and the phase itself does not end with an uncross mechanism.

Market Data publication:

Publication of orders and trades is public.

12.3.3. LATE MONITORING (NO TRADING)

The last Market Phase when the Exchange may still interact with Trading System and perform some necessary tasks before the trading is done for a day. While Exchange Members are not able to operate on their orders, the Exchange may still interact with System in order to prepare it for the next trading day. Some activities related to orders or trades may be observed, in case of trade cancel procedure.

Having in mind that Tender orders must be executed in full, no cancellation of remaining orders is expected.

12.3.4. MARKET CLOSED (NO TRADING)

When Market is closed no operations on orders are possible, neither by Exchange Members nor the Exchange, although some system components may still be available (e.g. Market Data Gateway).

12.4. ORDERS

12.4.1. ORDER TYPES

Order type defines the behavior of an order in the order book and the manner in which it is executed.

The following section describes order types available in Tender Market Model.

Limit Order

Limit Order is an order to buy or sell at a stipulated price.

12.4.2. VALIDITY CONDITIONS

Order validity for Tender Market Model condition defines for how long an order remains in the order book

Tender Market Model supports the following validity condition:

Good Till Cancel (GTC)

Order is valid until it is totally executed or canceled by the submitter or Trading System. Additional limitations may be imposed regarding the maximum length of an order.

12.4.3. TENDER OFFER COMPATIBILITY MATRIX

The table below presents the compatibility of specific validity conditions with an order type available for Tender Offer:

Order Type / Validity	GTC
Limit Order	yes

13. Tables of Examples

13.1. Example: Auction

Auction examples:

1st principle: Maximum executable quantity

BUY			SELL				
Aggr. Volume	Vol. at Price	Price	Vol. at Price	Aggr. Volume	Auction Vol.	Surplus	Pressure
200	200	20		600	200	-400	Sell
500	300	19	200	600	500	-100	Sell
500		18	200	400	400	100	Buy
600	100	17		200	200	400	Buy
600		16	200	200	200	400	Buy

In this example the maximum executable volume quantity (500) is at 19 which is the IMP price.

2nd principle: Minimum surplus

BUY			SELL				
Aggr. Volume	Vol. at Price	Price	Vol. at Price	Aggr. Volume	Auction Vol.	Surplus	Pressure
200	200	20		800	200	-600	Sell
500	300	19	200	800	500	-300	Sell
500		18	400	600	500	-100	Sell
600	100	17		200	200	400	Buy
600		16	200	200	200	400	Buy

In this example the maximum executable volume (500) is at 19 and at 18, however minimum surplus (-100) is at 18 which is the IMP price.

3rd principle: Market pressure

BUY			SELL				
Aggr. Volume	Vol. at Price	Price	Vol. at Price	Aggr. Volume	Auction Vol.	Surplus	Pressure
200	200	20		400	200	-200	Sell
500	300	19		400	400	100	Buy
500		18	200	400	400	100	Buy
600	100	17		200	200	400	Buy
600		16	200	200	200	400	Buy

In this example the maximum executable volume (400) and minimum surplus (100) is at 19 and at 18, however the market pressure is on the buy side and therefore the higher price 19 is selected as the IMP price.

4th principle: Reference price

BUY			SELL				
Aggr. Volume	Vol. at Price	Price	Vol. at Price	Aggr. Volume	Auction Vol.	Surplus	Pressure
300	300	20		600	300	-300	Sell
600	300	19		600	600	0	
600		18	200	600	600	0	
700	100	17	200	400	400	300	Buy
700		16	200	200	200	500	Buy

In this example the maximum executable volume (600), minimum surplus (0) and equal market pressure (0) is at two price levels at 19 and at 18. The IMP price must be nearest or equal to the reference price.

If the reference price would be equal to or higher than 19, then 19 is the IMP price.

If the reference price would be equal to or lower than 18 then 18 is the IMP price

If the reference price would be between 18 and 19 then the reference price is the IMP price.

Special case

On both sides there are Market Orders and/or Market To Limit Orders.

BUY			SELL				
Aggr. Volume	Vol. at Price	Price	Vol. at Price	Aggr. Volume	Auction Vol.	Surplus	Pressure
300	300	Market		200	200	100	Buy
300		Market	200	200	200	100	Buy

In this example the IMP price is equal to the Reference Price.

13.2. Example: Uncrossing Algorithm

Let's assume the order book is at the end of Auction phase.

Auction price = 21.60; Auction volume = 180

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
7	20	22.20	20.60	20	4
10	40	22.00	20.80	20	13
5	70	21.80	21.20	20	9
2	20	21.60	21.40	40	11

BUY			SELL		
6	20	21.60	21.40	20	12
8	20	21.60	21.60	60	3
1	20	21.40	21.90	90	15
14	80	21.30	22.10	70	16

Selection of orders

Based on IMP and IMV data, a Buy auction list and a Sell auction list are created.

Buy auction list includes all Buy orders with price limits higher than and equal to IMP.

Sell auction list includes all Sell orders with price limits lower than and equal to IMP.

BUY AUCTION LIST			SELL AUCTION LIST		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
7	20	22.20	20.60	20	4
10	40	22.00	20.80	20	13
5	70	21.80	21.20	20	9
2	20	21.60	21.40	40	11
6	20	21.60	21.40	20	12
8	20	21.60	21.60	60	3

Order numbers 1, 14, 15, 16 are removed from Auction Lists as they have price limits strictly worse than IMP.

Orders quantity allocation

On the short side all Sell orders are allocated for their quantity as Total Sell Qty = IMV.

On the long side Total Buy Qty > IMV thus some orders are not executed. In this case by taking into account price/time priority the last buy order no 8 will be partially executed (reduced to 10).

Order matching (trades generation)

All allocated orders are matched at Auction Price = 21.60. Orders are matched step by step starting from first lines (best prices) up to the end of Buy and Sell Auction List.

The following trades are generated:

Trade No.	Matched Orders	Quantity	Price
1	7 and 4	20	21.60
2	13 and 10	20	21.60
3	10 and 9	20	21.60
4	11 and 5	40	21.60
5	5 and 12	20	21.60
6	3 and 5	10	21.60
7	2 and 3	20	21.60

Trade No.	Matched Orders	Quantity	Price
8	3 and 6	20	21.60
9	8 and 3	10	21.60

13.3. Example: Price and Time Matching

Example A

Incoming Limit Order (Trade Price collars not triggered)

Assumptions:

- Tick size = 0.10,
- Trade Price Collars: upper limit - 10.50, lower limit - 9.50.

Initial Order book:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
1	20	9.90	10.00	30	2
3	30	9.80	10.10	8	4
15	80	9.80	10.10	15	8
16	40	9.60	10.30	30	11
6	10	9.50	10.50	40	5
7	20	9.50	10.50	20	9
10	70	9.50	10.60	80	12
13	100	9.40	10.90	10	14

(Remark: lower Order Seq. No. depicts higher Time Priority - order submitted earlier)

Incoming Sell Limit Order no. 17 100@9.50

Selecting opposing orders with crossed limits

List of selected orders:

BUY		
Order Seq. No.	Quantity	Price
1	20	9.90
3	30	9.80
15	80	9.80
16	40	9.60
6	10	9.50
7	20	9.50
10	70	9.50

Order quantity allocation

Sell order quantity 100 is allocated to buy orders according to Price/Time priority:

- order no. 1 - allocated for total quantity 20 - remaining Sell Qty = 80,
- order no. 3 - allocated for total quantity 30 before order no. 15 (Time priority) - remaining Sell Qty = 50,
- order no. 15 - partially allocated quantity 50 - leaves quantity 30 - remaining Sell Qty = 0 (Sell order filled).

Order book with allocated quantities:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
1	20	9.90	9.50	100	17
3	30	9.80			
15	50	9.80			

Order matching

After order quantity allocation orders are matched and trades are generated:

- trade no. 1: Order no. 1 - Order no. 17 - quantity 20,
- trade no. 2: Order no. 3 - Order no. 17 - quantity 30,
- trade no. 3: Order no. 15 - Order no. 17 - quantity 50.

Order book after processing Sell order:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
			10.00	30	2
			10.10	8	4
15	30	9.80	10.10	15	8
16	40	9.60	10.30	30	11
6	10	9.50	10.50	40	5
7	20	9.50	10.50	20	9
10	70	9.50	10.60	80	12
13	100	9.40	10.90	10	14

Example B

Incoming Limit Order (Trade Price collars triggered).

Assumptions:

- Tick size = 0.10,
- Trade Price Collars: upper limit - 10.50, lower limit - 9.50.

Initial order book:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
1	20	9.90	10.00	30	2
3	30	9.80	10.10	8	4
15	80	9.80	10.10	15	8
16	40	9.60	10.30	30	11
6	10	9.50	10.50	40	5
7	20	9.50	10.50	20	9
10	70	9.50	10.60	80	12
13	100	9.40	10.90	10	14

Incoming Buy Limit Order no. 17 200@11.00

Selecting opposing orders with crossed limits and with limits inside Trade Price Collars

List of selected orders:

SELL		
Price	Quantity	Order Seq. No.
10.00	30	2
10.10	8	4
10.10	15	8
10.30	30	11
10.50	40	5
10.50	20	9

Order numbers 12 and no. 14 are not included in the list of selected orders as their limits are greater than Upper Trade Price Collar.

Order quantity allocation

Buy order quantity 200 is allocated to Sell orders according to Price/Time priority:

- order no. 2 - allocated for total quantity 30 - remaining Buy Qty = 170,
- order no. 4 - allocated for total quantity 8 - remaining Buy Qty = 162,
- order no. 8 - allocated quantity 15 - remaining Buy Qty = 147,
- order no. 11 - allocated quantity 30 - remaining Buy Qty = 117,
- order no. 5 - allocated quantity 40 - remaining Buy Qty = 77,
- order no. 9 - allocated quantity 20 - remaining Buy Qty = 57.

Total allocated quantity of Sell orders is equal to 143 thus incoming Buy order is partially filled and unexecuted part is added to order book

Order book with allocated quantities:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
17	143	11.00	10.00	30	2
			10.10	8	4
			10.10	15	8
			10.30	30	11
			10.50	40	5
			10.50	20	9

Order matching

After order quantity allocation orders are matched and trades are generated:

- trade no. 1: Order no. 2 - Order no. 17 - quantity 30,
- trade no. 2: Order no. 4 - Order no. 17 - quantity 8,
- trade no. 3: Order no. 8 - Order no. 17 - quantity 15,
- trade no. 4: Order no. 11 - Order no. 17 - quantity 30,
- trade no. 5: Order no. 5 - Order no. 17 - quantity 40,
- trade no. 6: Order no. 9 - Order no. 17 - quantity 20.

After orders are matched, trading is stopped (Volatility Halt) and unexecuted part of an incoming order is added to the order book and Auction procedure starts.

Order book at the start of Auction procedure:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
17	57	11.00			
1	20	9.90			
3	30	9.80			
15	80	9.80			
16	40	9.60			
6	10	9.50			
7	20	9.50			
10	70	9.50	10.60	80	12
13	100	9.40	10.90	10	14

Example C

Incoming Buy Market Order with IOC validity (Trade Price collars not triggered).

Initial order book as in Example 2.

Incoming Buy Market Order no. 17: 40 @ MO.

Selecting opposing orders with crossed limits and with limits inside Trade Price Collars

List of selected orders:

SELL		
Price	Quantity	Order Seq. No.
10.00	30	2
10.10	8	4
10.10	15	8

Order quantity allocation

Buy Market Order quantity 40 is allocated to Sell orders according to Price/Time priority:

- order no. 2 - allocated for total quantity 30 - remaining Buy Qty = 10,
- order no. 4 - allocated for total quantity 8 before order no. 15 (Time priority) - remaining Buy Qty = 2,
- order no. 15 - partially allocated quantity 2 - leaves quantity 13 - remaining Buy Qty = 0 (Buy order filled).

Order book with allocated quantities.

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
17	40	Market	10.00	30	2
			10.10	8	4
			10.10	2	8

Order matching

After order quantity allocation orders are matched and trades are generated:

- trade no. 1: Order no. 2 - Order no. 17 - quantity 30,
- trade no. 2: Order no. 4 - Order no. 17 - quantity 8,
- trade no. 3: Order no. 8 - Order no. 17 - quantity 2.

Order book after processing Buy Market Order:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
1	20	9.90			
3	30	9.80			
15	80	9.80	10.10	13	8
16	40	9.60	10.30	30	11
6	10	9.50	10.50	40	5
7	20	9.50	10.50	20	9
10	70	9.50	10.60	80	12
13	100	9.40	10.90	10	14

Example D

Incoming Buy Market Order with IOC validity (Trade Price collars triggered).

Initial order book as in Example 2.

Incoming Buy Market Order no. 17: 300 @ MO.

Selecting opposing orders with crossed limits and with limits inside Trade Price Collars

List of selected orders:

SELL		
Price	Quantity	Order Seq. No.
10.00	30	2
10.10	8	4
10.10	15	8
10.30	30	11
10.50	40	5
10.50	20	9

Order nos. 12 and 14 with price limits 10.60 and 10.90 respectively are not selected as the price limits are outside Trade Price Collars.

Order quantity allocation

Buy Market Order quantity 300 is allocated to Sell orders according to Price/Time priority:

- order no. 2 - allocated for total quantity 30 - remaining Buy Qty = 270,
- order no. 4 - allocated for total quantity 8 (before order no. 8 - Time priority) - remaining Buy Qty = 262,
- order no. 8 - allocated quantity 15 - remaining Buy Qty = 247,
- order no. 11 - allocated quantity 30 - remaining Buy Qty = 217,
- order no. 5 - allocated quantity 40 (before order no. 8 - Time priority) - remaining Buy Qty = 177,
- order no. 9 - allocated quantity 20 - remaining Buy Qty = 157.

Total allocated quantity of Sell orders is equal to 143 thus incoming Buy order is partially filled. As incoming order is Market Order with IOC validity then unexecuted part of Buy order is canceled. In this case there no Volatility Halt and trading is continued.

Order book with allocated quantities:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
17	143	Market	10.00	30	2
			10.10	8	4
			10.10	15	8
			10.30	30	11
			10.50	40	5
			10.50	20	9

Order matching

After order quantity allocation orders are matched and trades are generated:

- trade no. 1: Order no. 2 - Order no. 17 - quantity 30,
- trade no. 2: Order no. 4 - Order no. 17 - quantity 8,
- trade no. 3: Order no. 8 - Order no. 17 - quantity 15,
- trade no. 4: Order no. 11 - Order no. 17 - quantity 30,
- trade no. 5: Order no. 5 - Order no. 17 - quantity 40,
- trade no. 6: Order no. 9 - Order no. 17 - quantity 20.

Order book after processing Buy Market Order.

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
1	20	9.90			
3	30	9.80			
15	80	9.80			
16	40	9.60			
6	10	9.50			
7	20	9.50			
10	70	9.50	10.60	80	12
13	100	9.40	10.90	10	14

Example E

Incoming Buy Market To Limit Order with IOC validity (Trade Price collars not triggered).

Initial order book:

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
3	30	9.80	10.10	8	4
15	80	9.80	10.10	15	8
16	40	9.60	10.30	30	11

Selecting opposing orders with crossed limits and with limits inside Trade Price Collars.

Selection of orders is restricted to orders at the best opposite price level only.

First example (MTL order filled - matched with one opposing order).

Incoming Buy Market To Limit Order no. 17: 5 @ MTL.

List of selected orders:

- only order no. 4 is selected.

Order quantity allocation:

- order no. 4 - allocated quantity 5 (partially filled).

Order matching:

- trade no. 1: order no. 4 with order no. 17 - quantity 5.

MTL Buy order fully executed.

Order book after processing Buy Market To Limit Order.

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
3	30	9.80	10.10	3	4
15	80	9.80	10.10	15	8
16	40	9.60	10.30	30	11

Second example (MTL order filled - matched with two opposing orders)

Incoming Buy Market To Limit Order no. 17: 20 @ MTL.

List of selected orders:

- order no. 4,
- order no. 8.

Order quantity allocation:

- order no. 4 - allocated quantity 8,
- order no. 8 - allocated quantity 12 (partially filled).

Order matching:

- trade no. 1: order no. 4 with order no. 17 - quantity 8,
- trade no. 2: order no. 8 with order no. 17 - quantity 12.

MTL Buy order fully executed

Order book after processing Buy Market To Limit Order

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
3	30	9.80			
15	80	9.80	10.10	3	8
16	40	9.60	10.30	30	11

Third example (MTL order partially filled - matched with two opposing orders)

Incoming Buy Market To Limit Order no. 17: 40 @ MTL.

List of selected orders:

- order no. 4,
- order no. 8.

Order quantity allocation:

- order no. 4 - allocated quantity 8,
- order no. 8 - allocated quantity 15.

Order matching:

- trade no. 1: order no. 4 with order no. 17 - quantity 8,
- trade no. 2: order no. 8 with order no. 17 - quantity 15.

MTL Buy order partially executed.

As MTL order is IOC order then unexecuted part of order is canceled.

Order book after processing Buy Market To Limit Order.

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
3	30	9.80			
15	80	9.80			
16	40	9.60	10.30	30	11

Example F

Incoming Buy Market To Limit Order with IOC validity (Trade Price collars triggered).

Trade Price Collars: upper limit - 10.50, lower limit - 9.50.

Initial order book.

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
3	30	9.80	10.60	80	12
15	80	9.80	10.90	10	14
16	40	9.60			

Incoming Buy Market To Limit Order 50 @ MTL.

As there are no instruments available inside Trade Price Collars - MTL order is canceled.

Example 4 - 8.3.3.2. Reference Price Matching.

Order book building

Reference Price = 100.

Let's assume that the following orders are submitted during CT@FP phase in the following sequence (the order sequence number depicts the time priority):

- #1 - Sell 100@105,
- #2 - Buy 200@101,
- #3 - Sell 150@102,
- #4 - Buy 250@103,
- #5 - Buy 270@103,
- #6 - Sell 125@102,
- #7 - Buy 55@98.

Order book

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
#2	200	100	102	150	#3
#4	250	100	102	125	#6
#5	270	100	105	100	#1
#7	55	98			

13.3.1. MATCHING EXAMPLES

Initial Order book

Reference Price = 100

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
#2	200	100	102	150	#3
#4	250	100	102	125	#6
#5	270	100	105	100	#1
#7	55	98			

Example A

Incoming order #8 Sell 1000@98.

Trades:

- order #2 and #8 - matched quantity 200,
- order #4 and #8 - matched quantity 250,
- order #5 and #8 - matched quantity 270.

Partially filled order #8 is added to the order book with the suppressed price 100 (leavesQty = 280).

Order book view after processing order #8

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
#7	55	98	100	280	#8
			102	150	#3
			102	125	#6
			105	100	#1

Example B

Order modification:

- order #6: price limit from 102 to 97.

Order book view after modifying order #6.

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
#7	55	98	100	280	#8
			100	125	#6
			102	150	#3
			105	100	#1

Example C

Incoming order #9 Buy 500@100.

Trades:

- order #9 and #8 - matched quantity 280,
- order #9 and #6 – matched quantity 125.

Partially filled order #9 is added to the order book with the price 100 (leavesQty = 95).

Order book view after processing order #9

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
#9	95	100	102	150	#3
#7	55	98	105	100	#1

Example D

Incoming Market Order IOC #10 Sell 400@MO.

Trades:

- order #9 and #10 - matched quantity 95.

Unexecuted part of Market Order is cancelled (IOC).

Order book view after processing order #10

BUY			SELL		
Order Seq. No.	Quantity	Price	Price	Quantity	Order Seq. No.
#7	55	98	102	150	#3
			105	100	#1