MIAX Pearl Equities Exchange

MIAX Express Orders
Binary Orders for Trading Equities

MEO Interface Specification

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1. Overview

MIAX Express Orders (**MEO**) interface is a messaging interface that MIAX Pearl Equities™ members and sponsored firms use to submit binary orders for trading on the MIAX Pearl Equities Exchange.

MEO Features:

MEO messaging and the system architecture is designed for low latency and high throughput messaging. Some of the key features of the interface are:

- MEO is a gateway interface that provides clients order entry capabilities to all MIAX Pearl Equities Matching Engines. MEO will route an order to the appropriate Matching Engine based on the security symbol.
- MEO uses binary numeric fields, fixed length ASCII fields and bit fields in order to utilize bandwidth efficiently and assist in achieving **low latency**.
- MEO requires the use of TCP IP protocol in order to provide a **guaranteed delivery** mechanism for the order packets. Order acknowledgements and Order Cancel acknowledgements come directly from the Matching Engine allowing for **enhanced determinism** of delivery and processing.
- Message formats are designed to use **minimal bandwidth**. Use of Symbol IDs in place of a full canonical symbol is an example.
- MEO allows Auto Cancel on Disconnect on each session thereby allowing firms to reduce their risk in case of system problems at their end.
- MEO also allows Auto Cancel on System/Matching Engine Failure on each session allowing firms to reduce their risk in case of MIAX Pearl Equities system failures that prevent Firm's interaction with existing orders.
- Orders entered via MEO are provided the following risk protection mechanisms:
  - Per Order Risk Metrics
    - Maximum Order Size Protection
    - Minimum and Maximum Order Price Protection
    - Price Tick Size Check
    - Limit Order Price Protection
    - Market Order Price Protection
    - Maximum Order Notional Value Protection
    - ISO Reject
    - Short Sale Reject
    - Short Sale Exempt Reject
    - Market Order Reject
    - Average Daily Volume (ADV) Check
    - Regulation SHO Security List Reject
    - Restricted Security List Reject
    - Non-Agency Reject
    - Override Capacity to Agency
    - Locate Account Validation

- - Early Trading Session Restriction
  - Late Trading Session Restriction
- Cumulative Risk Metrics
  - Maximum Gross Notional Trade Value Protection
  - Maximum Net Notional Trade Value Protection
  - Maximum Gross Notional Open Value Protection
  - Maximum Net Notional Open Value Protection
  - Maximum Gross Notional Trade and Open Value Protection
  - Maximum Net Notional Trade and Open Value Protection
  - Duplicate Order Check
  - Order Rate Protection
- Trade Risk Metrics
  - Trading Collar
  - Market Impact Collar
  - Self-Trade Protection
- Priority Purge Port for Mass Cancellations
- Note: Above protections are available to all members that use the MEO interface
- MEO provides order event and system state notifications allowing the firms to take necessary actions immediately.

This specification is intended to be used only by MIAX Pearl Equities member firms and the firms that are sponsored for MIAX Pearl Equities access by MIAX Pearl Equities member firms. Members are encouraged to refer to MIAX Pearl Equities User's Manual for additional details on functionalities supported by the exchange.

1.1   Exchange related information

1.1.1 Hours of operation for MIAX Pearl Equities Exchange

Please visit MIAX website for details about times for each of these periods.

Note: Times specified in the website are in United States Eastern Time zone.

3:00 am	**Firm Interface Start up time** Firms are allowed to connect to MEO and download security symbols.
3:30 am	**Live Order Window (LOW)** Start of acceptance of messages (including Orders). Orders received at or after this time can be accepted by MIAX Pearl Equities.
4:00 am	**Early Trading Session** Start of Early Trading Session on MIAX Pearl Equities.
9:30 am	**Regular Opening Process** Start of MIAX Pearl Equities Regular Opening process.
9:30 am to 4:00 pm	**Regular Trading Session** (ends at 1:00 pm on early closing days) MIAX Pearl Equities stops accepting orders with a Time In Force (TIF) of RHO and DAY for all traded symbols at the end of this trading session. All resting RHO and DAY orders are cancelled back to the members at this time. MIAX Pearl Equities may

	send trade related data following the end of the trading session for various operational reasons as needed.
4:00 pm to 8:00 pm	**Late Trading Session** (starts at 1:00 p.m and ends at 5:00 pm on early closing days) Start of Late Trading Session on MIAX Pearl Equities. MIAX Pearl Equities may send trade related data following the end of the trading session for various operational reasons as needed.
8:10 pm (approx.)	**Firm Interface End Time** (ends at 5:10 pm on early closing days) MEO has completed sending all messages and Firms will soon be disconnected

1.1.2 Obtaining more information

Information such as (but not limited to) membership, rules, fees and support can be obtained by sending an email to Trading Operations at TradingOperations@miaxglobal.com or by visiting MIAX website

1.2 MEO Architecture

MIAX Pearl Equities Matching Engines
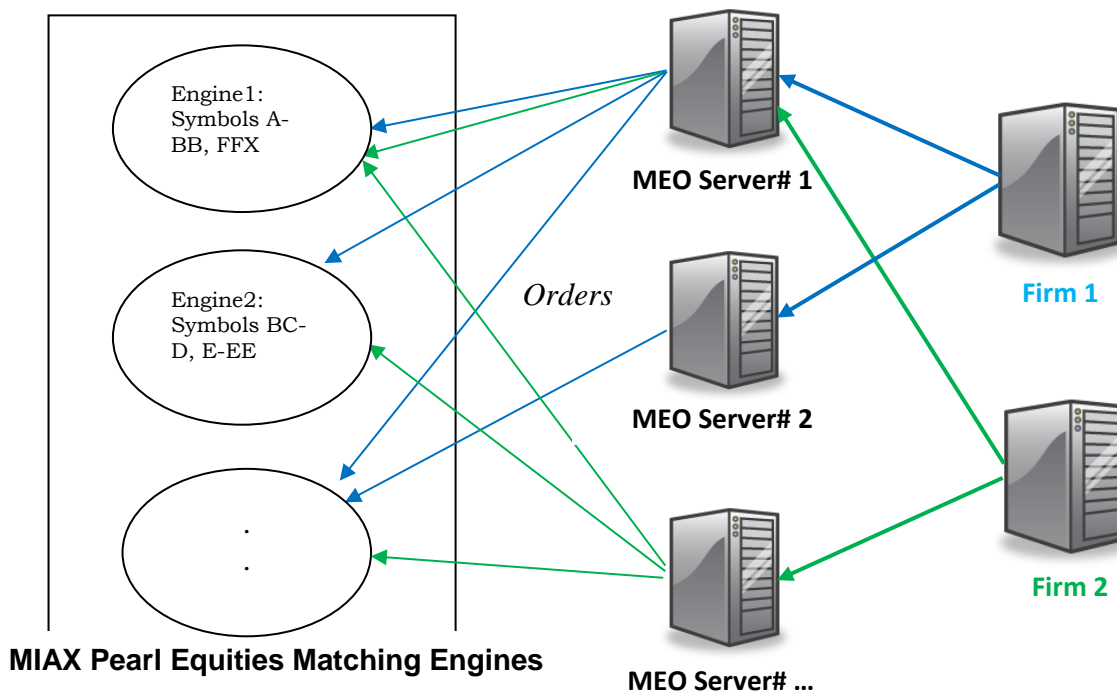
Highlights:

- MIAX Pearl Equities trading architecture is highly scalable and consists of multiple Matching Engines. Each Matching Engine handles trading for a set of security symbols. The symbol sets may not be contiguous ranges of symbols and could be organized in any manner as assigned by the exchange. For the most part, the symbol assignments will be static in terms of allocation to a Matching Engine. However, if reallocation of symbols across various Matching Engines is needed, such changes would be communicated to the firms with ample notice prior to the actual implementation.
- MIAX Pearl Equities MEO interface abstracts firms from symbol assignment across Matching Engines. Each MEO interface acts as a gateway to all MIAX Pearl Equities Matching Engines and routes order messages to the appropriate Matching Engine.
- Firms can connect to one or more pre-assigned servers that host their MEO interface instances and segment their order entry messages across these instances.
- This architecture offers low latency, high throughput, narrow fault domains and high degree of resiliency for Firm's order entry messages.

1.3 Certification for trading via MEO

Please contact MIAX Trading Operations to obtain more information about certification testing and the details about the test environment.

When the Firms are ready with their application, they must certify their application with MIAX Pearl Equities. This certification testing is a manual process. In order to schedule a certification test, please email MIAX Trading Operations.

1.4 Hot Topics

Membership: Contact MIAX Member services for details about MIAX Pearl Equities membership. As part of the on-boarding process, each member will be required to provide a list of NSCC MPIDs that can be used for order entry on a MEO session. Firms are allowed to use any of these MPIDs to send orders via the session after the permission is setup.

Live Order Window (LOW): Official order acceptance starts at 3:30 am. Any Orders entered before that time will be rejected. Orders received and accepted after 3:30 am will be in-play for opening and trading.

Port Setup: Member firms have flexibility in setting up MEO ports to cater to their architecture.
- *Port Types*:
  - **Full Service Port (FSP)** – Supports all MEO order input message types except Mass Cancel Requests.
  - **Priority Purge Port** – Supports Mass Cancel requests only. Refer to Appendix B for a description of the Priority Purge Port processing.
  - *Notes:*
    - Each MEO interface can have one Full Service Port and one Priority Purge Port.
    - A Mass Cancel Request is supported only on a Priority Purge Port: If a Firm has multiple MEO interfaces, Mass Cancel requests can be sent on Priority Purge Ports of any of these interfaces.
    - Receipt of unsupported messages, Exchange defined excessive number of Mass Cancels on a Priority Purge Port will result in a forced disconnect from the Priority Purge Port followed by a brief pause in the ability to reconnect. Please contact Trading Operations for the current settings for excessive Mass Cancels on a Priority Purge Port.

Data feeds: MIAX Pearl Equities has several value-adding data feeds. Details of the feeds and their content can be obtained by visiting MIAX website or emailing Trading Operations.

Symbol management: The list of all security symbols that can be traded per Matching Engine via the MEO interface will be received by the Firms when they login into MEO and become current with each Matching Engine. The MIAX Pearl Equities assigned Symbol ID of each security will be sent in every order message so that firms can tie each message to a security symbol.

Flow control: MEO is a synchronous messaging interface that supports an "N"-in-flight paradigm to the Matching Engines. Upon receipt of "N" binary orders, MEO will not read the firm facing order entry ports until it sends out a response. Firms that do not strictly follow a "N"-in-flight paradigm are advised to limit the number of in-flight liquidity blocks to less than 20 for optimal TCP protocol performance; i.e. under certain limited circumstances, exceeding this limit could result in shrinking window size and/or dropped packets. MEO implements similar flow control for the Priority Purge Ports, the "M"-in-flight for a Priority Purge Port is separate from the order entry ports. For more information regarding the in-flight settings, please reach out to MIAX Trading Operations.

Routing Instruction: Firms are allowed to designate each order as non-routable (DNR: Do Not Route), Route Once or Re-Routable. An order marked as Route Once is eligible for routing upon receipt, except when received before the Opening process. When received before the Opening process, the Route Once order is eligible to route as part of the Opening process. An order marked as Re-Routable is eligible for routing upon receipt as well as any subsequent time that resting quantity is locked or crossed by an away market quote. Please refer to MIAX Pearl Equities rules as to the order types that are routable.

Routing strategy:
- Order Protection: This is the default routing strategy available for Route Once and Re-Routable orders. The strategy will attempt to execute against the Protected BBOs of the away markets after it is executed locally at or better than each away BBO.
- Primary Auction (PAC): This is the routing strategy available only for Displayed Re-Routable orders. The strategy will attempt to route the order to participate in the Primary Listing Exchange's Opening, Closing and Regulatory Halt auctions when they occur. PAC orders will only participate in the Regular Trading Session of the Primary Listing Exchange i.e. from 9:30 AM ET to 4:00 PM ET (or 1:00 PM ET in case of an early close). Outside of these Primary Listing Exchange's auctions, the PAC order will rest and be available for trading on the Pearl Equities orderbook and routing to better priced away exchanges for "Price Improvement".

Handling of Orders that are locking or crossing BBOs:
- Self-Trade Protection: MIAX Pearl Equities offers Self-Trade Protection that firms can use to better manage their order flow and prevent unintended executions with their own orders. Firms can specify Self-Trade Protection instructions on individual orders.
- Order Management: MIAX Pearl Equities manages orders to opposite side ABBO (Away Best Bid and Offer) in order to prevent locking or crossing the ABBO. MIAX Pearl Equities will use the Price Sliding and Re-Price Frequency instructions provided by the Firm on an order to manage the order. Additionally, MIAX Pearl Equities manages orders to ensure compliance with Regulatory plans such as LULD and Regulation SHO.

Backup Ports: Firms will be assigned backup MEO ports on backup infrastructure. These are slated to be used in the event of failure of primary MEO infrastructure. These backup MEO ports will not accept any messages while operating in the backup mode and are solely used for connection verification while in this mode. Note that these backup ports will have separate IP addresses than the primary ports.

Auto-Cancel on Disconnect (ACOD): In the event a member's session with the exchange is disconnected, orders submitted via that session that are open on the Order Book can be cancelled automatically upon disconnect.

Members must select one of the following actions on a session by session basis which will be enforced when the protection is triggered:
- Cancel All Open Orders: All orders that were sent through this session and are open will be cancelled upon session disconnect.
- Do Not Cancel All Open Orders: This will disable Auto Cancel on Disconnect and MIAX Pearl Equities will not cancel any open orders upon that session's disconnect. This is the default behavior for the session if the member does not opt in for ACOD.

When MEO detects a disconnect for any reason (whether due to graceful logout, a connection loss or loss of heartbeats), it will trigger the auto cancel on disconnect process, whereby MEO will try to cancel all eligible orders (eligibility defined above).

The ACOD feature is provided on a best effort basis. Executions can occur while MEO is processing the ACOD event. As the technical circumstances initiating a disconnect may vary, Firms may contact Trading Operations to confirm the status of ACOD eligible open orders remaining at MIAX Pearl Equities that were sent via the session(s) that disconnected. The cancel and execution notifications resulting from cancels or trades during the disconnect can also be received upon a subsequent reconnect by the Firm on the same day.

Auto-Cancel on System/Matching Engine Failure (ACOSF): In the event of a Matching Engine or MEO interface failure that prevents Firm's interaction with existing orders, members may request that their open orders are cancelled automatically for a given session. Orders submitted via any of the member's other sessions will not be affected. Additionally, orders submitted to any Matching Engines that are not impacted will not be affected.

Members must select one of the following actions on a session by session basis which will be enforced when the protection is triggered:

- Cancel All Open Orders: All open orders in the impacted Matching Engine(s) that were sent through this session will be cancelled upon system failure.
- Do Not Cancel All Open Orders: This will disable Auto Cancel on System Failure and MIAX Pearl Equities will not cancel any open orders from that session upon system failure. This is the default behavior for the session if the member does not opt in for ACOSF.

The ACOSF feature is provided on a best effort basis. Executions can occur while the ACOSF event is being processed. As the technical circumstances initiating an ACOSF may vary, Firms are advised to contact Trading Operations to confirm the status of ACOSF eligible open orders remaining at MIAX Pearl Equities. The cancel and execution notifications resulting from cancels or trades during the failure can also be received upon a subsequent reconnect by the Firm on the same day.

Executions/Busts/Adjustments: All executions, Trade busts (cancels) and adjustments (corrections) from the current trading day are conveyed to Firms via MEO. As of Trades, Trade busts and adjustments are not sent on MEO.

1.5 Data Types

The following table describes the data types used in MEO messaging:

Note: Time fields in all messages are as per timings of United States Eastern Time zone.

Data Type	Description
BinaryU	Unsigned, Intel x86 byte-ordered (**little-endian**), binary encoded numbers
BinaryS	Signed, Intel x86 byte-ordered (**little-endian**), binary encoded numbers
Price6U	BinaryU Field with the last 6 (right most) digit places being decimal places.

	$1.00 is represented as 1,000,000
Price6S	BinaryS Field with the last 6 (right most) digit places being decimal places. $-1.00 is represented as -1,000,000
NanoTime	BinaryU field that contains number of nanoseconds since the UNIX Epoch, 1970-01-01 00:00:00 +0000 (UTC).
MilliTime	BinaryU field that contains number of milliseconds since the UNIX Epoch, 1970-01-01 00:00:00 +0000 (UTC).
Alphanumeric	Each place can contain characters or numbers. Left justified and space-padded on to the right
String	Characters in ASCII range 33-126 are allowed, except for pipe. If less than the maximum field size, must be null terminated for all the remaining bytes of the field

1.6 Configuration

Notifications: All the notifications listed in this specification can be enabled on each MEO order entry session/port. While requesting MEO ports, Firms can request which notifications they need to be enabled on each port.

Notes:

- Notifications are received only on the ports over which the order was received.
- Mass Cancels sent over a Priority Purge Port and Aggressive Side Purges sent over Full Service Port will result in Cancel notifications on the port over which the order was received.
- Notifications and Administrative Messages are not supported on Priority Purge Ports.
- All notifications are sequenced messages and contain the Matching Engine number that originated the notification; for more information on sequenced messages please refer to ESesM specification.

Session Based Configuration: Firms have the ability to configure their individual MEO sessions to receive various protections. The settings are only applied at the time of order entry or order modification. Please refer to MIAX Pearl Equities Port Attributes document (available at the MIAX website) for details on the configurable attributes.

2. Session Management Messages

Firms use **ESesM-TCP (MIAX proprietary session management Protocol)** for connecting to the MEO interface. Please refer to latest TCP Session Management document (available at MIAX website) for details about ESesM-TCP. This protocol layer offers session management capabilities such as authentication, application messaging over TCP/IP, sequencing of messages, heartbeats and gap fills. Some of the messages that are sent over MEO are considered to not be of any value for refreshing after reconnecting and hence those are unsequenced messages.

Note: Upon receipt of an unknown, malformed or illegal application message or session message, MEO will send an ESesM "Goodbye Packet" with a human readable reason text string and MEO will disconnect the line.

3. Administrative Messages

This section consists of administrative messages. Administrative messages are not entitlement based and cannot be disabled.

3.1 Symbol Update

This is the message format that will be used to disseminate all security symbols traded on MIAX Pearl Equities for the current session.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"SU"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
Symbol ID	4	BinaryU	Symbol ID mapped to a given symbol. It is assigned per trading session and is valid for that session. Firms are advised to download and use Symbol IDs for the current trading session as Symbols IDs could change across trading sessions.
Ticker Symbol	11	Alphanumeric	Ticker symbol for the security in NASDAQ Integrated Platform format.
Reserved	1	BinaryU	Reserved for future use.
Test Security Indicator	1	Alphanumeric	'Y' – Yes 'N' – No
Reserved	1	BinaryU	Reserved for future use.
Lot Size	4	BinaryU	Round Lot size in shares.
Opening Time	8	Alphanumeric	Expressed in HH:MM:SS format. Eg: 04:00:00
Closing Time	8	Alphanumeric	Expressed in HH:MM:SS format. Eg: 20:00:00
Primary Market Code	1	Alphanumeric	'A' - NYSE American 'B' - NASDAQ BX 'C' - NYSE National 'H' - MIAX Pearl Equities 'I' - NASDAQ ISE 'J' - CBOE EDGA Exchange 'K' - CBOE EDGX Exchange

			'L' - Long-Term Stock Exchange 'M' - NYSE Chicago 'N' - New York Stock Exchange 'P' - NYSE Arca 'Q' - NASDAQ 'U' - Members Exchange 'V' - Investors' Exchange 'X' - NASDAQ PHLX 'Y' - CBOE BYX Exchange 'Z' - CBOE BZX Exchange
Reserved	12	BinaryU	** Reserved for future use **

Points to note:
- This is a sequenced message.
- Entire Symbol list will be disseminated at the start of day.
- In each session, firms will receive all symbols trading across all Matching Engines for that trading day.
- Intra-day updates will also be published as they occur.

4. Application Messages

This section consists of application messages such as Orders and Notifications.

4.1 Liquidity Messages

4.1.1 New Order Request

Firms can use this format to send a single New Order Request.

Message Direction: Firm to MIAX Pearl Equities

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"N1"
Reserved	8	BinaryU	Reserved for future use.
MPID	4	Alphanumeric	Four character NSCC MPID of the Firm whose order is sent in the message.
Client Order ID	20	String	Firm specified unique order ID. MIAX Pearl Equities will validate that *Client Order ID* is unique across all open orders for the Session within a Matching Engine. However, firms are responsible to ensure this uniqueness across all orders sent during the trading day.
Symbol ID	4	BinaryU	Symbol ID mapped to a given Symbol assigned by MIAX Pearl Equities for the current trading session.
Price	8	Price6U	Limit price of the order. 0 is for Market Price Maximum Price: Defined in Regulatory Circular.
Size	4	BinaryU	Number of shares to buy/sell. Maximum Size: Defined in Regulatory Circular and/or configured per session.
Order Instructions	2	BinaryU	**Bit 0 – Side** • 0 – Buy • 1 – Sell **Bit 1-2 Short Sale Indicator** • 0 – Not Applicable (when buying) • 1 – Sell Long • 2 – Sell Short

Field Name	Length	Data Type	Notes
			• 3 – Sell Short Exempt **Bit 3 – Displayed** • 0 – No • 1 – Yes **Bit 4 – PostOnly** • 0 – No • 1 – Yes **Bit 5 – Locate Required** • 0 – No/Not Applicable (No = Client affirms ability to borrow or Member is relying on an exception to the Regulation SHO locate requirement for a Sell Short or Sell Short Exempt order. Not Applicable for a Buy or a Sell Long order) • 1 – Yes (Client does not affirm ability to borrow; results in a reject) **Bit 6 – ISO** • 0 – No • 1 – Yes **Bit 7 – Retail Order** • 0 – No • 1 – Yes **Bit 8-9 – Attributable Order** • 0 – No • 1 – Attributed to Firm MPID • 2 – Attributed "RTAL" to this order **Bit 10-11 – MinQty Exec Type** • 0 – Not Applicable (for non-MinQty Orders) • 1 – Only single contra order can fulfill MinQty requirement • 2 – Multiple contra orders can fulfill MinQty requirement **Bit 12 – Cancel Order if NOT a NBBO Setter** • 0 – No • 1 – Yes **Bit 13 – Cancel Order if NOT a NBBO Setter with Size** • 0 – No • 1 – Yes **Bit 14-15 – Reserved for future use**

Field Name	Length	Data Type	Notes
			Note: Bit 0 is LSB.
Time In Force(TIF)	1	Alphanumeric	Time in Force 'R' – Regular Hours Only (RHO) 'I' – Immediate or Cancel (IOC) 'D' – Day (DAY) 'F' – Fill Or Kill (FOK) 'T' – Good 'til Time (GTT) 'E' – Good 'til Extended Day (GTX)
Order Type	1	Alphanumeric	Order Type '1' – Limit '2' – Market 'M' – Midpoint Peg 'm' – Midpoint Peg, but do not match when NBBO is locked 'R' – Primary Peg 'r' – Primary Peg, but do not match when NBBO is locked
Price Sliding and Re-price Frequency	1	Alphanumeric	'D' – Display Price Sliding: Re-price Once 'C' – Display Price Sliding: Re-price Once, but Cancel if Crossed at Entry 'M' – Display Price Sliding: Re-price Multiple Times 'N' – No Price Sliding 'Q' – Not applicable

Self-Trade Protection	1	BinaryU	**Bit 0-2 – Self Trade Protection Level**
			    0 – Self Trade Protection Disabled
			    1 – Firm
			    2 – MPID
			    3 – Parent Group
			Bit 3-5 – Self Trade Protection Instruction
			    0 – Not Applicable
			    1 – Cancel Newest
			    2 – Cancel Oldest
			    3 – Cancel Both
			    4 – Decrement and Cancel
			
			Bit 6-7 - Reserved for future use
			
			Note: Bit 0 is LSB.

Self-Trade Protection Group	1	Alphanumeric	Customer specified protection group "A" to "Z", "a" to "z" or "0" to "9". If space (" "), group is not specified.

Routing	1	BinaryU	**Bit 0-2 – Routing Instruction**
			    • 0 – Route Once
			    • 1 – Re-Routable

Field Name	Length	Data Type	Notes
			• 2 – Do Not Route **Bit 3-7 – Routing Strategy** • 0 – Not Applicable • 1 – Order Protection • 2 – Primary Auction (PAC)
Trading Collar Dollar Value	8	Price6S	Custom Dollar Value Trading Collar Protection. Zero or negative value indicates exchange default will be used.
Capacity	1	Alphanumeric	'A' – Agency 'P' – Principal 'R' – Riskless Principal
Account	16	String	Optional customer ID provided by the Firm (same as FIX Tag=1). MEO will pass this through for clearing.
Clearing Account	4	String	Optional supplemental order identifier information provided by Firm (same as FIX Tag=116).
MinQty	4	BinaryU	Minimum fill quantity. Must be > 1 to be a MinQty order. If not a MinQty order, must be set to zero.
MaxFloor Qty	4	BinaryU	Number of shares of the order to display. The balance is reserve. Must be > 0 and in round lots to be a Reserve order. If not a Reserve order, must be set to zero.
Display Range Qty	4	BinaryU	Used for random replenishment of Reserve orders. Must be in round lots and < MaxFloor Qty. Must be set to zero to disable random replenishment or when it's not a Reserve order.
Peg Offset	8	Price6S	Signed dollar value up to four decimal places for a pegged order. If not a Primary Peg order, must be set to zero.
Locate Account	4	String	Optional information provided by Firm for Sell Short/Sell Short Exempt orders. MEO will pass this through for clearing.
Purge Group	1	Alphanumeric	Customer specified purge group "A" to "Z", "a" to "z" or "0" to "9". If space (" "), group is not specified.
Order Expiry Time	8	MilliTime	Expiration time of order with a TIF of GTT. Must be set to zero for all other TIFs.

Field Name	Length	Data Type	Notes
			<mark>Specified time must be later than the current time.</mark> <mark>NOTE: The entered time will be rounded down to the nearest second.</mark>
Reserved	<mark>11</mark>	BinaryU	Reserved for future use.

Points to note:

- Self-Trade Protection Group provides a way to create a more granular group within the same Firm, MPID or Parent Group at which the protection is applied. Self-Trade Protection Group can be specified when the Self Trade Protection Level is set to Firm, MPID or Parent Group. When specified, orders from the same Firm, MPID or Parent Group will be protected from trading with each other **only** if they have the same Self-Trade Protection Group.
- Defaults for Self Trade Protection Level, Instruction and Group can be configured at the session level. The default session level settings (if configured) will be applied to orders that have Self-Trade Protection Level set to "Disabled".
- Please refer to the Regulatory circulars for the maximum price and size accepted by the system. Additionally, Firms may provide a configuration of maximum order size applicable to their orders, otherwise exchange default maximum order size check will be used
- <mark>GTT Orders will be cancelled on a best efforts basis at their Expiry Time.</mark>

4.1.2 New Order Response

This message format provides an acknowledgement for a New Order Request accepted by MIAX Pearl Equities.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced or Sequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"NR"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	As specified in the New Order Request.
Client Order ID	20	String	As specified in the New Order Request.
Symbol ID	4	BinaryU	As specified in the New Order Request.
Order ID	8	BinaryU	Exchanged assigned unique order ID when order is accepted. If order is not accepted, set to zero. Order ID is unique across the exchange and across trading days.
Price	8	Price6U	As specified in the New Order Request.
Size	4	BinaryU	As specified in the New Order Request.
Status	1	Alphanumeric	" " – Successful. "A" – Duplicate Client Order ID

Field Name	Length	Data Type	Notes
			"B" – Not in Live Order Window
			"C" – Matching Engine is not available
			"D" – Duplicate Order Check rejected
			"E" – Exceeded Test Symbol throttle <mark>or Test Symbol not allowed</mark>
			"F" – ISO orders not allowed
			"G" – Invalid Self Trade Protection Group or its use
			"H" – Blocked by MEO user
			"I" – Invalid MPID
			"J" – Invalid Price
			"K" – Invalid Size
			"L" – Blocked by Firm over MIAX Member Firm Portal/API or by Helpdesk
			"M" – Exceeded max allowed size
			"N" – Exceeded max notional value
			"O" – Invalid Client Order ID
			"P" – Request is not permitted for this session
			"Q" – Short sale orders not allowed
			"R" – Blocked by Cumulative Risk Metrics
			"S" – Invalid Symbol ID
			"T" – Invalid Order Type
			"U" – Invalid use of Locate Required
			"V" – Invalid Sell Short
			"W" – Limit Order Price Protection
			"X" – MPID not permitted
			"Y" – ISO attribute not compatible with the order type
			"Z" – Undefined reason
			"a" – Invalid Capacity
			"b" – Invalid Time in Force
			"c" – Invalid Routing Instruction or its use
			"d" – Invalid Self Trade Protection Level
			"e" – Invalid Self Trade Protection Instruction or its use
			"f" – Invalid Attributable value or use
			"g" – Invalid Price Sliding and Re-Price Frequency value or use
			"h" – Invalid use of Post Only instruction
			"i" – Invalid use of Display instruction
			"j" – Invalid value or use for Available when Locked Instruction
			"k" – Market Order Price Protection
			"l" – Invalid Routing Strategy or its use.
			"m" – Invalid value in Account field
			"n" – Invalid value in Clearing Account field
			"o" – Invalid Trading Collar Dollar Value

Field Name	Length	Data Type	Notes
			"p" – Invalid for current Symbol Trading Status or Market State
			"q" – Primary Exchange IPO Not Complete/IPO in Progress
			"r" – Invalid use of MinQty size or MinQty Exec Type instruction
			"s" – Invalid use of Order Type
			"t" – Invalid MaxFloor Qty
			"u" – Invalid Display Range Qty
			"v" – Feature not Available
			"w" – Primary Listing Market routing not supported
			"x" – Too late for Primary Listing Market order
			"y" – PAC Orders are not allowed, routing to Primary Listing Market disabled
			"z" – Short sale exempt orders not allowed
			"0" – Limit price more aggressive than Market Impact Collar
			"1" – Market Orders not allowed
			"2" – Restricted security not allowed
			"3" – Blocked by Order Rate Metrics
			"4" – Average Daily Volume Protection
			"5" – Invalid offset for Primary Peg Order
			"6" – Invalid Purge Group specified
			"7" – Invalid or Not Permitted value in Locate Account field
			"8" – Blocked by Drop Copy ACOD event
			"9" – Blocked by Drop Copy ACOSF event
			"!" – Invalid use of 'Cancel Order if not a NBBO Setter' or 'Cancel Order if not a NBBO Setter with Size' order instruction
			"@" – Invalid Order Expiry Time
			"#" – Early Trading Session Restriction
			"$" – Late Trading Session Restriction
			"*" – Downgraded from older version
Reserved	10	BinaryU	Reserved for future use.

Points to note:

- Response is a sequenced message only when Status in the response is Successful, otherwise response is not sequenced.

4.1.3 Modify Order Request

Firms can use this format to send a request to modify a resting order.

Message Direction: Firm to MIAX Pearl Equities

Field Name	Length	Replaceable	Data Type	Notes
ESesM Protocol Data				*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	N	Alphanumeric	"M1"
Reserved	8	NA	BinaryU	Reserved for future use.
MPID	4	N	Alphanumeric	As specified in the New Order Request. If different, this modify request is rejected.
Client Order ID	20	Y	String	New *Client Order ID* for the order modification. MIAX Pearl Equities will validate that *Client Order ID* is unique across all open orders for the Session within a Matching Engine. However, firms are responsible to ensure this uniqueness across all order requests sent during the trading day.
Original Client Order ID	20	N	String	Target *Client Order ID* that is being modified. In the case of multiple modifications to a single order, this will be the *Client Order ID* of the most recent accepted change. If an order with this target *Client Order ID* is found for the same Session, this modify order request is processed and the target order is modified. If not, this modify order request is rejected.
Symbol ID	4	N	BinaryU	As specified in the New Order Request. Must match Symbol ID of the order that is being modified.
Price	8	Y	Price6U	New Limit Price for the order if price is being modified. Else the old price. Maximum Price: Defined in Regulatory Circular.
Size	4	Y	BinaryU	New size of the order if size is being modified. Else the old size. Maximum Size: Defined in Regulatory Circular and/or configured per session.
Order Instructions	1	Y	BinaryU	**Bit 0-1 Short Sale Indicator** • 0 – Not Applicable (when buying) • 1 – Sell Long

Field Name	Length	Replaceable	Data Type	Notes
				• 2 – Sell Short • 3 – Sell Short Exempt **Bit 2 Locate Required** • 0 – No/Not Applicable (No = Client affirms ability to borrow or Member is relying on an exception to the Regulation SHO locate requirement for a Sell Short or Sell Short Exempt order. Not Applicable for a Buy or a Sell Long order) • 1 – Yes (Client does not affirm ability to borrow; results in a reject) **Bit 3 – 7 – Reserved for future use** Note: Bit 0 is LSB.
MinQty	4	Y	BinaryU	New MinQty for the order if MinQty is being modified. Else the old MinQty. A MinQty order cannot be modified to be a non-MinQty order and vice versa; if attempted will result in a reject • If the original order set MinQty >1, the modify request cannot set it to zero or 1 • If the original order set MinQty to zero, the modify request cannot set it to a non-zero value
MaxFloor Qty	4	Y	BinaryU	New MaxFloor Qty for the Reserve order if MaxFloor Qty is being modified. Else the old MaxFloor Qty. Must be in round lots. A Reserve order cannot be modified to be a non-Reserve order and vice versa; if attempted will result in a reject • If the original order set MaxFloor > 0, the modify request cannot set it to zero • If the original order set MaxFloor Qty to zero, the modify request cannot set it to a non-zero value
Locate Account	4	Y	String	New Locate Account for Sell Short/Sell Short Exempt orders if Locate Account is being modified. Else the old Locate Account.
Time In Force(TIF)	1	Y	Alphanumeric	Time in Force 'R' – Regular Hours Only (RHO) 'D' – Day (DAY)

Field Name	Length	Replaceable	Data Type	Notes
				'T' – Good 'til Time (GTT) 'E' – Good 'til Extended Day (GTX)
Order Expiry Time	8	Y	MilliTime	Expiration time of order with a TIF of GTT. Must be set to zero for all other TIFs. Specified time must be later than the current time. NOTE: The entered time will be rounded down to the nearest second.
Reserved	19	NA	BinaryU	Reserved for future use.

Points to note:

- Modify Size behavior:
  - MIAX Pearl Equities will subtract the executed shares of the order from the quantity specified in the *Size* field of the modify request and leave open the remaining size for the order.
  - If the requested size is less than or the same as the executed size, the remaining size (Leaves Qty) of the order will be reduced to zero and the order will be closed. There will be no "too late to cancel" message generated.
  - Orders that modify price, MinQty or increase open size will always receive new time priority.
  - Buy orders that modify the Short Sale Indicator to any value other than 0 (Not Applicable), will be rejected. Sell orders that modify the Short Sale Indicator to 0 (Not Applicable) will be rejected.
  - A Modify Order Request will be rejected if the order is partially or fully routed to an away market with the exception of orders with routing strategy of Primary Auction (PAC). Modify request can be accepted for Primary Auction (PAC) orders if the order is fully routed to the Primary Listing Market's Opening, Re-Opening or Closing auction.The status field from the Modify Order Response should be used to determine the state of the modify request.
  - An order can only be modified from the session that submitted the original order.
  - GTT Orders will be cancelled on a best efforts basis at their Expiry Time.

4.1.4 Modify Order Response

This message format provides acknowledgement for a Modify Order Request accepted by MIAX Pearl Equities.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced or Sequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"MR"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.

Field Name	Length	Data Type	Notes
MPID	4	Alphanumeric	As specified in the Modify Order Request.
Client Order ID	20	String	New *Client Order ID* specified in the Modify Order Request.
Original Client Order ID	20	String	As specified in the Modify Order Request.
Symbol ID	4	BinaryU	As specified in the Modify Order Request.
Order ID	8	BinaryU	Exchange assigned unique order ID. Set to zero if request is rejected.
Leaves Qty	4	BinaryU	Size of the order that is still open, includes size on MIAX Pearl Equities and any size routed to away markets. If the modification request is accepted with Status=" " and current size of the order becomes zero (Leaves Qty = 0), the order is closed. If the modification request is rejected, Leaves Qty is not applicable and is set to zero. If the modification request is accepted with Status="c", the Leaves Qty will provide the value prior to the pending modification request.
Price	8	Price6U	As specified in the Modify Order Request.
Status	1	Alphanumeric	" " – Successful. "A" – Duplicate Client Order ID "B" – Not in Live Order Window "C" – Matching Engine is not available "D" – Cannot find order with Target Client Order ID "E" – Exceeded Test Symbol throttle or Test Symbol not allowed "F" – Order is routed "G" - Short sale orders not allowed "H" – Blocked by MEO user "I" – Invalid MPID "J" – Invalid Price "K" – Invalid Size "L" – Blocked by Firm over MIAX Member Firm Portal/API or by Helpdesk "M" – Exceeded max allowed size "N" – Exceeded max notional value "O" – Invalid Client Order ID "P" – Request is not permitted for this session "Q" – Specified MPID does not match target order "R" – Blocked by Cumulative Risk Metrics "S" – Invalid Symbol ID "T" – Invalid Target Client Order Id "U" – Invalid use of Locate Required "V" – Invalid Sell Short

Field Name	Length	Data Type	Notes
			"W" – Limit Order Price Protection "X" – MPID not permitted "Z" – Undefined reason "a" – Invalid MinQty modification "b" – Invalid to change MaxFloor Qty "c" – Modification request is sent to another market and pending completion "d" – Not allowed, Order is already pending modification "p" – Invalid for current Symbol Trading Status or Market State "t" – Invalid MaxFloor Qty "y" – PAC Orders are not allowed, routing to Primary Listing Market disabled "z" – Short sale exempt orders not allowed "0" – Limit price more aggressive than Market Impact Collar "1" – Market Orders not allowed "2" – Restricted security not allowed "3" – Blocked by Order Rate Metrics "4" – Average Daily Volume Protection "7" – Invalid or Not Permitted value in Locate Account field "8" – Blocked by Drop Copy ACOD event "9" – Blocked by Drop Copy ACOSF event "@" – Invalid Order Expiry Time "#" – Invalid Time In Force "$" – Early Trading Session Restriction "*" – Downgraded from older version
Reserved	10	BinaryU	Reserved for future use.

Points to note:

- Response is a sequenced message only when Status in the response is Successful, otherwise response is not sequenced.

4.1.5 Cancel Order Request

Firms can use this format to send a cancel request for a resting order.

Message Direction: Firm to MIAX Pearl Equities

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"CO"

Field Name	Length	Data Type	Notes
Reserved	8	BinaryU	Reserved for future use.
MPID	4	Alphanumeric	As specified in the New Order Request. If different, this cancel request is rejected.
Client Order ID	20	String	*Client Order ID* of the cancel request. MIAX Pearl Equities will validate that *Client Order ID* is unique across all open orders for the Session within a Matching Engine. However, firms are responsible to ensure this uniqueness across all order requests sent during the trading day.
Original Client Order ID	20	String	Target *Client Order ID* that is being cancelled. In case the order has had multiple modifications prior to the cancel request, this will be the *Client Order ID* of the most recently accepted modify request. If an order with this target *Client Order ID* is found for the same Session, this cancel request is processed and the target order is cancelled. If not, this cancel request is rejected.
Symbol ID	4	BinaryU	As specified in the New Order Request. Must match Symbol ID of the order that is being cancelled.
Reserved	10	BinaryU	Reserved for future use

Points to note:
- Cancel of an order that is not open (or never existed) will result in a cancel reject.
- Cancel Order Request for an order is accepted only from the session that submitted the original order. An order can also be cancelled as part of a mass cancel request submitted from a priority purge port.

4.1.6 Cancel Order Response

This message format provides response to an Order Cancel Request.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced or Sequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"CR"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	MPID specified in the Cancel Order Request.
Client Order ID	20	String	*Client Order ID* in the Cancel Order Request.
Original Client Order ID	20	String	As specified in the Cancel Order Request.
Symbol ID	4	BinaryU	As specified in the Cancel Order Request.
Order ID	8	BinaryU	Exchanged assigned unique order ID. Set to zero if request is rejected.
Leaves Qty	4	BinaryU	Size of the order that is still open. Non-Zero value indicates that this size of the order is routed and cannot be immediately cancelled. (When Status = " " or Status = "c") When Leaves Qty is zero and status is successful, the order is closed. Leaves Qty is also set to zero when cancel request is rejected.
Status	1	Alphanumeric	" " – Successful. "A" – Duplicate Client Order ID "B" – Not in Live Order Window "C" – Matching Engine is not available "D" – Cannot find order with Target Client Order ID "E" – Exceeded Test Symbol throttle or Test Symbol not allowed "F" – Routed order already pending cancel "I" – Invalid MPID "O" – Invalid Client Order ID "P" – Request is not permitted for this session "Q" – Specified MPID does not match target order "S" – Invalid Symbol ID "T" – Invalid Target Order ID "X" – MPID not permitted "Z" – Undefined reason "c" – Cancellation Request is routed to another market and pending completion "*" – Downgraded from older version
Reserved	10	BinaryU	Reserved for future use.

Points to note:
- Response is sequenced only when Status in the response is Successful.
- Cancellation of a partially or fully routed order can result in a Successful response. The size of the order on MIAX Pearl Equities book will be cancelled immediately, but the order will be pending cancel with a non-zero Leaves Qty value for the routed size. When the routed order returns, the unexecuted portion is immediately cancelled and a cancel notification is sent out.

4.1.7 Cancel Order by Exchange Order ID Request

Firms can use this format to send a cancel request for a resting order using Exchange assigned Order ID

Message Direction: Firm to MIAX Pearl Equities

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"CX"
Reserved	8	BinaryU	Reserved for future use.
MPID	4	Alphanumeric	As specified in the New Order Request. If different, this cancel request is rejected.
Client Order ID	20	String	*Client Order ID* of the cancel request. MIAX Pearl Equities will validate that *Client Order ID* is unique across all open orders for the Session within a Matching Engine. However, firms are responsible to ensure this uniqueness across all order requests sent during the trading day.
Order ID	8	BinaryU	Exchange assigned unique Order ID when order is accepted. Order ID is unique across the exchange and across trading days.
Symbol ID	4	BinaryU	As specified in the New Order Request. Must match Symbol ID of the order that is being cancelled.
Reserved	10	BinaryU	Reserved for future use

Points to note:
- This message can be used to cancel an order entered through the same or a different MEO session. All of the following are required when this message is used:
  - Session submitting the message is entitled for this Message Type.
  - MPID specified in the message is entitled for this session.
- Cancel of an order that is not open (or never existed) will result in a cancel reject.
- Cancelling an order entered through FIX session is not allowed.

- The session requesting the cancel will not receive any notifications for the order if it is different than the order entry session. It will only receive the Cancel Order by Exchange Order ID response message.

4.1.8 Cancel Order by Exchange Order ID Response

This message format provides response to Cancel Order by Exchange Order ID Request.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced or Sequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"CQ"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	MPID specified in the Cancel Order by Exchange Order ID Request.
Client Order ID	20	String	*Client Order ID* in the Cancel Order by Exchange Order ID Request.
Symbol ID	4	BinaryU	As specified in the Cancel Order by Exchange Order ID Request.
Order ID	8	BinaryU	*Order ID* in the Cancel Order by Exchange Order ID Request.
Leaves Qty	4	BinaryU	Size of the order that is still open. Non-Zero value indicates that this size of the order is routed and cannot be immediately cancelled. (When Status = " " or Status = "c") When Leaves Qty is zero and status is successful, the order is closed. Leaves Qty is also set to zero when cancel request is rejected.
Status	1	Alphanumeric	" " – Successful. "A" – Duplicate Client Order ID "B" – Not in Live Order Window "C" – Matching Engine is not available "D" – Cannot find order with specified Order ID "E" – Exceeded Test Symbol throttle or Test Symbol not allowed "F" – Routed order already pending cancel "G" – Cannot cancel order submitted by a FIX session "H" – Invalid Order ID "I" – Invalid MPID "O" – Invalid Client Order ID "P" – Request is not permitted for this session "Q" – Specified MPID does not match target order

Field Name	Length	Data Type	Notes
			"S" – Invalid Symbol ID "X" – MPID not permitted "Z" – Undefined reason "c" – Cancellation Request is routed to another market and pending completion "*" – Downgraded from older version
Reserved	10	BinaryU	Reserved for future use.

Points to note:
- Response is sequenced only when Status in the response is Successful.
- Cancellation of a partially or fully routed order can result in a successful response. The size of the order on MIAX Pearl Equities book will be cancelled immediately, but the order will be pending cancel with a non-zero Leaves Qty value for the routed size. When the routed order returns, the unexecuted portion is immediately cancelled and a cancel notification is sent out to the session that submitted the order.

4.1.9 Mass Cancel Request

Firms can use this message format to request the cancellation of all orders for an MPID.

Message Direction: Firm to MIAX Pearl Equities

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"XQ"
Reserved	8	BinaryU	Reserved for future use.
MPID	4	Alphanumeric	NSCC MPID of the Firm requesting the mass cancel.
Client Order ID	20	String	Unique ID assigned by the Firm to this Mass Cancel Request.
Scope	1	Alphanumeric	'M' – MPID. Purge all orders for specified MPID.
Action	1	Alphanumeric	'B' – Block only. The system will reject all new orders 'M' – Mass cancel only. The system will mass-cancel all open orders. New orders can be accepted 'X' – Block and mass-cancel 'R' – Remove blocking for the specified scope.
Purge Group	1	Alphanumeric	Customer specified purge group "A" to "Z", "a" to "z" or "0" to "9". If space (" "), group is not specified.
Reserved	9	BinaryU	For future use.

Points to note:
- Mass Cancel Request is only available on a Priority Purge Port session

- A Mass Cancel Request will cancel all open orders for the MPID across all symbols, including orders received for the MPID over FIX.
    - o Members have the option to apply the Purge Group filter to further narrow the scope of the request. If this filter is used only orders with the Purge Group specified will be cancelled.
    - o When Purge Group is set to space (" "), the Action will impact all orders for the MPID regardless of the Purge Group specified on each individual order.
    - o When Purge Group space (" ") is blocked, all incoming orders (except cancels) for the MPID will be rejected regardless of the Purge Group specified on each individual order until Purge Group space (" ") is unblocked.
- A Mass Cancel Request is not atomic and is processed by system on best effort basis.
- A Mass Cancel Request with action 'B' (Block only) or 'X' (Block and mass-cancel) will require a reset before any new order or order modification messages are accepted from the blocked MPID. A reset can be done on any of the Priority Purge Ports of the Firm. A reset is done with the same message type as the Mass Cancel, but action 'R' (Remove blocking). If a mass cancel with block only and a block and mass cancel are done consecutively, only a single reset is required.
- A Mass Cancel Request with action 'M' (Mass cancel only) will not require a reset.
- *Client Order ID* specified in the Mass Cancel Request is not validated for uniqueness and is only echoed back in the corresponding Mass Cancel Response. Firms are recommended to use unique *Client Order ID* for the trading day across all message types.

4.1.10 Mass Cancel Response

This message format will be used to inform the Firm about the status of their previous Mass Cancel Request.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"XR"
Notification Time	8	NanoTime	Time at which this message was generated by the MEO interface.
MPID	4	Alphanumeric	As specified in the Mass Cancel Request.
Client Order ID	20	String	As specified in the Mass Cancel Request.
Number of Matching Engines	1	BinaryU	24. This is the number of Matching Engines in MIAX Pearl Equities. *Matching Engine Status* field below is repeated for each Matching Engine in sequential order.
Matching Engine Status	24	Alphanumeric	Status response for the Mass Cancel Request from the Matching Engine. Includes a one character code status for the Matching Engine. " " – Successful.

Field Name	Length	Data Type	Notes
			"I" – Invalid MPID "X" – MPID not permitted "P" – Request is not permitted for this session "R" – Invalid Scope "A" – Invalid action "C" – Matching Engine not available "U" – State of the request for this Matching Engine is unknown "O" – Invalid Client Order ID "Z" – Undefined reason "6" – Invalid Purge Group specified "*" – Downgraded from older version
Reserved	10	BinaryU	Reserved for future use.

Points to note:
- This is not a sequenced message.
- This message is sent back on the MEO Purge Port session over which the Mass Cancel Request was received. Individual cancel notifications for each order cancelled are sent on the sessions over which the orders were originally submitted.
- If the firm got disconnected without receiving response to this message, it is recommended sending another request to confirm the request.

4.1.11 Aggressive Side Purge (ASP) Request

Firms can use this message format to request the atomic cancellation of orders for an MPID, symbol, side and price range.

Message Direction: Firm to MIAX Pearl Equities

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"XS"
Reserved	8	BinaryU	Reserved for future use.
MPID	4	Alphanumeric	NSCC MPID of the Firm requesting the Aggressive Side Purge (ASP).
Client Order ID	20	String	Unique ID assigned by the Firm to this Aggressive Side Purge (ASP).
Symbol ID	4	BinaryU	Symbol ID mapped to a given Symbol assigned by MIAX Pearl Equities for the current trading session.

Side	1	BinaryU	**Bit 0** – **Side**
			   • 0 - Buy
			   • 1 - Sell
			Bit 1-7 – **Reserved for future use**

Field Name	Length	Data Type	Notes
			Note: Bit 0 is LSB.
Price	8	Price6U	Orders with a Limit Price equal to or more aggressive than this price will be cancelled. Orders with a Limit Price that is less aggressive than this price will NOT be cancelled. If set to zero, all orders for the MPID, Symbol, Side will be cancelled. Price must be provided in valid price increment, unless zero. NOTE: • Only up to "N" orders will be cancelled per each Aggressive Side Price (ASP) Request. "N" is an Exchange defined value. The current value of "N", is defined by Regulatory Circular. • When there are more than "N" number of orders to cancel, orders with the most aggressive price will be prioritized.
Reserved	10	BinaryU	For future use.

Points to note:
- This is not a sequenced message.
- The cancelation request will atomically cancel up to N orders that have price equal or better than then specified price in Aggressive Side Purge (ASP) request.
- The orders are always cancelled starting with the most aggressive price. If more than one orders are at the same price, orders are cancelled using their arrival time.
- Order modifications do not change sequence in which Aggressive Side Purge (ASP) eligible orders are cancelled at the same price.
- Entitlement to use this request is a requirement. Contact Trading Operations for additional information.

4.1.12 Aggressive Side Purge (ASP) Response

This message format will be used to inform the Firm about the status of their previous ASP Mass Cancel Request.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Unsequenced Pkt; Refer to ESesM Protocol Specification*
Message Type	2	Alphanumeric	"SR"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	As specified in the Aggressive Side Purge (ASP).
Client Order ID	20	String	As specified in the Aggressive Side Purge (ASP).
Symbold ID	4	BinaryU	As specified in the Aggressive Side Purge (ASP).
Status	1	Alphanumeric	Status of this request " " – Successful "C" – Matching Engine is not available "E" – Exceeded Test Symbol throttle or Test Symbol not allowed "I" – Invalid MPID "J" – Invalid Price "O" – Invalid Client Order ID "P" – Request is not permitted for this session "S" – Invalid Symbol ID "X" – MPID not permitted "Z" – Undefined reason "*" – Downgraded from older version
Number of Orders Cancelled	1	BinaryU	Number of orders that were cancelled by Aggressive Side Purge (ASP).
All Aggressive Side Purge (ASP) Eligible Orders Cancelled	1	Alphanumeric	Possible values: • 'Y' – All Aggressive Side Purge (ASP) eligible orders are cancelled. • 'N' – Not all Aggressive Side Purge (ASP) eligible orders are cancelled. • 'X' – Not Applicable, when Status is not successful.
Reserved	10	BinaryU	Reserved for future use

Points to note:
- If there are more than "N" Aggressive Side Purge (ASP) eligible orders to be cancelled, the "All Aggressive Side Purge (ASP) Eligible Orders Cancelled" will be set to "N". Please refer to the Regulatory Circular for the current value of "N".

4.2 Notifications

Notifications provide details of an order in MIAX Pearl Equities after acceptance of an order request or after an unsolicited update/cancellation of the order. All notifications messages listed in this section can be enabled or disabled on individual sessions and are sent only if enabled. Please contact Trading Operations for more information.

4.2.1 System State Notification

This message is published whenever system state events take place.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"SN"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MEO Version	8	Alphanumeric	MEO interface version. Eg: MEO1.0
Session ID	1	BinaryU	MIAX Pearl Equities assigned ID for the current trading session for the Matching Engine.
System Status	1	Alphanumeric	"S" – Start of System Hours "C" – End of System Hours "1" – Start of Test Session "2" – End of Test Session
Reserved	8	BinaryU	Reserved for future use.

Points to note:
- This is a sequenced message
- It is published for each Matching Engine

4.2.2 New Order Notification

This message is published whenever New Order Request is accepted by MIAX Pearl Equities exchange.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"O1"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.

Field Name	Length	Data Type	Notes
MPID	4	Alphanumeric	As specified in the New Order Request.
Order ID	8	BinaryU	Exchanged assigned unique order ID.
Client Order ID	20	String	As specified in the New Order Request.
Symbol ID	4	BinaryU	As specified in the New Order Request.
Price	8	Price6U	As specified in the New Order Request
Size	4	BinaryU	As specified in the New Order Request
Order Instructions	2	BinaryU	As specified in the New Order Request.
Time In Force(TIF)	1	Alphanumeric	As specified in the New Order Request.
Order Type	1	Alphanumeric	As specified in the New Order Request.
Price Sliding and Re-Price Frequency	1	Alphanumeric	As specified in the New Order Request.
Self-Trade Protection	1	BinaryU	As specified in the New Order Request. Note: If session default Self Trade Protection settings were applied on order entry, this field will provide those values.
Self-Trade Protection Group	1	Alphanumeric	As specified in the New Order Request. Note: If session default Self Trade Protection settings were applied on order entry, this field will provide those values.
Routing	1	BinaryU	As specified in the New Order Request.
Trading Collar Dollar value	8	Price6S	As specified in the New Order Request.
Capacity	1	Alphanumeric	As specified in the New Order Request. Note: In case session elects to "Override Capacity as Agency" regardless of the capacity on the order, this field will have the value "Agency".
Account	16	String	As specified in the New Order Request.
Clearing Account	4	String	As specified in the New Order Request.
MinQty	4	BinaryU	As specified in the New Order Request.
MaxFloor Qty	4	BinaryU	As specified in the New Order Request.
Display Range Qty	4	BinaryU	As specified in the New Order Request.
Peg Offset	8	Price6S	As specified in the New Order Request.
Locate Account	4	String	As specified in the New Order Request.
Purge Group	1	Alphanumeric	As specified in the New Order Request.
Original Order Capacity	1	Alphanumeric	As specified in the New Order Request.
Order Expiry Time	8	MilliTime	As specified in the New Order Request. NOTE: Will be rounded-down to the nearest second
Reserved	10	BinaryU	Reserved for future use.

Points to note:
- This is a sequenced message.

- The message can only be received on the session that submitted the new order request.

4.2.3 Modify Order Notification

This message is published whenever a Modify Order Request is accepted by MIAX Pearl Equities. A Modify Order Notification will be published when a modify order request is pending and also when it is subsequently successful or unsuccessful.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"MN"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	As specified in the Modify Order Request
Client Order ID	20	String	New *Client Order ID* specified in the Modify Order Request.
Original Client Order ID	20	String	*Client Order ID* of the order before it was modified. Not available in the Modify Notification that is published after a pending request is subsequently successful or unsuccessful.
Symbol ID	4	BinaryU	As specified in the Modify Order Request.
Order ID	8	BinaryU	Exchange assigned unique order ID.
Price	8	Price6U	As specified in the Modify Order Request. Not available when Status="X"
Size	4	BinaryU	As specified by in the Modify Order Request. Not available when Status="X"
Leaves Qty	4	BinaryU	Size of the order that is still open, includes size on MIAX Pearl Equities and any size routed to away markets. If zero, order is closed as a result of the modify request. Not available when Status="X"
Order Instructions	1	BinaryU	As specified in the Modify Order Request. Not available when Status="X"
MinQty	4	BinaryU	As specified in the Modify Order Request. Not available when Status="X"
MaxFloor Qty	4	BinaryU	As specified in the Modify Order Request. Not available when Status="X"
Pending Modify Status	1	Alphanumeric	Modification request status " " – Pending Modification is completed Or Pending state is not applicable "P" – Modifikation request is sent to another market and is pending completion "X" – Pending Modification Request is rejected

Field Name	Length	Data Type	Notes
Pending Reject Reason	1	Alphanumeric	Pending replace reject reason. Only applicable when Status="X" " " – Not applicable "X" – Rejected by Primary Listing Market
Locate Account	4	String	As specified in the Modify Order Request Not available when Status="X"
Time In Force(TIF)	1	Alphanumeric	As specified in the Modify Order Request. Not available when Status="X" and will be set to '*'
Order Expiry Time	8	MilliTime	As specified in the Modify Order Request. Not available when Status="X" NOTE: Will be rounded-down to the nearest second.
Reserved	17	BinaryU	Reserved for future use.

Points to note:
- This is a sequenced message.
- This message can only be received on the session that requested the order modification.
- If a pending Modify Order Request is rejected, a Modify Order Notification will be sent irrespective of the entitlements.

4.2.4 Cancel/Reduce Size Order Notification

This is the message format that will be used when Cancel Order Request is accepted by MIAX Pearl Equities or when unsolicited order cancels or order size reductions are to be notified to firms.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"XN"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	As specified in the New Order Request.
Client Order ID	20	String	*Client Order ID* of the order. If the order has had multiple modifications, this will be the *Client Order ID* of the most recent accepted change for the order.
Symbol ID	4	BinaryU	As specified in the New Order Request.
Order ID	8	BinaryU	Exchange assigned unique Order ID.
Leaves Qty	4	BinaryU	Size of the order that is still open, includes size on MIAX Pearl Equities and any size routed to away markets. If zero, order is fully cancelled. Not available when Cancel Request Status="X"

Field Name	Length	Data Type	Notes
Cancel Reason	1	Alphanumeric	"A" – Cancelled due to Cumulative Risk Metrics "B" – Reserved for future use "C" – Time in Force cancelled "D" – Auto Cancel on Disconnect (ACOD) "E" – Post Only order is locking/crossing MIAX Pearl Equities BBO "F" – Auto Cancel on System Failure (ACOSF) "G" – Cancelled due to price sliding instruction "H" – Cancelled by Helpdesk or over MIAX Member Firm Portal/API "I" – Order Expired "J" – Symbol trading status makes PAC Market order non tradeable "K" – Trading Collar Protection "L" – Sell Short ISO when Short Sale Price Test is in effect "M" – Symbol is not trading "N" – Limit Order Price Protection "O" – Route to Primary Listing Market Rejected "P" – Cancelled by a Mass Cancel Request over a Priority Purge Port "Q" – Unexpected Cancel by Primary Listing Market "R" – Cancelled due to failed Price Improvement route "S" – Cancelled due to Primary Auction route timeout "T" – Cancelled due to Order Rate Protection "U" – Cancelled by user through order entry session "V" – Invalid Pegged Order Price "W" – PAC Order Cancelled as Security is halted and Closing Auction at Primary Listing Market will not be conducted. "X" – Not Applicable. Used when Pending Cancel Status is "X" "Y" – Primary Auction order is Cancelled due to a modification reject from Primary Listing Market. "0" – Cancelled due to Market Impact Collar "1" – Full cancel due to Self-Trade Protection - Cancel Newest Instruction "2" – Full cancel due to Self-Trade Protection - Cancel Oldest Instruction "3" – Full cancel due to Self-Trade Protection - Cancel Both Instruction "4" – Full/Partial cancel due to Self-Trade Protection - Decrement and Cancel Instruction

Field Name	Length	Data Type	Notes
			"5" – Cancelled due to Drop Copy ACOD event
			"6" – Cancelled due to Drop Copy ACOSF event
			"7" – Cancelled as order did not set NBBO
			"8" – Cancelled by user through a session other than the order entry session
			"9" – Cancelled by Aggressive Side Purge (ASP) request
			"@" – Early Trading Session Restriction
			"#" – Late Trading Session Restriction
			"$" – Cancelled as order did not set NBBO with Size
			"Z" – Undefined reason
			"*" – Downgraded from older version
Last Price	8	Price6U	Match price if the order had not been prevented from execution by Self Trade Protection. Only applicable when Cancel Reason is '1' or '2' or '3' or '4', otherwise set to zero.
Last Size	4	BinaryU	Number of shares that would have matched if the order had not been prevented from execution by Self Trade Protection. Only applicable when Cancel Reason is '1' or '2' or '3' or '4', otherwise set to zero.
Pending Cancel Status	1	Alphanumeric	Status for Pending Cancel Request " " – Pending Cancellation is completed OR Pending State is Not Applicable "X" – Pending Cancellation Request is rejected "P" – Cancel request was received but is pending
Pending Reject Reason	1	Alphanumeric	Pending cancel reject reason. Only applicable when Status= "X" " " – Not applicable "X" – Rejected by Primary Market
Reserved	8	BinaryU	Reserved for future use.

Points to note:
- This is a sequenced message.
- This message can only be received on a session over which the original order was sent.
- It is possible to receive multiple cancel notifications for the same order when routed children of a cancelled order return or when a portion of the order is cancelled due to self-trade protection.
- If a pending Cancel Order Request is rejected, a Cancel Order Notification will be sent irrespective of the entitlements.

4.2.5 Order Price Update Notification

This is the message format that will be used to notify firms about order re-prices. This message is also used to notify firms of the working price of the order when a new order is added to the book or when a modify order request is processed. Notification generated for a new order or an order modification is always sent.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"P1"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
Symbol ID	4	BinaryU	As specified in the New Order Request.
Order ID	8	BinaryU	Exchange assigned unique Order ID.
Client Order ID	20	String	*Client Order ID* of the order. If the order has had multiple modifications, this will be the *Client Order ID* of the most recent accepted change for the order.
Working Price	8	Price6U	Current Working Price of the order.
NBBO Indicator	1	Alphanumeric	'Y' – NBBO Setter 'F' – NBBO First Joiner 'S' – NBBO Setter with Size 'J' – NBBO First Joiner with Size 'N' – None of the above values are applicable.
Reserved	9	BinaryU	Reserved for future use.

Points to note:
- This is a sequenced message.
- This message can only be received on a session that submitted the original order.
- Consecutive Order Price Update notifications for the same order with the same Working Price may be received under certain scenarios.

4.2.6 Reserve Order Replenishment Notification

This is the message format that will be used to notify firms of their Reserve order replenishment events.

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"RA"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.

Field Name	Length	Data Type	Notes
Symbol ID	4	BinaryU	As specified in the New Order Request.
Order ID	8	BinaryU	Exchange assigned unique Order ID of the Reserve order.
Secondary Order ID	8	BinaryU	Secondary Order ID used to publish the display portion of the Reserve order on MIAX Pearl Equities DOM feed.
Display Qty	4	BinaryU	Display size of the Reserve order after replenishment.
Reserved	10	BinaryU	Reserved for future use.

Points to note:
- This is a sequenced message.
- This message can only be received on a session that submitted the original order.

4.2.7 Execution Notification

This message format will be used to notify the firms of their order executions (fills/partial fills), trade corrections and cancellations (busts).

Message Direction: MIAX Pearl Equities to Firm

Field Name	Length	Data Type	Notes
ESesM Protocol Data			*Sequenced Pkts; Refer to ESesM Protocol Specification.*
Message Type	2	Alphanumeric	"E1"
Matching Engine Time	8	NanoTime	Time at which this message was generated by the Matching Engine.
MPID	4	Alphanumeric	As specified in the New Order Request.
Symbol ID	4	BinaryU	As specified in the New Order Request.
Client Order ID	20	String	Client Order ID of the order. If the order has had multiple modifications, this will be the *Client Order ID* of the most recent accepted change for the order.
Trade ID	8	BinaryU	Exchange assigned unique Trade ID. See notes below for details.
Execution ID	8	BinaryU	Exchange assigned unique Execution ID. See notes below for details.
Correction Number	1	BinaryU	Trade correction number. Used to identify the version of the trade being corrected or cancelled. Increments by 1 for each subsequent correction. Set to zero for new trades.
Trade Status	1	Alphanumeric	Possible values: "E" – New Execution "C" – Price/Size Correction

Field Name	Length	Data Type	Notes
			"X" – Trade Cancellation (bust)
Last Price	8	Price6U	Price of this execution if it is a new execution. Price after the correction if it is a trade correction. Price of the trade cancelled if it is a trade bust.
Last Size	4	BinaryU	Number of shares executed if it is a new execution. Number of shares after the correction if it is a trade correction. Number of shares cancelled if it is a trade bust.
Order Instructions	2	BinaryU	**Bit 0** – **Order Side** • 0 – Buy • 1 - Sell **Bit 1-15** – **Reserved for future use** Note: Bit 0 is LSB.
Reserved	1	BinaryU	 Reserved for future use.
Executing Trading Center	1	Alphanumeric	Exchange at which trade was executed. 'A' - NYSE American 'B' - NASDAQ BX 'C' - NYSE National 'H' - MIAX Pearl Equities 'I' - NASDAQ ISE 'J' - CBOE EDGA Exchange 'K' - CBOE EDGX Exchange 'L' - Long-Term Stock Exchange 'M' - NYSE Chicago 'N' - New York Stock Exchange 'P' - NYSE Arca 'Q' - NASDAQ 'U' - Members Exchange 'V' - Investors' Exchange 'X' - NASDAQ PHLX 'Y' - CBOE BYX Exchange 'Z' - CBOE BZX Exchange
Secondary Order ID	8	BinaryU	Applicable to Reserve orders. Secondary Order ID used on MIAX Pearl Equities DOM feed for the executed display portion of the Reserve order. Set to zero for non-Reserve orders or if the execution is for the non-display portion of the Reserve order.
Liquidity Indicator	3	String	Please refer to MIAX Pearl Equities Liquidity Indicator Codes document (available on the MIAX website) for the list of codes.
Locate Account	4	String	As specified in the New Order Request.

| Field Name	Length	Data Type	Notes
Original Order Capacity	1	Alphanumeric	As specified in the New Order Request.
Additional Liquidity Indicator	1	BinaryU	**Bit 0-2 - NBBO Setter/Joiner/First Joiner/Setter with Size/Joiner with Size/First Joiner with Size** • Please refer to MIAX Pearl Equities Liquidity Indicator Codes document (available on the MIAX website) for the list of codes. **Bit 3-7 - Reserved for future use** Note: Bit 0 is LSB.
Executing Trading Center MPID	4	String	Reserved for future use.
Reserved	12	BinaryU	Reserved for future use

Points to note:
- This is a sequenced message.
- Each two-sided clearing trade is assigned a Trade ID that is unique across the exchange for the trading day. Each side of the trade is assigned an Execution ID that is unique for the trading day.
- This message can only be received on a session that submitted the original order.
- Trade Cancels and Corrections only for the current trading day are sent using this message.

Appendix A: Contact List

Please visit MIAX website for obtaining most up-to-date contact list and other such information.

Appendix B: Priority Purge Ports

Illustration of Priority Purge Port Input Processing:

MIAX PEARL Equities Matching Engine
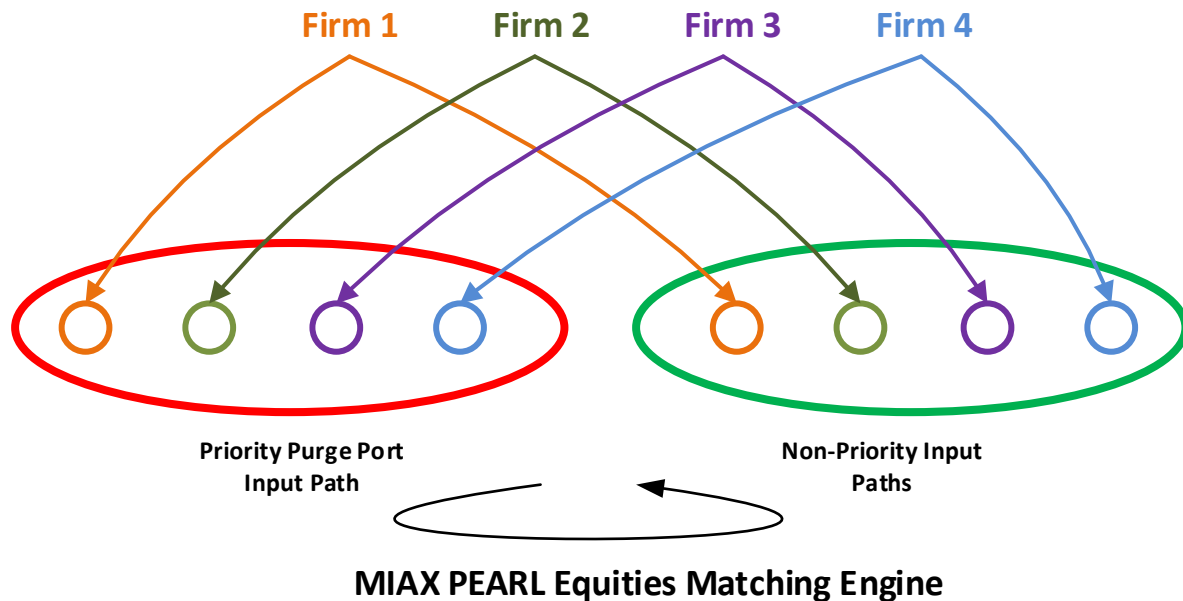
The Priority Purge Ports provide an expedited processing path to the Matching Engine. This is achieved by the MEO Priority Purge Port having its own "M-in-flight" separate from the Full Service Port and the Matching Engine first checking if there are pending requests in the priority path waiting to be processed before checking any other inbound paths for pending requests.

Example of the Processing:

1) Process pending request(s) from the Priority Purge Port Input Path
2) Process pending request(s) from the Non-Priority Input Paths

Appendix C: Revision History

Revision Date	Version	Description
Jan 24, 2020	1.0	First official release.
Feb 06, 2020	1.1	Removed Minimum Order Price from Symbol Update message. Updated the Order Type values in New Order Request message. Added Locate Required to Modify Order Request message. Added additional reason codes in New Order Response, Modify Order Response and Cancel Order Response messages. Added notes on support for Routing Instructions and Routing Strategy in the Hot Topics section.
Apr 24, 2020	1.2	Removed Tradable field from Symbol Update message. It is now replaced with a reserved field. Added additional reason codes in New Order Response, Modify Order Response and Cancel/Reduce Size Order Notification messages. Updated the description of Priority Purge Ports in Appendix B.
Jun 08, 2020	1.3	Cleaned up reason codes for Cancel Order Response message. Added a clarification that consecutive Order Price Update Notification messages may be received with the same Working Price for the same order.
Aug 10, 2020	1.4	Added Last Price and Last Size fields to Cancel/Reduce Size Order Notification. When the reason for this notification is self-trade protection, these fields will indicate the match price and the number of shares that would have matched if the order had not been prevented from execution due to self-trade protection.
Sept 28, 2020	1.5	Updated the Liquidity Indicator field values in the Execution Notification message to indicate if the executed order was displayed or non-displayed. Also added reserved values for future use.
Nov 05, 2020	1.5.a	Removed Security Type field from Symbol Update message, it is now replaced with a reserved field. Added clarification in Symbol Update message for Symbol ID field that it could change across trading sessions and firms are advised to download and use it for the current trading session. Noted in the Overview section Net Notional Trade Protection as an additional Cumulative Risk Protection provided to orders entered via MEO.
Jan 10, 2021	1.6	Additional liquidity indicators added for Execution Notification.
Feb 26, 2021	2.0	Added new message types for New Order Request, Modify Order Request, New Order Notification and Modify Order Notification to support MinQty and Reserve orders. These new messages are similar to corresponding old messages with new fields and additional reserved bytes at the end of message. Added a new message for Reserve Order Replenishment Notification.

		Added Status codes to New Order Response and Modify Order Response messages to support MinQty and Reserve orders. Added Secondary Order ID in Execution Notification message for Reserve orders. Added a 3 byte Liquiditty Indicator field at the end of the Execution Notification message using existing Reserve bytes. This now replaces the previous 1 byte Liquidity Indicator field which is now changed to a Reserve byte.
Apr 15, 2021	2.0.a	Added new error code "t" to Modify Order Response message.
May 24, 2021	2.1	Added support for Primary Auction (PAC) orders
Sep 27, 2021	2.1a	Added new error code "J" to Cancel/Reduce Size Order Notification message.
Mar 21, 2022	2.1b	Updated the language for Modify request to include Min Qty as one of the fields when modified will cause the order to receive new time priority.
July 07, 2022	2.2	Added Primary Peg Order Type, Peg Offset, Parent Group SelfTradeProtection, LocateAccount, Original Order Capacity and PurgeGroup.
Sep 15, 2022	2.2a	Updated the language with regard to Client Order ID uniqueness from per-MPID to per-Session, within a matching engine.
Sep 28, 2022	2.2b	Added a new error code "T" for Cancel/Reduce Size Order Notification.
Dec 09, 2022	2.3	Provide more granular self-trade protections reasons in Cancel/Reduce Size Order Notification.
Jan 24, 2023	2.3a	Added a 1 byte Additional Liquidity Indicator field at the end of the Execution Notification message using existing Reserve bytes.
Mar 06, 2023	2.4	Added new error codes "8", "9" for New Order Response and Modify Order Response. Added new error codes "W", "Y", "5", "6" for Cancel/Reduce Size Order Notification. New version of Execution Notification "E1" that contains a new field "Executing Trading Center MPID" as a reserved field for future use and renamed the existing field "Executing Exchange" to "Executing Trading Center".
Jun 12, 2023	2.4a	Updated the language for Additional Liquidity Indicator field in Execution Notification for Bit 0-2 of this field as "NBBO Setter/Joiner"
Jul 06, 2023	2.5	Added support for "Cancel Order if NOT a NBBO Setter" in the New Order Request using the reserved bits of the Order Instruction field. Added new error codes – "!" for New Order Response and "7" for Cancel/Reduce Size Order Notification. Added a 1 byte NBBOSetter field at the end of Order Price Update Notification message using existing Reserve bytes.
Sept 25, 2023	2.6	Added new messages Cancel Order by Exchange Order ID Request and its response Cancel Order by Exchange Order ID Response to support cancelling of order using Exchange Order ID. Added a status "X" in the Cancel Order Response.

		Added a new cancel reason "8" in Cancel/Reduce Size Order Notification and updated the description for error code "U". Renamed the field NBBO Setter in the Order Price Update Notification message to NBBO Indicator and added a new value "F" for that field. Updated the description for Additional Liquidity Indicator field in Execution Notification message to indicate it can have a new value "First Joiner". Added a note for the Self-trade Protection and Self-Trade Protection Group fields in the New Order Notification. Added a note in the New Order Request message.
Feb 09, 2024	2.6a	Updated the language for Trading Collar Dollar Value field in the New Order Request to include all orders. Updated the error text for error code "L" in the New Order Response and Modify Order Response. Updated the error text for error code "o" in the New Order Response. Updated the error text for Cancel reason "H" in the Cancel/Reduce Size Order Notification.
Aug 22, 2024	2.7	Updated the Hours of operation for the MIAX Pearl Equities Exchange to support Early and Late Trading. Added a new data type "MilliTime". Added support for new "TIF's" DAY, FOK, GTT and GTX and added a new field "Order Expiry Time" in the New Order Request. Added support for "Cancel Order if NOT a NBBO Setter with Size" in the New Order Request using the reserved bits of the Order Instruction field. Added new error codes "@", "#", "$" for New Order Response. Updated the error text for error codes "!", "E" and "p" in the New Order Response. Added support for new fields "Time In Force (TIF)" and "Order Expiry Time" modification in the Modify Order Request. Added new error codes "p", "@", "#" and "$" for Modify Order Response. Updated the error text for error code "E" in the Modify Order Response, Cancel Order Response, Cancel Order by Exchange Order ID Response. Added new messages "Aggressive Side Purge (ASP) request" and its response "Aggressive Side Purge (ASP) response" to support atomic cancelling of orders using Symbol, Side and Price for an MPID. Added a new field "Order Expiry Time" in the New Order Notification. Added new fields "Time In Force (TIF)" and "Order Expiry Time" in the Modify Order Notification. Added new cancel codes "9", "@", "#" and "$" for Cancel/Reduce Size Order Notification. New version of Order Price Update Notification that contains "Client Order ID" field. Added new values "S" and "J" for the "NBBO Indicator" field in the Order Price Update Notification.

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