SOLA - Oslo Børs Derivatives market

OSLSOLA 201 FIX Business Design Guide

Issue 1.0
22 February 2013

Important note

This document has been produced by Oslo Børs to assist customers in the use of the SOLA platform on the Oslo Børs market place. Part of the documentation is based on documentation from the London Stock Exchange Group. For more details, please see references in the appendix.

If you have any general queries relating to this document, please email:
technicalsupport@oslobors.no

Further copies of this document can also be downloaded from the Oslo Børs website at the following link:
http://www.oslobors.no/ob_eng/Oslo-Boers/Trading/Trading-systems/SOLA

Disclaimer

This document has been prepared on the basis of the best information available. Oslo Børs has taken reasonable efforts to ensure that the information in this publication is correct at the time of publication, but shall not be liable for decisions made in reliance on it. Oslo Børs will seek to provide notice to customers of changes being made to this document, but this notice cannot be guaranteed. Therefore, please note that this publication may be updated at any time. The information contained is therefore for guidance only. This document does not form part of the contractual documentation between the Oslo Børs and its customers.

Change log

This document can be updated at any time, and has been through the following iterations:

Issue	Date	Description
1.0	22 February 2013	Initial document release

Please note that only the latest issue of this document will be available from the Oslo Børs website. Details of the changes made in each issue of the document are described in the appendix.

Content

1.   Introduction

Oslo Børs uses SOLA for trading in standardized derivatives. SOLA is recognized as one of the world's leading trading systems for both options and futures. SOLA is developed by The Montreal Exchange, and has been used for derivatives trading at Oslo Børs since December 2009.

1.1   Purpose

This FIX Business Design Guide provides essential information for participants and independent software vendors in the functional design of their application in order to interface with SOLA using the FIX protocol.

1.2   Readership

The target audience for these publications is anyone working at either the business or Information Technology (IT) level of an organisation interested in the functional design of the SOLA trading system.

Messages are highlighted in **bold text**. Fields within messages are indicated by use of *italic* letters. References to other documents in the series are indicated by use of *underlined italic* letters.

1.3   Document series

This document is a part of a series of documents providing a holistic view of full trading and information services available from Oslo Børs post the upgrade to the SOLA 5 platform.

The current series of documents are outlined below:

General

OSLSOLA 005 SOLA 5 Interface Updates

Trading

OSLSOLA 201 FIX Business Design Guide
OSLSOLA 202 FIX Specification Guide
OSLSOLA 203 SAIL Business Design Guide
OSLSOLA 204 SAIL Specification Guide

Market Data

OSLSOLA 301 HSVF Specification Guide

The latest version of this documentation series can be found on:
http://www.oslobors.no/ob_eng/Oslo-Boers/Trading/Trading-systems/SOLA

2. Service Descripion

2.1 Description of trading phases

The trading phases are described in the following sections.

2.1.1 Consultation Start

This phase is reserved for the Exchange to perform actions on instruments for the forthcoming trading day (e.g., reserve instruments). No order entries coming from participants or Oslo Børs can be accepted during this phase. However, the Exchange can perform order deletions for a specific instrument or global deletions of a specific participant's orders.

2.1.2 Order Cancellation

This phase allows Participants to cancel orders.

2.1.3 Pre-opening

This phase allows participants to enter, modify, and cancel orders. Orders introduced during this period contribute to the calculation of the Calculated Theoretical Opening ("CTO") but are not traded.

2.1.4 Opening

At the scheduled Opening time, the random opening period begins and the instrument opening process can occur at any time between the beginning and the end of the random period. The random period duration is configured by the Exchange. During the opening process orders are matched and trades are generated at the last calculated CTO. An optimization algorithm maximizes the number of trades and reduces the remaining imbalance. FIFO (time priority at each price) is used to allocate the trades at the CTO.

2.1.5 Trading Session (Continuous Trading)

This is the main trading period, whereby orders and quotes may be entered, deleted and modified with execution enabled. The switch to the Trading Session phase marks the end of the opening processes and is triggered as soon as the Order Cancellation phase ends.

2.1.6 Closing

At the scheduled Closing time, the random closing period begins and the instrument closing process can occur at any time between the beginning and the end of the random period. The random period duration is configured by the Exchange. During the closing process orders are matched and trades are generated at the last CTO. An optimization algorithm maximizes the number of trades and reduces the remaining imbalance. FIFO (time priority at each price) is used to allocate the trades at the CTO.

2.1.7 Exchange Intervention

This is a period during which the Exchange can perform all the modifications necessary to regulate the market and correct errors (deletion of orders for a specific instrument, cancellation of trades, etc.). During this period, neither participants nor the Exchange can place orders. Participants may receive messages during this phase, e.g., Group or Instrument State change notices.

2.1.8 Consultation End

This phase is reserved for the Exchange for the purposes of consulting with the market. During this period, neither participants nor the Exchange can place orders. Participants will not receive any messages during this phase.

2.1.9 Mini Batch

This is a phase during which a group switches to next trading day. Orders whose validity date has expired are deleted and statistics for the instruments are reset (high, low, volume). Participants cannot enter orders on any instrument during this phase. Notifications of expired orders are sent to participants, though participants are not typically connected during this phase. Such messages would be available upon next connection.

2.1.10 Post-session

This is a weekly session during which various off-line processing takes place - including all maintenance processing. Participants cannot enter any orders on any instrument during this phase. As in the maintenance phase, messages to participants may be created during this phase. However, they would typically be available upon next connection.

2.2 Instrument Groups

An instrument group is a set of investment instruments or financial instruments governed by the same trading rules.

An instrument is identified by its Group ID plus its Instrument ID. An Instrument ID is unique within its instrument group.

2.3 Behaviour of an Instrument Independently of its Group

The normal behaviour of an instrument is to follow the rules of its group according to the group status. This section describes certain cases where the instrument behaves independently of its group.

2.3.1 Reservation, Opening of an Instrument

An instrument may be reserved by the Exchange if deemed necessary. Reservation, triggered manually or automatically at the opening, is aimed at controlling the market by limiting the gap between prices.

The impact which the reservation has on the processing of orders related to that instrument varies according to the phase in which the group is situated.

2.3.1.1 Order Cancellation

If necessary, the Exchange can prevent an instrument from trading when the market opens. The Exchange can then reauthorize the instrument and the rules governing the instrument's group are reapplied.

2.3.1.2 Trading Session

If necessary, the Exchange can reserve an instrument. The instrument is then set apart from the group and its trading rules. Orders entered are processed as during Order Cancellation Phase.

The Exchange can lift the reservation on an instrument by opening the instrument which will then follow the trading rules governing its group.

2.4 Behaviour of a Strategy Instrument Dependent on its Legs

A strategy instrument always follows its leg trading state. If any of its legs is placed in a reserved mode, the trading engine automatically places the strategy instrument in a
non-trading mode. All orders entered for this strategy instrument will be processed in the same way as during the Order Cancellation phase.

The strategy instrument can only trade if all its leg components are in the Trading Session. The strategy instrument will then follow the different phases as described in section 2.1 above.

3. Connection Management

In order to establish a FIX session, clients need to pay special attention to the following items:

- Clients are allowed to establish FIX sessions on each trading day
- The Exchange CompID is 'LSE1'
- No encryption technique is supported
- For a Resend Request, the Exchange will always request all messages subsequent to the last received ([BeginSeqNo 7=first message of range], [EndSeqNo 16=0]). Any new messages received before the reception of the last requested message will be discarded
- The Exchange does not support 24-hour connectivity and a new session must be re-established each morning
- The Exchange allows only one participant per FIX session (or per CompID). ISVs offering a service bureau are required to have a separate CompID, and therefore a separate FIX session, for each of their clients
- For message traffic efficiency, the Exchange does not allow clients to send a Heartbeat message at intervals of less than 30 seconds. Consequently, Logon messages with a value of less than 30 seconds, and not equal to 0 (meaning no Heartbeat will be sent) in the [HeartBtInt 108] field are rejected. If a participant does not send a message within 2 Heartbeat periods, the Exchange will send a Test Request message and wait for a response from the participant. If the participant does not respond to the Test Request within the Heartbeat period, the session will be disconnected. To summarize, if a participant does not send any messages within 3 Heartbeat periods, the connection is dropped and the participant will need to reconnect.

Figure 1: Initializing a FIX Connection

PARTICIPANT		EXCHANGE
Logon [MsgType 35 = A]	→	
	←	Logon [MsgType 35 = A]
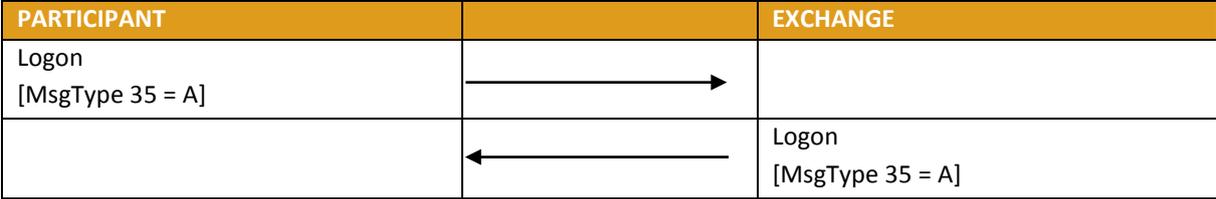
Figure 2: Terminating a FIX Connection

PARTICIPANT		EXCHANGE
Logout [MsgType 35 = 5]	→	
	←	Logout [MsgType 35 = 5]
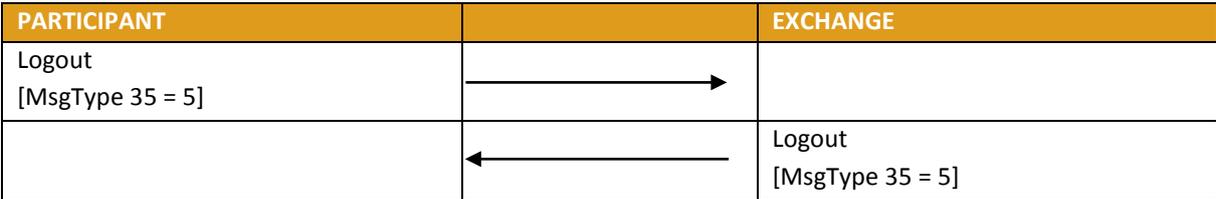
Figure 3: Sending a Heartbeat

PARTICIPANT		EXCHANGE
Heartbeat [MsgType 35 = 0]	→	
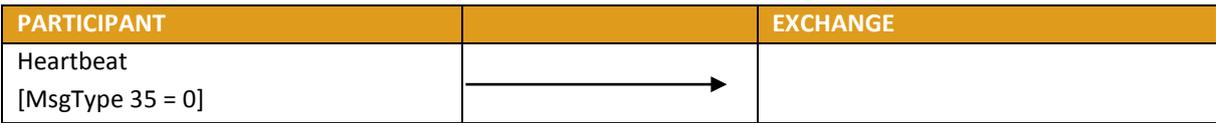
Figure 4: Heartbeat Management

PARTICIPANT		EXCHANGE
Test Request [MsgType 35 = 1] [TestReqID 112 = value]	→	

		Heartbeat [MsgType 35=0] [TestReqID 112 = value]
	←	

Figure 5: Sending a Resend Request

PARTICIPANT		EXCHANGE
Resend Request [MsgType 35 = 2] [BeginSeqNo 7 = seqno] [EndSeqNo 16 = seqno or 0]	→	
	←	Resend Original Messages [PossDupFlag 43 = Y] and/or [MsgType 35 = 4] [ResetSeqNumFlag 141 = Y]

Figure 6: Sending a Sequence Reset

PARTICIPANT		EXCHANGE
Resend Request [MsgType 35 = 4] [ResetSeqNumFlag 141 = Y]	→	
	←	Resend Original Messages [PossDupFlag 43 = Y] or Sequence Reset MsgType 35 = 4] [ResetSeqNumFlag 141 = Y

Figure 7: Receiving a Session Level Reject

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] required field missing	→	
	←	Reject [MsgType 35 = 3] [RefSeqNum 45 = offending msg#] [Text 58 = description]

3.1 Using a Single FIX Session to Send Orders for Multiple Traders/Users

Participants may use a single FIX session to send orders for different Traders/Users. In order to utilise this functionality the following optional tags are available on the FIX interface:

- Tag 50: SenderSubID, alphanumeric, maximum 11 characters
- Tag 57: TargetSubID, alphanumeric, maximum 11 characters

Tags 50 and 57 are commonly used as a unique value to identify a specific message originator, for example a specific trading desk or trader. For all FIX message types, the Exchange will support tag 50 SenderSubID and return back the same value in tag 57 TargetSubID. These tags will be part of the Standard Message Header.

As with the CompIDs, the Exchange will map SubIDs to TraderIDs. Values used by participants in tag 50 will need to be configured in the Exchange participant database. All messages received with a value not configured will still be accepted but will be associated to the default TraderID configured for the CompID. Messages received without tag 50 will use the default TraderID as well (see following table). Consequently, this change is transparent for Participants who do not wish to implement and support this change.

Note: Participants who choose to support these new tags will need to contact the Exchange to have their new SubIDs configured.

Scenarios	Client CompID	Default TraderID linked with CompID	Client SubID	TraderID linked with SubID (new configuration)	TraderID used on the Exchange
Client SubID not provided	ABCDE	999S0F1	None	None	999S0F1
Client SubID provided but not configured on the Exchange	ABCDE	999S0F1	2-ABC	999S0Q1	999S0F1
Client SubID provided and configured on the Exchange	ABCDE	999S0F1	3-ABC	999S0Q1	999S0Q1

4. Order Management

4.1 General Processing (Buy or Sell Order)

To enter an order, a participant sends a NEW ORDER SINGLE message.

The Exchange carries out validation on the parameters of the message received. If one of these parameters is invalid, the Exchange sends back an EXECUTION REPORT - REJECT rejecting the message received and specifying the first error detected.

If validation is successful, the Exchange accepts the message received and attributes an [OrderId 37] to the order entered.

An EXECUTION REPORT message received immediately after an order entry can indicate that it has been:

- Entered on the order book (a part of the order having possibly been executed)
- Eliminated
- Executed partially or in full

If an order is either partially or fully executed, the client receives, immediately after the EXECUTION REPORT ([OrdStatus 39=0]) message, one or more EXECUTION REPORT ([OrdStatus 39=1 or 2]) messages providing more information about the trade that took place.

If the order was on a strategy instrument, the client receives an EXECUTION REPORT for the strategy instrument ([OrderStatus 39=1 or 2, MultiLegReportingType = 3]) and additional EXECUTION REPORT messages for each leg ([OrderStatus 39=1 or 2, MultiLegReportingType = 2]) providing additional information related to the price and quantity at which each of the individual legs of the strategy instrument traded.

If the order has been booked (an EXECUTION REPORT message is sent with [OrdStatus 39=0]) the participant will automatically receive at a later time one of the following messages:

- One or more EXECUTION REPORT ([OrdStatus 39=1 or 2]) messages
- In the case of a Strategy Order, several EXECUTION REPORT messages ([OrdStatus 39=1 or 2, MultiLegReportingType 442=2]) in addition to the EXECUTION REPORT on the strategy instrument ([OrdStatus 39=1 or 2, MultiLegReportingType 442=3]) are sent. Each of the leg EXECUTION REPORT can be linked to its parent strategy trade (EXECUTION REPORT on the strategy instrument) message by the Strategy Instrument Id ([SecurityAltId 10455]) and Strategy Execution Id ([SecondaryExecId 527]).
- An EXECUTION REPORT ([OrdStatus 39=4]) message if the order is eliminated

If the order entered is a STOP or IF TOUCHED order, the participant will later receive another EXECUTION REPORT message with [OrdStatus 39=0] and [OrdType 40=2] when the order is triggered and becomes a regular limit order (trigger price reached).

Figure 8: Order is rejected

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 8] [OrdStatus 39 = 8] [ExecTransType 20 = 0]

Figure 9: Order is accepted and fully executed

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 0] [OrdStatus 39 = 0] [ExecTransType 20 = 0]
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 1] [OrdStatus 39 = 1] [ExecTransType 20 = 0]
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 2] [OrdStatus 39 = 2] [ExecTransType 20 = 0]

Figure 10: Minimum Quantity Order is not executed when entered

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] [MinQty 110 = 20]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 =4] [OrdStatus 39 = 4] [ExecTransType 20 = 0]

Figure 11: Stop Order is triggered

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] [StopPx 99 = 1.00]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 =0] [OrdStatus 39 = 0] [ExecTransType 20 = 0] [OrdType 40 = 4]
	←	Execution Report[1] [MsgType 35 = 8] [ExecType 150 = 0] [OrdStatus 39 = 0] [ExecTransType 20 = 0] [OrdType 40 = 2]

1. When the Stop order is triggered and becomes a regular limit order.

Figure 12: New Order is sent with Possible Resend

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] [PossResend 97 = Y]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 4] [OrdStatus 39 = 4] [ExecTransType 20 = 0]

Figure 13: Order is resent with Possible Resend

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] [PossResend 97 = Y]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 0] [ExecTransType 20 = 0]

611 614   99 873 895 035   60 682 74,76   547 271   9,23   30 807 264 273   60,41   70 527 334 970   27,07
218 209   76,05   73 338 63,78   963 107   48,18   285 400   12,54   378 413   634 507   25,49   664 189   839 695   413 906   66,03   218 209   76,05   73 338 63,78   963 107   48,18   285 400   378 413   634 507   25,49   664 189
74,56 % 345 221   3,06   797 438   955 078   844 871   652 843   417 224   77,64   627 646   480 725   99,46   163 847   13,67   626 990   74,56   345 221   3,06   797 438   955 078   844 871   652 843   77,64   627 646
391 682   87,64   8,07   7,09   265 632   93,23   278 502   65,20   868 144   240 829   88,20   746 648   24,60   42,25   978 425   391 682   87,64   8,07   7,09   265 632   93,23   278 502   65,20   868 144   240 829   88,20   746 648
04 % 731 861   133 687   543 805   956 510   650 710   437 203   495 810   69 503 391 097   82,03   695 077   558 285   79,48   26,25   95,04   731 861   133 687   543 805   956 510   650 710   437 203   495 810   69 503 391 097
9 815   23 613 309 958   44,68   197 270   712 115   738 525   31,19   64 949 53,49   118 408   67,86   131 538   73,94   18,94   989 815   23 613 309 958   44,68   197 270   712 115   738 525   31,19   64 949 53,49   118 408   67,86   131 538
57,30 % 955 025   885 835   296 679   16,30   260 080   38,37   98,64   737 763   904 949   500 579   370 354   941 532   793 784   31,09   57,30   955 025   885 835   296 679   16,30   260 080   38,37   98,64   737 763   904 949
4   58,09 % 285 129   557 917   518 976   143 178   11,61   769 489   664 491   629 041   103 986   54,07   438 799   688 154   459 822   676 344   58,09   285 129   557 917   518 976   143 178   11,61   769 489   664 491   629 041   103 986   438 799   688 154
385 534 379   6,64   463 815   206 839   981 623   592 752   313 642   56,49   419 412   771 005   459 317   52 048 27,24   16,71   40 385 534 379   6,64   463 815   206 839   981 623   592 752   313 642   56,49   419 412   771 005   65 317 52 048   558 285
426 631   25,03 % 309 933   858 433   98,83 % 356 425   850 062   219 285   92 981 42,30 % 431 025   41,43 % 278 758   44,32 % 763 425   426 631   25,03 % 309 933   858 433   98,83 % 356 425   850 062   219 285   92 981 42,30 % 431 025   278 758

4.1.1   Fill and Kill Order Completely Filled upon entry

A Fill and Kill order is also referred to as an Immediate or Cancel order (IOC). The participant will receive an EXECUTION REPORT ([OrdStatus 39=0]) message indicating that the order has been accepted. Then one or more EXECUTION REPORT ([OrdStatus 39=1 or 2]) messages will be sent. In each of the reports, the [LeavesQty 151] field specifies whether a part of the order remains to be traded. In the last EXECUTION REPORT, the [LeavesQty 151] is set to 0.

In the case of a strategy order fill, several EXECUTION REPORT messages ([OrdStatus 39=1 or 2, MultiLegReportingType 442=2]) in addition to the EXECUTION REPORT on the strategy instrument are sent.

Figure 14: A Fill and Kill Order is partially Executed in Continuous Trading

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] [TimeInForce 59 = 3]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 0] [OrdStatus 39 = 0] [ExecTransType 20 = 0]
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 1] [OrdStatus 39 = 1] [ExecTransType 20 = 0]
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 4] [OrdStatus 39 = 4] [ExecTransType 20 = 0]

Figure 15: A Fill and Kill Order is not Executed in Continuous Trading

PARTICIPANT		EXCHANGE
New Order [MsgType 35 = D] [TimeInForce 59 = 3]	→	
	←	Execution Report [MsgType 35 = 8] [ExecType 150 = 4] [OrdStatus 39 = 4] [ExecTransType 20 = 0]

4.1.2 Stop and If Touched Order

If the order entered is a STOP or IF TOUCHED order, the participant will later receive another EXECUTION REPORT message with [OrdStatus 39=0] and [OrdType 40=2] when the order is triggered and becomes a regular limit order (trigger price reached).

The following table illustrates all possible triggering surfaces:

Triggering Surface	Verb	StopPxCondition
Trigger Price ≥ LAST	Buy	5255 = T: If Touched
	Sell	5255 = S: Stop
Trigger Price ≤ LAST	Buy	5255 = S: Stop
	Sell	5255 = T: If Touched
Trigger Price ≥ BID	Buy	5255 = F: If BID Touched
	Sell	5255 = E: Stop on BID
Trigger Price ≤ BID	Buy	5255 = E: Stop on BID
	Sell	5255 = F: If BID Touched
Trigger Price ≥ ASK	Buy	5255 = H: If ASK Touched
	Sell	5255 = I: Stop on ASK
Trigger Price ≤ ASK	Buy	5255 = I: Stop on ASK
	Sell	5255 = H: If ASK Touched

4.1.3 While Connected Orders

Order with designated as "While Connected" [TimeInForce 59 = W] is automatically cancelled following a participant disconnection.

Figure 16: While Connected orders cancelled on disconnection of a participant

PARTICIPANT		EXCHANGE
NewOrderSingle [MsgType 35 = D][1] [TimeInForce 59 = W]	⟶	
	⟵	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 0] [ExecType 150 = 0] [TimeInForce 59 = W]
Service interruption or MOC disables a participant		
	⟵	ExecutionReport[2] [MsgType 35 = 8] [OrdStatus 39 = I] [ExecType 150 = 4]
[1]: While Connected Order FIX<D> entered with TimeInForce 59=W		
[2]: A FIX<8> is emitted per While Connected order entered with OrderStatus = 'I' (Eliminated On Disconnect)		

Figure 17: While Connected orders cancelled on EOD Mini batch

PARTICIPANT		EXCHANGE
NewOrderSingle [MsgType 35 = D] [TimeInForce 59 = W]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 0] [ExecType 150 = 0] [TimeInForce 59 = W]
EOD Minibatch		
	←	ExecutionReport[1] [MsgType 35 = 8] [OrdStatus 39 = I] [ExecType 150 = 4]
[1]: A FIX<8> is emitted per While Connected order entered with OrderStatus = 'I' (Eliminated On Disconnect)		

4.1.4 Committed Order

Committed Order does not interact with the instrument order book. A Committed Order is submitted using NEW ORDER SINGLE and OrdType 40 = C. Committed order must include the opposite firm [Contra Trader 337].

Figure 18: Committed orders traded

PARTICIPANT		EXCHANGE
NewOrderSingle [MsgType 35 = D] [OrdType 40 = C]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 0] [ExecType 150 = 0]
NewOrderSingle [MsgType 35 = D] [OrdType 40 = C]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 0] [ExecType 150 = 0]
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 2] [ExecType 150 = 2]
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 2] [ExecType 150 = 2]

Figure 19: Committed order cancelled by participant before it trades

PARTICIPANT		EXCHANGE
NewOrderSingle [MsgType 35 = D] [OrdType 40 = C]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 0] [ExecType 150 = 0]
OrderCancelRequest [MsgType 35 = F]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 4] [ExecType 150 = 4]

Figure 20: Pending Committed order cancelled on Mini batch event

PARTICIPANT		EXCHANGE
NewOrderSingle [MsgType 35 = D] [OrdType 40 = C]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 0] [ExecType 150 = 0]
Mini batch, pending one sided orders are flushed		
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 4] [ExecType 150 = 4]

Figure 21: Committed order not accepted by the trading engine

PARTICIPANT		EXCHANGE
NewOrderSingle [MsgType 35 = D] [OrdType 40 = C]	→	
	←	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 8] [ExecType 150 = 8]

```
55  611 614    99 873 895 035    60 682 74,76    547 271    9,23    30 807 264 273    60,41    70 527 334 970    27,07
% 218 209    76,05    73 338 63,78    963 107    48,18    285 400    12,54    378 413    634 507    25,49    664 189    839 695    413 906    66,03    218 209    76,05    73 338 63,78    963 107    48,18    285 400    378 413    634 507    25,49    664 189
74,56 % 345 221    3,06    797 438    955 078    844 871    652 843    417 224    77,64    627 646    480 725    99,46    163 847    13,67    626 990    74,56    345 221    3,06    797 438    955 078    844 871    652 843    77,64    627 646
29    474 471    64 383 951 024    871 844    9,02    537 510    52,49    190 854    168 916    36,76    649 977    237 229    125 030    859 448    990 929    474 471    64 383 951 024    871 844    9,02    537 510    52,43    190 854    168 916
391 682    87,64    8,07    7,09    265 632    93,23    278 502    65,20    868 144    240 829    88,20    746 648    24,60    42,25    978 425    391 682    87,64    8,07    7,09    265 632    93,23    278 502    65,20    868 144    240 829    88,20    746 648
04 % 731 861    133 687    543 805    956 510    650 710    437 203    495 810    69 503 391 097    82,03    695 077    558 285    79,48    26,25    95,04    731 861    133 687    543 805    956 510    650 710    437 203    495 810    69 503 391 097
9 815    23 613 309 958    44,68    197 270    712 115    738 525    31,19    64 949 53,49    118 408    67,86    131 538    73,94    18,94    989 815    23 613 309 958    44,68    197 270    712 115    738 525    31,19    64 949 53,49    118 408    67,86    131 538
457,30 % 955 025    885 835    296 679    16,30    260 080    38,37    98,64    737 763    904 949    500 579    370 354    941 532    793 784    31,09    57,30    955 025    885 835    296 679    16,30    260 080    38,37    98,64    737 763    904 949
385 534 379    6,64    463 815    206 839    981 623    592 752    313 642    56,49    419 412    771 005    459 317    52 048 27,24    16,71    40 385 534 379    6,64    463 815    206 839    981 623    592 752    313 642    56,49    419 412    771 005    65 317 52 048    558 285
426 631    25,03 % 309 933    858 433    98,83 % 356 425    850 062    219 285    92 981 42,30 % 431 025    41,43 % 278 758    44,32 % 763 425    426 631    25,03 % 309 933    858 433    98,83 % 356 425    850 062    219 285    92 981 42,30 % 431 025    278 758
```

4.1.5 New Order Cross

A NEW ORDER CROSS does not interact with the instrument order book. The same member must be on both sides of the order. A NEW ORDER CROSS can be rejected or traded at reception.

Figure 22: Entering an Accepted Cross Order

PARTICIPANT		EXCHANGE
NewOrderCross [MsgType 35 = s]	⟶	
	⟵	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 2] [ExecType 150 = 2]
	⟵	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 2] [ExecType 150 = 2]

Figure 23: Cross Order Rejected

PARTICIPANT		EXCHANGE
NewOrderCross [MsgType 35 = s]	⟶	
	⟵	ExecutionReport [MsgType 35 = 8] [OrdStatus 39 = 8] [ExecType 150 = 8]

4.2 Order Modification

A participant may amend any open orders. Orders that have been fully executed, deleted or cancelled cannot be modified.

A participant cannot modify the instrument ID or the side (buy or sell) of the order. If the quantity is reduced the order retains price/time priority. Any other attributes that are modified will result in the order being eliminated and replaced by a new one.

To modify an order, the participant sends an ORDER CANCEL/REPLACE REQUEST message. In this message, the participant specifies the following elements enabling the Exchange to locate the order:

- The instrument affected by the modification [Symbol 55], [SecurityType 167], [PutOrCall 201], [StrikePrice 202], [MaturityMonthYear 200], [MaturityDay 205] and [OptAttribute 206]
- The [OrigClOrdID 41]
- The side of the order [Side 54]

The Exchange performs validation on the message received. When an error is detected in the incoming message, the Exchange sends a CANCEL REJECT message specifying the error code for the first error detected. If no parameters have been modified, the Exchange sends a CANCEL REJECT specifying 'No modification of the order'.

If the message is valid, the Exchange eliminates the old order from the order book and replaces it with a new one, to which it attributes a new [OrderId 37]. It sends the acknowledgement of the modification in the form of an EXECUTION REPORT message. This message contains the new [OrderId 37] attributed to the modified order by the Exchange and the revised characteristics of the modified order.

The modified order can be:

- Entered in the book (the order has been modified and at least a part of the order has been entered in the Order Book)
- Eliminated (the order has been modified and immediately eliminated)
- Executed partially or in full (the order has been modified and immediately executed in full or partially)

Figure 24: Modification is rejected

PARTICIPANT		EXCHANGE
Order Cancel/Replace [MsgType 35 = G]	⟶	
	⟵	Order Cancel Reject [MsgType 35 = 9]

Figure 25: Modification is accepted

PARTICIPANT		EXCHANGE
Order Cancel/Replace [MsgType 35 = G] [OrdQty 38 = qty]	⟶	
	⟵	Execution Report [MsgType 35 = 8] [OrdStatus 39 = 5] [LeavesQty 38 = qty]

4.3 Order Cancellation

Clients may cancel all orders entered by themselves. Cancellations will only be valid for orders, or part of an order, which are currently booked.

To cancel an order, the client sends a CANCEL REQUEST message. This message specifies all the parameters allowing the Exchange to locate the order:

- The instrument affected by the modification [Symbol 55], [SecurityType 167], [PutOrCall 201], [StrikePrice 202], [MaturityMonthYear 200], [MaturityDay 205] and [OptAttribute 206]
- The [OrigClOrdID 41]
- The side of the order [Side 54]

The Exchange performs validation on the message received. If the CANCEL REQUEST is not valid, the Exchange sends a CANCEL REJECT message indicating the error code for the first error detected.

If the CANCEL REQUEST is valid, the Exchange will send the acknowledgement of the cancellation in the form of an EXECUTION REPORT ([OrdStatus 39=4]) message specifying the outcome reserved for the order.

Figure 26: Cancellation is accepted

PARTICIPANT		EXCHANGE
Cancel Request [MsgType 35 = F]	→	
	←	Execution Report [MsgType 35 = 8] [OrdStatus 39 = 4]

Figure 27: Cancellation is rejected

PARTICIPANT		EXCHANGE
Cancel Request [MsgType 35 = F]	→	
	←	Order Cancel Reject [MsgType 35 = 9]

4.4   Entry of a Request for Quote

Request for Quote entry allows participants to broadcast a REQUEST FOR QUOTE to other participants.

The client enters a QUOTE REQUEST message with the symbol and an optional quantity. If the message is valid, the participant receives a QUOTE ACKNOWLEDGEMENT message with [QuoteAckStatus 297=0]. If the QUOTE REQUEST message is not valid, the Exchange sends a QUOTE ACKNOWLEDGEMENT message with [QuoteAckStatus 297=5].

Figure 28: Request for Quote

PARTICIPANT		EXCHANGE
Quote Request [MsgType 35 = R]	→	
	←	Quote Acknowledgement [MsgType 35 = b]

4.5   Entry Of A User Defined Strategy (UDS)

A trader can request the creation of a user defined strategy (UDS) by submitting a SECURITY DEFINITION REQUEST. The SECURITY DEFINITION REQUEST must include the strategy leg information.

Strategy Creation requests can be accepted [SecurityResponseType 321=1], accepted but modified [SecurityResponseType 321=2] or rejected [SecurityResponseType 321=3].

If the creation is modified the SECURITY DEFINITION message includes the new instrument structure. The leg ordering sequence may differ from the original request but will not be marked as modified if the ratio and the verb for all legs remain the same.

Figure 29: Strategy instrument successfully created

PARTICIPANT		EXCHANGE
Security Definition Request [MsgType 35 = c]	→	
	←	Security Definition [MsgType 35 = d]

Figure 30: Error on creating Strategy instrument

PARTICIPANT		EXCHANGE
Security Definition Request [MsgType 35 = c]	→	
	←	Error [MsgType 35 = 3]

4.6 Unsolicited Services

4.6.1 Entry or Cancellation of an Order by the Exchange
The Exchange may enter or cancel orders on behalf of a participant.

The cancellation can be done for orders entered by the Exchange in the participant's account.

This action can take place during:
- Order Cancellation
- Trading Session

If the Exchange enters an order on behalf of a participant, the client does not receive any acknowledgements or receive any messages related to this order.

The participant that entered the initial order will receive the EXECUTION REPORT [OrdStatus 39=4 or 5] message for any orders cancelled by the Exchange.

4.6.2   Elimination of an Order

The table below describes all the scenarios where order elimination may occur **without** the participant sending a cancellation message.

Reason for Elimination	
The order price is outside the instrument limit price	EXECUTION REPORT [OrdStatus 39=F or G] message sent to the Participant who initially entered the order
During the instrument opening Market Order without opposite order are eliminated.	EXECUTION REPORT [OrdStatus 39=4] message sent to the Participant who initially entered the order
Participant disconnection eliminates While Connected Order.	EXECUTION REPORT [OrdStatus 39=I] message sent to the Participant who initially entered the order
Instrument state does not allow order with disclosed quantity.	EXECUTION REPORT [OrdStatus 39=4] message sent to the Participant who initially entered the order
Cancellation of an order by The Exchange	Possible during: Order Cancellation, Trading Session, Exchange Intervention, Consultation End of Day, and Group Interruption. EXECUTION REPORT [OrdStatus 39=4] message sent to the Participant who initially entered the order
Instrument has expired, updated or is deleted	Carried out during Mini Batch or Post-session. If the TICK INCREMENT for prices is modified, all prices that do not respect the new TICK INCREMENT are purged. The others remain on the order book.
Validity of the order is reached	Carried out at the end of each trading day just before or during Maintenance. Also carried out at the end of the week (last trading day of the weekly session) just before Post-session

Figure 21: Global Cancellation of all Orders for a Member Initiated by the Exchange

PARTICIPANT		EXCHANGE
	←	Execution Report [1, 2] [MsgType 35=8] [OrdStatus 39=4]
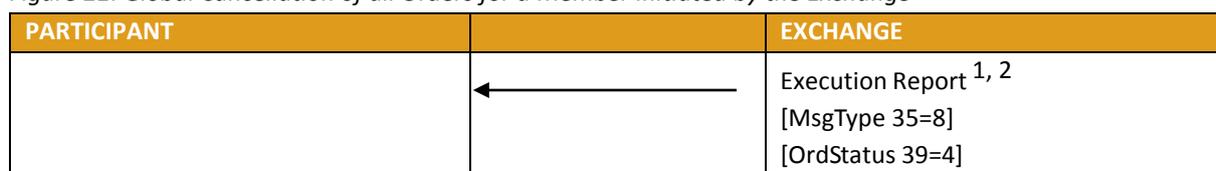
1. Will be sent for every booked order posted by the member

2. No [OrigClOrdID 41] is sent

4.7 Cancellation of a Trade by the Exchange

If required, the Exchange can cancel a trade that took place during the day. This cancellation can be initiated in accordance with the Exchange rules.

This can take place during:

- Order Cancellation
- Pre-Opening
- Trading Session
- Suspended
- Exchange Intervention
- Consultation End
- On an Interrupted group

The Exchange sends the two clients concerned an EXECUTION REPORT ([ExecTransType 20=1]) message. This message specifies all the parameters relating to the cancelled trade.

If the trade involved a strategy instrument, the Exchange will cancel a trade on a leg-by-leg basis. For each leg trade cancellation, the Exchange sends an EXECUTION REPORT ([ExecTransType 20=1, MultiLegReportingType=2) to each of the two Participants. When all the legs-trades have been cancelled, the Exchange also sends an EXECUTION REPORT ([ExecTransType 20=1, MultiLegReportingType=3]) to the participant(s) who entered the strategy order.

Figure 22: Cancellation of a Trade with Impact on the Last Price Made by the Exchange

PARTICIPANT		EXCHANGE
	←	Execution Report [MsgType 35=8] [OrdStatus 39=4] [ExecTransType 20=1]

5. Queries

In order to assist clients manage and synchronize their trading database, the Exchange offers two types of queries: Order Mass Status and Security Definition.

5.1 Order Mass Status

This query returns all orders that were entered during the day for the participant.

One EXECUTION REPORT [ExecTransType 20=3] is returned for each active order of the Participant.

The maximum number of requests is limited to 5 per Participant per day.

5.2 Security Definition

This query returns all listed instruments on the Exchange. This request generates one message per instrument. For strategies, SECURITY DEFINITION responses include the definition of each leg.

The maximum number of requests is limited to 3 per participant per day and they are only permitted before the Market Opening.

APPENDIX 1 - Supported Message Types

The table below lists the Exchange FIX interface message names and types:

Type	FIX Messages	Originator
Application	D - New Order Single	Participant
	G - Order Cancel/Replace Request	Participant
	F - Order Cancel Request	Participant
	R - Quote Request	Participant
	8 - Execution Report	Exchange
	9 - Order Cancel Reject	Exchange
	b - Quote Acknowledgement	Exchange
	c - Security Definition Request	Participant
	d - Security Definition	Exchange
	AF - Order Mass Status Request [1]	Participant
Administrative	3 - Error / Reject	Participant / Exchange
	0 - Heartbeat	Participant / Exchange
	A - Logon	Participant / Exchange
	2 - Resend Request	Participant / Exchange
	5 - Logout	Participant / Exchange Exchange
	1 - Test Request	Participant / Exchange
	4 - Sequence Reset	Participant / Exchange

1. Taken from FIX 4.3

Appendix 2 – Issue updates

This appendix describes the details of the changes made in each issue of this document.

Issue 1.0 – released 22 February 2013
Minor updates to the document compared to the previous revision, as well as using the Oslo Børs layout.

Appendix 3 - References

References to external resources are given below.

Technical information for the SOLA 5 Upgrade from Turquoise:
http://www.tradeturquoise.com/tq_resources.shtml