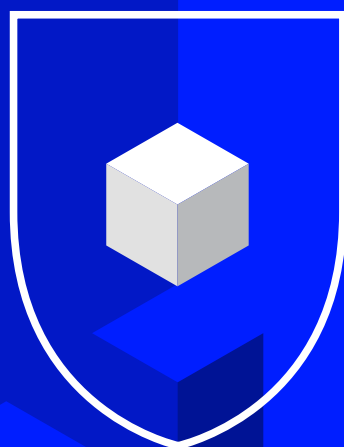
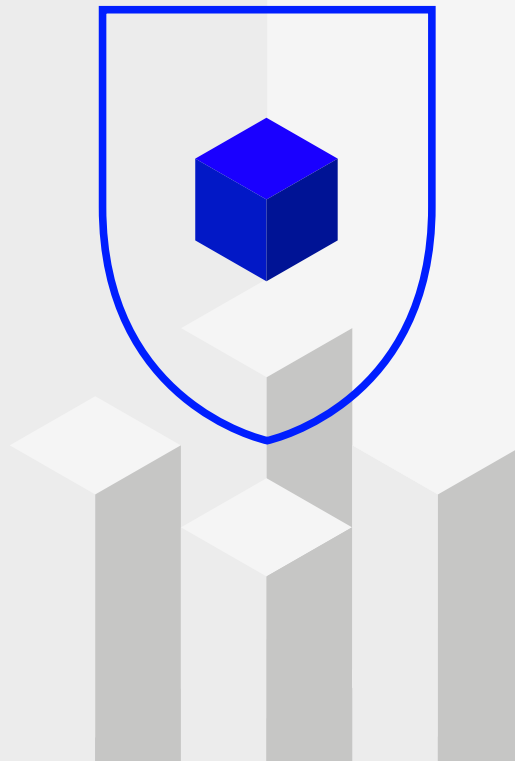


ETP PRICE MONITORING MECHANISMS



LONDON
STOCK
EXCHANGE



Introduction

Circuit breakers were first introduced in the US following the Black Monday stock market crash in 1987, as a means of managing extreme volatility and preserving orderly trading conditions. Not all circuit breakers work the same way. In the US, market-wide circuit breakers enforce a trading pause for all stocks for 15 minutes. London Stock Exchange's price monitoring functionality is constantly evolving to respond to clients' changing needs and instead, employs a security-by-security price monitoring mechanism.

Order books can be subject to rapid price movements. When volatility hits markets, or individual stocks suffer important price moves, London Stock Exchange operates price monitoring functionality, also known as circuit breakers. Circuit breakers are tools that temporarily halt trading activity or delay an auction execution if certain price movement tolerances would be breached. Following the halt, the affected security will be placed into auction allowing a price to be formed in an orderly fashion.

An auction is a period where no automatic execution takes place in order to concentrate available liquidity. The goal is to find the most popular price, rather than the highest or lowest price. This helps remove volatility from the market by slowing down trading. By bringing together a large number of market participants, auctions help determine a price for a stock that can be perceived as a fair valuation at a given point in time.

Opening auction price monitoring

A five-minute price monitoring extension (PME) is triggered when at the end of the call period (or any preceding auction extension period) the indicative auction match price is greater than a configured tolerance away from the previous closing price. If at the end of a five-minute PME, the indicative auction uncross price is greater than a configured tolerance away from the previous closing price, then additional PMEs will continue to be triggered if the indicative auction uncross price persists outside of price tolerance. Depending on the instrument trading sector, the maximum number of PMEs that can be triggered is four or five.

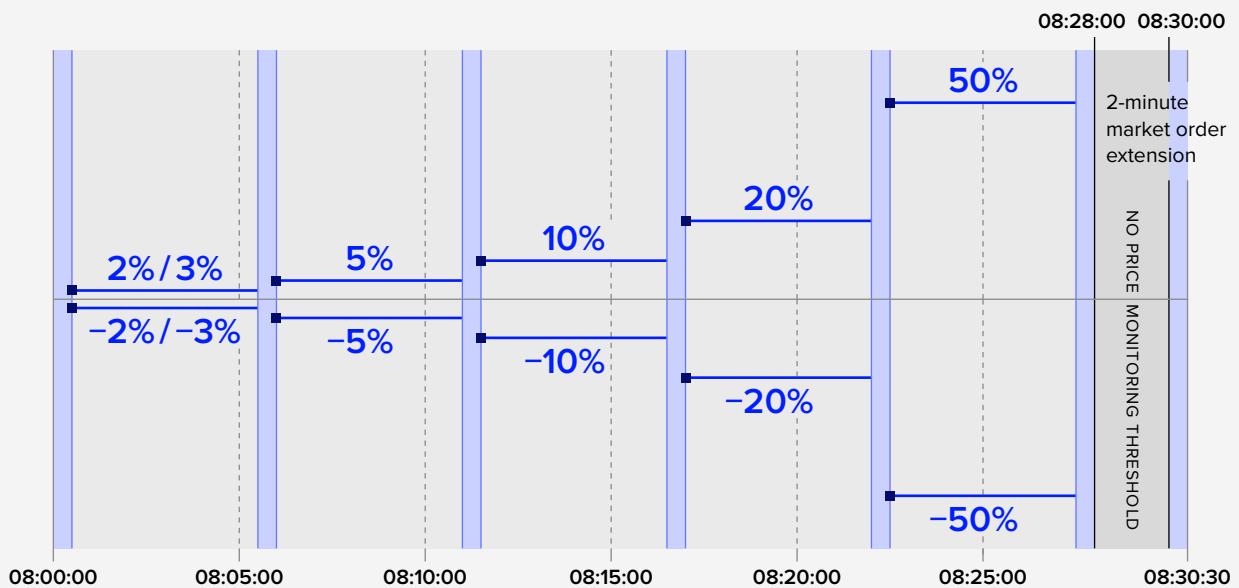
Also, a market order extension will occur at the end of the final PME if the indicative auction uncross price would result in market orders remaining unexecuted. **Note that each call period, PME and market order extension is followed by a random period of up to 30 seconds.**

- PME stages example: 2% (5 mins), 5% (5 mins), 10% (5 mins), 20% (5 mins), 50% (5 mins) – latest possible open based on PME stages is 08:30:30, (including 30-second random periods and two-minute market order extension).
- The auction can open if price is less than the PME stage's stated price monitoring percentage range away from the previous close. If indicative price persists outside the tolerance range, then the next PME stage is activated until the end of the cycle.

The figure below shows an example of an opening auction price monitoring model with the following attributes:

- Five PMEs
- Staggered price tolerance %
- Five minutes per PME

Example opening auction price monitoring model



Up to 30-second random period can be followed after call period, each PME and market order extension.

■ Price monitoring threshold — PME ■ 30-second random period

Regular trading circuit breakers

In regular trading, two reference prices are relevant:

- **The dynamic reference price** is the last order book execution price (or previous closing price if more recent) prior to the submission of the incoming order.
- **The static reference price** is the most recent auction price from the current day. Where that auction did not generate an execution, the next automated trade that follows the auction will be adopted instead.

For ETP instruments in regular trading, if the price of a potential execution breaches the dynamic or static price monitoring thresholds, e.g., ±5% and ±10% respectively, then no executions at that price will occur. Instead, this will trigger an automatic execution suspension (AESP), often referred to as a circuit breaker, and a five-minute auction will commence to allow the security's price to re-form in an orderly fashion. If at the end of the five-minute auction, the indicative auction uncross price is greater than a configured tolerance away from the dynamic reference price, then additional PME stages will continue to be triggered if the indicative auction uncross price persists outside of price tolerance. Depending on the instrument trading sector, the maximum number of PMEs that can be triggered following an AESP call period is 4. Also, a two-minute market order extension will occur at the end of the final PME if the indicative auction uncross price would result in market orders remaining unexecuted. Note that each call period, PME and market order extension is followed by a random period of up to 30 seconds.

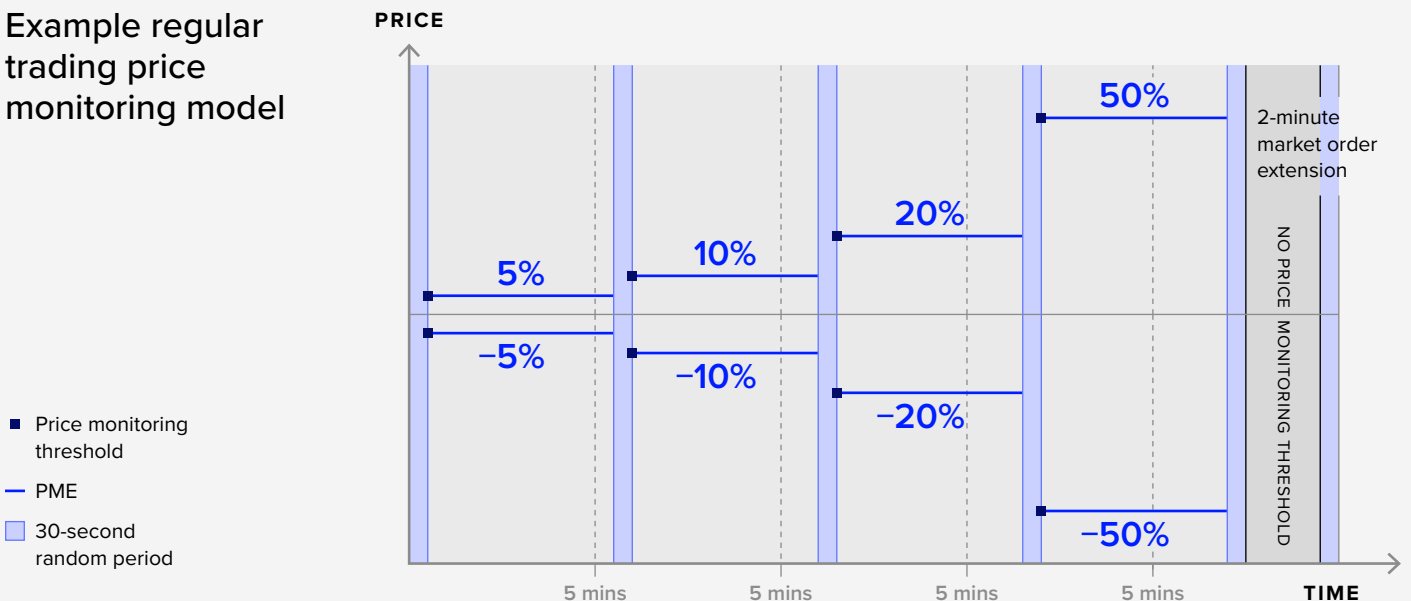
In the event an AESP auction does not result in an uncrossing trade (UT) and therefore does not update the dynamic or static reference prices, both prices will instead be updated with the mid-price of the Registered Market Makers' Best Bid Offer at the time the circuit breaker was triggered, only when there is either at least one Executable Quote (EQ) and/or named limit order present on both bid and offer.

In addition to the existing dynamic and static reference price logic ETF & ETC / ETN order book reference prices will attempt to update every 15 minutes plus a 0–30 second random timer with the mid-price of the Registered Market Makers' Best Bid Offer. The reference price will be updated only when a Registered Market Maker is present on both the bid and the offer with Executable Quotes (EQ) or named limit orders. In the event of no Registered Market Makers being present with EQ or named limit orders at the update time triggered then the reference price will not be updated. The system will reattempt to update the reference price following the same methodology every 1 minute plus a 0–30 second random timer until an updated reference price is established.

London Stock Exchange may also set reference prices manually if required in any order book security. This may be done for a new instrument or following a transfer to a new segment or corporate action.

- PME stages example: 5% (5 mins), 10% (5 mins), 20% (5 mins), 50% (5 mins)

Example regular trading price monitoring model



Details of market configuration can be found within the [Millennium Exchange Business Parameters](#) document.

- Columns N–V of the ‘Trading Service Breakdown’ tab outline the number and duration of price monitoring extensions and market order extensions in relation to the various auction types.
- Columns AN–BB of the ‘Sector Breakdown’ tab provide the price tolerance parameters which cause the auctions to enter into price monitoring extensions, and also the tolerances during the continuous phase which, if breached, will cause an automatic execution suspension (AESP) often referred to as a circuit breaker.

For more information on the operation of order book auctions please see sections 7.2 to 7.4 of [MIT – Guide to trading system](#).

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