

Nordic Equity TotalView-ITCH

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1 Overview

ITCH for NASDAQ OMX Nordic is a direct data feed product offered by NASDAQ OMX Nordic, which features the following data elements:

- **Order level data with attribution:** NASDAQ OMX Nordic will provide its full order depth using the standard ITCH format. ITCH uses a series of order messages to track the life of a customer order.¹ The ITCH message formats supports market participant attribution.
- **Trade messages:** To ensure that customers have complete information about trade flow, ITCH supports a trade message to reflect a match of a non-displayable order in the system. ITCH also supports a separate trade message to reflect cross transactions.
- **Net Order Imbalance Data:** In the minutes leading up to the Opening and Closing Crosses, the system disseminates the calculated equilibrium price, the imbalance direction and quantity, and the best bid and offer in each order book. Because the calculation includes non-displayable as well as displayable order types, the Net Order Imbalance Indicator (NOII) is the best predictor of the opening and closing prices available to the public.
- **Administrative messages**, such as trading actions and symbol directory messages:
 - Trading action messages are used to inform market participants when a security is halted or released for trading.
 - Symbol Directory messages provide basic security data such as the market tier and Financial Status Indicator.
- **Event controls**, such as start of day, end of day and the states of the different market segments.

¹ ITCH is an outbound market data feed only. The ITCH protocol does not support order entry.

2 Architecture

The ITCH feed is made up of a series of sequenced messages. Each message is variable in length based on the message type and is composed of non-control ASCII bytes. The messages that make up the ITCH protocol are typically delivered using a higher level protocol that takes care of sequencing and delivery guarantees.

NASDAQ OMX Nordic offers the ITCH data feed in three protocol options:

| Protocol Option | Number of Outbound Channels |
|---|---|
| SoupTCP | Single outbound channel for all securities. |
| Compressed via <i>SoupTCP</i> | <i>Single outbound channel for all securities. This protocol option may be offered to members.</i> |
| MoldUDP | Single outbound channel for all securities. |

3 Data Types

All numeric fields are composed of a string of ASCII coded digits, right justified and space filled on the left.

All alpha fields are left justified and padded on the right with spaces.

Prices are given in decimal format with 6 whole number places followed by 4 decimal digits. The whole number portion is padded on the left with spaces; the decimal portion is padded on the right with zeros. The decimal point is implied by position; it does not appear inside the price field.

4 Message Formats

The ITCH feed is composed of a series of messages that describe orders added to, removed from, and executed on the NASDAQ OMX Nordic as well as disseminate Cross and Stock Directory information.

4.1 Time Messages

For bandwidth efficiency reasons, the NASDAQ OMX Nordic will use separate time stamp messages for the ITCH product. The messages will be sequenced so that data feed recipients can apply the time stamps properly. The time stamp is broken into two separate messages: seconds and milliseconds.

Please note that the timestamp for new seconds will always be immediately followed by a time stamp for new milliseconds.

4.1.1 Seconds Message

This message is sent every second for which at least one ITCH message is being generated. The message contains the number of seconds since midnight in CET (Central European Time).

| SECONDS MESSAGE | | | | |
|-----------------|--------|--------|---------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "T" | Seconds Message. |
| Second | 1 | 5 | Numeric | Number of seconds since midnight (CET). |

4.1.2 Milliseconds Message

This message is sent every millisecond for which at least one ITCH message is being generated.

| MILLISECONDS MESSAGE | | | | |
|----------------------|--------|--------|---------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "M" | Milliseconds Message. |
| Millisecond | 1 | 3 | Numeric | Number of milliseconds since last second. |

4.2 Event and State Change Messages

4.2.1 System Event Message

The system event message type is used to signal a market or data feed handler event. The format is as follows:

| SYSTEM EVENT MESSAGE | | | | |
|----------------------|--------|--------|-------|-------|
| Name | Offset | Length | Value | Notes |

| | | | | |
|--------------|---|---|--------------|-------------------------------|
| Message Type | 0 | 1 | "S" | System Event Message. |
| Event Code | 1 | 1 | Alphanumeric | See System Event Codes below. |

NASDAQ OMX Nordic supports the following event codes on a daily basis.

| SYSTEM EVENT CODES – DAILY | |
|-----------------------------------|--|
| Code | Explanation |
| "O" | Start of Messages. Outside of time stamp messages, the start of day message is the first message sent in any trading day. |
| "C" | End of Messages. This is always the last message sent in any trading day. |

4.2.2 Market Segment State Message

The market segment state message relays information on state changes for a market segment. Each order book belongs to a market segment as noted by the Market Segment ID field of the Order Book Directory message (see section 4.3.1).

| MARKET SEGMENT STATE MESSAGE | | | | |
|-------------------------------------|---------------|---------------|--------------|---------------------------------------|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "O" | Market Segment Event Message. |
| Market Segment ID | 1 | 3 | Numeric | Market Segment identifier. |
| Event Code | 4 | 1 | Alphanumeric | See Market Segment State Codes below. |

NASDAQ OMX Nordic supports the following event codes on a daily basis.

| MARKET SEGMENT STATE CODES | |
|-----------------------------------|--|
| Code | Explanation |
| "P" | Pre-Open. Order books are open for full order management. No automatic matching. |
| "O" | Opening Auction. Order books are open for full order management. No automatic matching. Net Order Imbalance dissemination. |
| "T" | Continuous Trading. Order books are for full order management open and automatic matching occurs. |
| "L" | Closing Auction. Closing Auction has begun. Order books are still open for full order management, but no automatic matching. Net Order Imbalance dissemination. |
| "S" | Post-Trade. Only volume reduction of GTC orders is allowed. It is possible to receive Broken Trade messages and Order Delete messages after the End of Day. |
| "C" | Closed. Order books are closed. |

4.3 Stock Related Messages

4.3.1 Order Book Directory

At the start of each trading day, order book directory messages are disseminated for all active order books², including halted securities, in INET Nordic.

Receivers should note that Order Book Directory messages can also be sent out during the day, in the relatively rare event that any of the fields change intra-day or a new order book is admitted to trading.

| ORDER BOOK DIRECTORY | | | | |
|-----------------------------|---------------|---------------|--------------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "R" | Order Book Directory Message |
| Order Book | 1 | 6 | Numeric | Denotes the primary identifier of an order book. |
| Symbol | 7 | 16 | Alphanumeric | Human-readable name of the security. |
| ISIN | 23 | 12 | Alphanumeric | ISIN code identifying security. |
| Financial Product | 35 | 3 | Numeric | Values: 1 = Stock 2 = Equity Warrant 3 = Equity Right 4 = Bond 6 = Lottery Bond Series 7 = Convertible 8 = Warrant 11 = Unit Trust Certificate 12 = Index Fund Unit |
| Trading Currency | 38 | 3 | Alphabetic | Trading currency. |
| MIC | 41 | 4 | Alphabetic | Market Identifier Code identifying the Exchange. |
| Market Segment ID | 45 | 3 | Numeric | Denotes which Market Segment this order book belongs to. Used primarily to map Market Segment State changes to the order book. |
| Note Codes | 48 | 8 | Numeric | Note Codes. This field is a decimal encoded bit field where multiple Note Codes can be set concurrently by being binary OR:ed together. A value of zero means no Note Code set. Example 1: Note Codes=3, means both NM and XR Note Codes are active. Example 2: Note Codes=1F means that NM, XR, SP, PO and UD are set. 1 = NM, New Market Company 2 = XR, Excluding participating in right/s 1 = SP, Excluding participating in |

² Please note that order books only available for trade reporting are not included in the ITCH flow.

| | | | | |
|----------------|----|---|---------|---|
| | | | | <p>split</p> <p>8 = PO, Company subject to public offer</p> <p>16 = UD, Under drawing</p> <p>32 = SR, Excluding comb. Split and issue right/s</p> <p>64 = UL, UnListed</p> <p>128 = WI, When Issued</p> <p>256 = BR, Company Bankruptcy</p> <p>512 = SU, Suspension</p> <p>1024 = ,RL Removal from listing in process</p> <p>2048 = SL, Other surveillance list reason</p> <p>4096 = TO, A significant reverse take-over pending</p> <p>8192 = CS, Cent shares</p> <p>16384 = RS, Reversed Split</p> <p>32768 = BS, Excluding comb. Bonus & Split</p> <p>65536 = SS, Excluding comb. Split & Redemption share</p> <p>131072 = FN, First North Company</p> <p>262144 = OB, On the surveillance list</p> <p>524288 = XD, Excluding dividend</p> <p>0 = No Note Codes available for Orderbook.</p> |
| Round Lot Size | 56 | 9 | Numeric | Indicates the number of shares that represent a round lot for the issue |

4.3.2 Order Book Trading Action

This administrative message is used to indicate the current trading status of a security to the trading community.

Prior to the start of system hours, a Trading Action spin will be sent out. In the spin, the NASDAQ OMX Nordic will send out an Order Book Trading Action message with the "T" (Trading Resumption) for all exchange-listed securities that are eligible for trading at the start of the system hours. If a security is absent from the pre-opening Trading Action spin, firms should assume that the security is being treated as halted in the NASDAQ OMX Nordic platform at the start of the system hours.

Please note that securities may be halted in the system for both regulatory and operational reasons.

After the start of system hours, the NASDAQ OMX Nordic will use the Trading Action message to relay changes in trading status for an individual security. Messages will be sent when a security is halted, is released for auction, or is released for trading.

| ORDER BOOK TRADING ACTION | | | | |
|----------------------------------|---------------|---------------|--------------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "H" | Stock Trading Action Message. |
| Order Book | 1 | 6 | Numeric | Denotes the identity (order book id) of an order book. |
| Trading State | 7 | 1 | Alphabetic | "H" = Halted "T" = Trading on NASDAQ OMX Nordic "Q" = Auction Period |
| Reserved | 8 | 1 | Alphanumeric | Reserved. |
| Reason | 9 | 4 | Alphanumeric | Trading Action reason. For the list of reason codes, please refer to the table below. |

Listed below are the reason codes provided when Trading State="H" - Halted.

| REASON CODES FOR TRADING HALT ACTIONS | |
|--|---------------------------|
| Code | Value |
| TH | Trading Halt |
| RH | Regulatory Halt |
| MH | Matching Halt |
| TS | Technical Stop |
| VHD | Volatility Halt - Dynamic |
| VHS | Volatility Halt - Static |
| Space | Reason Not Available |

4.4 Add Order Message

An Add Order Message indicates that a new order has been accepted by the NASDAQ OMX Nordic system and was added to the displayable book. The message includes a day-unique Order Reference Number used by the NASDAQ OMX Nordic to track the order.

The NASDAQ OMX Nordic will support two variations of the Add Order message format.

4.4.1 Add Order – No MPID Attribution

This message will be generated for unattributed orders in the INET Nordic system.

| ADD ORDER MESSAGE | | | | |
|--------------------------|---------------|---------------|--------------|--|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "A" | Add Order Message. |
| Order Reference Number | 1 | 9 | Numeric | The unique reference number assigned to the new order. The order reference number is Increasing, but not necessarily sequential. |
| Buy/Sell Indicator | 10 | 1 | Alphabetic | The type of order being added. "B" = buy order. "S" = sell order. |
| Quantity | 11 | 9 | Numeric | The total number of shares associated with the order being added to the book. |
| Order Book | 20 | 6 | Numeric | The Orderbook ID for which the order is being added. |
| Price | 26 | 10 | Numeric | The display price of the new order. Refer to Data Types for field processing notes. |

4.4.2 Add Order – MPID Attribution

This message will be generated for attributed orders and quotations entered into the INET Nordic system.

| ADD ORDER – MPID ATTRIBUTION MESSAGE | | | | |
|---|---------------|---------------|--------------|--|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "F" | Add Order Message. |
| Order Reference Number | 1 | 9 | Numeric | The unique reference number assigned to the new order. The order reference number is Increasing, but not necessarily sequential. |
| Buy/Sell Indicator | 10 | 1 | Alphabetic | The type of order being added. |

| | | | | |
|-------------|----|----|------------|--|
| | | | | "B" = buy order. "S" = sell order. |
| Quantity | 11 | 9 | Numeric | The total number of shares associated with the order being added to the book. |
| Order Book | 20 | 6 | Numeric | The security symbol for which the order is being added. |
| Price | 26 | 10 | Numeric | The display price of the new order. Refer to Data Types for field processing notes. |
| Attribution | 36 | 4 | Alphabetic | NASDAQ market participant identifier associated with the entered order. MarketMaker Orders flagged with an attribution of "_MMO". |

4.5 Modify Order Messages

Modify Order messages always include the Order Reference Number of the Add Order to which the update applies. To determine the current display shares for an order, ITCH subscribers must deduct the number of shares stated in the Modify message from the original number of shares stated in the Add Order message with the same reference number. NASDAQ OMX Nordic may send multiple Modify Order messages for the same order reference number and the effects are cumulative. When the number of display shares for an order reaches zero, the order is dead and should be removed from the book.

4.5.1 Order Executed Message

This message is sent whenever an order on the book is executed in whole or in part.

Note that only one side of the matched orders can be in the book when the match occurs. This is because the system does not allow modifying of orders. So a match has to occur when a new order is sent in. The Order Executed message always refers to the order already in the book.

If the incoming order causing the match can't be fully filled, the remainder will be placed in the book after the match has occurred.

It is possible to receive several Order Executed Messages for the same order if that order is executed in several parts. Multiple Order Executed Messages on the same order are cumulative.

| ORDER EXECUTED MESSAGE | | | | |
|------------------------|--------|--------|---------|--|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "E" | Order Executed Message. |
| Order Reference Number | 1 | 9 | Numeric | The order reference number associated with the executed order. |
| Executed Quantity | 10 | 9 | Numeric | The number of shares executed. |

| | | | | |
|------------------------------|----|---|------------|--|
| Match Number | 19 | 9 | Numeric | Assigned by NASDAQ OMX NORDIC to each match executed. Each match consists of one buy and one sell. The matching buy and sell executions share the same match number. The match number is also referenced in the Trade Break Message. |
| Participant ID, owner | 28 | 4 | Alphabetic | |
| Participant ID, counterparty | 32 | 4 | Alphabetic | |

4.5.2 Order Executed with Price Message

This message is sent in the relatively rare event that an order on the book is executed in whole or in part with a price different than the initial display price.

Note that only one side of the matched orders can be in the book when the match occurs. This is because the system does not allow modifying of orders. So a match has to occur when a new order is sent in. The Order Executed message always refers to the order already in the book.

If the incoming order causing the match can't be fully filled, the remainder will be placed in the book after the match has occurred.

It is possible to receive several Order Executed Messages for the same order if that order is executed in several parts. Multiple Order Executed Messages on the same order are cumulative.

The executions may be marked as non-printable. If the execution is marked as non-printed, it means that the shares will be included into a later Cross Trade. If a firm is looking to use the ITCH data in trade tickers or volume calculations, NASDAQ OMX recommends that firms ignore messages marked as non-printable to prevent double counting.

Cross execution information is available in one aggregated Cross Trade Message.

| ORDER EXECUTED WITH PRICE MESSAGE | | | | |
|--|---------------|---------------|--------------|--|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "C" | Order Executed Message. |
| Order Reference Number | 1 | 9 | Numeric | The order reference number associated with the executed order. |
| Executed Quantity | 10 | 9 | Numeric | The number of shares executed. |
| Match Number | 19 | 9 | Numeric | Assigned by NASDAQ OMX NORDIC to each match executed. Each match consists of one buy and one sell. The matching buy and sell executions share the same match number. The match number is also referenced in the Trade Break Message. |
| Printable | 28 | 1 | Alphabetic | Indicates if the execution should be |

| | | | | |
|-------------------------------|----|----|-------------|--|
| | | | ic | reflected on time and sale displays and volume calculations. "N" = non-printable "Y" = printable |
| Trade Price | 29 | 10 | Numeric | |
| Participant ID, owner | 39 | 4 | Alphabet ic | |
| Participant ID, counterpart y | 43 | 4 | Alphabet ic | |

4.5.3 Order Cancel Message

This message is sent whenever an order on the book is modified as a result of an explicit partial cancellation.

Please note that no Order Cancel message is sent when part of an order is executed. The reduced quantity of the remaining order needs to be deduced from the Order Executed message.

| ORDER CANCEL MESSAGE | | | | |
|------------------------|--------|--------|---------|--|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "X" | Order Cancel Message. |
| Order Reference Number | 1 | 9 | Numeric | The reference number of the order being canceled or reduced. |
| Canceled Quantity | 10 | 9 | Numeric | The number of shares to be removed from the display size of the order as the result of a cancellation. |

4.5.4 Order Delete Message

This message is sent whenever an order on the book is being cancelled. All remaining shares are no longer accessible so the order should be removed from the book.

Please note that no Order Delete message is sent when an order is completely filled. The receiver needs to keep track of the remaining quantity on all orders by recalculating the remaining quantity on each Order Executed message received. Orders must be removed from the book when remaining quantity reaches 0.

| ORDER DELETE MESSAGE | | | | |
|------------------------|--------|--------|---------|--|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "D" | Order Delete Message. |
| Order Reference Number | 1 | 9 | Numeric | The reference number of the order being canceled or reduced. References a previously sent Add Order Message. |

4.6 Trade Messages

4.6.1 Trade Message (Non-Cross)

The Trade Message is designed to provide execution details for normal match events involving non-displayable order types. (Note: There is a separate message for cross events, see section 4.6.2.)

Since no Add Order Message is generated when a non-displayed order is initially received, NASDAQ OMX Nordic cannot use the Order Executed message for all matches. The Trade Message is used to report a match for a non-displayable order in the book.

Note that only one side of the matched orders can be in the book when the match occurs. This is because the system does not allow modifying of orders. So a match has to occur when a new order is sent in. The match can occur between either two non-displayable orders, or one non-displayable order and one displayed order. Regardless of combination, the Trade message is generated whenever the order already in the book is a non-displayable order.

It is possible to receive multiple Trade Messages for the same order if that order is executed in several parts. Trade Messages for the same order are cumulative.

Trade Messages with Trade Type = B or S should be included in trade tickers as well as volume and other market statistics. Messages with Trade type = S should not be included in price statistics (Last, High, Low, Average, VWAP, BBO), only in Turnover and market share statistics. Since Trade Messages do not affect the displayed book, however, they may be ignored by firms just looking to build and track the order book view.

| TRADE MESSAGE (NON-CROSS) | | | | |
|----------------------------------|---------------|---------------|--------------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "P" | Trade Message Identifier |
| Order Reference Number | 1 | 9 | Numeric | The unique reference number assigned to the order on the book being executed. |
| Trade type | 10 | 1 | Alphabetic | Indicates where a non-displayed order has been executed. "B" = Main book "S" = Nordic@Mid |
| Quantity | 11 | 9 | Numeric | The number of shares being matched in this execution. |
| Order Book | 20 | 6 | Numeric | Orderbook ID. |
| Match Number | 26 | 9 | Numeric | Assigned by NASDAQ OMX NORDIC to each match executed. Each match consists of one buy and one sell. The matching buy and sell executions share the same match number. The Match Number is referenced in the Trade Break Message. |
| Trade Price | 35 | 10 | Numeric | |

| | | | | |
|------------------------|----|---|------------|--|
| Participant ID, buyer | 45 | 4 | Alphabetic | |
| Participant ID, seller | 49 | 4 | Alphabetic | |

4.6.2 Cross Trade Message

Cross Trade message indicates that the cross process for a specific security is completed.

The Cross Trade message is sent out for all active issues in the system following the Opening, Trade Halt release, and Closing cross. Firms may use the Cross Trade message to determine when the cross for each security has been completed. (Note: For the halted securities, firms should use the Trading Action message to determine when an issue has been released for trading.)

For most issues, the Cross Trade message will indicate the bulk volume associated with the cross event. If the order interest is insufficient to conduct a cross in a particular issue, however, the Cross Trade message may show the shares as zero.

To avoid double counting of cross volume, firms should not include transactions marked as non-printable in trade tickers or market statistic calculations.

| CROSS TRADE MESSAGE | | | | |
|----------------------------|---------------|---------------|--------------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "Q" | Cross Trade Message |
| Quantity | 1 | 9 | Numeric | The number of shares matched in the Cross. |
| Order Book | 10 | 6 | Numeric | Orderbook ID. |
| Cross Price | 16 | 10 | Numeric | The price at which the cross occurred. Refer to Data Types for field processing notes. |
| Match Number | 26 | 9 | Numeric | The generated day-unique Match Number of this execution. |
| Cross Type | 35 | 1 | Alphabetic | The cross session for which the message is being generated. "O" = Opening Cross. "C" = Closing Cross. "H" = Cross for halted securities. |
| Number of Trades | 36 | 10 | Numeric | |

4.7 Broken Trade / Order Execution Message

The Broken Trade Message is sent whenever an execution is broken. A trade break is final; once a trade is broken, it cannot be reinstated.

Firms that use the ITCH feed to create trade tickers or calculate market statistics should be prepared to process the broken trade message. If a firm is only using the ITCH feed to build a book, however, it may ignore these messages as they have no impact on the current book.

| BROKEN TRADE MESSAGE | | | | |
|-----------------------------|---------------|---------------|--------------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "B" | Broken Trade Message. |
| Match Number | 1 | 9 | Numeric | The Match Number of the execution that was broken. This refers to a Match Number from a previously transmitted Order Executed Message, Order Executed With Price Message, or Trade Message. |

4.8 Net Order Imbalance Indicator (NOII)

NOII data is disseminated once for every order book when the auction starts. After that, an update is sent each time an order book changes, but *not more than once every second per order book* in the minutes leading up to the Opening Cross, Closing Cross, and Halt Release Cross.

- For the standard Opening Cross, NOII messages will be disseminated during the fifteen minutes leading up to the start of market hours.
- For the Halt Release Cross, NOII messages will be disseminated during the auction period. The first NOII message will be disseminated approximately one second after the Stock Trading Action message with the "Q" action value is disseminated.
- For the Closing Cross, NOII messages will be disseminated during the five minutes leading up to the end of market hours.

| NOII MESSAGE | | | | |
|---------------------|--------|--------|------------|---|
| Name | Offset | Length | Value | Notes |
| Message Type | 0 | 1 | "I" | NOII Message |
| Paired Quantity | 1 | 9 | Numeric | The total number of shares that are eligible to be matched at the Current Reference Price. If the value exceeds 9 digits, the value will be set to 999 999 999. |
| Imbalance Quantity | 10 | 9 | Numeric | The number of shares not paired at the Current Reference Price. If the value exceeds 9 digits, the value will be set to 999 999 999. |
| Imbalance Direction | 19 | 1 | Alphabetic | The market side of the order imbalance. "B" = buy imbalance "S" = sell imbalance "N" = no imbalance "O" = Insufficient orders to calculate |
| Order Book | 20 | 6 | Numeric | Orderbook ID. |
| Equilibrium Price | 26 | 10 | Numeric | Equilibrium Price if the order book is crossed, otherwise set to 0. |
| Cross Type | 36 | 1 | Alphabetic | The type of cross for which the NOII message is being generated "O" = Opening Cross "C" = Closing Cross "H" = Cross for halted securities |
| Best Bid Price | 37 | 10 | Numeric | Best Bid Price or Equilibrium Price (EP) if the book is crossed. |
| Best Bid Quantity | 47 | 9 | Numeric | Bid volume at top of book, or aggregated at EP if the book is crossed. If the value exceeds 9 digits, the value will be set to 999 999 999. |
| Best Ask Price | 56 | 10 | Numeric | Best Ask Price or EP if the book is crossed. |

| | | | | |
|----------------------|----|---|---------|---|
| Best Ask Quantity | 66 | 9 | Numeric | Ask volume at top of book, or aggregated at EP if the book is crossed. If the value exceeds 9 digits, the value will be set to 999 999 999. |
|----------------------|----|---|---------|---|

5 Support

If you have any questions or comments about this specification, email operator@nasdaqomx.com. We welcome suggestions for new features or improvements.

Specification documents can be located at:
<http://www.omxnordicexchange.com/customerlogin>

6 Revision History

| Date | Revision | Change Description |
|--------------------|-----------------|---|
| October 3, 2008 | 1.0 | Initial version. |
| October 16, 2008 | 1.1 | Updated protocol URLs. |
| December 1, 2008 | 1.2 | <p>Removed TradeID from the Trade Message.</p> <p>Removed references to Single Book, IPO auctions, time-and-sales displays, and other non-INET Nordic related terms.</p> <p>Added Printable field to Order Executed.</p> <p>Added Appendix on building the order book view.</p> <p>Various updates to the text.</p> <p>Added Participant ID, counterparty to Order Executed, and Trade message</p> <p>Rewrote the building the book section to clarify that Order Reference Number is used in the ranking.</p> <p>Added explanations that only a single Trade or Order Executed message is generated for each match.</p> <p>Added description on how to build the Trade Ticker.</p> <p>Changed Note Code field to a bit field to cater for multiple simultaneous Note Codes.</p> <p>Updated protocol URLs.</p> <p>Added Order Executed (without price) transaction.</p> <p>Reworked NOII message to convey top-of-book.</p> <p>Removed Time of Trade Execution</p> <p>Added Order Replace Message.</p> <p>Clarified Seconds message is based on GMT time.</p> <p>Corrected Order Book Group State message table name.</p> <p>Corrected Message type value on Order Exec w Price</p> <p>Added Broken Trade to Appendix on building the Trade Ticker.</p> |
| January 9, 2009 | 1.3 | <p>Changed Order Book Group to Market Segment</p> <p>Changed Price in Order Replace to 10 bytes</p> <p>Added Order Replace to Appendix A</p> |
| February 24, 2009 | 1.4 | <p>Changed Orderbook Group to Market Segment in Orderbook Directory message.</p> <p>Changed GMT to UTC.</p> |
| March 13, 2009 | 1.5 | Changed from UTC to CET. |
| March 24, 2009 | 1.6 | Changed Round Lot Size to 9 chars. |
| September 11, 2009 | 1.7 | <p>Clarified NOII dissemination intervals.</p> <p>Added note on Replace message being for future use.</p> |
| September 17, 2009 | 1.71 | Corrected an error where Round Lot Size was 6 instead of 9. This error was introduced in version 1.7, which was published Sept 11 th , so error was only published for 4 days. |
| November 6, 2009 | 1.8 | CLARIFICATION: Correction of “typo” in the description text for Note Code field of the Orderbook Directory message. This field is decimal number, not hex. This is in |

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|--------------------|----------|---|
| | | line with how INET have behaved in Pre prod since the start. So there is no change of system behaviour. |
| April 16, 2010 | 1.81 | CLARIFICATION: Changed type on Note Code field to Numeric CLARIFICATION: The following fields in the NOII message will be set to 999 999 999 if the value exceeds the size of the field: Best Bid Quantity Best Ask Quantity Imbalance Quantity Paired Shares Changed the name of the document. |
| June 28, 2010 | 1.83 | Reason codes for volatility halts added. |
| September 6, 2010 | 1.84 | Amendments to Trade Message (Non-Cross) for Nordic@Mid – buy/sell indicator replaced with “Trade Type” showing where hidden orders are matched. |
| September 22, 2010 | 1.85 | Redefined the Participant ID fields in the Trade (Non-Cross) message to buyer and seller. |
| October 12, 2010 | 1.85 | CLARIFICATION ONLY: Updated the description of the Trade Message. |
| January 12,2011 | 1.86 | Added support for MarketMaker Orders, affecting: Add Order – MPID Attribution Message |

Appendix A, How to build an order book view

The information needed to build an order book view from the ITCH message flow is contained in the Add Order Messages (see section 4.4) and the Modify Order Messages (see section 4.5). The messages are:

- Add Order – No MPID Attribution
- Add Order – MPID Attribution
- Order Executed
- Order Executed with Price
- Order Cancel
- Order Replace
- Order Delete

The two flavors of the Add Order messages have the same meaning; an order is added to the book. Orders shall be ranked by:

1. Price
2. Order Reference Number (an increasing number which can be interpreted as a timestamp in this regard).

The Order Executed (with Price) message, signals a partial or full fill. The order quantity must be reduced by the quantity of the Order Executed message.

The Order Cancel message is a partial cancel, meaning that the order in question must be reduced in quantity by the quantity carried in this message. Note that the Order Cancel does not necessarily mean that the order is removed from the book.

The Order Delete message tells the recipient to remove the order referenced.

Appendix B, How to build a Trade Ticker

The Trade Ticker is based on the following messages:

- Order Executed
- Order Executed with Price
- Trade
- Cross Trade
- Broken Trade

Note that Trades marked as non-printable shall be excluded to avoid double booking of trades.