

# London Stock Exchange

## **HISTORICAL DATA PRODUCTS: REBUILD ORDER BOOK**

### Technical Specifications



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# Introduction

## PURPOSE

This document provides detailed information for the Rebuild Order Book product including:

- Overview of the service
- Criteria for data inclusion in the service
- Format of the files
- Detailed description of service contents
- Availability of the service
- Other information

It will be updated and reissued when appropriate to do so.

## READERSHIP

This document is relevant to both technical and non-technical teams within member firms, information vendors and other market participants who currently have access to, or are interested in accessing, historical data products from London Stock Exchange Group (LSEG).

It is intended to provide all required information to access and interpret Rebuild Order Book files, one of our historical data product offerings.

## DOCUMENT HISTORY

This document has been subject to the following iterations:

Issue	Date	Description
1.0	20 June 2022	Initial version

In subsequent issues of this document, where amendments have been made, these changes are indicated through the use of **red text**.

## ENQUIRIES

For further information on London Stock Exchange Historical Data products, please contact the LSEG market data team at [marketdata@lseg.com](mailto:marketdata@lseg.com).

Further information on London Stock Exchange market data products can be found on our website:

<https://www.lseg.com/markets-products-and-services/market-information/market-data>

# Service Overview

## SERVICE DESCRIPTION

The Rebuild Order Book data product provides, for all order book driven securities, an end of day file containing details of:

- A snapshot view of the order book at the start of the day, detailing all orders residing on the order book
- Details of all visible orders entered onto the order book during the day
- Details of all automatically executed trades during the day
- Details of all orders deleted during the day, whether as a result of being executed or otherwise

The Rebuild Order Book Data Product provides intraday order information and trading data. The service facilitates the reconstruction of the London Stock Exchange order book. The service contains order add, modification and deletion, and trade detail information for automatic and manual trades throughout a trading day.

The files will contain comprehensive details of all trades and orders (excluding aggressive, hidden and queued orders) that have occurred during the current day. Rebuild Order Book files will be raw data files and will contain data records based on the following Trading message structures:

- Instrument Reference File
- Orders
- Trade Details

The key benefits of the Rebuild Order Book service are:

- Provides a comprehensive insight into order book activity in London Stock Exchange tradable instruments;
- Allows clients to understand the underlying liquidity in a security at any point in time, enabling better measurement of execution cost or “slippage”;
- Increases confidence in decision making through receiving officially badged data from a trusted source.

The service can be accessed either for:

- One-off historical data purchases, or;
- Ongoing daily subscriptions

## CRITERIA FOR INCLUSION IN THE SERVICE

The Rebuild Order Book product covers all order book driven instruments traded on London Stock Exchange. The Trade Report file will also include trades reported through the TRADEcho trading reporting service.

## FILE AVAILABILITY

### File Publication

The Rebuild Order Book file will be published on LSEG’s Managed File Transfer (MFT) service.

Customers should refer to the separate Managed File Transfer Connectivity Customer Guide for instructions on how to get access to this service.

Note that the MFT service may not be available during weekend maintenance windows.

### File Publication Time

The Rebuild Order Book files will be made available around 18:30 London time every business day.

The data will contain information relating to the current business day’s data.

The Exchange will take all reasonable steps to meet the above delivery times and dates, but such times and dates shall be estimates only and the Exchange shall not be liable for failure to meet them. In certain circumstances the publication of files will be delayed, for example on an extremely busy trading day. If a problem is encountered with the extraction process the Exchange will produce the files on a best endeavours basis.

## OTHER NOTES

### Iceberg Orders

A new unique Public Order Code is produced for each new visible peak produced for an Iceberg order. There is no indication in these files that an Iceberg order is present, and customers will need to make their own assumptions about the presence of Iceberg orders (and hidden orders) based on the data provided

Each iceberg peak that enters the order book has an order code that is disseminated as a separate Limit Order, these order codes are referred to as Public Order Codes. Each peak of an iceberg order is shown as a separate limit order on these files and the public order code is given in the order code field on the Execution Report file.

If an Iceberg order is on the book and is hit by an order whose size is greater than the current peak size, then any executions against the hidden volume are given in the Trade fields, but the partial or full matches on the hidden volume are not given in the ExecutionReport file. Similarly if an incoming Iceberg Order executes aggressively then no order details are given for the executed part, these are treated like non-persistent orders, any remaining volume will be treated as a new limit order with the full peak size if possible.

The mechanism type for Iceberg Order peaks is always shown as a Limit Order (LO).

During the Uncrossing Process, some executions can take place against the hidden volume of an Iceberg Order. In these cases it can appear that the volume of trades executed is greater than the original size of the order.

### Queued Orders

Members can enter stop orders (ST) (or stop limit orders (SL)) into the Trading system. These orders are placed in a queue until the stop price is reached. When the price is reached they can be moved to the normal orderbook and may execute if allowed.

The Rebuild orderbook product does not show Stop orders until (and if) they are moved to the normal orderbook – at which time they are shown in the same way as any other Limit Order

In addition Members can enter Limit or Market Orders with a Time in Force (TIF) for one of the scheduled or unscheduled Auctions. These orders act in the same way as stop orders and are placed in a queue until the correct session is reached. The Rebuild Orderbook product will show these orders being added only when they are moved into the normal orderbook.

### Hidden Orders

Hidden order and pegged orders are not visible to the market and are not shown in the Rebuild Orderbook Product, however any executions against hidden orders will be included

### Previous File Formats

This specification sets out the **current** file and field format for Rebuild Order Book files. The file and field format for these files changed in Q 2022. Please contact the LSEG market data team for the file and field formats for data prior to this date.

# Technical Specification

## FILE FORMAT

Files are created in accordance with the following specifications:

Attribute	Description
File format	csv
Fields delimiter	, (comma)
Field enclosing	Fields may optionally be enclosed by double quotes
Null fields	Will be empty (i.e. contain no data)
Decimal symbol	. (point)
Digit grouping symbol (thousands separator)	None
End of line	\n
Character encoding standard	UTF8

Files will be compressed using gzip and will be published with a .GZ extension. Clients should use widely available software such as 7-Zip or WinZip to access the file contents.

## FILE NAME

The Rebuild Order Book product provides three file types:

- Instrument Ref – contains instrument referential data
- Execution Report – contains order book information and details of on-book trades
- Trade Report – contains details of off-book and OTC trades

Note that should the file size for any of these files exceed 5GB then the file will be broken into multiple files. In this case, a system generated number will be appended to the file name of each file, for example LSE\_INSTRUMENTREF\_20211026\_0\_1\_1.CSV, LSE\_INSTRUMENTREF\_20211026\_0\_1\_2.CSV etc.

### Instrument Ref

The Instrument Ref files shall have the following format:

LSE\_INSTRUMENTREF\_<YYYYMMDD>.CSV

For example:

LSE\_INSTRUMENTREF\_20211026.CSV is the Instrument Ref file for 26 October 2021

### Execution Report

The Execution Report data is split across 3 files due to the size, and each file will be assigned a partition number 1 to 3. A single instrument's order data will not be split across partitions/files.

The Execution Report files shall have the following format:

LSE\_EXECUTIONREPORT<Partition ID>\_<YYYYMMDD>.CSV

For example:

LSE\_EXECUTIONREPORT1\_20211026.CSV is the Execution Report partition 1 file for 26 October 2021

LSE\_EXECUTIONREPORT2\_20211026.CSV is the Execution Report partition 2 file for 26 October 2021

## Trade Report

The Trade Report files shall have the following format:

TE\_TRADEREPORT\_<YYYYMMDD>.CSV

For example:

TE\_TRADEREPORT\_20211026.CSV is the Trade Report file for 26 October 2021

## INSTRUMENT IDENTIFIERS

In the ExecutionReport and TradeReport files, each instrument is identified using a single InstrumentID identifier. This is a unique numerical identifier. Customers should use the InstrumentRef file to map to the instrument reference data including ISIN, market segment, currency and mnemonic.

## TYPE DEFINITIONS

Definitions of the types of data fields are listed below:

Type Definition	Description
Integer	whole number
Date	format YYYY-MM-DD
Char(n)	alpha-numeric field of fixed length n
Float	real number field including a decimal point
Time	Time accurate to the nearest microsecond, format YYYY-MM-DD HH24:MI:SS.FF9 All times are in London local time

### ISO Cross References

- Country ISO3166
- Currency ISO4217 plus GBX (GB pence) and USX (US cents)
- ISIN ISO6166

## DATA SEQUENCING

The data in the files is not sorted and records can be placed in the files in a sequence that is not the same as the order of events in the trading system. Data is provided in the files (Timestamp and SequenceNumber) that allow the data to be sorted by the subscriber.

## START OF DAY DATA

To rebuild the order book for each instrument, a start-of-day position is provided. All the order additions, deletions and modifications for the day are included.

The Rebuild Order Book data files generated will contain only trade and/or order information, which relates to the current business day. If orders expire or are removed after the file is produced the removal messages will not be contained in the Rebuild Order Book Data file.



The start-of-day position will include those orders set to expire before 7am. This is due to the start-of-day position being created the night before and contains all orders still on the book at the end of trading day. Therefore, orders expiring before 7am on the subsequent trading day will be included in the subsequent day's Order Book Rebuild file (as start-of-day position), along with corresponding deletion records due to order expiry. These orders carried over night can be identified by an early TransactTime.

## FIELD FORMAT

### Header Record

The header record contains the column headings (comma delimited).

### Trailer Record

There is no trailer record.

### Data Fields - InstrumentRef

The following data fields are included in the InstrumentRef file.

Field	Type	Description
Instrument ID	Integer	Instrument Identifier allocated by the London Stock Exchange trading system. Unique numerical identifier.
Partition ID	Integer	Trading partition, e.g. 1, 2 or 3
Tradable Instrument Code	Char(12)	Together with the Country Of Register, Currency Code and Market Segment, this will uniquely identify a tradable instrument. This will be the International Security Identification Number (ISIN).
Market Segment Code	Char(4)	A code which uniquely identifies a specific trading area as defined by the London Stock Exchange.
Country Of Register	Char(2)	This specifies the Country of Register for a specific tradable instrument. This is an ISO country code (ISO 3166).
Currency Code	Char(3)	The currency in which prices for a tradable instrument are most frequently expressed. This is an ISO currency code (ISO 4217 plus GBX and USX).
Tradable Instrument Display Mnemonic	Char(4)	Tradable Instrument Display Mnemonic. The mnemonic code is allocated by the Exchange and used to identify a tradable instrument.

### Data Fields - ExecutionReport

The following data fields are included in the ExecutionReport file.

Field	Type	Description
Action Type	Char(1)	The action on the order and reason for this row Possible values for this field are set out elsewhere in this document
Transact Time	Time	Time of this event stamped by the Trading system
Sequence Number	Integer	Sequence number – unique to an instrument
Instrument ID	Integer	Instrument Identifier allocated by the London Stock Exchange trading system. Can be referenced to the InstrumentRef file.
Buy Sell Ind	Char(1)	B=Buy, S=Sell

Order Code	Char(12)	Code unique to the order – this field is case sensitive
Member ID	Char(11)	Member ID – only populated if the order is named
Order Type	Char(2)	Order Type indicator Possible values for this field are set out elsewhere in this document
Order Price	Float	Price of the order in the currency for the instrument
Remaining Visible Size	Integer	Number of shares for the order
Matching Order Code	Char(12)	Order code for the other side of the execution
Trade Code	Char(10)	Unique Trade Code for the execution
Trade Price	Float	Price for the execution
Executed Size	Integer	Number of Shares traded
Reserved 1		Reserved for future use
Reserved 2		Reserved for future use

## Data Fields - TradeReport

The following data fields are included in the TradeReport file.

Field	Type	Description
Sequence Number	Integer	Sequence number – unique to an instrument
Instrument ID	Integer	The InstrumentIdentifier allocated by the Millennium Trading system
Trade Code	Char(10)	Unique Trade Code for the execution
Trade Price	Float	Price for the execution
Trade Size	Float	Number of Shares traded
Trade Date Time	Time	Time of execution
Broadcast Update Action	Char(1)	A=Add, D=Delete
Trade Type Ind	Char(4)	Type of Trade Possible values for this field are set out elsewhere in this document
Trade Time Ind	Char(1)	Time Indicator Possible values for this field are set out elsewhere in this document
Bargain Conditions Ind	Char(1)	Y or N
Converted Price Ind	Char(1)	Y or N
Publication Date Time	Time	Time of publication
Reserved 1		Reserved for future use
Reserved 2		Reserved for future use

## TRADE TYPE INDICATOR

For On Book trades, the trade type indicator will take one of the following values:

Trade Type Indicator	Description
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'AT'	Automatic Trade
'CT'	Contra Trade
'UT'	Uncrossing Trade
'PT'	Closing Price Crossing Session Trade
'PC'	Previous Day Contra Trade
'RF'	Request for Quote Trade
'IX'	Internal Cross Trade
'IB'	Internal Block Trade Facility
'CX'	Committed Cross
'CB'	Committed Block Trade Facility

For Off Book trades, the trade type indicator will take one of the following values:

Trade Type Indicator	Description
XLON	Off Book – Executed on London Stock Exchange UK regulated market
XLOM	Off Book – Executed on London Stock Exchange multilateral trading facility (MTF), but not including AIM
AIMX	Off Book – AIM security executed on London Stock Exchange MTF
XOFF	OTC Trade (Not subject to Rules of London Stock Exchange)
SINT	SI Trade (Not subject to Rules of London Stock Exchange)
MIC of MTF	MTF trade (Not subject to Rules of London Stock Exchange) The trade type indicator will be set to the MIC code of the relevant Multilateral Trading Facility (MTF)
MIC of OTF	OTF trade (Not subject to Rules of London Stock Exchange) The trade type indicator will be set to the MIC code of the relevant Organised Trading Facility (OTF)

Please note these are subject to change – customers should refer to the 'Business and technical parameters' document in the Technical Library section of the London Stock Exchange website:

<https://www.londonstockexchange.com/resources/trade-resources?tab=technical-library>

## TRADE TIME INDICATOR

The following order trade time indicators are used in the Trade Time Indicator field:

Trade Time Indicator	Description
'N'	Normal
'L'	Late
'O'	Overnight

## ORDER TYPES

The following order type indicators are included in the Rebuild Order Book product:

Order Type Indicator	Description
'LO'	Limit order, Visible part of an Iceberg order, Stop Order or Stop Limit Order once it has been elected to the orderbook
'MO'	Market Order
'EQ'	Executable Quotes
'FQ'	Firm Quote (Not eligible for automatic Execution)

## ACTION TYPES

The following action type indicators are included in the Rebuild Order Book product. Please note these are subject to change:

Action Type Indicator	Action	Description
'N'	New	A new order added to the orderbook
'H'	Bust	A contra trade
'D'	Delete	A deletion initiated by the order owner
'E'	Expired	A deletion initiated by the Trading system
'M'	Matched	A removal of an order through execution
'P'	Partial	A removal of part of the volume of an order through execution
'U'	Update	An update to the price or size
'T'	Trade	Trade Details only