

MDP 3.0 - Market by Order - Book Management


CME Globex Market by Order (MBO) disseminates individual orders and quotes at every price level for the given instrument. MBO allows customers to view position(s) while preserving market participant anonymity.

This page describes the following MBO book management features:

- [MBO Book Management Processing Examples](#)
 - [Limit Order - New Action Example](#)
 - [Modify Order - Update MBO Quantity of Resting Order Example](#)
 - [Cancel Resting Order - MBO Update Only Example](#)

CME Globex maintains the Market by Order (MBO) depth view with the following data blocks:


- New - create/insert a new order (tag 37708-OrderUpdateAction=0 or tag 279-MDUpdateAction=0)
- Update - change order information (tag 37708-OrderUpdateAction=1 or tag 279-MDUpdateAction=1)
- Delete - remove an order (tag 37708-OrderUpdateAction=2 or tag 279-MDUpdateAction=2)

 Depending on the SBE template, either 37708-OrderUpdateAction or tag 279-MDUpdateAction order action will be used for book updates. See the [MBO Incremental Refresh SBE Message Processing](#) section for more information.

A book is built from a series of data blocks which indicate whether an order is to be inserted (New), changed (Update), or removed (Delete). The incremental instruction approach assumes the use of the [Market Data Incremental Refresh \(tag 35-MsgType=X\)](#) message.

- Order Priority (tag 37707-MDOrderPriority), from lowest to highest values, is used to position the order against other orders of the same instrument side, and price.
- To build the full depth MBO order book, each order must be sorted by instrument side, and price (in descending order for Bids and ascending order for Asks). Then the order priority number must be applied only to the orders of the same price/ side.

In the example below, 37-OrderID 111 has a higher book priority (1) than OrderID 901 despite OrderID 901 having a lower tag 37707-MDOrderPriority value.

 For tag 37707-MDOrderPriority, a lower value is a higher priority.

| Book Priority | MDOrderPriority | OrderID | Quantity | Price | Side |
|---------------|-----------------|---------|----------|-------|------|
| 1 | 653654 | 111 | 10 | 1000 | Buy |
| 2 | 703699 | 759 | 120 | 1000 | Buy |
| 3 | 765935 | 201 | 30 | 1000 | Buy |
| 4 | 524123 | 901 | 50 | 980 | Buy |

For MBO, there is no maximum number of orders or depth allowed on the book. All MBO book updates for an instrument within an event must be processed before the MBO book is valid.

MBO Order Priority is based on the sequence of iLink orders received by a CME Globex market segment (tag 1300-MarketSegmentID) and will be sent accordingly regardless of the match algorithm.


[Implied order book](#) information is not sent in MBO format.

MBO Book Management Processing Examples

The following section shows examples using the MBO book update actions: new, update and delete.

Limit Order - New Action Example

This example shows a new limit bid order accepted and added to the first level of the book, since there are no resting bid orders.

 Priority may not be sequential for tag 37707-MDOrderPriority outside of price (tag 270-MDEntryPx). Therefore, systems must first sort by price (tag 270-MDEntryPx), then by priority (tag 37707-MDOrderPriority) to determine the book order.

Starting Market by Order (MBO) Book

| Order Priority | BidOrderID | Bid Quantity | Bid Book Price | Book Priority | Ask Book Price | Ask Quantity | Ask OrderID | Order Priority |
|----------------|------------|--------------|----------------|---------------|----------------|--------------|-------------|----------------|
| 723654 | 111 | 10 | 1000 | 1 | 1020 | 5 | 107 | 833653 |
| 723699 | 759 | 120 | 1000 | 2 | 1030 | 7 | 800 | 713752 |
| 724123 | 901 | 50 | 980 | 3 | 1030 | 12 | 121 | 723688 |
| 722598 | 959 | 7 | 970 | 4 | 1040 | 20 | 194 | 733653 |
| 725111 | 987 | 25 | 960 | 5 | 1040 | 25 | 295 | 733667 |
| 722095 | 555 | 30 | 950 | 6 | 1040 | 15 | 1001 | 733761 |
| 722512 | 721 | 100 | 950 | 7 | 1040 | 5 | 858 | 734775 |

New Update Action

Order added to Bid side level 1 at Limit Price of 1010 and a quantity of 50.

Incremental Refresh Market Data

| Tag Number | Tag Name | Value | Description |
|------------|-------------------|--------|-------------|
| 270 | MDEntryPx | 1010 | |
| 37 | OrderID | 557 | |
| 37706 | MDDisplayQty | 50 | |
| 37707 | MDOOrderPriority | 723766 | |
| 37708 | OrderUpdateAction | 0 | 0 = new |



This example uses tag 37708-OrderUpdateAction, but depending on the SBE template, tag 279-MDUpdateAction may be used instead. See [Incremental Refresh SBE Template Book Processing](#) for more information.

Final Market by Order (MBO) Book

| Order Priority | BidOrderID | Bid Quantity | Bid Book Price | Book Priority | Ask Book Price | Ask Quantity | Ask OrderID | Order Priority |
|----------------|------------|--------------|----------------|---------------|----------------|--------------|-------------|----------------|
| 723766 | 557 | 50 | 1010 | 1 | 1020 | 5 | 107 | 833653 |
| 723654 | 111 | 10 | 1000 | 2 | 1030 | 7 | 800 | 733752 |
| 723699 | 759 | 120 | 1000 | 3 | 1030 | 12 | 121 | 723688 |
| 724123 | 901 | 50 | 980 | 4 | 1040 | 20 | 194 | 733653 |
| 722598 | 959 | 7 | 970 | 5 | 1040 | 25 | 295 | 733667 |
| 725111 | 987 | 25 | 960 | 6 | 1040 | 15 | 1001 | 733761 |
| 722095 | 555 | 30 | 950 | 7 | 1040 | 5 | 858 | 734775 |
| 722512 | 721 | 100 | 950 | 8 | | | | |

Modify Order - Update MBO Quantity of Resting Order Example

This example shows the update performed on an existing book when a an order modify is processed for MBO. The order will lose priority at the price level (950).



Priority may not be sequential for tag 37707-MDOOrderPriority outside of price. Therefore, systems must first sort by price then by tag 37707-MDOOrderPriority to determine priority.

Starting Book Market by Order (MBO) Book

| Order Priority | BidOrderID | Bid Quantity | Bid Book Price | Book Priority | Ask Book Price | Ask Quantity | Ask OrderID | Order Priority |
|----------------|------------|--------------|----------------|---------------|----------------|--------------|-------------|----------------|
| 723654 | 111 | 10 | 1000 | 1 | 1010 | 5 | 107 | 833653 |

| | | | | | | | | |
|---------------|------------|-----------|------------|---|------|----|------|--------|
| 723699 | 759 | 120 | 1000 | 2 | 1020 | 7 | 800 | 713752 |
| 724123 | 901 | 50 | 980 | 3 | 1020 | 12 | 121 | 723688 |
| 722598 | 959 | 7 | 970 | 4 | 1030 | 20 | 194 | 733653 |
| 725111 | 987 | 25 | 960 | 5 | 1030 | 25 | 295 | 733667 |
| 722095 | 555 | 30 | 950 | 6 | 1030 | 15 | 1001 | 733761 |
| 722512 | 721 | 100 | 950 | 7 | 1030 | 5 | 858 | 734775 |

Modify Bid Quantity (tag 35-MsgType=X) Data Block

OrderID 555 quantity is increased from 30 to 50. The order loses priority in the book.

Incremental Refresh Market Data

| Tag Number | Tag Name | Value | Description |
|------------|-------------------|--------|-------------|
| 270 | MDEntryPx | 950 | |
| 37 | OrderID | 555 | |
| 37706 | MDDisplayQty | 50 | |
| 37707 | MDOOrderPriority | 722787 | |
| 37708 | OrderUpdateAction | 1 | 1 = Update |



This example uses tag 37708-OrderUpdateAction, but depending on the SBE template, tag 279-MDUpdateAction may be used instead. See the [MBO Incremental Refresh SBE Message Processing](#) section for more information.

Market by Order (MBO) Final Order Book

Order quantity is increased from **30** to **50**. OrderID 555 loses priority in the book, and Order Priority changes from 722095 to 722787.

| Order Priority | Bid OrderID | Bid Quantity | Bid Book Price | Book Priority | Ask Book Price | Ask Quantity | Ask OrderID | Order Priority |
|----------------|-------------|--------------|----------------|---------------|----------------|--------------|-------------|----------------|
| 723654 | 111 | 10 | 1000 | 1 | 1010 | 5 | 107 | 833653 |
| 723699 | 759 | 120 | 1000 | 2 | 1020 | 7 | 800 | 713752 |
| 724123 | 901 | 50 | 980 | 3 | 1020 | 12 | 121 | 723688 |
| 722598 | 959 | 7 | 970 | 4 | 1030 | 20 | 194 | 733653 |
| 725111 | 987 | 25 | 960 | 5 | 1030 | 25 | 295 | 733667 |
| 722512 | 721 | 100 | 950 | 6 | 1030 | 15 | 1001 | 733761 |
| 722787 | 555 | 50 | 950 | 7 | 1030 | 5 | 858 | 734775 |

Cancel Resting Order - MBO Update Only Example

Cancel a resting order at price **850** which is outside the maximum market depth of 10 for the MBP book, therefore only an MBO update is sent.

Starting Market by Order (MBO) Book

| Order Priority | Bid OrderID | Bid Book Quantity | Bid Book Price | Book Priority | Ask Book Price | Ask Book Quantity | Ask OrderID | Order Priority |
|----------------|-------------|-------------------|----------------|---------------|----------------|-------------------|-------------|----------------|
| 723654 | 111 | 10 | 1000 | 1 | 1005 | 10 | 205 | 724866 |
| 723699 | 759 | 120 | 1000 | 2 | 1010 | 20 | 206 | 724333 |
| 724123 | 901 | 50 | 980 | 3 | 1020 | 15 | 207 | 713998 |
| 725750 | 365 | 10 | 980 | 4 | 1020 | 50 | 209 | 723444 |
| 722598 | 959 | 7 | 970 | 5 | 1030 | 70 | 215 | 723767 |
| 725111 | 987 | 25 | 960 | 6 | | | | |
| 725392 | 555 | 50 | 950 | 7 | | | | |
| 724002 | 844 | 35 | 940 | 8 | | | | |
| 724169 | 888 | 50 | 930 | 9 | | | | |

| | | | | | | | | |
|--------|-----|----|-----|----|--|--|--|--|
| 724731 | 677 | 5 | 900 | 10 | | | | |
| 723373 | 689 | 75 | 880 | 11 | | | | |
| 724815 | 702 | 40 | 870 | 12 | | | | |
| 725212 | 251 | 25 | 850 | 13 | | | | |
| 725731 | 890 | 20 | 820 | 14 | | | | |

Market by Price (MBP) Book

| Bid Number Of Orders | Quantity | Price | Price Level | Ask Price | Quantity | Ask Number Of Orders |
|----------------------|----------|-------|-------------|-----------|----------|----------------------|
| 2 | 130 | 1000 | 1 | 1010 | 5 | 1 |
| 2 | 60 | 980 | 2 | 1020 | 19 | 2 |
| 1 | 7 | 970 | 3 | 1030 | 65 | 3 |
| 1 | 25 | 960 | 4 | | | |
| 1 | 50 | 950 | 5 | | | |
| 1 | 35 | 940 | 6 | | | |
| 1 | 50 | 930 | 7 | | | |
| 1 | 5 | 900 | 8 | | | |
| 1 | 75 | 880 | 9 | | | |
| 1 | 40 | 870 | 10 | | | |

Delete Bid Quantity (tag 35-MsgType=X)

OrderID 251 for quantity of 25 at price of 850 is cancelled.

| Tag Number | Tag Name | Value | Description |
|------------|------------------|--------|-------------|
| 270 | MDEntryPx | 850 | |
| 37 | OrderID | 251 | |
| 37706 | MDDisplayQty | 25 | |
| 37707 | MDOOrderPriority | 725212 | |
| 279 | MDUpdateAction | 2 | 2 = Delete |



This example uses tag 279-MDUpdateAction, but depending on the SBE template, tag 37708-OrderUpdateAction may be used instead. See the [Incremental Refresh SBE Template Book Processing](#) section for more information.

Final Order Market by Order (MBO) Book

OrderID 251 for quantity of 25 at price of 850 is cancelled.

| Order Priority | Bid OrderID | Bid Book Quantity | Bid Book Price | Book Priority | Ask Book Price | Ask Book Quantity | Ask OrderID | Order Priority |
|----------------|-------------|-------------------|----------------|---------------|----------------|-------------------|-------------|----------------|
| 723654 | 111 | 10 | 1000 | 1 | 1005 | 10 | 205 | 724866 |
| 723699 | 759 | 120 | 1000 | 2 | 1010 | 20 | 206 | 724333 |
| 724123 | 901 | 50 | 980 | 3 | 1020 | 15 | 207 | 713998 |
| 725750 | 365 | 10 | 980 | 4 | 1020 | 50 | 209 | 723444 |
| 722598 | 959 | 7 | 970 | 5 | 1030 | 70 | 215 | 723767 |
| 725111 | 987 | 25 | 960 | 6 | | | | |
| 725392 | 555 | 50 | 950 | 7 | | | | |
| 724002 | 844 | 35 | 940 | 8 | | | | |
| 724169 | 888 | 50 | 930 | 9 | | | | |
| 724731 | 677 | 5 | 900 | 10 | | | | |
| 723373 | 689 | 75 | 880 | 11 | | | | |
| 724815 | 702 | 40 | 870 | 12 | | | | |

| | | | | | | | | |
|--------|-----|----|-----|----|--|--|--|--|
| 725731 | 890 | 20 | 820 | 13 | | | | |
|--------|-----|----|-----|----|--|--|--|--|

Market by Price (MBP) Book - No Change

The canceled order at price of **850** is below the disseminated 10 levels, therefore there are no changes to the MBP order book.

| Bid Number Of Orders | Quantity | Price | Price Level | Ask Price | Quantity | Ask Number Of Orders |
|----------------------|----------|-------|-------------|-----------|----------|----------------------|
| 2 | 130 | 1000 | 1 | 1010 | 5 | 1 |
| 2 | 60 | 980 | 2 | 1020 | 19 | 2 |
| 1 | 7 | 970 | 3 | 1030 | 65 | 3 |
| 1 | 25 | 960 | 4 | | | |
| 1 | 50 | 950 | 5 | | | |
| 1 | 35 | 940 | 6 | | | |
| 1 | 50 | 930 | 7 | | | |
| 1 | 5 | 900 | 8 | | | |
| 1 | 75 | 880 | 9 | | | |
| 1 | 40 | 870 | 10 | | | |