Technical Specifications

19 Aug 2019

SOLA Derivatives
HSVF Market Data

SOLA 14– v.11 19 Aug 2019

1 Introduction

1.1 Purpose

The purpose of this publication is to provide participants with the knowledge and technical details necessary for accessing and using the Exchange derivatives market data feed.

The High Speed Vendor Feed (HSVF) is comprised of trades, quotes, market depth, strategies, bulletins, summaries and other statistics.

This HSVF market data specification defines the communications interface and message formats for the high-speed transmission which broadcasts real-time trading and statistical information from the Exchange derivatives platform.

1.2 Readership

The target audience for this publication is the business or Information Technology level of an organisation interested in the functional design of the Exchange derivatives platform.

1.3 Revision History

Issue	Date	Description of change
6.0	20 December 2017	Sola 12 Drop 1 changes. Messages impacted: Sprint 1 and 2 - Group messages: GR Instrument Keys messages: J and JF
6.1	2 January 2018	Sola 12 Drop 1 changes. Messages impacted: Sprint 3 and 4 - Instrument Keys messages: J and JF
7.0	15 February 2018	Sola 12 Drop2 changes: - Price Indicator Marker of C/CF/CS/I/IF/IS trade messages updated: e: renamed to Exchange For Physical and s: Basis Trade added + Table of Contents updated
8.0	16 April 2018	Sola 12 Drop 3 changes: New value A. Average Difference Change for Strategy Pricing field (JS message)
8.0.1	22 October 2018	CurveGlobal LTIR Tick size reduction
9.0	1 November 2018	Sola 12 Drop 4 changes: New tick value for BNT (Bilateral negotiated transactions)
SOLA 13 v.10	15 April 2019	SOLA 13 N; NF Summary messages impacted: - **New values** for Event Type filed in N, NF Summary messages JS Strategy Instrument Key message impacted: - **New values** for Strategy Pricing filed in JS Strategy Instrument Keys H, HF, HS messages impacted: - **New value** "Implied off-tick prices" added to Level of Market Depth field - **New fields** Set of fields corresponding to the new implied level: BidPriceSign, BidPrice, BidSize, NbBidOrders, AskPriceSign, AskPrice, AskSize, AskNbOrders Section 17.5 Off-Tick Prices Implied level added
10.1	30 May 2019	Section 17.5 Correction to .4 and updated with new scenario .5
10.2	12 June 2019	Section 16.28 S1 (One Month SONIA Future) table added

Issue	Date	Description of change
11.0	**19 Aug 2019**	**HSVF UDP added (section 2.3 and 2.4)** **Event Type added to Summary Message (section 13 and 16)**

2 Overview

The High Speed Vendor Feed (HSVF) market data feed uses TCP/IP broadcast interface. Each message type is fixed in format and messages are non-blocked (i.e. the Exchange does not wait for an acknowledgement before sending the following message) re-transmission of any data is available.

Starting with SOLA 14, market data is also available via UPD (Multicast) stream. HSVF messages disseminated via the two new multicast channels (primary and secondary, that are A and B feed) are the same already available in the TCP protocol. The recovery of messages is guaranteed via the current TCP (unicast) channel.

HSVF messages consist of a standard message header followed by the message body which varies in format according to the message type.

2.1 Transmission format

Each message is framed by an STX and an ETX character. The format used is:

S **T** **X**	**MESSAGE HEADER**	**MESSAGE**	**E** **T** **X**

STX and ETX indicate the beginning and the end of the record being transmitted.

2.2 Message Header

The standard message header attached to all messages has the following format:

Field Name	L=23	T	Definition / Validation Rules
Time	12	N	HHMMSSmmmuuu Refer to Field Description “Time stamp”
Sequence Number	9	N	Each message is assigned a sequence number starting at ’000000001’ every day and incremented by 1 for each message sent. The sequence numbers will range from 000000001 to 999999999 (decimal, ASCII) with wrap around. *Note: Retransmitted messages will contain the original sequence numbers.*
Message Type	2	X	Identifies the type of message being sent. Format is left- aligned, right ’blank’ filled (if necessary).

2.3 TCP Transmission capability

The following table describes Transmission Capability. For formatting details on examples shown, refer to the Message Type RS – Connection Message – Min. 32 / Max. 6026 bytes.

Type of retransmission	Description

Type of retransmission	Description
Normal Connection **(i.e. Start of Day)**	1) Participant connects to specified port 2) Participant sends RS message type (**Not applicable for UDP**) ex. 000000001RS0000000000YNYYNYE6000 3) The Exchange sends data to Participant with: Starting sequence number 000000001 Regular market messages on Options, not Futures Market depth messages for all Trading Instruments Regular market messages and Strategies for all Trading Instruments Regular market messages with Summaries GAP Control: Y (will receive GAP messages) Protocol version E6 All options classes
RETRANSMISSION -A- (REQUESTING TO RECEIVE FROM BEGINNING OF THE DAY)	1) Participant connects to specified port 2) Participant sends RS message type (**(Not applicable for UDP**) ex. 000000001RS**0000000000**YNYYNYE6000 3) The Exchange resends all messages disseminated so far through out the day
RETRANSMISSION -B- (REQUESTING THE NEXT MESSAGE IN LINE)	1) Participant connects to specified port 2) Participant sends RS message type **(Not applicable for UDP)** ex. 000000001RS**9999999999**YNYYNYE6000 3) The Exchange sends the next message to Participant
RETRANSMISSION -C- **(FROM A SPECIFIC SEQUENCE NUMBER)**	1) Participant connects, if disconnected to specified port 2) Participant sends RS message type **(Not applicable for UDP)** ex. 000000001RS**0000013247**YNYYNYE6000 3) The Exchange sends all messages with sequence numbers greater than 13247 *Note: If the Exchange's sequence number is lower than participant's, transmission will begin with the next message*
DISCONNECTION	1) Participant disconnects from port

Notes:

1) For a retransmission (type 'A' or 'C'), participants should keep the same parameters (Type of market data / GAP Control / Option classes requested).

2) Participants are required to reconnect every day. If they do not disconnect, their connection is terminated by the Exchange at the end of the day.

3) Connection messages (RS) and Align End (VE) are not applicable to the Multicast but only to the TCP

2.4 UDP Transmission capability

Type of transmission	Description
Data Content	1. Instruments: • all Equity Options, Futures and Strategies are disseminated • equivalent to TCP subscription with RS message filled as follows: • Equity Options = Y • Futures = Y • Strategies = Y 2. Informartion Disseminated: • best 5 levels of orderbook (with implied prices), Trades, Post Trade (extended Trade Message) and Market Summary will be disseminated • equivalent to TCP subscription with RS message filled as follows: • Market Depth = I • Market Summaries = N • Post Trade = Y
Participant Subscription to UDP stream (Channel A or Channel B)	1) Participant subscribes to the multicast Channels (A and B feeds) and receive messages disseminated in real-time. Note: being UDP, no connection message is necessary 2) The Exchange sends data via the UDP stream before sending them via TCP 3) It's not possible to select a subset of messages to be received so all messages related to: - Market Reference Data (Options, Futures and Strategies) - Regular market messages on Options, Futures and strategies - Market depth messages for all tradable Instruments - Post Trade messages for all tradable instruments - Trade messages for all tradable instruments - Regular market messages with Summaries are broadcasted.
Participant Subscription to UDP stream (Channel A and Channel B) for resilience purposes	1) Participant subscribes to UDP stream on both Channel A and Channel B 2) Same data will be received from both Channels 3) If Channel A becomes unavailable, then Participant continues to receive data at every market event on Feed B 4) A gap in message sequence number is verified on Channel A, Participant can retrieve the messages from Feed B

Type of transmission	Description
Replay/Recovery (message re-transmission)	**1) Participant subscribes to the UDP stream** **2) There's a gap in the messages received via the UDP channels (or Feeds become unavailable)** **3) Participant connects to the unicast service specifying the sequence number in the login message (RS)** **4) Missing messages are delivered to the Participant via TCP**

1) ***In case the user specifies upon TCP connection (RS message) a subset of messages, the messages disseminated won't be the same as received in the UDP***

i.e: In case the user subscribes to receive the Best (instead of the Market Depth), any time there's first level book update, s/he will receive an F/FF/FS message while via UDP s/he will receive the H/HF/HS

2.5 Record format and definitions

- Whenever a field is indicated as being blank it contains the ASCII space character (hex 20).
- All numeric fields: Numbers (0 to 9), Right justified and zero filled.
- All alphanumeric fields (except 'Strategy Symbol' and 'Instrument External Code'): All characters possible (numbers, letters, others), right justified, zero filled unless stated otherwise.
- 'Strategy Symbol' and 'Instrument External Code' alphanumeric field: All characters possible, left justified, blank filled.
- All alphabetic fields: Letters (A to Z) left justified, blank filled unless stated otherwise.
- The 'Filler' field can have any format [numeric, alphanumeric, ASCII space character (hex 20)].

In the following tables, the column **L** represents the length in bytes of the described field, and the column **T** ('Data Type') will be represented by the following characters. Refer to the above for a more detail description of each:

A = Alphabetic

N = Numeric

X = Alphanumeric

3 Trade Messages

3.1 Message Type C: Option Trade

Field Name	L= 115	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Exchange on which the trade occurred. Refer to Field Description "Exchange ID"
Symbol Root	6	A	Option base symbol (symbol of the underlying)
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract

Field Name	L= 115	T	Definition / Validation Rules
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Volume	8	X	Number of contracts for the trade. Refer to Field Description “Indicator code”
Trade Price	8	X	Price at which the transaction took place Refer to Field Description “Fraction Indicator Code”
Net Change Sign	1	X	Sign +/- for the net change field
Net Change	8	X	Net change = last trade price – previous close Refer to Field Description “Fraction Indicator Code”
Stamp Time	12	N	Time of the option trade in UTC and microseconds HHMMSSmmmuuu Refer to Field Description “Time stamp”
Open Interest	7	X	Outstanding number of contracts in the series as of previous day Refer to Field Description “Indicator code”
Price Indicator Marker	1	A	Identifies the type of transaction Refer to Field Description “Price Indicator Marker”
Publication Date	8	N	Date of the publication YYYYMMDD
Transaction Id Code	14	X	Trade Identifier: Instrument Id + Group Id + Trade number
PTT Trade Types Flag Marker	1	A	Refer to Field Description “PTT Trade Type” marker
PTT Cancellations and Amendments Flag Marker	1	A	Refer to Field Description “PTT Cancellation and Amendments” marker
Deferral Flag Marker	1	A	Refer to Field Description “Deferral Flag” marker

3.2 Message Type CF: Futures Trade

Field Name	L= 99	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the trade occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Futures series symbol
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Volume	8	X	Total number of contracts traded Refer to Field Description “Indicator code”
Trade Price	8	X	Price at which the transaction took place. Refer to Field Description “Fraction Indicator Code”

Field Name	L= 99	T	Definition / Validation Rules
Net Change Sign	1	A	Sign +/- for net change field (sign)
Net Change	8	X	Net change = last trade price – previous settlement price. Refer to Field Description “Fraction Indicator Code”
Stamp Time	12	N	Time of the future trade in UTC and microseconds HHMMSSmmmuuu Refer to Field Description “Time stamp”
Price Indicator Marker	1	A	Identifies the type of transaction Refer to Field Description “Price Indicator Marker”
Publication Date	8	N	Date of the publication YYYYMMDD
Transaction Id Code	14	X	Trade Identifier: Instrument Id + Group Id + Trade number
PTT Trade Types Flag Marker	1	A	Refer to Field Description “PTT Trade Type” marker
PTT Cancellations and Amendments Flag Marker	1	A	Refer to Field Description “PTT Cancellation and Amendments” marker
Deferral Flag Marker	1	A	Refer to Field Description “Deferral Flag” marker

3.3 Message Type CS: Strategy Trade

A Strategy Trade is a message notification of a transaction on a strategy (which are 2 or more instruments being involved in the 1 trade).

Field Name	L= 118	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the trade occurred. Refer to Field Description “Exchange ID”
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS Alphanumeric with “.”,”+”,”-“
Volume	8	X	Total number of contracts traded Refer to Field Description “Indicator Code”
Trade Price Sign +/-	1	X	For Trade Price field (sign)
Trade Price	8	X	Price at which the transaction took place. Refer to Field Description “Fraction Indicator Code”
Net Change Sign +/-	1	A	For net change field
Net Change	8	X	Net change = last trade price – previous close Refer to Field Description “Fraction Indicator Code”
Stamp Time	12	N	Time of strategy trade in UTC and microseconds HHMMSSmmmuuu Refer to Field Description “Time stamp”
Price Indicator Marker	1	A	Identifies the type of transaction Refer to Field Description “Price Indicator Marker”
Publication Date	8	N	Date of the publication YYYYMMDD
Transaction Id Code	14	X	Trade Identifier: Instrument Id + Group Id + Trade number

Field Name	L= 118	T	Definition / Validation Rules
PTT Trade Types Flag Marker	1	A	Refer to Field Description “PTT Trade Type” marker
PTT Cancellations and Amendments Flag Marker	1	A	Refer to Field Description “PTT Cancellation and Amendments ” marker
Deferral Flag Marker	1	A	Refer to Field Description “Deferral Flag ” marker

4 Post Trade message

4.1 Message Type PT: Post Trade

Field Name	L=202	T	Field Type
Message Header	23		Refer to “Message Header” paragraph
Trading Date and Time	27	x	Date and Time of the trade expressed accordingly to ISO 8601: YYYY-MM-DDThh:mm:ss.dddddd Z
Instrument ID code type	4	A	Refer to field description “Instrument Code Type”
Instrument identification code	12	x	ISIN for all instruments except for strategies that Instrument Id + Group Id is to be used
Price	18	x	Price of the trade expressed in MIFID format: sign+12integer+dot+4decimal
Venue of execution (MIC Code)	4	A	Refer to field description “MIC Code”
Price notation	4	A	Refer to field description “Price notation”
Price currency	3	A	Refer to field description “Currency Code”
Measurement unit	3	A	Refer to field description “Measurement Unit”
Quantity in Measurement Unit	16	N	Quantity traded calculated
Quantity	10	N	Traded quantity
Notional amount	18	X	Notional traded amount sign+12integer+dot+4decimal e.g. +999999999999.9999
Notional currency	3	A	Refer to field description “Currency Code”
Publication date and time	27	X	Date and time in which the trade is published (may be different than the trade time for deferrals) accordingly to ISO 8601 YYYY-MM-DDThh:mm:ss.dddddd Z
Transaction to be cleared	4	A	Always to be set to “true”
Transaction Identification Code	14	X	Trade Identifier: Instrument Id + Group Id+ Trade number
PTT Trade Types Flag	4	A	Refer to Field Description “PTT Trade Type”
PTT Cancellations and Amendments Flag	4	A	Refer to Field Description “PTT Cancellation and Amendments ”
Deferral Flag	4	A	Refer to Field Description “Deferral Flag ”

5 Indication of Interest to Trade Messages (RFQ)

5.1 Message Type D: Option Indication of Interest to Trade (RFQ)

Field Name	L= 53	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the RFQ occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Option base symbol

Field Name	L= 53	T	Definition / Validation Rules
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Size of the RFQ	8	X	Number of contracts for which the price is requested Refer to Field Description “Indicator Code”

5.2 Message Type DF: Futures Indication of Interest to Trade (RFQ)

Field Name	L= 44	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the RFQ occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Symbol for the Future series
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Size of the RFQ	8	X	Number of contracts for which the price is requested Positive whole number Refer to Field Description “Indicator Code”

5.3 Message Type DS: Strategy Indication of Interest to Trade (RFQ)

Field Name	L= 62	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the RFQ occurred. Refer to Field Description “Exchange ID”
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS. Alphanumeric with “.”,”+”,”-“
Size of the RFQ	8	X	Number of contracts for which the price is requested Positive whole number Refer to Field Description “Fraction Indicator Code”

6 Instrument Schedule Notice

6.1 Message Type E: Instrument Schedule Notice Option

Field Name	L= 52	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the group status notice occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	X	Root of the instrument group
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Scheduled Instrument Status	1	A	Refer to Field Description “Instrument Status Marker”
Scheduled Status Change Time	6	N	HHMMSS Refer to Field Description “Time stamp”

6.2 Message Type EB: Instrument Schedule Notice Futures Option

Field Name	L= 52	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the instrument status notice occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	X	Root of the instrument group
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Scheduled Instrument Status	1	A	Refer to Field Description “Instrument Status Marker”
Scheduled Status Change Time	6	N	HHMMSS Refer to Field Description “Time stamp”

6.3 Message Type EF: Instrument Schedule Notice Future

Field Name	L= 43	T	Definition / Validation Rules

Field Name	L= 43	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the instrument status notice occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	X	Symbol for the Future series
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Scheduled Instrument Status	1	A	Refer to Field Description “Instrument Status Marker”
Scheduled Status Change Time	6	N	HHMMSS Refer to Field Description “Time stamp”

6.4 Message Type ES: Instrument Schedule Notice Strategy

Field Name	L= 61	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the Instrument status notice occurred. Refer to Field Description “Exchange ID”
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS. Alphanumeric with “.”,”+”,”-“
Scheduled Instrument Status	1	A	Refer to Field Description “Instrument Status Marker”
Scheduled Status Change Time	6	N	HHMMSS Refer to Field Description “Time stamp”

7 Quote Messages

7.1 Message Type F: Option Quote

Field Name	L= 72	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the quote occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Option base symbol
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Bid Price	8	X	Bid price for the option series. Refer to Field Description “Fraction Indicator Code”
Bid Size	5	X	Number of option contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Ask Price	8	X	Ask price for the option series. Refer to Field Description “Fraction Indicator Code”
Ask Size	5	X	Number of option contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Instrument Status Marker	1	A	Refer to Field Description “Instrument Status Marker”

7.2 Message Type FF: Futures Quote

Field Name	L= 63	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”
Symbol Root	6	A	Symbol for the Future series
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Bid Price	8	X	Bid price for the future contract. Refer to Field Description “Fraction Indicator Code”

Field Name	L= 63	T	Definition / Validation Rules
Bid Size	5	X	Number of futures contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Ask Price	8	X	Ask Price for the future contract. Refer to Field Description “Fraction Indicator Code”
Ask Size	5	X	The number of futures contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Instrument Status Marker	1	A	Indicates Instrument Status. Refer to Field Description “Instrument Status Marker”

7.3 Message Type FS: Strategy Quote

A Strategy Quote is the first limit of the market depth message disseminated from the Exchange routing engine for a strategy Instrument. It has the current established Best Bid/Best Ask, and Best Bid Volume/ Best Ask Volume (not including hidden volumes). It is a simple snapshot of what the market conditions are on the Instrument.

Field Name	L= 83	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS. Alphanumeric with “.”,”+”,”-“
Bid Price Sign	1	A	Sign +/- for Bid Price field
Bid Price	8	X	Bid price for the future contract Refer to Field Description “Fraction Indicator Code”
Bid Size	5	X	Number of futures contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Ask Price Sign	1	A	Sign +/- for Ask Price field
Ask Price	8	X	Ask price for the future contract. Refer to Field Description “Fraction Indicator Code”
Ask Size	5	X	The number of futures contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Instrument Status Marker	1	A	Indicates Instrument Status. Refer to Field Description “Instrument Status Marker”

8 Group Messages

8.1 Message Type GC: Group Status Schedule Notice

Field Name	L= 210	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.

Field Name	L= 210	T	Definition / Validation Rules
Exchange ID	1	A	Refer to Field Description "Exchange ID"
Symbol Root	6	X	Root of the instrument group
Instrument Group	2	X	Group of the instrument
Group Status	1	A	Group status of the trading instrument. Refer to Field Description "Group Status Marker"
Scheduled Time	6	N	HHMMSS Refer to Field Description "Time stamp"
Underlying Symbol Root	10	X	Symbol Root of the Underlying
Delivery Type	1	A	Refer to Field Description "Delivery Type"
Default Contract Size	8	N	Number of contract or shares
Description	100	X	Group Description
Underlying Issuer Name	14	X	Issuer Name of the Underlying
Underlying External ISIN	12	X	External ISIN of the Underlying
Underlying Instrument Type	1	A	Instrument Type of the Underlying Refer to Field Description "Underlying Instrument Type"
Instrument Type	1	A	Refer to Field Description "Instrument Type"
Month Code	24	A	Month Code

8.2 Message Type GR: Group Status

This message will be sent when a group of trading instruments enters a new status:

Field Name	L= 210	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Refer to Field Description "Exchange ID"
Symbol Root	6	A	Root of the instrument group
Group Instrument	2	X	Group of the instrument
Group Status	1	A	Group status of the trading instrument. Refer to Field Description "Group Status Marker"
Filler	4	A	Filler
Filler	2	X	Filler
Underlying Symbol Root	10	X	Symbol Root of the Underlying
Delivery Type	1	A	Refer to Field Description "Delivery Type"
Default Contract Size	8	N	Number of contract or shares
Description	100	X	Group Description
Underlying Issuer Name	14	X	Issuer Name of the Underlying
Underlying External ISIN	12	X	External ISIN of the Underlying

Field Name	L= 210	T	Definition / Validation Rules
Underlying Instrument Type	1	A	Instrument Type of the Underlying Refer to Field Description "Underlying Instrument Type"
Instrument Type	1	A	Refer to Field Description "Instrument Type"
Month Code	24	A	Month Code

8.3 Message Type GS: Group Status (Strategies)

This message will be sent when a Strategy group of trading instruments enters a new status. All strategies have a predetermined group that can be found in the JS message (Strategy Instrument Keys message).

Field Name	L= 186	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Refer to Field Description "Exchange ID"
Group Instrument	2	X	Group of the instrument
Group Status	1	A	Group status of the trading instrument. Refer to Field Description "Group Status Marker"
Filler	6	X	
Symbol Root	6	X	Symbol Root of the Instrument Group
Underlying Symbol Root	10	X	Symbol Root of the Underlying
Delivery Type	1	A	Refer to Field Description Delivery Type"
Default Contract Size	8	N	Number of contract or shares
Description	100	X	Group Description
Underlying Issuer Name	14	X	Issuer Name of the Underlying
Underlying External ISIN	12	X	External ISIN of the Underlying
Underlying Instrument Type	1	A	Instrument Type of the Underlying Refer to Field Description "Underlying Instrument Type"
Instrument Type	1	A	Refer to Field Description "Instrument Type"

9 Market Depth Messages

9.1 Message Type H: Option Market Depth

Field Name	L= 78 up to 202	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”
Symbol Root	6	A	Option base symbol
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Instrument Status Marker	1	A	Indicates Instrument Status. Refer to Field Description “Instrument Status Marker”
Number of Level	1	N	Number of level for the trading instrument 1 to 5
Level of Market Depth	1	A	Level of market depth 1 to 5: 1 to 5 levels A: Implied prices B: Implied off-tick prices
Bid Price	8	X	Bid price for the option series or ‘0000OUV0’ to represent a market order at the top of the book in a pre-auction phase. Refer to Field Description “Fraction Indicator Code”
Bid Size	5	X	Number of option contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent. Refer to Field Description “Indicator Code”
Number of Bid Orders	2	X	Number of bid orders, present at a given moment in the order book. If greater than 99 the 2nd character becomes an exponent. Refer to Field Description “Indicator Code”
Ask Price	8	X	Ask price for the option series or ‘0000OUV0’ to represent a market order at the top of the book in a pre-auction phase. Refer to Field Description “Fraction Indicator Code”
Ask Size	5	X	Number of option contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent. Refer to Field Description “Indicator Code”
Number of Ask Orders	2	X	Number of Ask Orders, present at a given moment in the order book. If greater than 99 the 2nd character becomes an exponent. Refer to Field Description “Indicator Code”

9.2 Message Type HF: Futures Market Depth

Field Name	L= 69 up to 193	T	Definition / Validation Rules

Field Name	L= 69 up to 193	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the market depth message occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Symbol for the Future series
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Instrument Status Marker	1	A	Indicates Instrument Status. Refer to Field Description “Instrument Status Marker”
Number of Level	1	N	Number of level for the trading instrument 1 – 5
Level of Market Depth	1	A	Level of market depth 1 to 5: 1 to 5 levels A: Implied prices B: Implied off-tick prices
Bid Price	8	X	Bid price for the future contract or ‘0000OUV0’ to represent a market order at the top of the book in a pre-auction phase. Refer to Field Description “Fraction Indicator Code”
Bid Size	5	X	Number of futures contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent. Refer to Field Description “Indicator Code”
Number of Bid Orders	2	X	Number of Bid Orders, present at a given moment in the order book. If greater than 99 the 2nd character becomes an exponent
Ask Price	8	X	Ask Price for the future contract or ‘0000OUV0’ to represent a market order at the top of the book in a pre-auction phase. Refer to Field Description “Fraction Indicator Code”
Ask Size	5	X	The number of futures contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent. Refer to Field Description “Indicator Code”
Number of Ask Orders	2	X	Number of Ask Orders, present at a given moment in the order book. If greater than 99 the 2nd character becomes an exponent Refer to Field Description “Indicator Code”

9.3 Message Type HS: Strategy Market Depth

Field Name	L= 89 up to 221	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”
Symbol	30	X	Identification of the strategy. The legs (underlying) are defined in message type NS Alphanumeric with “.”,”+”,”-“
Instrument Status Marker	1	A	Indicates Instrument Status. Refer to Field Description “Instrument Status Marker”

Field Name	L= 89 up to 221	T	Definition / Validation Rules
Number of Level	1	N	Number of level for the trading instrument 1 – 5
Level of Market Depth	1	A	Level of market depth 1 to 5: 1 to 5 levels A: Implied prices B: Implied off-tick prices
Bid Price Sign	1	A	Sign +/- for the Bid Price field
Bid Price	8	X	Bid price for the future contract or '0000OUV0' to represent a market order at the top of the book in a pre-auction phase. Refer to Field Description "Fraction Indicator Code"
Bid Size	5	X	Number of futures contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description "Indicator Code"
Number of Bid Orders	2	X	Number of Bid Orders, present at a given moment in the order book. If greater than 99 the 2nd character becomes an exponent Refer to Field Description "Indicator Code"
Ask Price Sign	1	X	Sign +/- for the Ask Price field.
Ask Price	8	X	Ask price for the future contract or '0000OUV0' to represent a market order at the top of the book in a pre-auction phase. Refer to Field Description "Fraction Indicator Code"
Ask Size	5	X	The number of futures contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent. Refer to Field Description "Indicator Code"
Number of Ask Orders	2	X	Number of Ask Orders, present at a given moment in the order book. If greater than 99 the 2nd character becomes an exponent. Refer to Field Description "Indicator Code"

10 Trade Cancellation Messages

10.1 Message Type I: Option Trade Cancellation

A cancellation will reduce the total volume, value and transactions by the amount of the cancelled trade. A cancellation message is followed by an Options Summary message (message type N) which will reflect the corrected market.

Field Name	L= 106	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”
Symbol Root	6	A	Option base symbol
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Volume	8	X	Number of contracts being cancelled Refer to Field Description “Indicator Code”
Trade Price	8	X	Price at which the transaction took place. Refer to Field Description “Fraction Indicator Code”
Stamp Time	12	N	Time of the option trade in UTC and microseconds HHMMSSmmmuuu Refer to Field Description “Time stamp”
Open Interest	7	X	Outstanding number of contracts in the series as of the previous day. Refer to Field Description “Indicator Code”
Price Indicator Marker	1	X	Identifies the type of transaction. Refer to Field Description “Price Indicator Marker”
Publication Date	8	N	Date of the publication YYYYMMDD
Transaction Id Code	14	X	Trade Identifier: Instrument Id + Group Id + Trade number
PTT Trade Types Marker	1	A	Refer to Field Description “PTT Trade Type” marker
PTT Cancellations and Amendments Marker	1	A	Refer to Field Description “PTT Cancellation and Amendments ” marker
Deferral Marker	1	A	Refer to Field Description “Deferral Flag ” marker

10.2 Message Type IF: Futures Trade Cancellation

A cancellation will reduce the total volume, value and transactions by the amount of the cancelled trade. A cancellation message is followed by a Future Summary message (message type NF) which will reflect the corrected market.

Field Name	L= 90	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”

Field Name	L= 90	T	Definition / Validation Rules
Symbol Root	6	A	Symbol for the Future series
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Volume	8	X	Number of contracts being cancelled Refer to Field Description “Indicator Code”
Trade Price	8	X	Price at which the transaction took place. Refer to Field Description “Fraction Indicator Code”
Stamp Time	12	N	Time of the futures trade in UTC and microseconds HHMMSSmmmuuu Refer to Field Description “Time stamp”
Price Indicator Marker	1	X	Identifies the type of transaction. Refer to Field Description “Price Indicator Marker”
Publication Date	8	N	Date of the publication YYYYMMDD
Transaction Id Code	14	X	Trade Identifier: Instrument Id + Group Id + Trade number
PTT Trade Types Flag	1	A	Refer to Field Description “PTT Trade Type”
PTT Cancellations and Amendments Flag	1	A	Refer to Field Description “PTT Cancellation and Amendments ”
Deferral Flag	1	A	Refer to Field Description “Deferral Flag ”

10.3 Message Type IS: Strategy Trade Cancellation

A cancellation will reduce the total volume, value and transactions by the amount of the cancelled trade. A cancellation message is followed by a Strategy Summary message (message type NS) which will reflect the corrected market.

Field Name	L= 108	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Refer to Field Description “Exchange ID”
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS. Alphanumeric with “.”,”+”,”-“
Volume	8	X	Number of contracts being cancelled Refer to Field Description “Indicator Code”
Trade Price Sign	1	A	Sign +/- for the Trade Price field
Trade Price	8	X	Price at which the transaction took place. Refer to Field Description “Fraction Indicator Code”
Stamp Time	12	N	Time of the futures trade in UTC and microseconds HHMMSSmmmuuu Refer to Field Description “Time stamp”
Publication Date	8	N	Date of the publication YYYYMMDD
Transaction Id Code	14	X	Trade Identifier: Instrument Id + Group Id + Trade number
PTT Trade Types Flag	1	A	Refer to Field Description “PTT Trade Type”

Field Name	L= 108	T	Definition / Validation Rules
PTT Cancellations and Amendments Flag	1	A	Refer to Field Description “PTT Cancellation and Amendments ”
Deferral Flag	1	A	Refer to Field Description “Deferral Flag ”

11 Instrument Keys Messages

11.1 Message Type J: Option Instrument Keys

Field Name	L= 311	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the instrument is listed. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Option base symbol (symbol of the underlying)
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description “Call/Put Code”
Strike Price	8	X	Strike price of the option in full. Refer to Field Description “Fraction Indicator Code”
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Strike Price Currency	3	A	Currency used for the Option Strike Price Refer to Field Description “Currency Code”
Maximum Number of Contracts per Order	6	X	Maximum authorized number of contract per order Refer to Field Description “Indicator Code”
Minimum Number of Contracts per Order	6	X	Minimum authorized number of contract per order Refer to Field Description “Indicator Code”
Maximum Threshold Price	8	X	Maximum threshold price authorized for an option contract Refer to Field Description “Fraction Indicator Code”
Minimum Threshold Price	8	X	Minimum threshold price authorized for an option contract Refer to Field Description “Fraction Indicator Code”
Tick Increment Table	7	X	Tick Table Identifier that indicates the precision with which the price of an order limit can be expressed. Refer to the Chapter “Tick Increment Tables”
Filler	1	X	Filler
Option type	1	A	Type of option “A” for American “E” for European
Market Flow Indicator	2	A	Refer to the Field Description “Market Feed Indicator”
Group Instrument	2	X	Group of the instrument
Instrument	4	X	Instrument identification within a Group
ISIN	12	X	External ISIN
Instrument External Code	30	X	External identifier used by traders when entering an Order
Option Marker	2	A	Refer to Field Description “Markers for Options”
Underlying Symbol Root	10	X	Symbol root for the underlying security
Contract Size	8	X	Defines the quantity of deliverable underlyings in one contract. Refer to Field Description “Indicator Code”

Field Name	L= 311	T	Definition / Validation Rules
Tick Value	8	X	Refer to Field Description “Fraction Indicator Code”
Liquidity Status	1	A	Refer to Field Description “Liquidity Status”
Sub Asset Class of Derivatives	1	A	Refer to Field Description: “Sub Asset Class of Derivatives”
Sub Class of Derivatives	2	A	Refer to Field Description: “Sub Class of Derivatives”
Price Notation	1	A	Refer to Field Description “Price Notation”
Measurement Unit	1	A	Refer to field description “Measurement Unit”
Block Min Value	18	X	Block Min Value expressed in notional
Block Max Value	18	X	Block Max Value expressed in notional
RFQ Min Value	18	X	RFQ Block Min Value expressed in notional
RFQ Max Value	18	X	RFQ Block Max Value expressed in notional
Outside Min Value	18	X	Outside Min Value expressed in notional
Liquidity/Maturity bucket	1	A	Refer to Field Description: “Liquidity/Maturity bucket”
IsFlexible	1	A	This field valued with: 1: Flexible series 0: Standard series
Post Trade LIS Value	18	X	Post Trade LIS threshold expressed in notional
Block Min Volume	8	X	Pre- Trade LIS volume threshold
Block Max Volume	8	X	Pre- Trade LIS volume threshold
Outside Spread Min Volume	8	X	Pre- Trade LIS volume threshold
Post Trade LIS Volume	8	X	Post Trade LIS volume threshold

Note: If both “Maximum Threshold Price” and “Minimum Threshold Price” are set to 0, no thresholds have been configured.

11.2 Message Type JF: Futures Instrument Keys

Field Name	L= 304	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Exchange on which the trade occurred. Refer to Field Description “Exchange ID”
Symbol Root	6	A	Futures series symbol
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Expiry Year	2	N	Last two digits of the expiry year of the future
Expiry Month	1	A	Expiry month code of the future
Expiry Day	2	N	Expiry day of the future
Maximum Number of Contracts per Order	6	X	Maximum authorized number of contract per order Refer to Field Description “Indicator Code”

Field Name	L= 304	T	Definition / Validation Rules
Minimum Number of Contracts per Order	6	X	Minimum authorized number of contract per order Refer to Field Description “Indicator Code”
Maximum Threshold Price	8	X	Maximum threshold price authorized for an option contract Refer to Field Description “Fraction Indicator Code”
Minimum Threshold Price	8	X	Minimum threshold price authorized for an option. Refer to Field Description “Fraction Indicator Code”
Tick Increment Table	7	X	Tick Table Identifier that indicates the precision with which the price of an order limit can be expressed. Refer to the Chapter “Tick Increment Tables”
Filler	1	X	
Market Flow Indicator	2	A	Defines the type of instruments Refer to Field Description ”Market Feed Indicators”
Group Instrument	2	X	Group of the instrument
Instrument	4	X	Instrument identification within a Group
ISIN	12	X	External ISIN
Instrument External Code	30	X	External identifier used by traders when entering an order
Currency	3	A	Refer to Field Description “Currency Code”
Underlying Symbol Root	10	X	Symbol Root of the Underlying
Contract Size	8	X	Defines the quantity of deliverable underlyings in one contract. Refer to Field Description “Indicator Code”
Tick Value	8	X	Refer to Field Description “Fraction Indicator Code”
Liquidity Status	1	A	Refer to Field Description “Liquidity Status”
Sub Asset Class of Derivatives	1	A	Refer to Field Description: “Sub Asset Class of Derivatives”
Sub Class of Derivatives	2	A	Refer to Field Description: “Sub Class of Derivatives”
Price Notation	1	A	Refer to Field Description “Price Notation”
Measurement Unit	1	A	Refer to field description “Measurement Unit”
Block Min Value	18	X	Block Min Value expressed in notional
Block Max Value	18	X	Block Max Value expressed in notional
RFQ Min Value	18	X	RFQ Block Min Value expressed in notional
RFQ Max Value	18	X	RFQ Block Max Value expressed in notional
Outside Min Value	18	X	Outside Min Value expressed in notional
Liquidity/Maturity bucket	1	A	Refer to Field Description: “Liquidity/Maturity bucket”
IsFlexible	1	A	This field valued with: 1: Flexible series 0: standard series
Post Trade LIS	18	X	Post Trade LIS threshold expressed in notional
Block Min Volume	8	X	Pre- Trade LIS volume threshold
Block Max Volume	8	X	Pre- Trade LIS volume threshold
Outside Spread Min Volume	8	X	Pre- Trade LIS volume threshold

Field Name	L= 304	T	Definition / Validation Rules
Post Trade LIS Volume	8	X	Post Trade LIS volume threshold

Note: If both "Maximum Threshold Price" and "Minimum Threshold Price" are set to 0, no thresholds have been configured.

11.3 Message Type JS: Strategy Instrument Keys

Field Name	L= 145	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Exchange on which the instrument is listed. Refer to Field Description "Exchange ID"
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS. Alphanumeric with "."","+","-"
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Maximum Number of Contracts per Order	6	X	Maximum authorized number of contract per order Refer to Field Description "Indicator Code"
Minimum Number of Contracts per Order	6	X	Minimum authorized number of contract per order Refer to Field Description "Indicator Code"
Maximum Threshold Price Sign	1	X	Sign +/- for the Maximum Threshold Price.
Maximum Threshold Price	8	X	Maximum threshold price authorized for an option contract Refer to Field Description "Fraction Indicator Code"
Minimum Threshold Price Sign	1	X	Sign +/- for the Minimum Threshold Price.
Minimum Threshold Price	8	X	Minimum threshold price authorized for an option contract. Refer to Field Description "Fraction Indicator Code"
Tick Increment	8	X	Precision with which the price of an order limit can be expressed. Refer to Field Description "Fraction Indicator Code" It is calculated as the lowest tick level granularity allowed on the Strategy legs.
Market Flow Indicator	2	A	Defines the type of instruments Refer to "Market Feed Indicators"
Group Instrument	2	X	Group of the instrument
Instrument	4	X	Instrument identification within a Group
Instrument External Code	30	X	External identifier used by traders when entering an order
Strategy Allow Implied	1	A	Indicates if the Strategy supports Implied Pricing Y: Yes N: No
Strategy Pricing	1	A	Indicate the pricing method for the strategy. L : Same as legs N : Notional A: Average Difference Change R: Ratio Inter Commodity Spread B: Ratio Calendar Spread

Field Name	L= 145	T	Definition / Validation Rules
Filler	1	A	Filler: blank
Filler	1	A	Filler: blank
Price Notation	1	A	Refer to Field Description “Price Notation”
Measurement Unit	1	A	Refer to field description “Measurement Unit”
Currency	3	A	Refer to Field Description “Currency Code”
IsFlexible	1	A	This field valued with: 1: Flexible series 0: Standard series

12 Bulletins

News and market surveillance notices are sent in bulletins messages. Bulletins will be sent throughout the trading day. More than one message will be used if the bulletin is longer than 79 characters. The continuation character “0” indicates that the bulletin continues to the next record.

When a Trading instrument has been halted by the Exchange, a Bulletin Message explaining the reason for the halt will be transmitted. When the trading instrument is reinstated, another Bulletin Message explaining the news that accompanied the reinstatement will be transmitted.

All records that make up a particular bulletin will be sent out together. No other message will be interspersed among the records that make up a complete bulletin.

12.1 Message Type L (1): Regular Text Bulletin

Field Name	L= 111	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Reserved	1		Reserved for future use
Bulletin Type	1	X	1 = Regular Text Bulletin 2 = Stressed Market Condition Start 3 = Stressed Market Condition End 4 = Stressed Market Obligations Start 5 = Stressed Market Obligations End
Group	2	X	Group Id
Instrument	4	X	Instrument Id
Bulletin Contents	79	X	Bulletin in textual form. Left justified, blank fill
Continue Marker	1	N	0 = bulletin continues in next record 1 = bulletin ended

13 Summary Messages

13.1 Message Type N: Option Summary

An option summary message is sent following an option trade cancellation. An option summary message is also sent each day at the start of the day in order to provide a list of options which will be trading each day. At that point, all price fields with the exception of the Closing price (which will have the previous day's Settlement price) and the Open interest will contain zero values.

Any option summary sent after the BEGINNING OF OPTIONS SUMMARY message (with Message Type = Q) contains the list of trading instruments for the day (sent prior to market opening) or the summaries after the close of the market.

Field Name	L= 162	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Identifies the exchange for the option Refer to Field Description "Exchange ID"
Symbol Root	6	A	Option base symbol
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Call/Put Code	1	A	Refer to Field Description "Call/Put Code"
Strike Price	8	X	Strike price of the option in full. Refer to Field Description "Fraction Indicator Code"
Corporate Action	1	A	Refer to Field Description "Corporate Action Marker"
Bid Price	8	X	Most recent bid price. Refer to Field Description "Fraction Indicator Code"
Bid Size	5	X	Number of contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description "Indicator Code"
Ask Price	8	X	Most recent ask price. Refer to Field Description "Fraction Indicator Code"
Ask Size	5	X	Number of contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description "Indicator Code"
Last Price	8	X	Most recent trade price. Refer to Field Description "Fraction Indicator Code"
Closing Price	8	X	Internal closing price calculated by Sola internal based on the last trade/bid/ask in the book at the time of market closure. Refer to Field Description "Fraction Indicator Code"
Settlement Price	8	X	Official CC&G/OSLO Clearing Securing closing prices from the clearing houses which is used to calculate they daily settlements. 0 until market closes. Refer to Field Description "Fraction Indicator Code"
Open Interest	7	X	Outstanding number of contracts in the series as of previous day. Refer to Field Description "Indicator Code"
Tick	1	X	Determined by the difference between last price and the previous different trade price + = uptick - = downtick
Volume	8	X	Total number of contracts traded or current volume if sent after a cancellation

Field Name	L= 162	T	Definition / Validation Rules
Net Change Sign	1	A	Sign +/- for net change field
Net Change	8	X	Net change = last trade price – previous settlement Net change will be zero if the option did not trade on the last business day or did not trade today. Refer to Field Description “Fraction Indicator Code”
Open Price	8	X	Price of the first trade of the day. Refer to Field Description “Fraction Indicator Code”
High Price	8	X	Highest trade price of the day or current high price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Low Price	8	X	Lowest trade price of the day or current low price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Option Marker	2	A	Refer to Field Description “Markers for Options”
Underlying Symbol Root	10	X	Symbol root for the underlying security
Delivery Year	2	N	Last two digits of the delivery year
Delivery Month	1	A	Delivery month for the contract
Delivery Day	2	N	Delivery day
Event Type	1	X	Event Type

13.2 Message Type NF: Futures Summary

A Futures summary is sent following a Futures trade cancellation. A Futures summary is also sent each day at the start of the day in order to provide a list of Futures which will be trading each day. At that point, all price fields, with the exception of the previous day Settlement price and the open interest will contain zero values.

Any summary sent after the BEGINNING OF FUTURE SUMMARY message (with Message Type = QF) contains the list of trading instruments for the day (sent prior to market opening) or the summaries after the close of the market.

Field Name	L= 153	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Identifies the exchange for the future Refer to Field Description “Exchange ID”
Symbol Root	6	A	Symbol for the Future Series
Maturity Year	2	N	Last two digits of the maturity year of the contract
Maturity Month	1	A	Maturity month code of the contract
Maturity Day	2	N	Maturity day of the contract
Corporate Action	1	A	Refer to Field Description “Corporate Action Marker”
Bid Price	8	X	Closing bid or most recent bid if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Bid Size	5	X	Number of contracts represented by the Bid Price If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Ask Price	8	X	Closing Ask Price or most recent Ask Price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”

Field Name	L= 153	T	Definition / Validation Rules
Ask Size	5	X	Number of contracts represented by the ask price If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Last Price	8	X	Last trade price for the contract or the current price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Open Price	8	X	Price of the first trade of the day. Refer to Field Description “Fraction Indicator Code”
High Price	8	X	Highest trade price of the day or current high price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Low Price	8	X	Lowest trade price of the day or current low price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Closing Price	8	X	Closing price sent at the closing of the market. Refer to Field Description “Fraction Indicator Code”
Settlement Price	8	X	Official CC&G/OSLO Clearing Securing closing prices from the clearing houses which is used to calculate they daily settlements. 0 until market closes. Refer to Field Description “Fraction Indicator Code”
Net Change Sign	1	X	Sign +/- for net change field
Net Change	8	X	Net change = last Trade Price – previous Settlement Price If no previous settlement price (new series) then net change is zero. Refer to Field Description “Fraction Indicator Code”
Volume	8	X	Total number of contracts traded Refer to Field Description “Indicator Code”
Previous Settlement	8	X	Settlement Price for the previous day. Refer to Field Description “Fraction Indicator Code”
Open Interest	7	X	Outstanding number of contracts in the series as of previous day. Refer to Field Description “Indicator Code”
Underlying Symbol Root	10	X	Symbol root for the underlying security
Event Type	1	X	Event Type

13.3 Message Type NS: Strategy summary

A Strategy summary is sent following a Strategy trade cancellation. A Strategy summary is also sent each day at the start of the day in order to provide a list of Strategies which will be trading each day. At that point, all price fields, with the exception of open interest will contain zero values.

Any Strategy summary sent after the BEGINNING OF STRATEGY SUMMARY message (with message Type = QS) contains the list of trading instruments for the day (sent prior to market opening) or the summaries after the close of the market.

Field Name	L= 203 up to 797	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	X	Identifies the exchange for the strategy Refer to Field Description “Exchange ID”

Field Name	L= 203 up to 797	T	Definition / Validation Rules
Symbol	30	X	Identification of the strategy The legs (underlying) are defined in message type NS. Alphanumeric with "."."+"."-"
Bid Price Sign	1	X	Sign + /- for the Bid Price field
Bid Price	8	X	Closing bid or most recent bid if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Bid Size	5	X	Number of contracts represented by the Bid Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Ask Price Sign	1	X	Sign +/- for the Ask Price field
Ask Price	8	X	Closing ask or most recent ask if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Ask Size	5	X	Number of contracts represented by the Ask Price. If size is greater than 99999, the 5th character becomes an exponent Refer to Field Description “Indicator Code”
Last Price Sign	1	A	Sign +/- for the Last Price field
Last Price	8	X	Last Trade Price for the contract or the current price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Open Price Sign	1	A	Sign +/- for the Open Price field
Open Price	8	X	Price of the first trade of the day. Refer to Field Description “Fraction Indicator Code”
High Price Sign	1	A	Sign +/ - for the High Price field
High Price	8	X	Highest trade price of the day or current high price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Low Price Sign	1	A	Sign +/- for the Low Price field
Low Price	8	X	Lowest Trade Price of the day or current low price if sent after a cancellation. Refer to Field Description “Fraction Indicator Code”
Net Change Sign	1	A	Sign +/- for net change field
Net Change	8	X	Net change = last trade price - previous close If no previous settlement price (new series) then net change is zero. Refer to Field Description “Fraction Indicator Code”
Volume	8	X	Total number of contracts traded Refer to Field Description “Indicator Code”
Number of Legs	2	N	Number of legs in the strategy 2 to 20
Ratio Sign	1	A	Identification of the transaction in the strategy (buy or sell of the underlying) + : Buy of the underlying - : Sell of the underlying
Ratio	2	N	Quantity (bought or sold) on underlying in the strategy. 1 to 20
Leg Symbol	30	X	Identification of the leg

14 Beginning of Summary Messages

14.1 Message Type Q: Beginning of Options Summary

This message indicates that the "beginning of day option" summaries (message type N) are to follow. Other messages (such as bulletins) can be interspersed with the summaries.

Field Name	L= 24	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Identifies the exchange Refer to Field Description "Exchange ID"

14.2 Message Type QB: Beginning of Futures Options Summary

This message indicates that the beginning of day Future Options summaries are to follow. Other messages (such as bulletins) can be interspersed with the summaries.

Field Name	L= 24	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Identifies the exchange Refer to Field Description "Exchange ID"

14.3 Message Type QF: Beginning of Futures Summary

This message Indicates that the beginning of day Futures summaries (message type NF) are to follow. Other messages can be interspersed with the summaries.

Field Name	L= 24	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Identifies the exchange Refer to Field Description "Exchange ID"

14.4 Message Type QS: Beginning of Strategy Summary

This message indicates that the beginning of day Strategy summaries (message type NS) are to follow. Other messages can be interspersed with the summaries.

Field Name	L= 24	T	Definition / Validation Rules
Message Header	23		Refer to "Message Header" paragraph.
Exchange ID	1	A	Identifies the exchange Refer to Field Description "Exchange ID"

15 Other Messages

15.1 Message Type RS: Connection Message (not applicable to UDP subscription)

Field Name	L= 51 up to 6039	T	Definition / Validation Rules
Message Header	23	X	Refer to “Message Header” paragraph.
Reset Sequence	10	N	Indicates the last message received. Messages will restart at ’0000000001’ every day.
Equity Options	1	A	Client wants to receive all regular market messages on the Options market. Y: Yes N: No
Futures	1	A	Client wants to receive all regular market messages on the Futures market. Y: Yes N: No
Market Depth	1	A	Client wants to receive: Y: Market Depth messages (type H*) on the top 5 Bids/ Asks for the type of trading instruments chosen I: Market Depth messages (type H*) on the top 5 Bids/Asks and the calculated implied best limit N: The best Bid/Ask message (type F*) for the type of trading instrument chosen T: Trade messages (type C*) without Quotes or Market Depth messages
Strategies	1	A	Client wants to receive: Y: Regular market messages, and all the Strategies on the different trading instruments N: Only regular market messages
Market Summaries	1	A	Y: Client wants to receive ONLY the market summaries and the Instrument key messages N: Client wants to receive the regular market messages with the summaries and the Instrument key messages
GAP Control	1	X	Client will receive GAP messages: Y: Yes (or 0) N: No (or 1) *Note: The sequence number will not be in an n+1 order.*
Post Trade	1	X	Client will receive PT messages: Y: Yes N: No
HSVF Protocol Version	2	X	E7: LSE SOLA version E7. Only protocol supported.
Number of Classes Requested	3	N	000: Client wants to receive messages on all classes. 001 to 999: Client wants to receive messages on indicated number of classes.
Classes Requested	6 up to 5994	X	Class requested (using the 6 character symbol root, right padded with blanks). Maximum: 999 classes. *Example: to request for classes ABC and DEF: ABC<blank><blank><blank>DEF<blank><blank><blank>*

15.2 Message Type S: End of sales

The "End of Sales" message will be sent when there is no more trading activity to be transmitted. This will occur after the closing of the market.

Field Name	L= 30	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Reserved	1		Reserved for future use
Time	6	N	Time at which the message is transmitted HHMMSS Refer to Field Description “Time stamp”

15.3 Message Type U: End of transmission

This message will be sent to indicate that the day's transmission is complete. After this, no HSVF messages will be transmitted. Transmission will resume the following day.

Field Name	L= 30	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Exchange ID	1	A	Identifies the exchange. Refer to Field Description “Exchange ID”
Time	6	N	Time at which the message is transmitted HHMMSS Refer to Field Description “Time stamp”

15.4 Message Type V: Circuit Assurance

A Circuit Assurance message is sent out if no messages were sent by the Exchange for more than one minute once the broadcast has started (i.e. at the termination of the Test Loop message). This will be an assurance that the line is up.

This message will continue to be sent until the End of Transmission message (type U) is sent. The Circuit Assurance message will repeat the sequence number of the previous record transmitted (except if it is a re-transmit message) i.e. it will not increment the sequence number.

Field Name	L= 29	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph.
Time	6	N	Time at which the message is transmitted HHMMSS Refer to Field Description “Time stamp”

15.5 Message Type VE: Align End (not applicable to UP subscription)

Align End message indicates when the HSVF data flow is aligned i.e. indicates that recovery data are terminated and from now on live data are being received.

The user will subscribe the enhanced gap control functionality by specifying the flag Y for the gap control field in the RS message.

The Align End message will repeat the sequence number of the previous record transmitted, as already happens for ‘V’ message (Circuit Assurance).

Field Name	L= 23	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph. Message type = VE

15.6 Message Type W: Gap sequence (not applicable to UDP subscription)

Field Name	L= 32	T	Definition / Validation Rules
Message Header	23		Refer to “Message Header” paragraph. *Note: Sequence Number for the ‘W’ message is the same as the Sequence Number for the first skipped message of a Class different from the Class requested.*
Sequence Numbers Skipped	9	N	Sequence numbers skipped. *Note: This value must be equal to the Sequence Number of the last skipped message of a Class different from the Class requested.*

The Gap message signals the beginning and ending sequence numbers of messages relating to classes different from those subscribed to by the client during the connection message.

The example outlined in the following table indicates the messages to be received by a client who has subscribed to receive market data on Class ’YYY’, along with Gap messages.

The table data under Message Log lists a number of message types showing; Sequence Number, Message Type, Exchange ID, and Symbol Root. Based on what the client has subscribed to in the Connection Message (RS), the messages to be received are listed under the Client Received Messages section of the table. Refer to **Message Type RS - Connection Message - Min. 32 / Max. 6026 bytes** for details on subscription options.

Message Log				Client Received Messages				
SeqNo	Msg Type	Exchange ID	Symbol Root	SeqNo	Msg Type	Exchange ID	Symbol Root	Skipped SeqNo
000007393	C	Q	YYY	000007393	C	E	YYY	n/a
000007394	H	Q	ZZZ					
000007395	C	Q	XXX					
000007396	C	Q	ZZZ					
000007397	H	Q	FFF	000007394	W	n/a	n/a	000007397
000007398	N	Q	YYY	000007398	N	E	YYY	n/a
000007399	H	Q	ZZZ					

16 Fields Description

16.1 Call/Put Code

Call/Put Code	Description
C	Call
P	Put
O	Over

Call/Put Code	Description
U	Under

16.2 Corporate Action Marker

Corporate Action Marker	Description
X, Y, Z, Q, R, S, G, U, V	Pending Corporate Action impacting contract
Blank	No Corporate Action impacting contract

16.3 Currency code

Marker	Description
USD	US $
CAD	Canadian $
GBP	Pound Sterling
GBX	Penny Sterling
CHF	Swiss Franc
EUR	Euro
JPY	Yen
SEK	Swedish Krona
NOK	Norwegian Krone
DKK	Danish Krone
AUD	Australian Dollar
BRL	Brazilian Real
CNY	Chinese Yuan Renminbi
CZK	Czech Krone
HKD	Hong Kong Dollar
HUF	Hungarian Forint
INR	Indian Rupee
MYR	Malaysian Ringgit
PLN	Polish Zloty
RON	New Romanian Leu
RUB	Russian Rubble
SGD	Singapore Dollar
TRY	New Turkish Lira
ZAR	South African Rand
Blank	Not provided

16.4 Deferral Flags

Marker	Delivery Type	Description
L	**LRGS**	Large in scale
I	**ILQD**	Illiquid Trade
S	**SIZE**	Above the size
(Blank)	**(Blanks)**	None

16.5 Delivery Type

Delivery Type	Description
'C'	Cash
'P'	Physical

16.6 Event Type

Event Type	Description
C	Trade cancellation
D	Daily Settlement Price (CURVE only)
F	Final Settlement Price (CURVE only)
R	Reference Data
O	Open Interest update (CURVE only)
' '	SOLA Closing Price

16.7 Exchange ID

Exchange ID	Description
I	Italian Derivatives Exchange Market (IDEM)
E	London Stock Exchange derivatives Market (LSEDM)
O	Oslo Bors (OB)
R	London Stock Exchange Interest Rate derivatives Market

16.8 Fraction Indicator Code

Prices will be a numeric field followed by the fraction or multiplier position. The delineation of the whole number portion of the price and the decimal/fractional portion of the price will be defined by the last character with the Fraction Indicator Code (FI).

Fraction Indicator Code will be one (1) Alphanumeric Character as follows:

Fraction	Code	Multiplier	Code
1/1	0		

Fraction	Code	Multiplier	Code
1/10	1	10	L
1/100	2	100	M
1/1,000	3	1,000	N
1/10,000	4	10,000	O
1/100,000	5	100,000	P
1/1,000,000	6	1,000,000	Q
1/10,000,000	7		
1/100,000,000	8		
1/1,000,000,000	9		

16.9 Indicator code

This code is used for Bid/Ask Size, Volume, and Open Interest. When the number is higher than the maximum number possible to represent with the field length, the last character becomes an exponent.

Marker	Description (the size of the bid/ask field)	
C	100	(Hundreds)
D	1,000	(Thousands)
E	10,000	(Ten-Thousands)
F	100,000	(Hundred-Thousands)
G	1,000,000	(Millions)
H	10,000,000	(Ten-Millions)
I	100,000,000	(Hundred-Millions)
J	1,000,000,000	(Billions)

Data	Message sent	Participant Display
Bid size of 124 872	Size field will indicate '1248C'	124 800
Volume of 8,457,188	Volume will indicate '8457188'	8,457,188
Volume of 258,487,797	Volume will indicate '2584877C'	258,487,700
Open Interest of 544,871	Size field will indicate '544871'	544871
Open Interest of 17,458,795	Size field will indicate '174587C'	17,458,700

16.10 Liquidity Status

Exchange ID	Description
?	Unknown
L	Liquid
I	Illiquid

16.11 Market Feed Indicators

The following table lists the Market Feed indicators:

First letter	Type of Instrument	Second Letter	Type of Underlying
F	Futures	U	Rate
P	Options on Futures	X	Index
O	Options	E	Equities
U	Strategies on Options on Futures	L	Long term
V	Strategies on Futures		
W	Strategies on Options		

16.12 Markers for Options

First letter (Currency or type of market)	
Marker	**Description**
B	Trading in British Pound
C	Trading in Canadian Dollar
F	Trading in Euro
E	Trading in Swiss Franc
U	Trading in US Dollar
Y	Trading in Japanese Yen
S	Trading in Swedish Krona
N	Trading in Norwegian Krone
D	Trading in Danish Krone
X	Trading in British Pence
A	Trading in Australian Dollar
L	Trading in Brazilian Real
R	Trading in Chinese Yuan Renminbi
K	Trading in Czech Krone
H	Trading in Hong Kong Dollar
O	Trading in Hungarian Forint
I	Trading in Indian Rupee
M	Trading in Malaysian Ringgit
Z	Trading in Polish Zloty
V	Trading in New Romanian Leu
P	Trading in Russian Ruble
G	Trading in Singapore Dollar
T	Trading in New Turkish Lira
J	Trading in South African Rand

2nd letter (Type of options)	
Marker	**Description**
Blank	Regular Options (Plain vanilla)
B	Binary Options

16.13 Instrument Code Type

Name	Description
ISIN	Isin
OTHR	Other

16.14 Instrument Status Marker

Status Marker	Description
E	Intervention before Opening phase
Y	Pre-opening for Standard Series Not Trading for Strategy Instruments if at least one of the legs is in a not tradable state
O	Opening phase
T	Continuous Trading phase
F	Forbidden phase
H	Interrupted (Trading Halted)
R	Reserved phase (Instrument goes into an intraday auction)
S	Suspended phase (only for Instrument Messages)
A	Exchange Intervention
C	End of Consultation phase
BLANK	If not used

16.15 Instrument Type

Name	Description
E	Equity
F	Future
I	Index
O	Option
S	Strategy
X	Equity Option
Y	Future Option
Z	Sponsored Option

16.16 Group Status Marker

Status Marker	Description
E	Intervention before Opening phase
Y	Pre-opening phase
O	Opening phase
T	Continuous Trading phase
F	Forbidden phase
H	Interrupted (Trading Halted)
A	Exchange Intervention
C	End of Consultation phase
BLANK	If not used

16.17 Measurement Unit

Name	Description (in PT message)
M	MWh
K	kWh
T	Ton
(Blank)	None

16.18 MIC Code

Name	Description
XLOD	LSE Derivatives Market (Equity derivatives and CurveGlobal products)
XDMI	IDEM
XOSL	Oslo Børs

16.19 Price Indicator Marker

Marker	Description	Disseminated	Affect Last Price	Affect Volume	Affect High / Low
(blank)	Actual transaction took place	Yes	Yes	Yes	Yes
P	Strategy reporting	Yes	No	Yes	No
I	Implied trade	Yes	Yes	Yes	Yes
1	Exchange granted 1 (TG1)	Yes	No	Yes	Yes
2	Exchange granted 2 (TG2)	No	No	No	No
T	Committed	Yes	Yes	Yes	Yes
K	Committed Block	Yes	No	Yes	No
C	Cross	Yes	Yes	Yes	Yes

Marker	Description	Disseminated	Affect Last Price	Affect Volume	Affect High / Low
B	Cross Block	Yes	No	Yes	No
A	As-of-trade	Yes	No	No	No
L	Late trade	Yes	No	Yes	No
e	Exchange For Physical	Yes	No	Yes	No
s	Basis Trade/Exchange for Security/Exchange of Future for Swap	Yes	No	Yes	No

16.20 Price Notation

Name	Description
M	MONE
P	PER
Y	YIEL
B	BAPO

16.21 PTT Cancellation and Amendments

Marker	Name	Description
C	CANC	Cancellation
A	AMND	Amendment
(Blank)	(Blanks)	None

16.22 PTT Trade Type

Marker	Name	Description
T	TPAC	Package transaction flag
X	XFPH	Exchange For Physical
(Blank)	(Blanks)	None

16.23 Time stamp

Time should always be in Universal Time Coordinated (UTC) for IDEM, LSEDM Equity derivatives/OB markets and LSEDM Interest Rate derivatives.

Format	Description
HHMMSS	This format is a common way of describing the content, i.e. Hours, Minutes, Seconds.
HHMMSSmmmuuu	This format is a common way of describing the content, i.e. Hours, Minutes, Seconds, Milliseconds and Microseconds.

16.24 Sub Asset Class of Derivatives, Sub Class of Derivatives and Liquidity/Maturity bucket

IDEM, IDEX and AGREX

IDEM Equity derivatives	Sub Asset Class of Derivatives		Sub Class of Derivatives		Liquidity/Maturity bucket
FTSE MIB futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**S**
FTSE MIB mini-futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**S**
FTSE MIB options (including weekly)	Stock index options	**L**	NOT RELEVANT	**XX**	**S**
FTSE MIB dividend index futures	Dividend index futures / forwards	**M**	NOT RELEVANT	**XX**	**P**
Stock options (including weekly)	Stock options	**O**	NOT RELEVANT	**XX**	**P, Q, R, S**
Stock futures	Stock futures / forwards	**P**	NOT RELEVANT	**XX**	**P, Q, R, S**
Single stock dividend futures	Stock dividend futures / forwards	**Q**	NOT RELEVANT	**XX**	**P, Q, R, S**

IDEX & AGREX	Sub Asset Class of Derivatives		Sub Class of Derivatives		Liquidity/Maturity bucket*
Italian power baseload	Energy commodity futures / forwards	**E**	Electricity, Italian PUN, with notional currency in Euro, baseload, cash settled / physically delivered via GME	**EA**	**A, B, C, D, E, F, G, H, I, J, K, Z**
Italian power peakload	Energy commodity futures / forwards	**E**	Electricity, Italian PUN, with notional currency in Euro, peakload, cash settled / physically delivered via GME	**EB**	**A, B, C, D, E, F, G, H, I, J, K, Z**
German/Austrian power baseload	Energy commodity futures / forwards	**E**	Electricity, German/Austrian price, with notional currency in Euro, baseload, cash settled	**EC**	**A, B, C, D, E, F, G, H, I, J, K, Z**
German/Austrian power peakload	Energy commodity futures / forwards	**E**	Electricity, German/Austrian price, with notional currency in Euro, peakload, cash settled	**ED**	**A, B, C, D, E, F, G, H, I, J, K, Z**
Agrex futures	Agricultural commodity futures / forwards	**G**	Italian durum wheat, with notional in EUR	**AE**	**A, B, C, D, E, F, G, H, I, J, K, L, Z**

LSEDM

LSEDM	Sub Asset class of Derivatives		Sub class of Derivtives		Liquidity/Maturity Bucket
FTSE RIOB index futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**P**

LSEDM	Sub Asset class of Derivatives		Sub class of Derivtives		Liquidity/Maturity Bucket
OBX index futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**P**
OBOSX index futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**P**
FTSE 100 index futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**T**
FTSE UK Large Cap SLQ index futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**P**
BIST 30 index futures	Stock index futures / forwards	**K**	NOT RELEVANT	**XX**	**P**
FTSE RIOB index options	Stock index options	**L**	NOT RELEVANT	**XX**	**P**
OBX index options	Stock index options	**L**	NOT RELEVANT	**XX**	**P**
FTSE 100 index options (incl. weekly)	Stock index options	**L**	NOT RELEVANT	**XX**	**S**
BIST 30 index options	Stock index options	**L**	NOT RELEVANT	**XX**	**P**
IOB DR stock options	Stock options	**O**	NOT RELEVANT	**XX**	**P**
Norwegian stock options	Stock options	**O**	NOT RELEVANT	**XX**	**P**
UK stock options	Stock options	**O**	NOT RELEVANT	**XX**	**P, Q, R, S**
IOB DR stock futures	Stock futures / forwards	**P**	NOT RELEVANT	**XX**	**P**
IOB DR dividend neutral stock futures	Stock futures / forwards	**P**	NOT RELEVANT	**XX**	**P**
Norwegian stock futures	Stock futures / forwards	**P**	NOT RELEVANT	**XX**	**P**
UK stock futures	Stock futures / forwards	**P**	NOT RELEVANT	**XX**	**P, Q, R, S**
IOB DR dividend futures	Stock dividend futures / forwards	**Q**	NOT RELEVANT	**XX**	**P**
IOB DR late dividend futures	Stock dividend futures / forwards	**Q**	NOT RELEVANT	**XX**	**P**

CurveGlobal

CurveGlobal	Sub Asset class of Derivatives		Sub class of Derivtives		Liquidity/Maturity Bucket
Schatz futures	Bond futures/forwards	**A**	Republic of Germany, Short term	**BA**	**A, B, Z**
Bobl futures	Bond futures/forwards	**A**	Republic of Germany, Mid term	**BB**	**A, B, Z**
Bund futures	Bond futures/forwards	**A**	Republic of Germany, Long term	**BC**	**A, B, Z**
Long Gilt futures	Bond futures/forwards	**A**	UK Debt Management (Office for HM Treasury in the United Kingdom), Long term	**BW**	**A, B, Z**
Three month Euribor futures	IR futures/FRA	**C**	European Interbank Offered Rate (Euribor®), Three Months	**IA**	**A, B, C, D, E, F, G, Z**

CurveGlobal	Sub Asset class of Derivatives		Sub class of Derivtives		Liquidity/Maturity Bucket
Three month Sterling futures	IR futures/FRA	**C**	ICE Benchmark Administration Limited London Interbank Offered Rate (ICE LIBOR), Three Months	**IB**	**A, B, C, D, E, F, G, Z**
Three month SONIA futures	IR futures/FRA	**C**	Compounded Sterling Over Night Index Average (SONIA) rate, Three Months	**IC**	**Z**

16.25 Underlying Instrument Type

Format	Description
!	Other
A	Interest Rate Index
B	Basket
C	Currency
D	Dividend
E	Equity
F	Future
H	Forward
I	Index
J	Forward Rate Agreements
K	Spread bet
M	Commodity
N	Dividend Index
O	Option
P	Paneuropean
Q	Contract For Difference
R	Interest Rate
S	Strategy
T	Debt
U	Paneuropean Index
V	Volatility Variance Index
W	Swap
X	Equity Option
Y	Future Option
Z	Sponsored Option
1	Agrics
2	Extraction
3	Industrial
4	Service
5	Energy Power
6	Energy Gas

Format	Description
7	Environmental
8	Polypropylene products
9	Generated recourses
?	Unknown

16.26 Tick Increment Tables - IDEM, IDEX and AGREX

The naming convention on IDEM is as follows (Tick Increment Table Identifier):

Short Name	Name
AG	AGREX Future
DF	IDEM DIVIDEND Future
DV	IDEM FTSE MIB DIV INDEX FUTURE
EF	IDEM Stock Future
EO	IDEM Stock Option
IF	IDEM FTSE MIB Future
IO	IDEM FTSE MIB Option
IW	IDEM FTSE MIB Weekly
MF	FTSE100 MINI Future
XF	IDEX Future

16.26.1 AG (AGREX Future)

Price		Tick Increment	BNT Tick Increment
From	**To**		
0	+	0.2500	0.2500

16.26.2 DF (IDEM DIVIDEND Future)

Price		Tick Increment	BNT Tick Increment
From	**To**		
0	+	0.0001	0.0001

16.26.3 DV (IDEM FTSE MIB DIV Index Future)

Price		Tick Increment	BNT Tick Increment
From	**To**		
1.00	+	1.0000	1.0000

16.26.4 EF (IDEM Stock Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0	+	0.0001	0.0001

16.26.5 E0 (IDEM Stock Option)

Price		Tick Increment	BNT Tick Increment
From	To		
0	0.005	0.0001	0.0001
0.005	+	0.0005	0.0005

16.26.6 EO (IDEM Stock Option)

Price		Tick Increment	BNT Tick Increment
From	To		
0.0001	0.0050	0.0001	0.0001
0.0050	+	0.0005	0.0005

16.26.7 IF (IDEM FTSE MIB Future, MINI FTSE MIB Future and FTSE ITALIA PIR Mid Cap TR INDEX FUTURE)

Price		Tick Increment	BNT Tick Increment
From	To		
5.00	+	5.0000	5.0000 (1.0000)*

(*) The go-live date for the introduction of a reduced tick size equal to 1 index point for orders to execute Negotiated Transactions is subject to regulatory approval. Target implementation date is in January 2019.

16.26.8 IO (IDEM FTSE MIB Option)

Price		Tick Increment	BNT Tick Increment
From	To		
1.00	100.00	1.0000	1.0000 (1.0000)*
100.00	500.00	2.0000	2.0000 (1.0000)*
500.00	+	5.0000	5.0000 (1.0000)*

(*) The go-live date for the introduction of a reduced tick size equal to 1 index point for orders to execute Negotiated Transactions is subject to regulatory approval. Target implementation date is in January 2019.

16.26.9 IW (IDEM FTSE MIB Weekly)

Price		Tick Increment	BNT Tick Increment
From	To		
1.00	+	1.0000	1.0000

16.26.10 XF (IDEX Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0	+	0.0100	0.0100

16.27 Tick Increment Tables - LSEDM

The naming convention on LSEDM is as follows (Tick Increment Table Identifier):

Short Name	Name
GB	UK Stock Options
Gf	UK Stock Futures
T1	UK Index Future
T2	UK Index Option
T4	FTSE SuperLiquidity Index Future
NB	Norwegian Binary Options
NF	Norwegian Index Future
NO	Norwegian Index Options
Nf	Norwegian Stock Futures
No	Norwegian Stock Options
UF	Russian Index Futures
UO	Russian Index Options
UL	Russian & IOB Stock Futures Liquid. The tick table in this section applies to the following underlyings only: LKOD – Lukoil OAO MNOD – Norilsk Nickel OJSC NVTK – Novatex OAO OGZD – Gasprom OAO ROSN – Rosneft OAO SBER – SBERBANK
Uf	Russian & IOB Stock Futures (The tick table in this section applies only to the underlyings not listed in the UL section above)
Uo	Russian & IOB Stock Options
Ud	Russian Stock Dividend Futures
t0	Turkish Index Option
t1	Turkish Index Future

16.27.1 GB (UK Stock Option)

Price		Tick Increment	BNT Tick Increment
From	To		
0.25	+	0.2500	0.2500

16.27.2 Gf (UK Stock Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.01	+	0.0100	0.0100

16.27.3 T1 (UK Index Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0.5	+	0.5000	0.5000

16.27.4 T2 (UK Index Option)

Price		Tick Increment	BNT Tick Increment
From	To		
0.5	+	0.5000	0.5000

16.27.5 NF (Norwegian Index Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0	999.9	0.1000	0.0001
1000.00	+	0.2500	0.0001

16.27.6 NO (Norwegian Index Options)

Price		Tick Increment	BNT Tick Increment
From	To		
0	0.24	0.01	0.0001
0.25	3.95	0.05	0.0001
4	7.9	0.1	0.0001
8	+	0.25	0.0001

16.27.7 Nf (Norwegian Stock Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0	49.99	0.0100	0.0001

Price		Tick Increment	BNT Tick Increment
50.00	99.95	0.0500	0.0001
100.00	499.9	0.1000	0.0001
500.00	+	0.5000	0.0001

16.27.8 No (Norwegian Stock Options)

Price		Tick Increment	BNT Tick Increment
From	To		
0	0.24	0.0100	0.0001
0.25	3.95	0.0500	0.0001
4.00	7.9	0.1000	0.0001
8.00	+	0.2500	0.0001

16.27.9 UF (Russian Index Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.01	+	0.2500	0.0001

16.27.10 UO (Russian Index Options)

Price		Tick Increment	BNT Tick Increment
From	To		
0.01	0.09	0.0100	0.0001
0.1	3.95	0.0500	0.0001
4.00	9.9	0.1000	0.0001
10.00	+	0.2500	0.0001

16.27.11 UL (Russian & IOB Stock Futures - Liquid)

The tick table in this section applies to the following underlyings only:

— LKOD – Lukoil OAO
— MNOD – Norilsk Nickel OJSC
— NVTK – Novatek OAO
— OGZD – Gazprom OAO
— ROSN – Rosneft OAO
— SBER – SBERBANK

Price	Tick Increment	BNT Tick Increment

Price		Tick Increment	BNT Tick Increment
From	To		
0.0001	0.9999	0.0001	0.0001
1.00	4.9995	0.0005	0.0005
5.00	9.999	0.001	0.001
10.00	49.995	0.005	0.005
50.00	99.99	0.01	0.01
100	499.95	0.05	0.05
500	999.9	0.1	0.1
1000	4999.5	0.5	0.5
5000	9999	1.00	1.00
10000	99999999	5.00	5.00

16.27.12 Uf (Russian & IOB Stock Futures)

The tick table in this section applies only to underlyings not listed in section 16.26.13 above.

Price		Tick Increment	BNT Tick Increment
From	To		
0.0001	0.4999	0.0001	0.0001
0.5	0.9995	0.0005	0.0005
1.00	4.999	0.001	0.001
5.00	9.995	0.005	0.005
10	49.99	0.01	0.01
50	99.5	0.05	0.05
100	499.9	0.1	0.1
500	999.5	0.5	0.5
1000	4999	1.00	1.00
5000	99999999	5.00	5.00

16.27.13 Uo (Russian & IOB Stock Options)

To be introduced on 10 December 2018 (see LSEDM Market Notice N.1388/18):

Price		Tick Increment	BNT Tick Increment
From	To		
0	0.099	0.0001	0.0001
0.01	0.245	0,0010	0.0001
0.25	1.99	0.01	0.0001
2.00	3.95	0.0500	0.0001
4.00	9.9	0.1000	0.0001

Price		Tick Increment	BNT Tick Increment
10.00	+	0.2500	0.0001

16.27.14 Ud (Russian Stock Dividend Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0.0005	0.9995	0.0005	0.0005
1.00	4.999	0.0010	0.0010
5.00	+	0.0100	0.0100

16.27.15 t0 (Turkish Index Option)

Price		Tick Increment	BNT Tick Increment
From	To		
0.01	+	0.0100	0.0100

16.27.16 t1 (Turkish Index Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0.025	+	0.0250	0.0250

16.28 Tick Increment Tables - CurveGlobal

Short Name	Name
E3	Three month Euribor Futures
G3	Three month Sterling Futures
E0	Schatz Futures
E1	Bobl Futures
E2	Bund Futures
G0	Long Gilt Futures
SF	Three month SONIA Futures

16.28.1 E3 (Three month Euribor Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.005	+	0.0050	~~0~~.005 0.0001(1)

1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019

16.28.2 G3(Three month Sterling Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.0050	+	0.005	0.005 (0.0001(1)

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

16.28.3 E0 (Schatz Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.0025	+	0.0025	0.0025(0.0001(1))

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

16.28.4 E1 (Bobl Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.005	+	0.0050	0.0050 (0.0001(1))

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

16.28.5 E2 (Bund Futures)

Price		Tick Increment	BNT Tick Increment
From	To		
0.005	+	0.0050	0.0050 (0.0001[(1)])

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

16.28.6 G0 (Long Gilt Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0.005	+	0.0050	0.0050 (0.0001[(1)])

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

16.28.7 SF (Three Month SONIA Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0.005	+	0.0050	0.0050 (0.0001[(1)])

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

16.28.8 S1 (One Month SONIA Future)

Price		Tick Increment	BNT Tick Increment
From	To		
0.005	+	0.0050	0.0050 (0.0001[(1)])

(1) The go-live date for the introduction of a separate reduced tick size equal to 0.0001 for orders to execute Negotiated Transactions Bilaterally Negotiated Trades for CurveGlobal® will be separately communicated via LSEDM Market Notice. Target implementation date is in Q4 2019.

17 Message processing

17.1 Summary messages

Summary messages are sent:

- At the beginning of the day to define the instruments traded on that day
- After a trade cancellation if extreme values have been changed (Open/High/Low/Last)
- At the end of the day with relevant data such as the Open/High/Low/Last/Volume
- During the day if a new instrument is added
- During the day if a Settlement Price or Open Interest event are sent by the Clearing System

17.2 Instruments keys and the book updates

On HSVF the Instruments keys and the book updates are disseminated:

- J(i) messages are disseminated at the beginning of the trading day for all tradable series.
- J and JF messages are disseminated any time the instrument Min/Max thresholds are updated
- J (for Options), JF (for Futures) and JS (for Strategies) messages are disseminated at the start of day for all the instrument that are **not yet expired**
- For options the H message is disseminated for all the instrument that are **tradable on the given date**
- For future the HF message is disseminated for all the instrument that are **tradable on the given date**

17.3 Strategies' processing

Messages to use:

- JS (Strategy Instrument Keys)
- J/JF (Leg Instrument key messages for options, and futures)
- NS (Strategy Summary Messages)

Process:

1. Collect all JS Messages broadcasted in the HSVF and maintain all of their Symbols for future linking to the Symbols in the NS message which will be disseminated after the HSVF JS message. Note JS messages can be broadcasted in HSVF at anytime during the normal trading day for newly created User Requested Flexible Combinations.
2. For each J/JF message record, create and maintain a table of Leg "Symbol – HSVF External Code" couplings.
3. For each leg received in each NS messages:
    - Find the HSVF External Code which is now coupled to the leg Symbol created in step 1
    - Generate the leg description by joining the:
        - Leg Ratio Sign
        - Leg Ratio Integer
        - Leg HSVF External Code
    - Remove all the insignificant "0" and spaces

4. Generate the strategy description by joining the legs description in their respective order in the NS message and you remove all the insignificant spaces.

17.4 Group status change

For each group the status change is disseminated according the following schedule:

- At 8:00 the groups status change Intervention Before Opening is disseminated.
- At 8:30 the groups status change Preopening is disseminated (for FIB and MINI only).
- At 9:00 the groups status changes Opening and Continuous Trading are disseminated (all groups except for AGREX market that opens at 14:30).

17.5 Off-Tick Prices Implied level

Implied price level B is disseminated to show when a price "better" than the best possible full tick price is available. This implied level shown in Market Depth messages have the following characteristics:

- Level of Market Depth = B
- Price = best possible full tick price
- Quantity = Aggregated volume at the "best price" even when that "best price" has not been disseminated

Market Depth Messages dissemination:

Scenario	**H<i> message dissemination**	
	Number of Level disseminated	**Level of Market Depth**
1. Bid/Ask Prices on Implied level A	1	A
2. Bid/Ask Prices on Implied level B	1	B
3. Bid Price on Implied level A and Ask Price on Implied level B or vice versa	2	A and B
4. An incoming order price change the Implied level populated **E.g.** Bid Price on implied A, an incoming order change the implied level to B	1	A or B **E.g.** A empty and B
5. Bid/Ask Prices on Implied Level B are cancelled	2	A and B empty