



# ***UMDF PUMA Conflated***

## **FIX Market Data Specification**

**Version: 2.0.11**

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## Revision History

Date	Version	Description	Author
Jun, 27st,2019	2.0.11	- Added new domain for tag 277 in section 6.8.3.	AYSF
Aug. 6th, 2018	2.0.10	- Added new domains for tag 762.	AYSF
Sep, 21st, 2017	2.0.9	- Added section 6.8.15 about volatility prices and corresponding tags 811-PriceDelta, 31-LastPx and 1025-FirstPx to sections 6.5.3 and 6.5.4.	AYSF/ JLRM
May 3rd, 2016	2.0.8	- Updated sections 6.5.3, 6.5.4, 6.8.1 and 6.8.3 with new tags 37023, 37024, 37025 and new domain for tag 37019 in conformance to the BTB Security Lending system changes.	JLRM
Nov, 11st, 2015	2.0.7	- Changed the domain of tag 762-SecuritySubType, adding new types for Foreign Indices and the new BDR products. - Added domain M2 to tag 37011-GovernanceIndicator.	JLRM
Apr, 7th, 2014	2.0.6	- Added new domains for tags 167 and 762 to reflect the addition of Fixed Income ETF products.	JLRM
Nov, 13th, 2014	2.0.5	- Yet another change to the description of tag 1150-TradingReferencePrice, this time clearing up that it's only used by Economic Indicators in the Derivatives segment.	JLRM
Oct, 24th, 2014	2.0.4	- Changed description of tag 1150-TradingReferencePrice. - Changed descriptions of tags 37016-MDInsertDate and 37017-MDInsertTime for Trade History messages, explaining that these tags are only returned for 269=2 Trade blocks. - Added a warning on sections 6.4.1 and 6.5.1 stating that all subscriptions must hold at least one filter to be valid, thus a customer that wants to subscribe to all market data will have to hold more than one simultaneous subscription.	JLRM
July, 15th, 2014	2.0.3	- Updated description of tag 1020-TradeVolume on 6.5.3, 6.5.4 and 6.6.2, explaining it could also be present on Trade Volume groups (269=B). - Updated section 6.8.3 explaining tag 1020-TradeVolume is only sent for electronic trades. - Section 6.8.12, on settlement tag 286 can be only 1,4. - Added "1" as the default value for tag 336-TradingSessionID on sections 6.5.3, 6.5.4 and 6.6.2. - Tag 262 message 35=UTHQ on section 6.6.1 is no longer required to be unique. - Reviewed diagram on section 6.2, clarifying the business message flow. - Edited description of section 6.5.1 to better describe the behavior of Snapshot messages (35=W).	JLRM

		<ul style="list-style-type: none"> <li>- Added a new domain to tags 281 and 560 indicating that a maximum number of subscriptions have been exceeded on sections 6.4.2 and 6.5.2. Also added matching explanation on section 6.5.1.</li> <li>- Removed domain 5(Overlay) from tag 279-MDUpdateAction, as this value is only used on TOB feeds on section 6.5.4.</li> <li>- Reordering of fields in most messages, to match with the actual order being produced on sections.</li> </ul>	
May, 2nd, 2014	2.0.2	<ul style="list-style-type: none"> <li>- Removed 269=2,3,4 from section 6.8.1 header, as it's not book related.</li> <li>- Added tag 346-NumberOfOrders to section 6.8.1.</li> <li>- Changed section 6.8.2 and 6.8.9, removing mentions about channels (inexistent on TCP Market Data).</li> <li>- Added a table clarifying on the usage of tag 277 on section 6.8.3.</li> <li>- Removed unused error messages from tag 560 on section 6.4.2.</li> <li>- Update the error messages on 6.5.2, including new value "T" and removing unused values.</li> <li>- Updated the error messages on section 6.6.2, removing value 1, and adding "T".</li> <li>- Updated derivatives phase and state behavior (added tag 1174 on section 6.5.5)</li> <li>- Corrected tags 9325-LastTradeDate and 37019-EarlyTermination from derivatives only to equities only (used for BTC instruments) on section 6.5.3.</li> <li>- Added in detail explanation about subscription filters to sections 6.4.1 and 6.5.1.</li> <li>- Included better explanation of usage for Trade history on section 6.6.</li> </ul>	JLRM
Mar, 25th, 2014	2.0.1	<ul style="list-style-type: none"> <li>- Noted on Section 2.3 (Compression Layer) that only the outbound messages from BVMF are compressed and that the reference implementation is not available at the FTP site yet.</li> <li>- Section 6.4.1 updated to clarify about multiple subscriptions and about cancelation.</li> <li>- Section 6.5.1 updated to clarify about multiple subscriptions and about cancelation. Also marked 1021-MDBookType as required to properly reflect the restriction to allow a subscription to use either MBP or MBO, not both.</li> <li>- Added a legend to the column names used on tables, on chapters 4 and 6.</li> <li>- Included extended the domains of tag 167 and 762 to classify Corporate Fixed Income on sections 6.4.1, 6.4.2 and 6.5.1.</li> </ul>	JLRM
Feb, 13nd, 2014	2.0.0	<ul style="list-style-type: none"> <li>- Customer spec first release.</li> </ul>	JLRM

# 1 Preface

UMDF PUMA Conflated provides a TCP protocol based, conflated market data feed for Equities, Derivatives and FX listed in the BM&FBOVESPA Trading System using their native currency.

This document outlines UMDF PUMA Conflated system FIX 4.4 market data messages features and is targeted at third-parties which need to consume those messages from UMDF PUMA Conflated.

FIX is a technical specification for electronic communication of trade-related messages. It is an open standard managed by members of FIX Protocol Limited (<http://www.fixprotocol.org/>).

It is assumed that the reader of this document has previous knowledge of the basic functioning of the FIX protocol.

## 1.1 Abbreviations

Abbreviation	Description
FIX	Financial Information Exchange Protocol
IP	Internet Protocol
TCP	Transport Control Protocol

## 1.2 Glossary

Term	Definition
BM&FBOVESPA Electronic Link	One of BM&FBOVESPA's solutions for accessing its electronic trading platform.
BM&FBOVESPA	Securities, Commodities and Futures Exchange, based in São Paulo, Brazil. For more information, visit <a href="http://www.bmfbovespa.com.br">http://www.bmfbovespa.com.br</a> .
Broker	A broker is an individual or firm who acts as an intermediary between a buyer and seller, usually charging a commission.
Brokerage	Used interchangeably with broker when referring to a firm rather than an individual. Also called brokerage house or brokerage firm.
FIX Gateway	Service that provides connectivity to third-party clients and brokerages using the FIX protocol.
Instrument	Financial capital in a readily tradable form.
Market Data	A collective term for quotes, last sales, volume statistics and other information used by the market to evaluate trading opportunities.

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Security	A stock, bond or contract that has been authorized for trading on, and by, a registered exchange. Each exchange has different criteria to determine a security's eligibility for listing.
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## 2 Market Data Architecture

UMDF PUMA Conflated provides a conflated single feed market data stream with the “Tag=Value” FIX 4.4 pattern syntax using the TCP protocol which allows efficient message delivery to customers’ applications. The following sections describe the connectivity features.

### 2.1 Physical/Link Layer Options

Market participants can choose from the following connectivity options, described as follows:

#### 2.1.1 RCCF

RCCF (“Rede de Comunicações da Comunidade Financeira” or Financial Community Communications Network) is an MPLS network that connects all brokerage firms to BM&FBOVESPA, as well as some distributors and other interested clients. This network allows specific SLAs and contingency features. It is typically used to receive market data and transactional messages (order management).

#### 2.1.2 RCB

RCB (“Rede de Comunicação BM&FBOVESPA” or BM&FBOVESPA Communications Network) is a newer communication option available to the BM&FBOVESPA’s customers. Based on Ethernet over SONET (EoS/EoSDH), it allows participants to choose from a vast array of link speeds and service levels, which contrasts with RCCF, as the latter offers packaged, predefined solutions.

### 2.2 Network Setup

Before a client can connect to the FIX market data interface, there are some configuration parameters that must be agreed between the FIX client and the System, such as:

- The customer’s FIX client is responsible for initiating a TCP connection to the UMDF TCP Market Data Port.
- UMDF PUMA Conflated does not support encryption of FIX messages.
- BVMF Market Operations will provide clients with the IP addresses and port numbers of UMDF PUMA Conflated Market Data Ports.
- The default heartbeat interval for the FIX connection is set to 30 seconds unless otherwise agreed on with the participants.

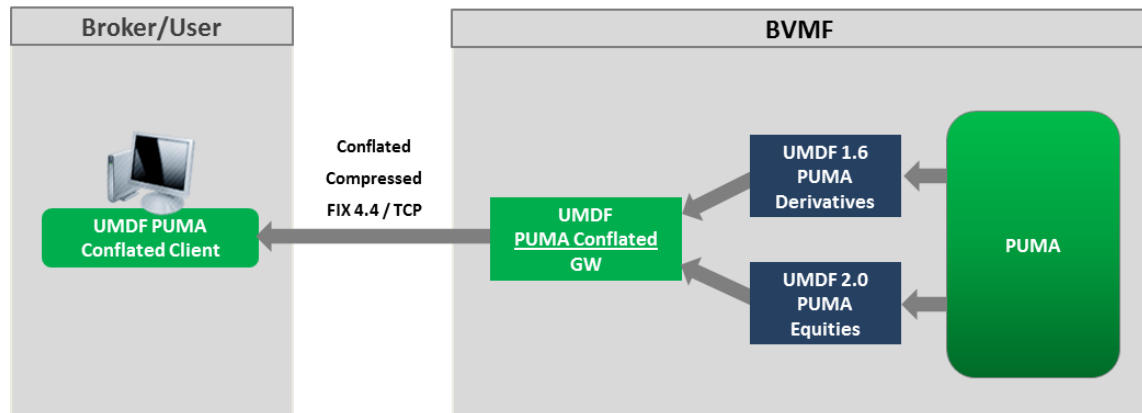
Before connecting to BM&FBOVESPA, the counterparty must undergo the certification process according to the activity it will perform.

The certification process is better described in section 6.8.15 of this document. The physical link used for certification may vary from the one to be used in production, once it is the application that is being certified, and not the physical layer. Hence, a client application which will run using either



RCCF or a dedicated link in the production environment may be certified through an Internet VPN connection.

The diagram below illustrates the connection schema in respect to the remainder of the PUMA Platform:



## 2.3 Compression Layer

The connection to the UMDF PUMA Conflated used an intrinsic compression layer using the standard ZLIB compression algorithm (RFC 1950, accessible at <http://tools.ietf.org/html/rfc1950>) for bandwidth optimization purposes. The customer application must be able to decode this stream of compressed bytes before processing the market data messages. Please note that only outbound messages are compressed, the customer application should always send plain, uncompressed messages.

In the near future, a reference implementation to decode this compressed market data will be available at:

<ftp://ftp.bmf.com.br/FIXFAST/reference/UMDFTCP/>

## 2.4 Session Assignment

FIX comp IDs and IP addresses for connection are assigned by BM&FBOVESPA for connecting counterparties. The process is differentiated according to the counterparty category (banks, trading firms, DMA providers, vendors, other exchanges). For more details, please contact:

### **BM&FBOVESPA Trading Support Group (TSG)**

+55 11 2565-5000, option 2 (São Paulo)

[tradingsupport@bvmf.com.br](mailto:tradingsupport@bvmf.com.br)

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## 3 FIX Protocol

The FIX Protocol is a free and open messaging standard that was developed in 1992 by Jim Leman, Jacques Perold, Bob Lamoureux, and Chris Morstatt of Salomon Brothers and Fidelity Investments to facilitate a bi-lateral communications framework for equities trading.

Since its conception, its usage has significantly expanded in response to evolving industry needs and today it is the predominant messaging standard for pre-trade and trade communication globally within the equity markets.

The FIX Protocol is a generic protocol with a flexible structure that allows more than one possible implementation. This chapter describes the specific features for the implementation of the FIX protocol in the UMDF PUMA Conflated system.

More info about the FIX Protocol can be obtained at <http://www.fixprotocol.org/>.

### 3.1 FIX Protocol Syntax

There are two FIX Protocol Syntax patterns, traditional ("Tag=Value") and XML (FIXML). UMDF PUMA Conflated uses the **traditional** "Tag=Value" FIX syntax. The current FIX version in use by UMDF PUMA Conflated is FIX 4.4.

### 3.2 Message Format

The general format of a FIX message is a standard header followed by the message body fields and terminated with a standard trailer.

Each message is composed by a stream of <tag>=<value> fields with a field delimiter between fields in the stream. Tags are of data type **TagNum** (see table in section 3.3). All tags must have a specified value. Optional fields without values should not be specified in the FIX message. A Reject (MsgType=3) message will be the response to a tag with no value.

Except where noted, fields within a message can be defined in any sequence (Relative position of a field within a message is inconsequential.) The exceptions to this rule are described below:

1. General message format is composed by the standard header followed by the body followed by the standard trailer.
2. The first three fields in the standard header are: tag 8-BeginString followed by tag 9-BodyLength followed by tag 35-MsgType.
3. The last field in the standard trailer is the tag 10-Checksum.

#### Field Delimiter:



All the fields in a FIX message are terminated by a delimiter character. The non-printing, ASCII "SOH" (#001, hex: 0x01, referred to in this document as <SOH>), is used for field termination. Messages are delimited by the "SOH" character following the CheckSum field. All messages begin with the "8=FIX.x.y<SOH>" string and terminate with "10=nnn<SOH>".

### 3.3 Data Types

FIX 4.4 has 35 data types available. They are described as follows:

Name	Base Type	First Introduced
Amt	float	FIX 4.2
Boolean	char	FIX 4.2
Char		FIX 4.2
Country	string	FIX 4.2
Currency	string	FIX 4.2
Date	date	FIX 4.0
DayOfMonth	int	FIX 4.1
Exchange	string	FIX 4.2
Float	float	FIX 2.7
Int	int	FIX 2.7
Length	int	FIX 4.3
LocalMktDate	string	FIX 4.2
MonthYear	string	FIX 4.1
MultipleCharValue	string	FIX 4.4
MultipleStringValue	string	FIX 4.2
NumInGroup	int	FIX 4.3
Pattern		FIX 4.4
Percentage	float	FIX 4.3
Price	fix	FIX 4.2
PriceOffset	float	FIX 4.2
Qty	float	FIX 4.2
Reserved1000Plus	pattern	FIX 4.4
Reserved100Plus	pattern	FIX 4.4
Reserved4000Plus	pattern	FIX 4.4
SeqNum	int	FIX 4.3
String		FIX 4.2
TZTimeOnly	string	FIX 4.4
TZTimestamp	String	FIX 4.4
TagNum	Int	FIX 4.3
Tenor	pattern	FIX 4.4
Time		FIX 4.0
UTCDate	String	FIX 4.2
UTCDateOnly	String	FIX 4.0
UTCTimeOnly	String	FIX 4.2
UTCTimestamp	String	FIX 4.2

## 4 Session Management

This section describes session-level FIX messages sent between UMDF PUMA Conflated and FIX clients.

In the following tables the **REQ** column means the tag is Required (Y), Conditionally Required (C) or Non Required (N) in FIX.

### 4.1 Standard FIX 4.4 Session Behavior

In a typical production UMDF PUMA Conflated setup, multiple Market Data servers are installed for each client. One of the Market Data servers functions as Primary whereas the others function as Standby servers. Clients should first initiate the session to the Primary Market Data server. If the connection fails, clients should retry the primary connection after 30 seconds. If the primary reconnection is not possible yet, then the client can connect to a standby server.

It is a responsibility of the client to detect any message gaps after a connection break. If the incoming sequence number is greater than expected, a retransmission of the messages can be requested by sending the *Resend Request* (MsgType=2) message to the System.

### 4.2 Message header format

All UMDF PUMA Conflated Market Data messages carry the following fields in the header:

TAG	FIELD NAME	REQ	COMMENTS
8	BeginString	Y	FIX4.4 (Must be the first field in the message)
9	BodyLength	Y	(Must be the second field in the message)
35	MsgType	Y	(Must be the third field in the message)
34	MsgSeqNum	Y	See standard FIX protocol specification
43	PossDupFlag	N	Always required for retransmissions, whether prompted by the sending system or as a result of a resend request.
49	SenderCompID	Y	The value used must be recognized and agreed by BVMF.
52	SendingTime	Y	Indicates the time the message was sent by BVMF.
56	TargetCompID	Y	Please use the value as provided by BVMF Market Operations

### 4.3 Message trailer format

All UMDF PUMA Conflated Market Data messages carry the following fields in the trailer:

TAG	FIELD NAME	REQ	COMMENTS
10	Checksum	Y	(Always unencrypted, always last field in the message)

## 4.4 Logon

### 4.4.1 Logon Request (MsgType=A)

The logon message authenticates a user establishing a connection to UMDF PUMA Conflated. The logon message must be the first message sent to UMDF PUMA Conflated by the client.

TAG	FIELD NAME	REQ	COMMENTS
	Message Header	Y	MsgType=A
98	EncryptMethod	Y	Always unencrypted. Must send a value = 0
108	HeartBtInt	Y	Default value used by UMDF PUMA Conflated is 30. Please set this to 30 unless otherwise agreed with BVMF Market Operations.
141	ResetSeqNumFlag	N	
789	NextExpectedMsgSeqNum	N	
	Message Trailer	Y	



The sequence number, in the initial logon for each trading day, must be set to "1".

- If a client receives a sequence number that is less than expected, the client must terminate the session immediately and contact BVMF Market Operations to correct the problem.
- BVMF strongly advises clients to reset the sequence number on logon for market data sessions

### 4.4.2 Logon Response

Once UMDF PUMA Conflated receives a Logon request, it validates the header tag 49-SenderCompID. No messages should be sent to UMDF PUMA Conflated until a Logon message is received in reply from UMDF PUMA Conflated.

When UMDF PUMA Conflated returns a positive Logon response, the client can start performing the following:

- Start the heartbeat timer
- Start exchanging messages with the System

### 4.4.3 Logon Failure

If the validation fails, UMDF PUMA Conflated shuts down the connection; no Logout message is sent before the termination.

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## 4.5 Administrative messages

This section describes the minimum requirements to keep the session alive and synchronized.

### 4.5.1 Heartbeat messages (MsgType=0)

UMDF PUMA Conflated must receive a message from the client at least **once** in the heartbeat interval (default to 30 seconds) defined in the logon. If the session is idle and no message is received within two heartbeat intervals, UMDf PUMA Conflated considers the session dead. A Logout message is sent to the client and the session is disconnected.

UMDF PUMA Conflated sends a message at least once in the heartbeat interval.

### 4.5.2 Other messages

UMDF PUMA Conflated handles the following **FIX 4.4** standard administration messages:

- Test Request (MsgType=1)
- Resend Request (MsgType=2)
- Sequence Reset (MsgType=4)
- Logout (MsgType=5)

Please note that the tag 122-OrigSendingTime is ignored by UMDf PUMA Conflated in all messages.

## 4.6 Reject Messages

Reject messages (MsgType=3) received by UMDf PUMA Conflated will be ignored by the System. However, clients must not send a Resend Request (MsgType=2) for the rejected message. Otherwise, it is possible to fall into an infinite resend loop. Reject messages (MsgType=3) sent by UMDf PUMA Conflated will include the sequence number of the rejected message with the reject reason in the text field, and tag 373-SessionRejectReason, whenever possible.

When UMDf PUMA Conflated receives a message with a sequence number that is less than expected during normal session processing, a Logout (MsgType=5) message will be sent to the client and the session will be terminated.

In the event of UMDf PUMA Conflated receiving a sequence number that is less than expected when the client reconnects after a break in the session during the same trading day, the session will be terminated immediately without sending a Logout. The client should contact the BVMF Market Operations to correct the problem.

## 4.7 Logout Messages

The Logout message (MsgType=5) initiates or confirms the termination of a FIX session. Disconnection without the exchange of logout messages should be interpreted as an abnormal condition, for instance, network level disconnection.

There are other scenarios where the client's FIX session can be disconnected. Depending on the situation, UMDf PUMA Conflated may either wait or not for the logout response message from the client before terminating the connection, e.g. idle session with no message after two heartbeat intervals.

## 5 Incremental Book Management

The book received via FIX 4.4 session is incremental, i.e. changes to the book are relayed on individual messages providing “deltas” of the previous state of the book.

The actions to be executed by the client system receiving the incremental message are determined by the tag *279-MDUpdateAction*, whose value carries an instruction that can be either add, delete, change, delete from or delete through. The items in the order book that are affected by the action stated in the tag 279 are stated in the tag *290-MDEntryPositionNo*, which contains a position in the order book.

### 5.1 Book Management Considerations

For bid or offer book entries (price depth book), the deletion is based on the entry’s position (field *MDEntryPositionNo*). For example, assume ten bids for a security. Adding a bid with *MDEntryPositionNo*=2 requires the receiver to move down other Market Data Entries, i.e. the Market Data Entry on the 2<sup>nd</sup> display position will move to the 3<sup>rd</sup>, the 3<sup>rd</sup> moves to the 4<sup>th</sup>, etc. UMDF PUMA Conflated will not send a modification of all *MDEntries* on the 2<sup>nd</sup> through the final position just to update the *MDEntryPositionNo* field; the counterparty must infer the change.

Similarly, deleting a Market Data Entry on the 2<sup>nd</sup> position causes the 3<sup>rd</sup> Market Data Entry to move into the 2<sup>nd</sup> position, the 4<sup>th</sup> to move into the 3<sup>rd</sup> position, etc. UMDF PUMA Conflated will not issue a change action to modify the position of an entry in the book. Change updates are only sent when a value applicable to a specific *MDEntryPositionNo* – such as total quantity or number of orders – changes.

All Snapshot and Incremental Market Data messages containing book information (entry types 269=0,1) are sent on a separated message, containing only the book updates. This message will have the tag **1021-MDBookType** tag set to indicate the type of book to which is refers (Order depth or Market depth).

However, Snapshot and Incremental Market Data messages containing statistics (all other entry types different from 269=0,1) will be separated from messages containing book updates and these messages will never contain the tag **1021-MDBookType**.

### 5.2 Order depth book

Order depth book contains order by order information, where each entry represents an individual order. For example, this is how an order-depth book looks like:

BID			OFFER		
PosNo	Size	Px	Px	Size	PosNo
1	5000	10.58	11.03	7000	1
2	4000	10.58	11.03	2000	2
3	3000	10.57	11.05	1000	3
4	4000	10.54			4

One entry per order: same price on more than one entry.

Usually BVMF provides the full depth of the book for order-depth book, however, for instruments with extremely deep books, even book by order can impose a limited depth. Client systems must determine the book depth for an instrument from the tag *264-MarketDepth* in the Security List (MsgType=y) message.

In general, if a trade occurs, BVMF will send a delete or change data block to update the book. The trade data block itself is not used to update the order book.

### 5.3 Price depth book

Price-depth book contains price by price information, where each entry represents the aggregation of all order quantities at that price. The following table illustrates the price-depth book of the same book described above:

BID				OFFER			
PosNo	NoOrders	Size	Px	Px	Size	NoOrders	PosNo
1	2	9000	10.58	11.03	9000	2	1
2	1	3000	10.57	11.05	1000	1	2
3	1	4000	10.54				3

One entry per price: more than one order per entry.

In addition to the quantity and the price, the price-depth book also makes the number of orders that composes a specific price available. BVMF presets the depth of the book that will be made available per instruments, usually defaulting to 10. Client systems must determine the book depth for an instrument from the tag *264-MarketDepth* in the SecurityList (MsgType=y) message.

The change data block is sent to update characteristics of a price level without changing the price itself, or impacting any other prices in the book (update to the order count or quantity at that price).

### 5.4 Price-depth Bottom Row Handling

For price-depth book only, the recipient of the market data must know how many price levels are being supplied by UMDF PUMA Conflated. The recipient must delete the bottom price row when the number of price rows is exceeded – UMDF PUMA Conflated will not send a delete of the bottom row when the number is exceeded. UMDF PUMA Conflated will send the bottom row again when a higher level row is deleted.

The following example illustrates this behavior:

BID			
PosNo	NoOrders	Size	Px
1	2	9000	10.58
2	1	3000	10.57
3	1	4000	10.54
4	4	10000	10.53
5	3	8000	10.50

Top row of the book (best bid).

Bottom row of the book.

New buy order is received (BUY 1000 @ 10.60), updating the top of the book (bid):



Market Data Incremental Refresh	
MDEntryPositionNo	1
MDUpdateAction	New
MDEntrySize	1000
MDEntryPx	10.60
NumberOfOrders	1

Bid			
PosNo	NoOrders	Size	Px
1	1	1000	10.60
2	2	9000	10.58
3	1	3000	10.57
4	1	4000	10.54
5	4	10000	10.53
6	3	8000	10.50

New bottom row of the book

Implicit deletion of the previous bottom row.

The order with price 10.57 is deleted (CANCEL BUY 3000 @ 10.57):

Market Data Incremental Refresh	
MDEntryPositionNo	3
MDUpdateAction	Delete
MDEntryPositionNo	5
MDUpdateAction	New
MDEntrySize	8000
MDEntryPx	10.50
NumberOfOrders	3

So, the book will miss the last row until the insertion in the last position:

Bid			
PosNo	NoOrders	Size	Px
1	1	1000	10.60
2	2	9000	10.58
3	1	4000	10.54
4	4	10000	10.53

New bottom row will be sent by BVM&F:

Market Data Incremental Refresh	
MDEntryPositionNo	5
MDUpdateAction	New
MDEntrySize	8000
MDEntryPx	10.50
NumberOfOrders	3

The book after the event will be:

Bid			
PosNo	NoOrders	Size	Px
1	1	1000	10.60
2	2	9000	10.58
3	1	4000	10.54
4	4	10000	10.53
5	3	8000	10.50

New bottom row will be sent by BVM&F.

## 5.5 Market Data Conflation (Market Data Throttling)

In order to facilitate customers coping with the increasing market data messaging volumes and bandwidth requirements, the UMDF PUMA Conflated market data platform feed is throttled. Being throttled, book updates are sent at specific intervals, consolidating the end state of the order book to reduce the amount of book updates and convey the same end result.

The throttling interval (i.e. the interval at which the book updates are sent) is deemed to be optimal at **300 ms**. Depending on the market data velocity, this interval may be increased to avoid the need for bandwidth updates by end customers. It is known that such interval does not affect negatively in any way the ability for a human trader to operate the markets. Customers willing to receive more or less frequent Market Data, can adopt these different intervals (such as 100 ms or 500ms).



### IMPORTANT

Please note that trades and statistical data (such as high price, low price, security state and trading phase changes) are still sent without being throttled, in real time.

Consider the instrument PETR4 and the arbitrary amount of time passed since the beginning of the measurement period (“ $\Delta t$ ”). As various market participants issue orders for this instrument, a non-throttled market data feed would contain the following flow of messages:

PETR4 market data message sequence					
Security	Instruction	Side	Price	Quantity	$\Delta t$ (ms)
PETR4	INSERT	BUY	24.00	100	0
PETR4	INSERT	BUY	24.01	200	100
PETR4	INSERT	SELL	24.03	300	200
PETR4	INSERT	SELL	24.05	100	300
PETR4	INSERT	BUY	23.98	400	400
PETR4	MODIFY	BUY	24.00	200	500
PETR4	MODIFY	SELL	24.05	200	600
PETR4	DELETE	SELL	24.05	200	700
PETR4	MODIFY	BUY	24.01	100	800
PETR4	INSERT	BUY	23.99	500	900
PETR4	DELETE	BUY	23.99	500	1000
Total number of messages sent: 11					

The end state of buy and sell orders for PETR4 is shown below:

Buy Quantity	Buy Price	Sell Price	Sell Quantity
100	24.01	24.03	300
200	24.00		
400	23.98		

If the throttling mechanism is applied to the same market data feed as before, all the changes to the order prices are batched in the same message, generating a *snapshot* of the order prices. This mechanism aggregates the end state of the order book in the same message, thus reducing the messaging overhead.

The following sequence of messages would be generated.

PETR4 market data message sequence			
Security	Instruction, Side, Price, Quantity		$\Delta t$ (ms)
PETR4	INSERT	BUY 24.00 100	380
	INSERT	BUY 24.01 200	
	INSERT	SELL 24.03 300	
	INSERT	SELL 24.05 100	

PETR4 market data message sequence			
Security	Instruction, Side, Price, Quantity		$\Delta t$ (ms)
PETR4	INSERT	BUY 23.98 400	720
	MODIFY	BUY 24.00 200	
	DELETE	SELL 24.05 200	
PETR4	MODIFYBUY 24.01 100		1100
Total number of messages sent: 3			

The end state of buy and sell orders for PETR4 is shown below:

Buy Quantity	Buy Price	Sell Price	Sell Quantity
100	24.01	24.03	300
200	24.00		
400	23.98		

Note a decrease of approximately 72% in the number of messages sent to achieve the same end result of the order book at the end of the time interval.

## 6 Application Messages (Messaging Functionality)

This section describes the application-level FIX messages sent and accepted by UMDF PUMA Conflated.

In the following tables, the **REQ** column means the tag is Required (Y), Conditionally Required (C) or Non Required (N) in the FIX message. An X in the **EQ** column means the tag is used for Equities and Corporate Fixed Income products, while an X in the **DER** column means the tag is used for Derivatives/FX.

### 6.1 Message Types

MsgType	Definition
35=x	SecurityListRequest - Instrument definition list request
35=y	SecurityList - Instrument definition list
35=V	MarketDataRequest - Market Data request
35=W	MarketDataFullRefresh - Market Data snapshot
35=X	MarketDataIncrementalRefresh - Incremental Market data update
35=f	SecurityStatus - Security status change notification
35=UTHQ	TradeHistoryRequest - message to request past trades
35=UTHP	TradeHistoryResponse - message responding past trades requests
35=UTOTQ	MarketTotalsRequest - message used to (un)subscribe to Market Totals
35=UTOTP	MarketTotalsResponse - response to a subscription request
35=UTOTC	MarketTotalsComposition - reports the composition of Market Totals
35=UTOT	MarketTotalsBroadcast - periodically reports the value of Market Totals

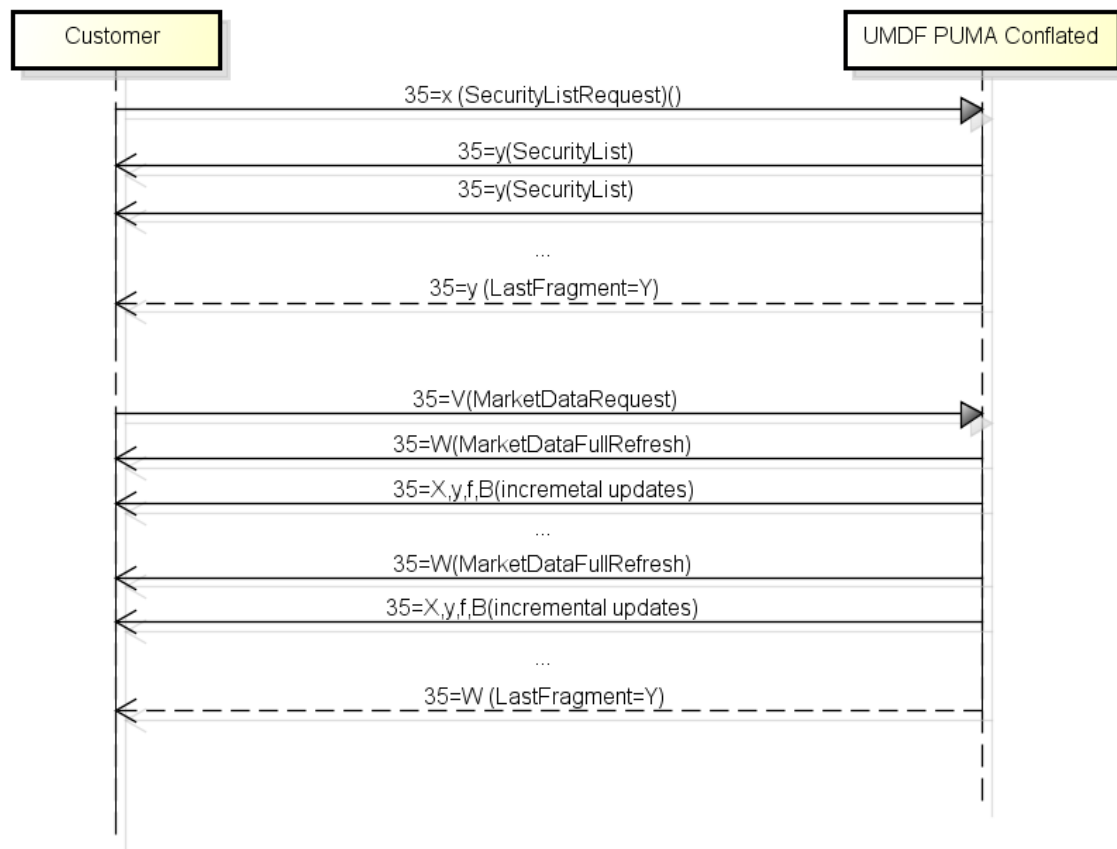


#### IMPORTANT

If a customer application sends repeated messages that result in a reject, the respective session may get disconnected automatically.

### 6.2 Message Flow

The figure below illustrates the basic message flow in the UMDF PUMA Conflated platform, after the FIX 4.4 session is established:



### 6.3 Instrument Identification Block

This block is common to most market messages. It contains the tags that uniquely identify an instrument, and works as a “stamp” of the instrument identification in the message specification.

In the following table **REQ** means the field is Required (Y), Conditionally Required (C) or Non Required (N) in FIX.

TAG	FIELD NAME	REQ	COMMENTS
22	SecurityIDSource	Y	SecurityID qualifier. Value issued by BVMF: <b>8</b> = Exchange Symbol (BVMF security identification).
207	SecurityExchange	Y	Value supported by UMDf PUMA Conflated: <b>BVMF</b>
48	SecurityID	Y	Unique instrument identifier for a given qualifier (SecurityIDSource)

### 6.4 Security List

This set of FIX messages are utilized so that the connecting parties are able to determine which instruments can be traded via UMDf PUMA Conflated. Instrument definition messaging is based

on a subscription model, in which the clients subscribe to receive instrument definitions according to specific criteria, and optionally receive updates afterwards. The subscription may be cancelled at any time.

#### 6.4.1 Security List Request (MsgType = x)

The Security List Request message is used by customers to send a request UMDF PUMA Conflated to retrieve a list of securities that are available for trading. Its response is a SecurityList message, which contains information about the instruments traded. In case the request fails, the response will be a SecurityList message with the tag 560-SecurityRequestResult indicating the reason for the rejection.

The new subscription mechanics on UMDF PUMA Conflated is entirely based on filters, hence sometimes the selected filters will result in an empty instrument set. Since the platform supports online creation of instruments, a subscription that results in an empty set is perfectly valid (the set can receive new instruments later, during the day). Thus customers applications must know how to handle 35=y responses containing no instruments.

For instance, one could subscribe to a SecurityGroup that usually contains only UDS instruments, this group could start the day with no valid instruments, but subscribing to this will guarantee that if one such instrument is ever created the customer will receive the related messages.

Also, two subscriptions could match instruments previously subscribed; in this case the response will carry all matched instruments, even if they are repeated. However, incremental changes to them will be relayed only once to each session.

It's possible to maintain many simultaneous subscriptions, each with a unique value for tag **320-SecurityReqID**. In the event of instrument creation during the session, users will receive the correspondent SecurityList messages, as long as it matches one of the subscription filters.

Cancellation of the subscription may be done by setting the field SubscriptionRequestType to 2 (unsubscribe). To define which request is to be unsubscribed, it needs to be properly identified by sending tag **320-SecurityReqID** with the same value used when subscribing.

Additionally, if subscribing to a set of securities, the response may contain only the securities the session has permission to access.



#### IMPORTANT

Since the new subscription policy is based on **filters**, it's always mandatory for each request to have at least one filter. This implies that to subscribe to all instruments one will have to hold many simultaneous subscriptions.

TAG	FIELD NAME	REQ	EQ	DER	COMMENTS
	<i>Message Header</i>	Y	X	X	MsgType=x
167	SecurityType	N	X	X	Specifies the SecurityType of the desired instruments. (FILTER)  Valid Values (Corporate Fixed Income):

					<ul style="list-style-type: none"> <li>- ETF (Exchange Traded Fund)</li> <li>- CORP (Corporate)</li> </ul> <p>Valid Values (Derivatives and FX):</p> <ul style="list-style-type: none"> <li>- FUT (Futures)</li> <li>- SPOT (Spot Market)</li> <li>- SOPT (Spot Options)</li> <li>- FOPT (Future Options)</li> <li>- DTERM (Derivative Forward or "Termo")</li> </ul> <p>Valid Values (Equities):</p> <ul style="list-style-type: none"> <li>- CASH (rights, etc)</li> <li>- OPT (Option)</li> <li>- FORWARD (Equity Forward or "Termo")</li> <li>- ETF (Exchange Traded Fund)</li> <li>- INDEX (Non Tradeable index)</li> <li>- OPTEXER (Option Exercise)</li> <li>- MLEG (Multileg Instrument, UDS)</li> <li>- CS (Common Stock)</li> <li>- PS (Preferred Stock)</li> <li>- SECLOAN (Security loan, or BTB)</li> <li>- INDEXOPT (Option on Index)</li> </ul>
263	SubscriptionRequestType	Y	X	X	<p>Subscribe or unsubscribe for security changes in the request. Values accepted by UMDF PUMA Conflated:</p> <p>1 = Securities + Updates (Subscribe)</p> <p>2 = Disable previous request (Unsubscribe)</p>
320	SecurityReqID	Y	X	X	<p>Unique ID of the Security List Request. It's strongly recommended that this value is unique throughout the trading day since it will be used to cross reference the request to the response.</p> <p>When unsubscribing, this tag should contain the ID of the request being canceled.</p>
460	Product	N	X	X	<p>Specifies the Product of the desired instruments. (FILTER)</p> <p>Valid Values:</p> <p>2 = COMMODITY</p> <p>3 = CORPORATE</p> <p>4 = CURRENCY</p> <p>5 = EQUITY</p> <p>6 = GOVERNMENT</p> <p>7 = INDEX</p> <p>15 = ECONOMIC INDICATOR</p> <p>16 = MULTILEG</p>

461	CFICode	N	X	X	Specifies the CFICode of the desired instruments. Please refer to ANNA CFI & ISO 10962 for details on how to use this field ( <a href="http://www.anna-web.org/index.php/home/cfiiso10962/">http://www.anna-web.org/index.php/home/cfiiso10962/</a> ). (FILTER)
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#### 6.4.2 Security List (MsgType = y)

This message is used to relay instrument information, such as insertion, update or deletion. Each message can contain multiple instruments (default is 15) and clients usually receive multiple messages in response to each request.

Just after subscribing to security list, the response will come as a series of Security List messages (35=y), marked with tags 393-TotNoRelatedSym and 893-LastFragment. The customer application should process all such messages until all securities are received (number of received securities is equal to the value of tag 393) and the message containing tag 893-LastFragment equal to "Y" is received.

There is a maximum limit of subscriptions that can be held simultaneously. This limit is configured by the Market Surveillance, but it should be reasonable enough for customers to maintain several subscriptions without degrading server performance.

Updates to any security will be sent out to customers on separate Security List messages (35=y) in an ad-hoc fashion, carrying a single security per message. In this case the Security List message will not carry request related tags such as 320-SecurityReqID, 560-SecurityRequestResult, 393-TotNoRelatedSym and 893-LastFragment.

TAG	FIELD NAME	REQ	EQ	DER	COMMENTS
	<i>Message Header</i>	Y	X	X	MsgType=y
320	SecurityReqID	C	X	X	Echoed back from the Security List Request message that caused this message to be sent. Always sent when this message is a reply to a Security List Request.
322	SecurityResponseID	C	X	X	Unique ID of this message, generated by UMDF PUMA Conflated. Only sent when this message is a response to a Security List Request.
560	SecurityRequestResult	C	X	X	The results returned to the Security List Request message. Always sent when this message is a reply to a Security List Request. Values issued by UMDF PUMA Conflated: (also used to confirm unsubscription) 0= Valid request 1 = Invalid or unsupported request 6 = Duplicate SecurityReqID



							M = Maximum number of subscriptions exceeded
393			TotNoRelatedSym	C	X	X	Total number of securities being returned for this request. Always sent when this message is a reply to a Security List Request.
893			LastFragment	C	X	X	Indicates whether this message is the last in the sequence of messages requested. Not sent by default.  Valid values: Y = Last message
146			NoRelatedSym	C	X	X	Specifies the number of repeating instruments specified. Not sent if this message is reporting an error (tag 560 > 0).
➔	55		Symbol	Y	X	X	Instrument symbol
➔	48		SecurityID	Y	X	X	Unique instrument id.
➔	22		SecurityIDSource	Y	X	X	Security ID qualifier.
➔	207		SecurityExchange	Y	X	X	Market to which the instrument belongs.
➔	1141		NoMDFeedTypes	Y	X	X	Number of MD Feed Types.
➔	➔	1022	MDFeedType	Y	X	X	Indicates feed type as standard or implied. Not sent for MBO. Valid values: STD = Standard MBP IMP = Implied MBP (not used)
➔	➔	264	MarketDepth	Y	X	X	Identifies the number of depth levels of the book.
➔	➔	1021	MDBookType	Y	X	X	Used to request a specific type of book updates when subscribing. If not sent means to subscribe for all available book types. Valid Values:  2 = Price Depth 3 = Order Depth
➔	201		PutOrCall	C	X	X	Indicates whether an option contract is a put or call.
➔	454		NoSecurityAltID	C	X	X	Number of alternate security identifiers.
➔	➔	455	SecurityAltID	C	X	X	Security Alternate identifiers for this security
➔	➔	456	SecurityAltIDSource	C	X	X	Identifies class or source of the SecurityAltID (455) value. Required if SecurityAltID is

							specified. Values issued by UMDf PUMA Conflated: 8= ExchangeSymbol 4= ISIN Number H= Clearing house/organization
→	460	Product	Y	X	X		Indicates the type of product the security is associated with.  Valid Values: 2 = COMMODITY 3 = CORPORATE 4 = CURRENCY 5 = EQUITY 6 = GOVERNMENT 7 = INDEX 15 = ECONOMIC INDICATOR 16 = MULTILEG
→	461	CFIcode	Y	X	X		Classification of Financial Instruments (CFI code) values, which indicate the type of security using ISO 10962 standard.
→	1151	SecurityGroup	Y	X	X		Indicates the group this instrument belongs to.
→	167	SecurityType	Y	X	X		Valid Values (Corporate Fixed Income): - ETF (Exchange Traded Fund) - CORP (Corporate)  Valid Values (Derivatives and FX): - FUT (Futures) - SPOT (Spot Market) - SOPT (Spot Options) - FOPT (Future Options) - DTERM (Derivative Forward or "Termo")  Valid Values (Equities): - CASH (rights, etc) - OPT (Option) - FORWARD (Equity Forward or "Termo") - ETF (Exchange Traded Fund) - INDEX (Non Tradeable index) - OPTEXER (Option Exercise) - MLEG (Multileg Instrument, UDS) - CS (Common Stock)

						- PS (Preferred Stock) - SECLOAN (Security loan, or BTB) - INDEXOPT (Option on Index)
→	762	SecuritySubType	Y	X	X	The sub type of the instrument.  Values for derivatives/FX: 4 - FX spot 10 - Gold 20 - Index 30 - Interest rate 40 - FX rate 50 - Foreign debt 60 - Agricultural 70 - Energy 80 - Economic Indicator 90 - Strategy 100 - Future-style Option 110 - Volatility 120 - Swap 130 - MiniContract 140 - Financial RollOver 141 - Agricultural RollOver 142 – Stock RollOver 150 – Target Rate 190 - Carbon credit  Values for equities: 1001 - Ordinary Rights (DO) 1002 - Preferred Rights (DP) 1003 - Common Shares (ON) 1004 - Preferred Shares (PN) 1005 - Class A preferred shares (PNA) 1006 - Class B preferred shares (PNB) 1007 - Class C preferred shares (PNC) 1008 - Class D preferred shares (PND) 1009 - Ordinary Receipts (ON REC) 1010 - Preferred Receipts (PN REC) 1100 - Common Forward 1101 - Flexible Forward 1102 - Dollar Forward 1103 - Index Points Forward 1104 - Non-tradable ETF Index 1105 - Predefined Covered Spread 1106 - Tradable ETF 1107 - Non-tradable Index 1108 - User defined spread 1109 - Exchange defined spread (not currently in use) 1110 - Security Loan 1111 - Tradable Index 1112 - Brazilian Depositary Receipt 1113 - Fund 1114 - Other Receipt

						1115 - Other Right 1116 - UNIT 1117 - Class E Preferred Share (PNE) 1118 - Class F Preferred Share (PNF) 1119 - Class G Preferred Share (PNG) 1120 - Warrant 1122 - Non-tradable Security Lending 1123 - Foreign Index ETF 1125 - Government ETF 1126 - IPO or Follow on 1127 - Gross Auction 1128 - Net Auction 1129 - Tradable Index in Partnership 1130 - Nontradable Index in Partnership 1999 – Others  Values for corporate fixed income: 1106 - Tradable ETF 1124 - Fixed Income ETF 1131 - Nontradable Fixed Income ETF 1300 - Outright purchase 1301 - Specific collateral repo 1302 - Debenture 1303 - Real State Receivable Certificate 1304 - Agribusiness Receivable Certificate 1305 - Promissory Note 1306 - Letra Financeira 1307 - American Depositary Receipt 1308 - Unit Investment Fund 1309 - Receivable Investment Fund 1310 - Outright T+1 1311 - Repo T+1 1312 - Non-tradable gross settlement 1313 - Non-tradable net settlement 1314 - ETF Primary Market 1316 - Shares Primary Market 1317 - Rights Primary Market 1318 - Unit Primary Market 1319 - Fund Primary Market 1320 - Foreign Index ETF Primary Market 1321 - Warrant Primary Market 1322 - Receipt Primary Market 2002 - German Public Debts
→	200	MaturityMonthYear	C	X	X	Month and year of the maturity (for futures and options). Required for Futures and Options.

→	541	MaturityDate	C	X	X	Date of instrument maturity. For all but Spot and Forwards.
→	225	IssueDate	Y	X	X	The date which the security is issued/activated.
→	470	ContryOfIssue	Y	X	X	ISO country code of instrument issue.
→	202	StrikePrice	C	X	X	Strike price of option. Required if an Option
→	947	StrikeCurrency	C	X	X	Currency of option's strike price. Required if an Option.
→	1194	ExerciseStyle	C	X	X	Type of exercise of a derivatives security.
→	231	ContractMultiplier	C		X	Specifies the ratio or multiply factor to convert from "nominal" units (e.g. contracts) to total units (e.g. shares) (e.g. 1.0, 100, 1000, etc).
→	107	SecurityDesc	Y	X	X	Descriptive string of the security
→	667	ContractSettlMonth	C	X	X	Specifies when the contract will settle.
→	873	DatedDate	C	X	X	The date of the security activation, if different from the IssueDate.
→	916	StartDate	N	X		Start date of a financing deal, i.e. the date the buyer pays the seller cash and takes control of the Collateral.
→	63	SettlType	C	X	X	Indicates order settlement period using:  Dx = FX tenor expression for "days" where "x" is any integer > 0.eg. D5
→	64	SettlDate	C	X	X	Specific date of trade settlement. Format is YYYYMMDD. If present this field overrides SettlType (63).
→	917	EndDate	N	X		End date of a financing deal, i.e. the date the seller reimburses the buyer and takes back control of the collateral.
→	37012	PriceDivisor	C		X	Value that divides the Price field to produce the actual order price (based on Step of Quotation). (e.g. 1, 100, 1000, etc).

➔	980		SecurityUpdateAction	Y	X	X	When sent as a request response will always carry "M".  Valid values: A = Add D = Delete M = Modify
➔	969		MinPriceIncrement	C	X	X	Number of minimum tick increments
➔	5151		TickSizeDenominator	C	X	X	Number of decimals, used for pricing this instrument, e.g. price = 0.001, decimals = 3.
➔	9749		MinOrderQty	C	X	X	Minimum quantity of an order for the security.
➔	9748		MaxOrderQty	C	X	X	Maximum quantity of an order for the security.
➔	870		NoInstrAttrib	C	X	X	Number of repeating InstrAttribType entries.
➔	➔	871	InstrAttribType	C	X	X	Code to represent the type of instrument attributes.  Valid values: 24 = Trade type eligibility details for security. 34 = Eligibility for GTD/GTC
➔	➔	872	InstrAttribValue	C	X	X	Attribute value appropriate to the InstrAttribType (871) field.  Valid values for 871=24: 1 = Electronic Match Eligible 3 = Block Trade Eligible 17 = Negotiated Quote Eligible  Valid values for 871=34: 1 = GTD/GTC Eligible
➔	711		NoUnderlyings	C	X	X	Number of underlying instruments.
➔	➔	311	UnderlyingSymbol	Y	X	X	Underlying instrument's ticker symbol.  Conditionally required if NoUnderlyings > 0.
➔	➔	309	UnderlyingSecurityID	Y	X	X	Underlying instrument's security identifier. Conditionally required if NoUnderlyings > 0.
➔	➔	305	UnderlyingSecurityIDSource	Y	X	X	Qualifier for underlying instrument's security ID. Valid Values:

							8 = Exchange Symbol
→	→	308	UnderlyingSecurityExchange	Y	X	X	Underlying instrument's exchange. Valid Values: BVMF
→	→	6919	IndexPct	C	X		Used to provide % of each Equity in Index Calculation
→	→	37021	IndexTheoreticalQty	C	X		The theoretical quantity of this underlying belonging to an index.
→	15		Currency	C	X	X	Currency used for the price
→	120		SettlCurrency	C	X	X	Currency used for the settlement
→	6937		Asset	N			Asset associated with the security , such as DOL, BGI, OZ1, WDL, CNI, etc.
→	7595		NoSharesIssued	C	X	X	Social Capital – Total number of shares issued for Cash Equity Instrument
→	7534		SecurityStrategyType	C			Strategy type definition. Required for strategy instruments.
→	6938		SecurityValidityTimestamp	Y	X	X	Indicates the UTC timestamp when trading for this security expires, i.e. when it is not eligible to trade anymore.
→	1205		NoTickRules	C			Number of tick rules. This block specifies the rules for determining how a security ticks, i.e. the price increments which it can be quoted and traded, depending on the current price of the security For future use.
→	→	1206	StartTickPriceRange	C			Starting price range for specified tick increment For future use.
→	→	1207	EndTickPriceRange	C			Ending price range for the specified tick increment For future use.
→	→	1208	TickIncrement	C			Tick increment for stated price range. Specifies the valid price increments which a security can be quoted and traded For future use.
→	→	1209	TickRuleType	C			Specifies the type of tick rule which is being described For future use.
→	555		NoLegs	C	X	X	Number of instrument legs.
→	→	600	LegSymbol	C	X	X	Leg symbol.

							Conditionally required if NoLegs > 0.
→	→	602	LegSecurityID	C	X	X	Unique identifier for the instrument leg, as per LegSecurityIDSource. Conditionally required if NoLegs > 0.
→	→	603	LegSecurityIDSource	C	X	X	Qualifier for tag LegSecurityID. Conditionally required if NoLegs > 0. Valid Values: 8 = Exchange Symbol
→	→	623	LegRationQty	C	X	X	Ratio of the individual leg relative to the entire security
→	→	609	LegSecurityType	C	X	X	Indicates the type of the individual leg  Valid Values (Corporate Fixed Income): - ETF (Exchange Traded Fund) - CORP (Corporate)  Valid values (derivatives): - FUT (Futures) - SPOT (Spot Market) - SOPT (Spot Options) - FOPT (Future Options) - DTERM (Derivative Forward markets, or "Termo")  Valid values (equities): - CS (Common Stock) - PS (Preferred Stock) - CASH (rights, etc) - FORWARD (Equity Forward or "Termo") - ETF (Exchange Traded Fund) - OPT (Option) - INDEX (Non Tradeable index) - OPTEXER (Option Exercise) - MLEG (Multileg Instrument) - SECLOAN (Security loan, or BTB) - INDEXOPT (Option on Index)



→	→	624	LegSide	C	X	X	The side of this individual leg (multi-leg security). Conditionally required if NoLegs > 0. Valid Values: 1 = Buy 2 = Sell
→	→	616	LegSecurityExchange	C	X	X	Exchange code the leg security belongs to. Conditionally required if NoLegs > 0. Valid Values: BVMF
→	1300		MarketSegmentID	C		X	Identifies the Market Segment ID (for list orders)
→	37010		CorporateActionEventID	C		X	Unique numeric identifier for a corporate action event associated with the security. The identifier is unique within the security. Note. This tag does not represent the type of the Corporate Action.
→	37011		GovernanceIndicator	C		X	Corporate governance level indicator.  Valid Values: N1 = Level 1 N2 = Level 2 N3 = Level 3 NM = New Market MA = MAIS Market MB = SOMA Market <b>M2 = MAIS 2 Market</b>
→	37015		SecurityMatchType	N		X	Type of matching that occurred. Required for Special Auctions  Valid values: 8 = Issuing/Buy Back Auction
→	1234		NoLotTypeRules	C	X		Number of Lot Type Rules for the instrument

→	→	1093	LotType	C	X		Defines the lot type for the instruments. Valid Values: 1 = Odd Lot 2 = Round Lot 3 = Block Lot
→	→	1231	MinLotSize(round)	C	X		Minimum lot size allowed based on lot type specified in LotType(1093)
→		561	RoundLot	C		X	The trading lot size of the security
→		1377	MultiLegModel	C	X		Used for multileg security only. Defines whether the security is pre-defined or user-defined. Valid Values: 0 = Predefined Multileg Security 1 = User-Defined Multileg Security
→		1378	MultiLegPriceMethod	C	X		Used for multileg security only. Defines the method used when applying the multileg price to the legs. Valid Values: 3 = Individual
→		1144	ImpliedMarketIndicator	C			Indicates that an implied market should be created for either the legs of a multi-leg instrument (Implied-in) or for the multi-leg instrument based on the existence of the legs (Implied-out). <b>This tag is reserved for future use.</b>  Valid values: 0 = Not implied (default)
Message Trailer				Y	X	X	

## 6.5 Market Data Messages

### 6.5.1 Market Data Request (MsgType = V)

A Market Data Request is a general request for market data for tradable securities in UMDF PUMA Conflated. A successful Market Data Request is replied by a single Market Data Full Snapshot message for each instrument that matches the request. Upon receiving one of such messages, incremental updates (Market Data Incremental Refresh messages) start being generated for instruments whose snapshots have been already received.

Like on section 6.4.1, the subscription mechanics on UMDF PUMA Conflated, entirely based on filters, allows subscriptions where the selected filters will result in an empty instrument set. Since the platform supports online creation of instruments, a subscription that results in an empty set is perfectly valid (the set can receive new instruments later, during the day). Thus customers

applications must know how to handle 35=W responses containing no instruments (empty Snapshots).

For instance, one could subscribe to a SecurityGroup that usually contains only UDS instruments, this group could start the day with no valid instruments, but subscribing to this will guarantee that if one such instrument is ever created the customer will receive the related incremental messages.

Also, two subscriptions could match instruments previously subscribed; in this case the response will carry all matched instruments' snapshots, even if they are repeated. However, incremental updates (35=X) to them will be relayed only once for each session.

If the repeating group 146-NoRelatedSym is omitted it is assumed that the subscription pertains all available instruments.

It's possible to have multiple subscriptions using different filtering tags, providing the customer sends different values for tag **262-MDReqID**. For example, to subscribe to **both Price depth and Order depth books** it's necessary to send two subscriptions.

There is a maximum limit of subscriptions that can be held simultaneously. This limit is configured by the Market Surveillance, but it should be reasonable enough for customers to maintain several subscriptions without degrading server performance.

To cancel a subscription, tag 262-MDReqID must match another value used in a previous subscription. After a successful cancelation of subscription, no confirmation messages will be received (A 35=Y is still generated in case of failure).



#### IMPORTANT

Since the new subscription policy is based on **filters**, it's always mandatory for each request to have at least one filter. This implies that to subscribe to all market data one will have to hold many simultaneous subscriptions.

Tag	Tag Name	RE Q	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = V
262	MDReqID	Y	X	X	Must be unique, or the ID of previous Market Data Request to disable if SubscriptionRequestType = Disable previous Request (2).
263	SubscriptionRequestType	Y	X	X	Indicates what type of response is expected.  Valid values: 1 = Snapshot + Updates (Subscribe) 2 = Disable previous Request (Unsubscribe)
1021	MDBookType	Y	X	X	Used to request a specific type of book updates when subscribing.  Valid Values: 2 = Price Depth 3 = Order Depth

146	NoRelatedSym	N	X	X	Number of instruments requested.
→ 48	SecurityID	Y	X	X	Unique instrument id. (FILTER)
→ 22	SecurityIDSource	Y	X	X	Security ID qualifier.
→ 207	SecurityExchange	Y	X	X	Market to which the instrument belongs.
167	SecurityType	N	X	X	<p>Indicates type of security. (FILTER)</p> <p>Valid Values (Fixed Income):</p> <ul style="list-style-type: none"> <li>- ETF (Exchange Traded Fund)</li> <li>- CORP (Corporate)</li> </ul> <p>Valid values (derivatives):</p> <ul style="list-style-type: none"> <li>- FUT (Futures)</li> <li>- SPOT (Spot Market)</li> <li>- SOPT (Spot Options)</li> <li>- FOPT (Future Options)</li> <li>- DTERM (Derivative Forward markets, or "Termo")</li> </ul> <p>Valid values (equities):</p> <ul style="list-style-type: none"> <li>- CS (Common Stock)</li> <li>- PS (Preferred Stock)</li> <li>- CASH (rights, etc)</li> <li>- FORWARD (Equity Forward or "Termo")</li> <li>- ETF (Exchange Traded Fund)</li> <li>- OPT (Option)</li> <li>- INDEX (Non Tradeable index)</li> <li>- OPTEXER (Option Exercise)</li> <li>- MLEG (Multileg Instrument)</li> <li>- SECLOAN (Security loan, or BTB)</li> <li>- INDEXOPT (Option on Index)</li> </ul>
37022	NoSecurityGroups	N	X	X	Number of SecurityGroups the customer wants to subscribe.
→ 1151	SecurityGroup	Y	X	X	The quotation group the client wants to subscribe to. Required when 37022 > 0. (FILTER)
461	CFIcode	N	X	X	Classification of Financial Instruments (CFI code) values, which indicate the type of security using the ISO 10962 standard. (FILTER)
460	Product	N	X	X	<p>Indicates the type of product the security is associated with. (FILTER)</p> <p>2 = COMMODITY</p> <p>3 = CORPORATE</p> <p>4 = CURRENCY</p> <p>5 = EQUITY</p> <p>6 = GOVERNMENT</p> <p>7 = INDEX</p> <p>15 = ECONOMIC INDICATOR</p> <p>16 = MULTILEG</p>
	Message Trailer	Y	X	X	

### 6.5.2 Market Data Request Reject (MsgType = Y)

The Market Data Request Reject will be issued by UMDF PUMA Conflated when it is not able to handle the Market Data Request, due to business or technical reasons.

Tag	Tag Name	REQ	EQ	DE R	Comment
	<i>MsgHeader</i>	Y	X	X	MsgType = Y
58	Text	N	X	X	Descriptive text of reason for rejection
262	MDReqID	Y	X	X	Echoes back the ID of Market Data Request message that triggered this rejection.
281	MDReqRejReason	Y	X	X	Reason for the rejection of a Market Data request. Valid values: 1 = Duplicate MDReqID 3 = Insufficient permissions 4 = Unsupported SubscriptionRequestType T = Processing of prior request in progress M = Maximum number of subscriptions exceeded Y = MDReqID not found (attempt to cancel an unknown subscription request) Z = Invalid request
	<i>Message Trailer</i>	Y	X	X	

### 6.5.3 Market Data Snapshot/Full Refresh (MsgType = W)

The Market Data Snapshot/Full Refresh messages are sent as the response to a Market Data Request message. The message refers to only one Market Data Request. It will contain the appropriate MDReqID tag value to correlate the request with the response.

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = W
262	MDReqID	Y	X	X	Echoed back from the Market Data Request message.
911	TotNumReports	N	X	X	Total number of snapshots to be returned.
893	LastFragment	N	X	X	Indicates whether this message is the last in the sequence of messages requested. Not sent by default.  Valid values: Y = Last message

75		TradeDate	N	X	X	Used to specify the trading date which a set of market data applies for, in YYYYMMDD format. Absence of this field indicates current day (expressed in local time in the place of trade).
		<b>[ Instrument identification block ]</b> See Section "Instrument Identification Block" for tag values				
268		NoMDEntries	Y	X	X	Number of entries following.
→	269	MDEntryType	Y	X	X	Type Market Data entry. Valid values: 0 = Bid 1 = Offer 2 = Trade 3 = Index Value* 4 = Opening Price 5 = Closing Price 6 = Settlement Price 7 = Trading Session High Price 8 = Trading Session Low Price 9 = Trading Session VWAP Price A = Imbalance J = Rebuild Book g = Price Band h = Quantity Band B = Trade Volume C = Open Interest D = Composite Underlying Price c = Security trading state/phase <b>v = Volatility price</b>
→	270	MDEntryPx	C	X	X	Price of the MD entry. Conditionally required if the MD entry relates to a price.
→	15	Currency	C	X	X	Identifies the currency of the MDEntryPx
→	271	MDEntrySize	C	X	X	Quantity represented by the Market Data Entry. Conditionally required when MDEntryType = Bid (0), Offer (1), Trade (2) or Opening Price (4).

→	272	MDEntryDate	Y	X	X	Date of Market Data Entry.
→	273	MDEntryTime	Y	X	X	Time of Market Data Entry, up to milliseconds (hhmmssSSS).
→	274	TickDirection	C	X	X	Direction of the price tick. Conditionally required if reporting a Trade. Valid values: 0 = Plus Tick 1 = Zero-Plus Tick 2 = Minus Tick 3 = Zero-Minus Tick
→	336	TradingSessionID	C	X	X	Used to mark Non-Regular Session trades. If it is not present the default value is "1" (Regular Day Session).  Valid values: 1= Regular Day Session 6= Non Regular Session
→	625	TradingSessionSubID	C	X	X	Identifier for the trading phase. Conditionally required when MDEntryType='c'. If absent the default value is 17 = Open. Valid Values: 02 = Trading halt (Pause) 04 = No-Open (Close) 17 = Ready to trade (Open) 18 = Not available for Trading (Forbidden) 21 = Pre-Open (Reserved)
→	276	QuoteCondition	N	X	X	Space-delimited list of conditions describing a quote.  Valid values: "R" = Retransmission of the order "K" = Implied Price
→	277	TradeCondition	N	X	X	For optional use in reporting Trades/Imbalance. Space delimited list of conditions describing a trade/imbalance.

						Valid values: R = Opening Price X = Crossed L = Last Trade at the Same Price Indicator P = Imbalance more buyers Q = Imbalance more sellers U = Exchange Last 3 = Multi Asset Trade (Termo Vista) 1 = Leg trade 2 = Marketplace entered trade (trade on behalf) <b>RL = RLP Trade</b>
→	286	OpenCloseSettlFlag	C	X	X	Identifies if the opening price in field MDEntryPx represents a theoretical opening price and applicable to describe when the settlement data are related to.  Valid values: 0 = Daily open/Close settlement entry 1 = Session Open/Close settlement entry 4 = Entry from previous business day 5 = Theoretical settlement entry
→	432	ExpireDate	C	X		Date of order expiration (last day the order can trade), always expressed in terms of the local market date.
→	287	SellerDays	N	X		Specifies number of days that may elapse before delivery of security.
→	37	OrderID	C	X	X	Unique identifier for Order as assigned by the exchange, maps to the SecondaryOrderID field in the Execution Report message for the derivatives market (for the FX market, it is the actual OrderID). Required for



						Bids or Offers for market by order.
→	288	MDEntryBuyer	N	X	X	For optional use in reporting trades (buying party) or indicating a new bid entry. Note: not sent for MBP book messages.
→	289	MDEntrySeller	N	X	X	For optional use in reporting trades (selling party) or indicating a new offer entry. Note: not sent for MBP book messages.
→	346	NumberOfOrders	C	X	X	Number of orders at this price level.
→	290	MDEntryPositionNo	C	X	X	Display the position of a bid or offer, numbered from the most competitive to the least competitive, per market side, beginning with 1. Conditionally required when MDEntryType = 0 or 1 (Bid or offer)
→	326	SecurityTradingStatus	C	X	X	Identifier for the security trading status. Conditionally required when MDEntryType='c'. If absent the default value is 17 = Open. Valid Values: 02 = Trading halt (Pause) 04 = No-Open (Close) 17 = Ready to trade (Open) 18 = Not available for Trading (Forbidden) 20 = unknown or invalid 21 = Pre-Open (Reserved)
→	342	TradSesOpenTime	C	X	X	Indicates the time the auction is scheduled to end. Conditionally required when MDEntryType='c' and SecurityTradingStatus=21.
→	423	PriceType	C	X	X	Code to represent the price type. If it is not present the default value is "2" (Per unit).

							Valid Values: 1=percentage 2=per unit (i.e. per share or contract) 3=fixed amount (absolute value)
➔	451		NetChgPrevDay	C	X	X	Net change from previous trading day's closing price vs. last traded price (offshore currency).
➔	711		NoUnderlyings	C	X		This group is conditionally required for 269=D, Index Composite Entry Type. Number of repeating groups is based on Index Composite.
➔	➔	309	UnderlyingSecurityID	Y	X		Underlying instrument's security identifier. Conditionally required if NoUnderlyings > 0.
➔	➔	305	UnderlyingSecurityIDSource	Y	X		Qualifier for underlying instrument's securityID. Valid Values: 8 = Exchange Symbol
➔	➔	308	UnderlyingSecurityExchange	Y	X		Underlying instrument's exchange. Valid Values: BVMF
➔	➔	810	UnderlyingPx	Y	X		Underlying instrument price reflected in Index value.
➔	➔	37018	UnderlyingPxType	Y	X		Indicates the Underlying Instrument price type refelected in Index value. Valid Values: 0 = Trade (default) 1 = Average of TOB
➔	731		SettlPriceType	C	X	X	Type of settlement price: 1=final 2=theoretical/preview 3=updated
➔	1003		TradeID	C	X	X	Contains the unique identifier for this trade per instrument + trading date, as assigned by the exchange. Required if reporting a Trade.
➔	1020		TradeVolume	N	X	X	Total traded quantity (shares/contracts) of the trading day. It could be

						present only in the Trade (269=2) and Trade Volume (269=B) blocks.
→	1021	MDBookType	C	X	X	Required for book related messages. Not used for statistics and trades. Valid Values:  1 = Top of Book (not available) 2 = Price Depth 3 = Order Depth
→	1140	MaxTradeVol	C	X		The maximum order quantity that can be submitted for a security. The value is the minimum between % of shares issued and % of average traded quantity within 30 days.
→	1025	FirstPx	C		X	The price for the short future on a volatility price (269=v).
→	31	LastPx	C		X	The price for the long future on a volatility price (269=v).
→	811	PriceDelta	C		X	The rate of change in the price of a derivative with respect to the movement in the price of the underlying instrument(s) upon which the derivative instrument price is based. Only used for 269=v (Volatility price). This value is normally between -1.0 and 1.0.
→	1148	LowLimitPrice	N	X	X	Allowable low limit price for the trading day. A key parameter in validating order price. Used as the lower band for validating order prices. Orders submitted with prices below the lower limit will be rejected.
→	1149	HighLimitPrice	N	X	X	Allowable high limit price for the trading day. A key parameter in validating order price. Used as the upper band for validating

						order prices. Orders submitted with prices above the upper limit will be rejected.
→	1150	TradingReferencePrice	C		X	Reference price for the current trading price range. The value may be the settlement price or closing price of the prior trading day. Sent only for Economic Indicators.
→	1174	SecurityTradingEvent	N	X	X	Identifies an event related to a TradingSessionSubID.  Possible value: 4 – Reset Statistics 101 – Security Status separated from Group Phase 102 – Security Status following Group Phase
→	1306	PriceLimitType	N	X	X	Indicates if price value is expressed in tick, percentage, or actual price terms. This tag not sent for 269=g for economic indicator. Valid Values: 0=price 1=ticks 2=percentage
→	1500	MDStreamID	N	X	X	The identifier or name of the price stream. The default value is "E" (Electronic). Valid Values: E = Electronic X - Ex-pit T = Termo O = Option Exercise (E&B) N = Index L = Lending (BTB) A = All
→	6939	PriceBandType	C	X	X	Indicates type of price banding. Valid Values: 1= Hard Limits 2= Auction Limits 3= Rejection Band

						4= Static Limits
→	9325	LastTradeDate	C	X		Date the instrument last traded. Used as an input in the calculation of the MaxTradeVol and used to trigger an Auction. Not published if the product has never been traded.  Published as part of Adjusted Closing Price block 269=5 286=4.
→	37003	AvgDailyTradedQty	C	X		Daily average shares traded within 30 days – equity market only. Previously known as DailyAvgShares30D.
→	37008	PriceBandMidpointPriceType	C	X	X	Band Midpoint Type, used with Auction Price Banding Valid Values: 0 = Last Traded Price (default) 1 = Complementary Last Price 2 = Theoretical Price
→	37013	PriceAdjustmentMethod	C	X		Indicator of previous day's closing price. Valid Values: 0 = no adjustment (default) 1= Theoretical price of EX share. 2 = Theoretical price of EX share when greater than WITH price. 3 = Theoretical price of EX share, resulting from dividends in different types of stocks/companies. 4 =Price arbitrated by Market Authority
→	37014	MDEntryInterestRate	C	X		Interest Rate of the Termo Trade Expressed in decimal form. For example, 1% points is expressed and sent as 0.01. One basis point is represented as 0.0001.
→	37016	MDInsertDate	N	X	X	The date when the order was inserted or re-

						inserted into the order book or manually altered by MktOps
→	37017	MDInsertTime	N	X	X	The time when the order was inserted or re-inserted into the order book or manually altered by MktOps, The time is expressed up to milliseconds (hhmmssSSS).
→	37019	EarlyTermination	C	X		Indicates if the deal is subject to anticipated liquidation (early termination of the borrowing/lending). Used for BTB instruments only.  Valid values: 0 = Normal termination (default) 1 = Early termination 2 = Early termination also in case of PTO
→	37023	BTBCertIndicator	C	X		Indicates if the security lending offer or pre-contract is certified. If not sent, means the offer or pre-contract is not certified. Used for BTB instruments only.  Valid values: 0 = Certified (default) 1 = Not certified
→	37024	BTBContractInfo	C	X		Denotes extra information about the BTB pre-contract. Used for BTB instruments only.  Valid values: 1 = pre-contract (default) 2 = intention
→	37025	BTBGraceDate	C	X		Indicates the minimum date from when the borrower can call the loan contract to an end. Used for BTB instruments only.
→	37100	IndexSeq	C	X		Index Value Sequence.
		Message Trailer	Y	X		

#### 6.5.4 Market Data Incremental Refresh (MsgType = X)

After a subscription for Market Data messages succeeded and the Market Data Snapshot/Full Refresh has been issued, further updates will be communicated to the subscriber via the Market Data Incremental Refresh message. These messages will be sent until the client institution cancels the subscription with a Market Data Request with *SubscriptionRequestType=2*.

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = X
75	TradeDate	N	X	X	Used to specify the trading date which a set of market data applies for, in YYYYMMDD format. Absence of this field indicates the current day (expressed in the local time of the place of the trade).
1021	MDBookType	N	X	X	Required for book related messages. Not used for statistics and trades. Valid Values:  1 = Top of Book (not available) 2 = Price Depth 3 = Order Depth
268	NoMDEntries	Y	X	X	Number of entries following.
→ 279	MDUpdateAction	Y	X	X	Type of Market Data update action. Valid values: 0 = New 1 = Change 2 = Delete 3 = Delete Thru 4 = Delete From
→ 15	Currency	C	X	X	Identifies the currency of the MDEntryPx
→ 37	OrderID	C	X	X	Unique identifier for Order as assigned by the exchange, maps to the SecondaryOrderID field in the Execution Report message for the derivatives market (for the FX market, it is the actual OrderID). Required for Bids or Offers for market by order.
→	[ Instrument identification block ] See Section "Instrument Identification Block" for tag values				
→ 269	MDEntryType	Y	X	X	Type Market Data entry. Valid values: 0 = Bid

						1 = Offer 2 = Trade 3 = Index Value* 4 = Opening Price 5 = Closing Price 6 = Settlement Price 7 = Trading Session High Price 8 = Trading Session Low Price 9 = Trading Session VWAP Price A = Imbalance J = Rebuild Book g = Price Band h = Quantity Band B = Trade Volume C = Open Interest D = Composite Underlying Price v = Volatility Price
→	270	MDEntryPx	C	X	X	Price of the Market Data Entry. Required when this market data entry involves a price. Represents the notional value for trade volume (B). Other entry types that do not involve price do not require this tag.
→	271	MDEntrySize	C	X	X	Quantity or volume represented by the Market Data Entry. Required when MDUpdateAction = New (0) and MDEntryType = Bid (0), Offer (1), Trade (2), Trade Volume (B) or Opening Price (4).
→	272	MDEntryDate	Y	X	X	Date of Market Data Entry.
→	273	MDEntryTime	Y	X	X	Time of Market Data Entry, up to milliseconds (hhmmssSSS).
→	274	TickDirection	C	X	X	Direction of the price tick. Used as part of a trade message. Ex. Order price sequence 90, 100, 100 will have 274=1  Valid values: 0 = Plus Tick 1 = Zero-Plus Tick 2 = Minus Tick



						3 = Zero-Minus Tick
→	276	QuoteCondition	N	X	X	Space-delimited list of conditions describing a quote.  Valid values: "R" = Retransmission of the order "K" = Implied Price
→	277	TradeCondition	N	X	X	For optional use in reporting Trades/Imbalance. Space delimited list of conditions describing a trade/imbalance.  Valid values: R = Opening Price X = Crossed L = Last Trade at the Same Price Indicator P = Imbalance more buyers Q = Imbalance more sellers U = Exchange Last 3 = Multi Asset Trade (Termo Vista) 1 = Leg trade 2 = Marketplace entered trade (trade on behalf) <b>RL = RLP Trade</b>
→	286	OpenCloseSettlFlag	C	X	X	Identifies if the opening price in field MDEntryPx represents a theoretical opening price and applicable to describe when the settlement data are related to. Valid values issued by BVMF: 0 = Daily open/Close settlement entry 1 = Session Open/Close settlement entry 4 = Entry from previous business day 5 = Theoretical settlement entry

→	287	SellerDays	N	X		Specifies the number of days that may elapse before the delivery of the security. Only used for some types of trades in the forward market.
→	288	MDEntryBuyer	N	X	X	For optional use in reporting trades (buying party) or indicating a new bid entry. Note: not sent in FX messages (blind screen).
→	289	MDEntrySeller	N	X	X	For optional use in reporting trades (selling party) or indicating a new offer entry. Note: not sent in FX messages (blind screen).
→	290	MDEntryPositionNo	C	X	X	Display the position of a bid or offer, numbered from most competitive to least competitive, per market side, beginning with 1. Conditionally required when MDEntryType=0 or 1 (Bid or Offer).
→	336	TradingSessionID	C	X	X	Identifier for Trading Session. Used on Non-Regular Trading Session messages only. If it is not present the default value is "1" (Regular Session).  Valid values: 1= Regular Day Session 6 = Non Regular Session (After Hours)
→	346	NumberOfOrders	C	X	X	Contains the number of orders that make up the aggregate quantity at the price point. Required if this is a price-depth book entry.
→	423	PriceType	C	X	X	Code to represent the price type (applicable to settlement data). The default value is "2" (Per unit).  Valid values: 1 – Percentage 2 – Per unit (i.e. per share or contract) 3 – Fixed amount (absolute value)

→	432	ExpireDate	C	X		Date of order expiration (last day the order can trade), always expressed in terms of the local market date. Used in BTB contracts only.
→	451	NetChgPrevDay	C	X	X	Net change from previous trading day's closing price vs. last traded price (offshore currency).
→	711	NoUnderlyings	C	X		Number of repeating groups is based on Index Composition. Only used when representing Index Composite Underlying Price (269=D).
→	→	309	UnderlyingSecurityID	Y	X	Underlying instrument's security identifier.
→	→	305	UnderlyingSecurityIDSource	Y	X	Qualifier for underlying instrument's security ID.
→	→	308	UnderlyingSecurityExchange	Y	X	Underlying instrument's exchange.
→	→	810	UnderlyingPx	Y	X	Underlying instrument price reflected in Index value.
→	→	3701 8	UnderlyingPxType	Y	X	Indicates the Underlying Instrument price type reflected in Index value.  Valid values: 0 = Trade (default) 1 = Average of TOB
→	731	SettlPriceType	C	X	X	Required only for MDEntryType=6 (Settlement Price).  Valid values: 1 = Final 2 = Theoretical/Preview 3 = Updated
→	1003	TradeID	C	X	X	Contains the unique identifier for this trade per instrument + trading date, as assigned by the exchange. Conditionally required if reporting a Trade.
→	1020	TradeVolume	N	X	X	Total traded quantity (shares/contracts) of the trading day. It could be present only in the Trade (269=2) and Trade Volume (269=B) blocks.

→	1140	MaxTradeVol	C	X		The maximum order quantity that can be submitted for a security. The value is the minimum between % of shares issued and % of average traded quantity within 30 days.
→	1025	FirstPx	C		X	The price for the short future on a volatility price (269=v).
→	31	LastPx	C		X	The price for the long future on a volatility price (269=v).
→	811	PriceDelta	C		X	The rate of change in the price of a derivative with respect to the movement in the price of the underlying instrument(s) upon which the derivative instrument price is based. Only used for 269=v (Volatility price). This value is normally between -1.0 and 1.0.
→	1148	LowLimitPrice	N	X	X	Allowable low limit price for the trading day. A key parameter in validating order price. Used as the lower band for validating order prices. Orders submitted with prices below the lower limit will be rejected.
→	1149	HighLimitPrice	N	X	X	Allowable high limit price for the trading day. A key parameter in validating order price. Used as the upper band for validating order prices. Orders submitted with prices above the upper limit will be rejected.
→	1150	TradingReferencePrice	C		X	Reference price for the current trading price range. The value may be the settlement price or closing price of the prior trading day. <b>Sent only for Economic Indicators.</b>
→	1306	PriceLimitType	N	X	X	Describes how the prices are expressed. The default value is "0" (Price Unit).  Valid values: 0 = Price Unit 1 = Ticks

						2 = Percentage
→	1500	MStreamID	N	X	X	The identifier or name of the price stream. The default value is "E" (Electronic). Valid Values: E = Electronic X - Ex-pit T = Termo O = Option Exercise (E&B) N = Index L = Lending (BTB) A = All
→	6939	PriceBandType	C	X	X	Indicates the type of price banding (tunnel):  Used for Price Banding when MEntryType (269) = g and when tags 1148 and 1149 are sent.  Valid values: 1= Hard Limit 2= Auction Limits 3= Rejection Band 4= Static Limits
→	9325	LastTradeDate	C	X		Date the instrument last traded. Used as an input in the calculation of the MaxTradeVol and used to trigger an Auction. Not published if the product has never been traded.  Published as part of Adjusted Closing Price block 269=5 286=4.
→	37003	AvgDailyTradedQty	C	X		Daily average shares traded within 30 days – equity market only. Previously known as DailyAvgShares30D.
→	37008	PriceBandMidpointPriceType	C	X	X	Band Midpoint Type Complementary Last Price (CLAST) follows special rules described in 3BR6.2.3.1 Used with Auction Price Banding.  Valid values:

						0 = Last Traded Price (default) 1 = Complementary Last Price 2 = Theoretical Price
→	37013	PriceAdjustmentMethod	C	X		Indicator of previous day's closing price.  Used for Closing price adjustments related to Corporate Actions.  Valid values: 0 = No adjustment (default) 1 = Theoretical price of EX share. 2 = Theoretical price of EX share when greater than WITH price. 3 = Theoretical price of EX share, resulting from dividends in different types of stocks/companies. 4 = Price arbitrated by Market Authority
→	37014	MDEntryInterestRate	C	X		Interest Rate of the Termo Trade. Expressed in decimal form. For example, 1% points is expressed and sent as 0.01. One basis point is represented as 0.0001.
→	37016	MDInsertDate	N	X	X	Date when the order was inserted or re-inserted into the order book (used for GTD/GTC orders, only for equities market). For PUMA: In Trade (269=2 - New or Delete) – original trade date or manually entered by MktOps
→	37017	MDInsertTime	N	X	X	The time when the order was inserted or re-inserted into the order book or manually altered by MktOps, up to milliseconds (hhmmssSSS).
→	37019	EarlyTermination	C	X		Indicates if the deal is subject to anticipated liquidation (early termination of the borrowing/lending). Used for BTB instruments only.

						Valid values: 0 = Normal termination (default) 1 = Early termination 2 = Early termination also in case of PTO
→	37023	BTBCertIndicator	C	X		Indicates if the security lending offer or pre-contract is certified. If not sent, means the offer or pre-contract is not certified. Used for BTB instruments only. Valid values: 0 = Certified (default) 1 = Not certified
→	37024	BTBContractInfo	C	X		Denotes extra information about the BTB pre-contract. Used for BTB instruments only. Valid values: 1 = pre-contract (default) 2 = intention
→	37025	BTBGraceDate	C	X		Indicates the minimum date from when the borrower can call the loan contract to an end. Used for BTB instruments only.
→	37100	IndexSeq	C	X		Index Value sequence number. Used only for index instruments.
		Message Trailer	Y	X	X	

### 6.5.5 Security Status (MsgType = f)

The Security Status message relays trading phase changes of a specific instrument or instrument group. The client knows by the usage of the Security List message which instruments belong to a group. The new trading phase is specified in the TradingSessionSubID field.

When tag 1174-SecurityTradingEvent is sent with value “4”, a statistics reset must be performed by the client, erasing the memory values of the following statistics blocks:

MDEntryType	Description
2	Last Trade
3	Index Value
4	Opening Price
4	Theoretical Price (tag 286=5)
7	Trading Session High Price
8	Trading Session Low Price

<b>9</b>	Trading Session VWAP Price
<b>B</b>	Trade Volume

The same statistics will no longer be available at the Snapshot message (35=W) for future subscriptions, upon the receipt of message *SecurityStatus* (tag 35=f) with *SecurityTradingEvent* field (tag 1174) = 4 (Change of Trading Session).

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = f
	[ Instrument identification block ] See Section "Instrument Identification Block" for tag values				
60	TransactTime	Y	X	X	Timestamp when the business transaction represented by the message occurred.
75	TradeDate	Y	X	X	Trade date of the Market Data messages.
326	SecurityTradingStatus	C	X	X	Status related to a given instrument.  Valid values: 02 = Trading halt (Pause) 04 = No-Open (Close) 17 = Ready to trade (Open) 18 = Not available for trading (Forbidden) 20 = Unknown or invalid 21 = Pre-Open (Reserved) 101 = Final Closing Call
336	TradingSessionID	C	X		Identifier for Trading Session.  Valid values: 1 = Regular Day Session 6 = Non Regular Session (After Hours)
342	TradSesOpenTime	C	X	X	Indicates the time the auction is scheduled to end.
625	TradingSessionSubID	C	X	X	Phase related to a given SecurityGroup.  Valid values: 02 = Trading halt (Pause) 04 = No-Open (Close) 17 = Ready to trade (Open) 18 = Not available for trading (Pre-close) 21 = Pre-Open 101 = Final Closing Call
1151	SecurityGroup	C	X	X	The instrument group that is changing the trading phase.



1500	MDStreamID	N	X	X	The identifier or the name of the market data stream. If missing, default=E. Valid values: E = electronic A = all X = ex-pit S = surveillance O = option exercise C = over the counter S = surveillance
1174	SecurityTradingEvent	C	X	X	Identifies an event related to a TradingSessionSubID.  Possible value: 4 - Change of Trading Session = Reset Trading Statistics. 101 – Security Status separated from Group Phase 102 – Security Status following Group Phase
	<i>Message Trailer</i>	Y	X	X	

### 6.5.6 News (MsgType = B)

The News message is sent to communicate market information.

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = B
42	OrigTime	N	X	X	Time of message origination.
6940	NewsSource	Y	X	X	Indicates the source of the news.  Valid values for derivatives market: "1" – DCM "2" – BBMNet "3" – MarketSurveillance "4" – Internet "5" – DPR-VE "19" – Mkt Ops FX Agency "20" – Mkt Ops Derivatives Agency  Valid values for equities market: "11" – Over-the-counter news agency "13" – Electronic Purchase Exchange "14" – CBLC News Agency "15" – BOVESPA – Index Agency

					"16" – BOVESPA – Institutional Agency "17" – Mkt Ops Equites Agency "18" – BOVESPA – Companies Agency
1472	NewsID	N	X	X	Unique identifier for News message. Not sent for automated Trading Engine News messages.
1474	LanguageCode	N	X	X	Indicates the language the news is in. Represented by the two-letter ISO 639-1 standard identification. Absence of this field defaults to "pt" – Portuguese.
148	Headline	Y	X	X	The headline of a News message.
358	EncodedHeadlineLen	N	X	X	Must be set if EncodedHeadline field is specified and must immediately precede it.
359	EncodedHeadline	N	X	X	Encoded (non-ASCII characters) representation of the Headline field in the encoded format specified via the MessageEncoding field.
146	NoRelatedSym	N	X	X	Specifies the number of repeating symbols (instruments) specified.
→	<b>[ Instrument identification block ]</b> <b>*no changes to this block*</b>				
33	NoLinesOfText	Y	X	X	Identifies number of lines of text body.
→ 58	Text	Y	X	X	Free format text string.
→ 354	EncodedTextLen	N	X	X	Length of EncodedText field.
→ 355	EncodedText	N	X	X	Encoded (non-ASCII characters) representation of the Text (58) field in the encoded format specified via the MessageEncoding (347) field.
149	URLLink	N	X	X	A URL (Uniform Resource Locator) link to additional information  (e.g. <a href="http://www.bvmf.com/news.html">http://www.bvmf.com/news.html</a> )

## 6.6 Trade History

The trade history functionality allows customer applications to request missing trades and index values for the current trading day. This means that customers will not be able to recover missing bid/asks or any book changes using this feature, only trades and indexes values. Each request must be performed per instrument (since TradeIDs and IndexSeqs are valid per instrument).

When recovering trades/index values, it's advised to request the latest snapshot for a given instrument first to obtain the latest value for TradeID (or IndexSeq), as the Snapshot message (35=W) always contains the last Trade / Index Value (when available).

Using the TradeID / IndexSeq obtained in the Snapshot message (35=W), assemble a request passing the last known value in tag 7174-StartSequence (or "0" when no previous value was received).

**Please be advised that only up to 1000 trades / index values will be returned per request.** The request can contain a maximum delta between tags 7174 and 7175 of 10000 ids (meaning an average of 1000 trades, since they are usually issued by increments of 10).

If the last Trade History Response message (35=UTHP) received is the last message (893-LastFragment = Y) and the TradeID or IndexSeq returned does not match the last value received in the Snapshot, the customer application should assemble another request using the highest value received and repeat this process until the last UTHP message contains the requested TradeID / IndexSeq.

It's only possible to request data for instruments which a given session has access for.



This feature is meant to recover missing trades/index values only. Customers that require the recovery of all market data messages for the session, for charting purposes, are encouraged to use the TCP Historical Replay feature in standard UMDF PUMA platform.

### 6.6.1 Trade History Request (MsgType = UTHQ)

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = UTHQ
262	MDReqID	Y	X	X	
263	SubscriptionRequestType	Y	X	X	Indicates what type of response is expected. Valid values: 0 = Snapshot
146	NoRelatedSym	Y	X	X	Number of instruments requested. A maximum of 50 instruments may be specified per request.
→ 22	SecurityIDSource	Y	X	X	Security ID qualifier.
→ 48	SecurityID	Y	X	X	Unique instrument id.
→ 207	SecurityExchange	Y	X	X	Market to which the instrument belongs.

→	7174	StartSequence	Y	X	X	Starting TradeID / IndexSeq for recovery of trades or index values. If unknown use value = 0 to indicate to recover from the first one available.
→	7175	EndSequence	Y	X	X	Ending TradeID / IndexSeq for recovery of trades or index values.
		Message Trailer	Y	X	X	

## 6.6.2 Trade History Response (MsgType = UTHP)

Tag	Tag Name	REQ	EQ	DER	Comment
	Message Header	Y	X	X	MsgType = UTHP
281	MDReqRejReason	N	X	X	Reason for the rejection of a Trade History request request. Valid values: 0 = Unknown instrument 3 = Insufficient permissions 4 = Unsupported SubscriptionRequestType T = Processing of prior request in progress X = Response temporary unavailable Z = Invalid request
262	MDReqID	Y	X	X	Echoed back from the Trade History Request message.
893	LastFragment	N	X	X	Indicates whether this message is the last in the sequence of messages requested. Not sent by default.  Valid values: Y = Last message
	<b>[ Instrument identification block ]</b> See Section "Instrument Identification Block" for tag values. <b>Always sent, except when a query with no specified instrument is replied with an empty response.</b>				
268	NoMDEntries	Y	X	X	Number of entries following.
➔ 269	MDEntryType	Y	X	X	Type Market Data entry. Valid values: 2 = Trade 3 = Index Value*
➔ 75	TradeDate	N	X	X	Used to specify the trading date which a set of market data applies

						for, in YYYYMMDD format. Absence of this field indicates current day (expressed in local time in the place of trade).
→	270	MDEntryPx	C	X	X	Price of the MD entry. Conditionally required if the MD entry relates to a price.
→	271	MDEntrySize	C	X	X	Quantity represented by the Market Data Entry. Conditionally required when Trade (2) or Opening Price (4).
→	272	MDEntryDate	Y	X	X	Date of Market Data Entry generation.
→	273	MDEntryTime	Y	X	X	Time of Market Data Entry generation.
→	274	TickDirection	C	X	X	Direction of the price tick. Conditionally required if reporting a Trade. Valid values: 0 = Plus Tick 1 = Zero-Plus Tick 2 = Minus Tick 3 = Zero-Minus Tick
→	277	TradeCondition	N	X	X	For optional use in reporting Trades/Imbalance. Space delimited list of conditions describing a trade/imbalance.  Valid values: R = Opening Price X = Crossed L = Last Trade at the Same Price Indicator P = Imbalance more buyers Q = Imbalance more sellers U = Exchange Last 3 = Multi Asset Trade (Termo Vista) 1 = Leg trade 2 = Marketplace entered trade (trade on behalf) <b>RL = RLP Trade</b>

→	279	MDUpdateAction	N	X	X	Type of Market Data update action. The default value is 0.  Valid values: 0 = New 1 = Change 2 = Delete
→	286	OpenCloseSettlFlag	C	X	X	Identifies if the opening price in field MDEntryPx represents a theoretical opening price and applicable to describe when the settlement data are related to.  Valid values: 0 = Daily open/Close settlement entry 1 = Session Open/Close settlement entry 4 = Entry from previous business day 5 = Theoretical settlement entry
→	288	MDEntryBuyer	N	X	X	For optional use in reporting trades (buying party) or indicating a new bid entry. Note: not sent for MBP book messages.
→	289	MDEntrySeller	N	X	X	For optional use in reporting trades (selling party) or indicating a new offer entry. Note: not sent for MBP book messages.
→	336	TradingSessionID	C	X	X	Used to mark Non-Regular Session trades. If it is not present the default value is "1" (Regular Session).  Valid values: 1= Regular Session 6= Non Regular Session
→	451	NetChgPrevDay	C	X	X	Net change from previous trading day's closing price vs. last traded price (offshore currency).

→	1003	TradeID	C	X	X	Contains the unique identifier for this trade per instrument + trading date, as assigned by the exchange. Required if reporting a Trade.
→	1020	TradeVolume	N	X	X	Total traded quantity (shares/contracts) of the trading day. It could be present only in the Trade (269=2) and Trade Volume (269=B) blocks.
→	1500	MDStreamID	N	X	X	The identifier or name of the price stream. The default value is "E" (Electronic). Valid Values: E = Electronic X - Ex-pit T = Termo O = Option Exercise (E&B) N = Index L = Lending (BTB) A = All
→	37016	MDInsertDate	N	X	X	The date when the trade was inserted. Only used for trades (269=2).
→	37017	MDInsertTime	N	X	X	The time when the trade was inserted. Only used for trades (269=2).
→	37100	IndexSeq	C	X		Index Value Sequence. Only available in 269=3 (Index value) blocks.
		Message Trailer	Y	X		

## 6.7 Market Totals

The Market Totals functionality aggregates information regarding total trades on a given market segment. Currently the system informs the gross traded amount, total number of trades and total volume traded.

After a successful Logon, the customer application may subscribe / unsubscribe to Market Totals by sending a 35=UTOTQ message. Currently it's only possible to subscribe to all Market Totals instruments at once.

After a successful subscription (replied by a 35=UTOTP message without errors being reported on tag 281-MDReqRejReason), the system generates one or more 35=UTOTC messages informing the composition of each Market Totals instrument.

After all 35=UTOTC messages are received, the system starts to periodically send 35=UTOT messages informing the current totals for each Market Totals instrument.

### 6.7.1 Market Totals Request (MsgType = UTOTQ)

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = UTOTQ
262	MDReqID	Y	X	X	Must be unique. When unsubscribing, must be a MDReqID used previously by this session
263	SubscriptionRequest Type	Y	X	X	Indicates what type of response is expected. Valid values: 1 = Subscribe 2 = Disable previous subscription
	<i>Message Trailer</i>	Y	X	X	

### 6.7.2 Market Totals Response (MsgType = UTOTP)

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = UTOTP
262	MDReqID	Y	X	X	Must be unique
281	MDReqRejReason	N	X	X	Reason for the rejection of a Market Totals request. Not sent in case of success. Valid values: 1 = Duplicate MDReqID Y = MDReqID not found (attempt to cancel an unknown subscription request)
	<i>Message Trailer</i>	Y	X	X	

### 6.7.3 Market Totals Broadcast (MsgType = UTOT)

Tag	Tag Name	REQ	EQ	DER	Comment
	<i>Message Header</i>	Y	X	X	MsgType = UTOT
268	NoMDEntries	Y	X	X	Number of entries following.
→ 269	MDEntryType	Y	X	X	Type Market Data entry. Valid values: t = Market Total Broadcast
→ 55	Symbol	Y	X	X	Symbol identifying the Market Total
→ 272	MDEntryDate	Y	X	X	Date of Market Total calculation.
→ 273	MDEntryTime	Y	X	X	Time of Market Total calculation.
→ 381	GrossTradeAmt	Y	X	X	Total amount traded (i.e. quantity * price) expressed in units of currency.



→	387	TotalVolumeTraded	Y	X	X	Total volume traded.
→	6139	TotalNumOfTrades	Y	X	X	Total number of trades.
		<i>Message Trailer</i>	Y	X	X	

#### 6.7.4 Market Totals Composition (MsgType = UTOTC)

Tag			Tag Name	REQ	E Q	DE R	Comment
			Message Header	Y	X	X	MsgType = UTOTC
393			TotNoRelatedSym	Y	X	X	Total number of Market Totals instruments being returned for this request.
893			LastFragment	Y	X	X	Indicates whether this message is the last in the sequence of messages requested. Not sent by default.  Valid values: Y = Last message
6107			IndexID	N	X	X	The Symbol of the referred index. Only used when the Market Totals refers to one.
146			NoRelatedSym	Y	X	X	Specifies the number of repeating instruments specified.
➔	55		Symbol	Y	X	X	Symbol identifying the Market Total
➔	107		SecurityDesc	Y	X	X	Description of the Market Total.
➔	37022		NoSecurityGroups	Y	X	X	Number of underlying SecurityGroups.
➔	➔	1151	SecurityGroup	Y	X	X	Indicates a security group included in this Market Total.
			Message Trailer	Y	X	X	

#### 6.7.5 Unsupported FIX Messages



Apart from the messages mentioned herein this document, UMDF PUMA Conflated does not support any other FIX message types.

## 6.8 Market Data Messages Per Entry Type

### 6.8.1 Book Updates (269=0,1)

See chapter 5 for more details.

Here are the FIX tags that are associated with book updates repeating groups (X=required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0","1","2","3","4"	
269	MDEntryType	"0","1"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	C	"L" - for BTB book
270	MDEntryPx	C	Not sent for MOA and MOC, or deletes
271	MDEntrySize	C	Not sent on deletes
432	ExpireDate	C	Used for BTB contracts only
37019	EarlyTermination	C	Used for BTB contracts only
37023	BTBCertIndicator	C	Used for BTB contracts only
346	NumberOfOrders	C	Always sent on MBP bids and offers
272	MDEntryDate	X	
273	MDEntryTime	X	
37016	MDInsertDate	C	Only sent on MBO bids and offers
37017	MDInsertTime	C	Only sent on MBO bids and offers
276	QuoteCondition	"C", "R"	"R" – On book retransmission
288	MDEntryBuyer	C	Sent on bids, but not on MBP or FX, or deletes
289	MDEntrySeller	C	Sent on offers, but not on MBP or FX, or deletes
290	MDEntryPositionNo	X	
37	OrderID	C	Not sent for MBP or 279=3,4

### 6.8.2 Book Reset (269=J)

In case of component failure, BVMF will issue a market data incremental message with an entry type 'J' (Book Reset) to notify client systems that a book for specific instrument is corrupted.

Here are the FIX tags sent for such a repeating group (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0"	
269	MDEntryType	"J"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
272	MDEntryDate	X	
273	MDEntryTime	X	

### 6.8.3 Trade (269=2)

The trade data block is sent when a trade occurs to provide volume and trade statistics.

Below is the usage table for tag 277 in this block (X= required) :

Tag 277 Value	EQ	DER	Description
<b>R = Opening Price</b>	X	X	First trade on the session (also applies to after-hours session).
<b>X = Crossed</b>	X	X	Cross trade (intentional).
<b>L = Last Trade at the Same Price Indicator</b>	X	X	Indicates the trade uses the same price as the previous trade.
<b>U = Exchange Last</b>	X	X	Indicates the trade is being resent as the last trade (used on Market Data Snapshot message also), <b>this trade should never be considered as a new trade.</b>
<b>3 = Multi Asset Trade (Termo Vista)</b>	X	-	Trade generated automatically when a Termo Vista had a trade and was flagged accordingly.

<b>2 = Marketplace entered trade (trade on behalf)</b>	X	-	Trade entered by the market surveillance.
<b>1 = Leg trade</b>	X	-	Trade generated automatically when a User Defined Strategy (UDS) had a trade, indicating the trades on the respective legs.
<b>RP = RLP Trade</b>	X	X	Trade generated with Retail Liquidity Provider order.

Here are the FIX tags sent for a trade repeating group (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0","2"	
269	MDEntryType	"2"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"E","T","O"	
270	MDEntryPx	C	Not sent for Block Trades (BTF)
271	MDEntrySize	X	
37014	MDEntryInterestRate	C	Only sent for Termo trades
272	MDEntryDate	X	
273	MDEntryTime	X	
37016	MDInsertDate	X	
37017	MDInsertTime	X	
37019	EarlyTermination	C	Used for BTB instruments only.
37024	BTBContractInfo	C	Used for BTB instruments only.
37025	BTBGraceDate	C	Used for BTB instruments only.
274	TickDirection	C	
277	TradeCondition	C	
336	TradingSessionID	C	Sent on NRS trades
288	MDEntryBuyer	C	Not for FX trades

289	MDEntrySeller	C	Not for FX trades
451	NetChgPrevDay	C	Always sent on New Trades
287	SellerDays	C	Sent for Termo
1020	TradeVolume	C	Total traded volume for the session (only sent when 1500=E)
1003	TradeID	X	



#### NOTE 1

The last received repeating group MDEntryType (tag 269) = 2 (Trade) does not mean it is the last traded price. Please pay attention to the following fields to determine the last traded price: MDEntryTime (tag 273) and TradeID (tag 1003).



#### NOTE 2

When receiving a message with the repeating group whose MDEntryType (tag 269) = 2 (Trade) and TradeCondition (tag 277) contains U (Exchange Last), it means that it is not a “real” trade, but only information of the last valid trade. Therefore, the related repeating group only informs the price and quantity, and not contains other information like buying and selling parties, trade identification, etc.

### 6.8.4 Index Value (269=3)

This group of information is only applicable to indexes for equity markets. For this specific functionality, the following other entry types are valid: 4 (Opening Price), 5 (Closing Price), 6 (Settlement Price), 7 (Trading Session High Price), 8 (Trading Session Low Price), and 9 (Trading Session Average Price).

Market Data entry type Index Value (3) is used to inform the current value of given index and described as follows:

Tag	Name	Values	Comments
279	MDUpdateAction	“0”, “1”, “2”	
269	MDEntryType	“3”	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	“N”	
270	MDEntryPx	X	The current index point value

37100	IndexSeq	X	
272	MDEntryDate	X	
273	MDEntryTime	X	
274	TickDirection	C	

### 6.8.5 Opening Price (269=4)

This repeating group carries the summary information about opening trading session events per market data stream.

The theoretical opening price is also sent on this block (indicated by the presence of the tag 286-*OpenCloseSettlFlag*) and is calculated and updated based on the orders presented in the book during every auction including the pre-opening / pre-closing auction.

The repeating group is described below (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0", "2"	
269	MDEntryType	"4"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDSStreamID	"E", "O", "N"	Not sent for theoretical open
270	MDEntryPx	C	For theoretical open, represents TOP
271	MDEntrySize	C	Only sent for theoretical open, as TOQ
37014	MDEntryInterestRate	C	Only sent for Termo trades
272	MDEntryDate	X	
273	MDEntryTime	X	
286	OpenCloseSettlFlag	"0", "5"	
451	NetChgPrevDay	C	Not sent for theoretical open

### 6.8.6 Closing Price (269=5)

There are two forms of closing prices sent, differentiated by the tag 286-*OpenCloseSettlFlag*. When this tag has value "4", the price refers to the Adjusted Closing Price, also known as "Reference Price" for Equities.

Summary information about closing trading sessions per market data stream is described below (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0"	Always replace, never delete
269	MDEntryType	"5"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"E", "O", "T", "N"	
270	MDEntryPx	X	
9325	LastTradeDate	C	Always sent for Adjusted close (286=4)
37013	PriceAdjustmentMethod	C	Can be sent for Adjusted close (286=4)
272	MDEntryDate	X	
273	MDEntryTime	X	
286	OpenCloseSettlFlag	"0", "4"	3 – used for index preliminary close

### 6.8.7 Trading Session High, Low and VWAP (269=7, 8, 9)

The high trade price data block is sent for a trade event that has produced the highest trade price for the current session. Likewise, the low trade price data block indicates that a trade event has produced the lowest trade price for a given session. High, low and Volume-Weighted Average Price (VWAP) trade prices are helpful in tracking market trends. They also provide historical information for the current session regarding market behavior.

The FIX message syntax for Session High/Low/VWAP Trade Price repeating groups lie below (X=required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0", "2"	
269	MDEntryType	"7", "8", "9"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"E", "O", "T"	
270	MDEntryPx	X	
272	MDEntryDate	X	
273	MDEntryTime	X	

### 6.8.8 Auction Imbalance (269=A)

This repeating group carries auction imbalance information, indicating the remaining quantity and to which side (buyer or seller) the auction is pending towards.

Below is the usage table for tag 277 in this block:

Tag 277 Value	EQ	DER	Description
<b>P = Imbalance more buyers</b>	X	X	Used to indicate that the auction imbalance pends towards buyers.
<b>Q = Imbalance more sellers</b>	X	X	Used to indicate that the auction imbalance pends towards sellers.

Here are the FIX tags normally sent for this type of repeating group (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0", "2"	
269	MDEntryType	"A"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
271	MDEntrySize	X	Indicates the remaining auction quantity
272	MDEntryDate	X	
273	MDEntryTime	X	
277	TradeCondition	"P", "Q"	



#### NOTE

Customer applications are responsible for deleting the existing theoretical opening price and imbalance information from memory after trading phase changes from Pre-Open (tag 625-TradingSessionSubID = 21) for each instrument in the group whose trading status is different from Pre-Open status (tag 326-SecurityTradingStatus = 21).

### 6.8.9 Price and Quantity Bands (269=g, h)

Most of the information regarding price and quantity tunnels and bands is relayed on the Market Data for each specific instrument. The following types of bands and limits are now supported:

- Hard limits (269=g|6939=1) – fixed price range that triggers a rejection
- Rejection band (269=g|6939=2) – movable price range that triggers a rejection



- Auction band (269=g|6939=3) – movable price range that triggers an auction
- Static limits (269=g|6939=4) – to enable per-instrument circuit breakers
- Quantity limit (269=h) – restricting maximum match size, or triggering an auction

The Price Band (269=g) group is also used to send the Trading Reference Price for Derivative instruments.

Here are the FIX tags normally sent for this type of repeating group (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0"	Always replace, never delete
269	MDEntryType	"g", "h"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
6939	PriceBandType	"1", "2", "3", "4"	Not sent for reference price and quantity limits
1306	PriceLimitType	"0", "2"	Not sent for reference price and quantity limits
1148	LowLimitPrice	X	
1149	HighLimitPrice	X	
1150	TradingReferencePrice	C	Sent as reference price for Economic Indicators in Derivatives.
37008	PriceBandMidpointPriceType	"0", "1", "2"	Sent for Rejection and Auction Bands
37003	AvgDailyTradedQty	C	Sent for Quantity Limits
1140	MaxTradeVol	C	Sent for Quantity Limits
272	MDEntryDate	X	
273	MDEntryTime	X	

### 6.8.10 Trade Volume (269=B)

This repeating group contains information about trade volume or options exercise summary from the registration system such as financial traded volume (in local and foreign currencies), number of trading events etc. The full description for the group is below (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0"	No delete, always replace
269	MDEntryType	"B"	
48	SecurityID	X	

22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"E","O","L","N"	
270	MDEntryPx	C	Indicates the financial volume (R\$1 mi traded)
271	MDEntrySize	C	Indicates the number of trades of the session
15	Currency	X	
272	MDEntryDate	X	
273	MDEntryTime	X	
1020	TradeVolume	C	Total traded volume for the session, currently only sent it for E&B instruments.

### 6.8.11 Open Interest (269=C)

Open interest (also known as open contracts or open commitments) denotes the total number of contracts in a commodity or options market that are still open; that is, they have not been exercised, close out, or allowed to expire. The term also applies to a particular commodity or, in case of options, to the number of contracts outstanding on a particular underlying security.

Below is the basic template of both market data entry type (**C**) (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0"	No delete, always replace
269	MDEntryType	"C"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"E","L"	"L" – for BTB statistics
270	MDEntryPx	C	Sent for BTB
271	MDEntrySize	X	Indicates current open volume
272	MDEntryDate	X	
273	MDEntryTime	X	

### 6.8.12 Settlement Price (269=6)

The price data block is sent to update opening (current trading session), previous day adjustment and settlement price. This data block is useful for obtaining the settlement price and the previous

day's adjusted closing price and is sent after the close of the trading session and the opening price (price of first trades in the current session).

Here are the FIX tags normally sent for this type of repeating group (X= required, C=conditional):

Tag	Name	Values	Comments
279	MDUpdateAction	"0"	No delete, always replace
269	MDEntryType	"6"	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"A", "N"	
270	MDEntryPx	X	
423	PriceType	C	Never sent for index instruments
272	MDEntryDate	X	
273	MDEntryTime	X	
286	OpenCloseSettlFlag	"1", "4"	
731	SettlPriceType	"1", "2", "3"	

Usually, settlement prices are sent in a regular order during the trading day. However, Market Surveillance can issue corrections or updates to the settlement price for the previous or current session. Hence, it's advised that the customer application is able to process any combination for the tags 286-OpenCloseSettlFlag and 731-SettlPriceType.

The following table illustrates the regular schedule:

Event time	[286]	[731]	Description
Before session	4	1	Previous day final settle
During session	4	3	Previous day updated settle
During session	1	2	Current day preview settle
After session	1	1	Current day Final settlement

### 6.8.13 Composite Underlying Price (269=D)

For future use by indexes over BTFs.

Tag	Name	Values	Comments
279	MDUpdateAction	0	
269	MDEntryType	"D"	
48	SecurityID	X	

<b>22</b>	SecurityIDSource	X	
<b>207</b>	SecurityExchange	X	
<b>1500</b>	MStreamID	"N"	
<b>37100</b>	IndexSeq	X	
<b>711</b>	NoUnderlyings	X	
<b>309</b>	UnderlyingSecurityID	X	
<b>305</b>	UnderlyingSecurityIDSource	X	
<b>308</b>	UnderlyingSecurityIDExchange	X	
<b>810</b>	UnderlyingPx	X	
<b>37018</b>	UnderlyingPxType	C	
<b>272</b>	MDEntryDate	X	
<b>273</b>	MDEntryTime	X	

#### 6.8.14 Security Trading Phase/State (269=c) (Snapshot only)

Tag	Name	Values	Comments
<b>269</b>	MDEntryType	"c"	
<b>48</b>	SecurityID	X	
<b>22</b>	SecurityIDSource	X	
<b>207</b>	SecurityExchange	X	
<b>272</b>	MDEntryDate	X	
<b>273</b>	MDEntryTime	X	
<b>326</b>	SecurityTradingStatus	C	Sent when instrument is not following the group.
<b>625</b>	TradingSessionSubID	C	Sent when instrument is following the group.
<b>336</b>	TradingSessionID	N	Sends "6" when non-regular session.
<b>342</b>	TradSesOpenTime	N	Sent when the auction informed open time.
<b>1174</b>	SecurityTradingEvent	N	Can only be 101 or 102.

### 6.8.15 Volatility price (269=v)

Tag	Name	Values	Comments
279	MDUpdateAction	"0","2"	
269	MDEntryType	"v"	Volatility Price
83	RptSeq	X	
48	SecurityID	X	
22	SecurityIDSource	X	
207	SecurityExchange	X	
1500	MDStreamID	"E"	Not sent for theoretical open
811	PriceDelta	C	Only sent for MDEntryType ="v"
1025	FixPx	C	Only sent for MDEntryType ="v"
31	LastPx	C	Only sent for MDEntryType ="v"
272	MDEntryDate	X	
273	MDEntryTime	X	

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## 7 Certification Process

Before connecting to BM&FBOVESPA, the counterparty must undergo the certification process, which is described in details in separate documents at [www.bmfbovespa.com.br](http://www.bmfbovespa.com.br), follow 'Services' → 'Certification'.

For network connectivity to the exchange, please contact the Trading Support Group (TSG). For certification arrangements, email the Certification and Testing Center (CTC). Check the 'Contacts' section for details.

The network setup is similar for all segments, once connectivity will be provided via a Certification FIX Gateway. The physical link used for certification may vary from the one to be used in production, as it is the application that is being certified, and not the physical layer. Hence, a client application which will run using either RCCF or RCB in the production environment may be certified through an Internet VPN connection.

When the participant considers that the application is ready to be certified, he will connect to a certification FIX gateway, and will follow the BM&FBOVESPA's certification document for market data. The counterparty will perform a series of tests which are pre-specified by BM&FBOVESPA, and the result will be used as an evidence of passing the certification.