

Supervisory briefing

On the calibration of circuit breakers



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Executive Summary

The European Securities and Markets Authority (ESMA) aims to enhance supervisory convergence within the internal market by promoting common supervisory practices through this supervisory briefing.

Circuit breakers are tools used by trading venues to safeguard against market volatility. MiFID II mandates trading venues to halt or restrict trading during significant price movements. Commission Delegated Regulation (EU) 2017/584 (RTS 7) specifies mechanisms to manage volatility, including testing and monitoring. ESMA's Guidelines provide direction on calibrating circuit breakers based on asset class liquidity and volatility.

These tools have proven effective during many occasions, notably during events like the COVID-19 pandemic. However, varying calibrations were observed in commodity derivatives and equity markets in 2022. Notably, in the context of the invasion of Ukraine for commodity derivatives markets and other incidents, such as the May 2022 flash crash for equity markets, led to, at times, extreme market volatility and highlighted the need for additional regulatory scrutiny in the effectiveness and calibration of circuit breakers.

This supervisory briefing seeks to strengthen convergence on circuit breaker calibration methodology, promoting compliance, common understanding and enforcement practices among National Competent Authorities (NCAs).

This document provides a comprehensive overview of supervisory expectations regarding the calibration of circuit breakers in the context of MiFID II regulations and the Guidelines.

The supervisory briefing outlines several principles that NCAs should enforce to ensure effective circuit breaker implementation.

This briefing is non-binding, meant to enhance supervisory practices, and applicable across asset classes, with a focus on commodity derivatives.

1. Introduction and Background

1. One of ESMA's statutory objectives is to enhance supervisory convergence across the internal market by playing an active role in building a common supervisory culture by promoting common supervisory approaches and practices.
2. Circuit breakers are employed by trading venues as a way of protecting markets against episodes of volatility affecting particular instruments or the whole market. The circuit breaker requirements are framed by the following provisions:
 - Article 48(5) of MiFID II (Level 1);
 - Article 19 of Commission Delegated Regulation (EU) 2017/584¹ (RTS 7) (Level 2);
 - ESMA Guidelines on Calibration of circuit breakers and publication of trading halts (Level 3).
3. Recital 64 of MiFID II stresses the importance for trading venues to have in place mechanisms to temporarily halt or constrain trading in case of sudden unexpected price movements. Article 48(5) of MiFID II establishes an obligation for NCAs to require regulated markets to establish circuit breakers and sets out the main requirements related to circuit breakers (“...to be able to temporarily halt or constrain trading if there is a significant price movement in a financial instrument on that market or a related market during a short period and, in exceptional cases, to be able to cancel, vary or correct any transaction.”). Article 18(5) of MiFID II extends the requirement to MTFs and OTFs.
4. NCAs should ensure that trading venues adequately parameter their trading halts so that they are sufficient to prevent significant disruptions to the orderliness of trading and considering:
 - the liquidity of the different asset classes and sub-classes; and,
 - the nature of the market model and types of users.
5. Article 19 of Commission Delegated Regulation (EU) 2017/584² (RTS 7) further specifies the mechanisms to manage volatility by trading venues enabling or allowing algorithmic

¹ Commission Delegated Regulation (EU) 2017/584 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying organisational requirements of trading venues

² Commission Delegated Regulation (EU) 2017/584 of 14 July 2016 supplementing Directive 2014/65/EU of the European Parliament and of the Council with regard to regulatory technical standards specifying organisational requirements of trading venues

trading on their systems (from which voice trading is excluded³). In particular, trading venues need to have mechanisms to be able to halt or constrain trading during trading hours at any point.

6. Furthermore, Article 19(2) of RTS 7 requires trading venues to ensure that (a) mechanisms to halt or constrain trading are tested before implementation and periodically thereafter when the capacity and performance of trading systems is reviewed; (b) IT and human resources are allocated to deal with the design, maintenance and monitoring of the mechanisms implemented to halt or constrain trading; (c) mechanisms to manage market volatility are continuously monitored.
7. Finally, Article 19(3) and (4) of RTS 7 respectively require trading venues to maintain records of the rules and parameters set for such mechanisms and to ensure that they can be manually overridden if needed to ensure orderly trading.
8. To develop common standards and to provide clarification to trading venues and competent authorities of the provisions in Article 48(5) of MiFID II, ESMA issued “Guidelines on Calibration of circuit breakers and publication of trading halts” under Article 48(13) of MiFID II (Guidelines).
9. The Guidelines provide general guidance on how such calibration should be done, prescribing that circuit breakers should be calibrated at asset class level and when necessary, at a more granular level and that the liquidity and volatility of the financial instrument should be considered. The Guidelines state that trading venues should generally have in place both static and dynamic circuit breakers but leave trading venues some discretion to calibrate their own mechanisms.
10. As noted by ESMA in its Report on Trends, Risks and Vulnerabilities no.2⁴ as well as in the Final Report on Algorithmic Trading⁵, circuit breakers played a prominent role in a variety of circumstances where volatility materialised, such as during the beginning of the COVID-19 pandemic in 2020, and overall proved to achieve their objectives of contributing to managing high volatility events.
11. Nevertheless, market developments in commodity derivative markets as well as in equity markets in 2022 have demonstrated that trading venues employ different types of

³ Recital 3 of RTS 7: “[...] specific organisational requirements should be laid down in respect of regulated markets, multilateral trading facilities and organised trading facilities allowing for or enabling algorithmic trading through their systems. Such trading systems are those where algorithmic trading may take place as opposed to trading systems in which algorithmic trading is not permitted, including trading systems where transactions are arranged through voice negotiation.”

⁴ See TRV – ESMA Report on Trends, Risks and Vulnerabilities https://www.esma.europa.eu/sites/default/files/library/esma_50-165-1287_report_on_trends_risks_and_vulnerabilities_no.2_2020.pdf

⁵ See ESMA MiFID II Final Report on Algorithmic Trading https://www.esma.europa.eu/sites/default/files/library/esma70-156-4572_mifid_ii_final_report_on_algorithmic_trading.pdf

mechanisms where calibrations differ significantly, even when offering the same instruments for trading and using similar trading protocols. In particular, an analysis of the circuit breakers in place on EU commodity trading venues conducted by ESMA in 2022, showed that only a limited number of these trading venues appear to have in place both static and dynamic circuit breakers.

12. Following the invasion of Ukraine by Russia, EU energy commodity markets have been subject to record high and volatile prices, reaching a peak in August 2022. To address such price volatility, despite the measures already set out in MiFID II and described above, the Council considered it necessary to introduce a specific intraday volatility management mechanism (IVM) on trading venues trading energy derivatives. The IVM is intended to complement the existing circuit breakers mechanisms to address the volatility on energy markets.
13. Moreover, the events that occurred early March 2022 on the London Metal Exchange (LME) regarding Nickel trading worked as a reminder that market volatility can, in some instances, quickly turn into a challenge for trading venues, even impairing their ability to maintain orderly markets. Similarly, the flash crash in May 2022 showed that, despite all the controls and circuit breakers in place, EU trading venues remain exposed to sudden volatility spikes and indicated that a common understanding of the applicable rules on circuit breakers has not been entirely achieved.
14. ESMA is of the view that alongside the ongoing requirements and expectations set out in the above-mentioned regulations and guidelines and based on the lessons learnt from the events in 2022, there is a need to further promote supervisory convergence and to minimise the risk of divergent application of the existing requirements.
15. ESMA has therefore developed this supervisory briefing to promote convergence on the methodology of calibration of circuit breakers as well as on the practices that NCAs should implement to foster the compliance of trading venues with the circuit breaker regime. This supervisory briefing aims at clarifying certain concepts used in the Guidelines on circuit breakers and to provide guidance to NCAs regarding their role in the supervision of circuit breakers.
16. This supervisory briefing should be integrated in the practices implemented by NCAs in the supervision of circuit breakers across all asset classes, without prejudice to the risk-based approach that NCAs can apply. The supervisory approach of NCAs may be proportionate to the assessed level of risk with respect to a.o. the specific asset classes or size and type of activity of the trading venues under their supervision.
17. This supervisory briefing is issued under Article 29(2) of the ESMA Regulation which enables ESMA to develop new practical instruments and convergence tools such as

supervisory briefings. The purpose of these tools is to promote common supervisory approaches and practices. The content of this supervisory briefing is not subject to any 'comply or explain' mechanism for NCAs and is non-binding.

18. The content of this supervisory briefing is not exhaustive and does not constitute new policy. It has been designed to be used in the way that best fits with supervisors' methodologies and may be updated to reflect regulatory developments or supervisory experiences. The supervisory briefing focusses on the calibration of circuit breakers and trading halts, on the regular reporting on circuit breakers to ESMA and on the publication of information on the calibration of circuit breakers. The supervisory briefing is applicable to all asset classes, and in particular commodity derivatives.

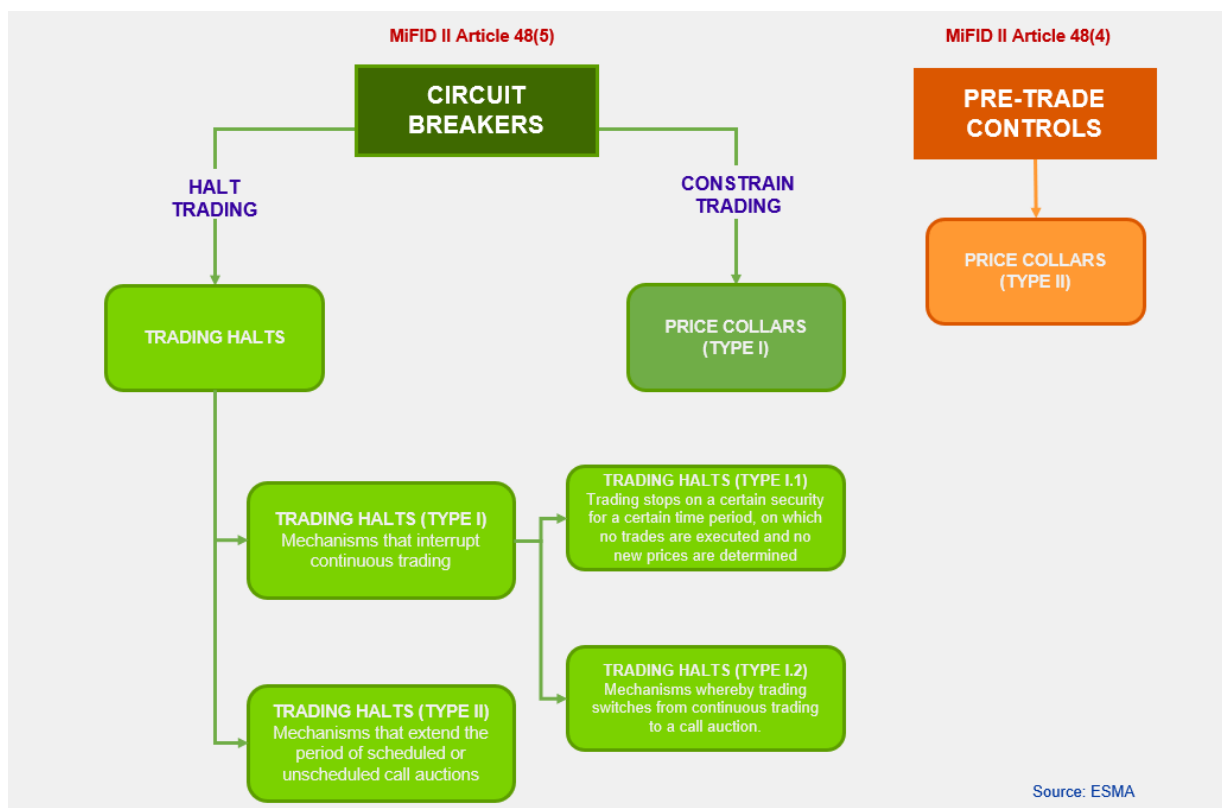
2. Supervisory briefing on the calibration of circuit breakers

2.1 The scope: circuit breakers, trading halts, price collars and pre-trade controls

19. In MiFID II circuit breakers are defined in Article 48(5) as mechanisms to temporarily halt or constrain trading if there is a significant price movement in a financial instrument.
20. Therefore, circuit breakers can take the form of (i) trading halts when they temporarily halt trading and (ii) price collars when the mechanism allows orders exceeding pre-determined volume and price thresholds entering the book, but it constrains the execution of such orders.
21. The Guidelines clarify the different types of trading halts in Section 2, distinguishing between those that interrupt continuous trading and those that extend the period of call auctions.
22. Additionally, it should be noted that MiFID II provides for two types of price collars, those under Article 48(5) of MiFID II (price collars of type I) and pre-trade controls under Article 48(4) of MiFID II which aim at rejecting orders exceeding pre-determined volume and price thresholds or that are clearly erroneous (price collars of type II).
23. Figure 1 provides a visualisation of the above explanations on the distinction between circuit breakers, trading halts, price collars and pre-trade controls under MiFID II. Price collars in this supervisory briefing are meant to be price collars of type I. Furthermore, Figures 2 to 5 in the Annex, provide examples of static price collars of type I and II and examples of static and dynamic trading halts of type I.1 and I.2 (all examples present circuit breakers based on price variations expressed in percentage).

24. Finally, it is important to note that while price collars, both of type I and II, react on the price of the orders, trading halts of type I (both types I.1 and I.2) and type II react on the price of the trade that is intended to be executed, more specifically on the matching of orders.

FIGURE 1 - CIRCUIT BREAKERS, TRADING HALTS, PRICE COLLARS AND PRE-TRADE CONTROLS



2.2 Need of having in place both Dynamic and Static Circuit Breakers

25. The aim of mandating circuit breakers to EU trading venues is to ensure that short term volatility episodes are adequately managed, by (i) triggering trading halts to temporarily stop trading thereby giving market participants time to reflect on their assessment of fundamentals (circuit breakers taking the form of trading halts), or by (ii) constraining the execution of orders, which would lead to large price changes, based on certain conditions (circuit breakers taking the form of price collars).
26. Therefore, under Article 48(5) of MiFID II a trading venue should put in place at least one of the two types of circuit breaker and choose to have either (i) trading halts mechanisms only, or (ii) price collars mechanisms only, or (iii) both.

27. In the Guidelines ESMA explained that circuit breakers both in the form of trading interruption and in the form of price collars should be calibrated using both static and dynamic reference prices. Therefore, ESMA expects that a trading venue puts in place two types of mechanisms (i) trading halts/price collars referenced to a static reference price (static circuit breakers) and (ii) trading halts/price collars referenced to a dynamic reference price (dynamic circuit breakers).
28. Static circuit breakers are more suited to manage intraday price volatility by preventing excessive price variations within a trading day while dynamic circuit breakers are more suited to prevent sharp price changes which can occur suddenly, and which are usually followed by a rapid price reversion (commonly known as flash crash phenomena). Therefore, static circuit breakers and dynamic circuit breakers should be used complementary as they serve a different purpose in the management of short-term volatility.
29. The Guidelines clarify that a trading venue can put in place only a static or a dynamic circuit breaker if it can demonstrate to its NCA that volatility is adequately managed with only static or dynamic thresholds. However, those trading venues, and NCAs, should periodically reassess the adequacy of having only a static or a dynamic circuit breaker in place and adapt their mechanisms if market conditions or market developments require so.
30. The elements that a trading venue should consider when assessing the need to adapt its mechanisms (as described in paragraph 12 of the Guidelines) include, but are not limited to, changes in the liquidity profile and the quotation level of the financial instrument⁶, changes in trading venue mode and rules⁷ which in turn might affect the internal references⁸, i.e. prices determined inside the venue which are then available to calibrate circuit breakers for the specific instrument, changes to the external references⁹ (i.e. changes to cross-asset and cross-market conditions).
31. ESMA considers that instruments deemed liquid should be subject to both trading halts and price collars and considers that as a baseline this concerns instruments that are considered liquid as determined by the assessment of liquidity prescribed by Commission Delegated Regulation 2017/567 for equity and equity-like instruments and Commission Delegated Regulation 2017/583 (RTS 2) for non-equity instruments, the results of which are published in the Financial Instruments Transparency System (FITRS).

⁶ See paragraph 12, second bullet point of the [Guidelines on trading halts](#).

⁷ See paragraph 12, fifth bullet point of the [Guidelines on trading halts](#).

⁸ See paragraph 12, sixth bullet point of the [Guidelines on trading halts](#).

⁹ See paragraph 12, seventh bullet point of the [Guidelines on trading halts](#).

Principle #1: An NCA should ensure that each trading venue under its jurisdiction has in place at least one type of circuit breaker, i.e., either trading halts or price collars or both. However, in the case of liquid instruments NCAs should generally require that both types of circuit breakers are expected to be in place.

Principle #2: An NCA should ensure that each trading venue under its jurisdiction has for each type of circuit breaker (trading halts and/ or price collars) in place two types of mechanisms (i) circuit breakers referenced to a static reference price (static circuit breakers) and (ii) circuit breakers referenced to a dynamic reference price (dynamic circuit breakers) except if the trading venue can demonstrate that volatility is adequately managed with only static or only dynamic circuit breakers.

Principle #3: An NCA should ensure that each trading venue under its jurisdiction periodically reassesses the adequacy of the type of circuit breakers (trading halts, price collars or both) including reassessing having in place only one type of circuit breakers (either static circuit breakers or dynamic circuit breakers). The NCA should ensure that the trading venue will adapt its mechanisms if market conditions, or market developments so require.

2.3 Calibrating Circuit Breakers

32. In the Guidelines ESMA specified that trading venues should calibrate their circuit breakers according to a pre-defined, statistically supported methodology, considering a non-exhaustive list of elements where appropriate. Those are defined in paragraphs 12 and 13 in Section 5.1 of the Guidelines.
33. In the context of the work on the Intraday Volatility Management (IVM) ESMA highlighted in its Final Report a few important aspects to take into account when calibrating the IVM for liquid vs. illiquid trading venues in the area of energy derivatives.
34. It was noted that the less liquid trading venues are “price takers” and would generally be using the price from the main markets to establish a reference price for the IVM.
35. Secondly, with respect to the interval of intraday updates of the reference price, it appears that more liquid trading venues update the reference price more frequently to ensure the price is representative of current market prices.
36. Also, the most liquid trading venues in general set tighter boundaries compared to less liquid trading venues to avoid sudden price variations and disorderly trading conditions.
37. Considering that the most liquid trading venues in energy derivatives follow in general the same approach when they calibrate circuit breakers, NCAs should consider the liquidity of the venue when assessing the calibration of circuit breakers in place in the context of the authorisation of the trading venue or in any subsequent supervisory activity.

38. Although this is specifically relevant for calibrating circuit breakers in relation to energy derivatives, these and other aspects could be of significance when calibrating circuit breakers for other instruments. It is therefore advisable for NCAs to take in to account the relevance of the various elements essential to calibrating circuit breakers.

Principle #4: An NCA should ensure that each trading venue under its jurisdiction has a statistically supported and documented methodology, considering the non-exhaustive list of elements defined in paragraphs 12 and 13 in Section 5.1 of the Guidelines when calibrating its circuit breakers. More specifically: to determine the circuit breakers mechanism and calibrate its parameters the following elements should be considered: (i) the liquidity profile and the quotation level of the financial instrument, (ii) the volatility profile of the financial instrument, (iii) the trading venue mode and rules, (iv) the internal references, i.e. prices determined inside the venue which are then available to calibrate circuit breakers for the specific instrument, (v) the external references (i.e. cross-asset and cross-market conditions) and (vi) the number of times the mechanism was used in the previous years on their platforms.

39. In the Guidelines ESMA specified the types of suitable static and dynamic reference prices that could be used to calibrate the circuit breakers.
40. Static circuit breakers are mechanisms to manage intraday price volatility by preventing excessive price variations within a trading day. The static reference price should serve as an anchor to set limits to intraday price variations and to allow “normal” price movements. Therefore, the static reference price should not be updated over short trading intervals, but over longer time horizons.
41. However, in case of unusual volatile market conditions, considered to occur when market events trigger a sudden high volatility on the instrument or more generally in the market involving the instrument, trading venues should be able to adjust the static reference price intraday to ensure the continuation of trading. Trading venues should set out in its methodology for calibrating circuit breakers under which circumstances the static reference price may be adjusted intraday.
42. Dynamic circuit breakers should prevent sharp price variations. Therefore, the dynamic reference price is expected to be updated intraday. To ensure smooth price variations due to short-term volatility the dynamic reference price should be updated over short trading intervals. In other words, it should be regularly updated over the trading day.
43. To reflect the fact that dynamic circuit breakers aim to prevent sudden price changes at one point in time compared to static circuit breakers, which instead aim to avoid significant price changes during the trading day, dynamic circuit breakers should have narrower boundaries than static circuit breakers.

Principle #5: An NCA should ensure that each trading venue under its jurisdiction has a clear methodology which clarifies:

- the ordinary frequency of the updates of the static reference price as well as the conditions of when and how extraordinary updates of the static reference price are possible;
- the ordinary frequency of the updates of the dynamic reference price as well as the conditions of when and how extraordinary updates of the dynamic reference price are possible.

Principle #6: An NCA should ensure that each trading venue under its jurisdiction sets tighter boundaries for price variations allowed under dynamic circuit breakers compared to static circuit breakers.

44. Finally, Section 5.1 of the Guidelines lists among the elements to be considered when setting the circuit breakers, not only the liquidity of the instrument (the liquidity profile and the quotation level of the financial instrument) but also that of related classes of instruments (cross-asset) and of the same instrument traded on other trading venues (cross-market) (external references).
45. These elements are relevant when determining (i) the price variation allowed by the static and dynamic thresholds, (ii) the static and the dynamic price to be used and (iii) the frequency of their updates.

Principle #7: An NCA should ensure that each trading venue under its jurisdiction takes into account the liquidity of the financial instrument of related asset classes or instruments on other trading venues, when determining the following elements of a circuit breaker: (i) the price variation allowed by the static and dynamic thresholds, (ii) the static and the dynamic price to be used, and (iii) the frequency of their updates.

2.4 Regular Methodology Review Based on Statistical Data

46. The Guidelines provide no guidance on the periodicity in which the calibration or update of the methodology should take place.
47. Article 18(3)(a) of RTS 7 though requires that trading venues need to have policies and arrangements in place to ensure they have mechanisms to manage volatility. Moreover, Article 19(2)(a) of RTS 7 requires trading venues to ensure that those 'mechanisms to halt or constrain trading are tested before implementation and periodically thereafter when the capacity and performance of trading systems is reviewed'.
48. The methodology used for calibrating circuit breakers should thus be regularly reviewed. Not only based on new statistical data and changed market conditions, but also periodically to ensure the mechanism is still appropriate.

49. The periodicity of updating the parameters will need to be determined by the trading venue itself as it is dependent on the characteristics of the elements considered in the methodology. To ensure a regular review of the methodology and possible update, a minimum frequency of once per year is expected.
50. Several elements, such as the liquidity profile or the volatility profile may change more frequently than the nature of the financial instrument or the trading venue mode and rules. The trading venue may consider levels for the elements above or below which the methodology needs to be recalibrated.
51. Sophisticated methodologies may by themselves automatically update the parameters over time without intervention by trading venue staff. This should be clearly explained by the trading venue to its NCA.
52. Trading venues should be able to apply proportionality in drafting their update-policy e.g., a methodology which is less sensitive to the variability of its elements may warrant a different policy than a highly sensitive methodology. The update policy should in any case safeguard that the methodology will continue to be adequate to avoid significant disruptions to the orderliness of trading.

Principle #8: An NCA should ensure that each trading venue under its jurisdiction has an update-policy in place. This update-policy should clarify how the trading venue will warrant the appropriateness of the mechanism over time. Such policy should provide for a periodic, at least annual, review and update, if needed, of the methodology itself and of the parameters that are used as an input to the methodology. NCAs should ensure that trading venues anticipate when and how to incorporate the consequences of ad hoc events affecting the parameters or the methodology to warrant its ongoing appropriateness.

53. The annual review required by NCAs provides for a back stop to ensure the methodology is at least annually reviewed by the trading venue. Together with the annual self-assessment of trading venues (see Article 2 of RTS 7) it creates a mechanism for standardising and integrating the review process of the trading venues.

Principle #9: An NCA should ensure that each trading venue under its jurisdiction includes in the annual self-assessment specificities concerning the timing and process to update the parameters of the methodology and the methodology itself. In addition, the annual self-assessment should clarify which changes or amendments to the parameters and methodology have been made over the assessed year.

2.5 Adequate Public Transparency

54. Transparency allows market participants to understand the framework and anticipate potential trading disruptions. Ensuring transparency is essential for building trust and

allowing market participants to make informed decisions during periods of high market stress, as emphasized in the Guidelines on the calibration of trading halts.

55. Article 18(4) of RTS 7 underlines the need for transparency by requiring trading venues to 'make public their policies and arrangements' amongst which are the arrangements in respect of mechanisms to manage volatility.
56. Hence, NCAs should ensure that trading venues provide adequate transparency by publishing on their website clear information on circuit breakers' functioning. The level of details of the displayed information should set out in a clear and concise manner the circumstances and the effects of trading halts being triggered.
57. A trading venue should have the option to withhold certain details on the implemented mechanism if such information is sensitive to the operations performed by the venue and/or might enable market participants to misuse that information (e.g., to artificially trigger a circuit breaker). This is also recognised in Article 18(4) of RTS 7 which excludes certain elements ('specific number of orders per second on the pre-defined time intervals and the specific parameters of their mechanisms to manage volatility') from the publication obligation.
58. Where trading venues apply various methodologies e.g., for different financial instruments, these individual methodologies should be published separately. Accurate and timely reporting of circuit breaker calibration and functioning and circuit breaker events is essential for market participants, regulators, and the public. Meaningful reporting enhances transparency and facilitates post-event analysis.
59. The displayed information should be easily found on the website and, as a minimum, should include:
 - (i) a general description of the mechanism with possible scenarios in case a circuit breaker is triggered as well as explaining if the triggering would result in a trading halt or in order rejection;
 - (ii) an explanation on the reference price used (including whether the reference is static or dynamic) and the circumstances which would lead to the triggering of the mechanism;
 - (iii) in case of trading halts, the duration of the halt should be indicated as well as an explanation on the price formation following trade resumption;
 - (iv) statistics on the number of times the circuit breakers were triggered at least with an annual frequency.
 - (v) optionally, information on the level of thresholds that trigger the mechanism.

Principle #10: An NCA should ensure that each trading venue under its jurisdiction discloses information which is easily accessible on its website and enables the public to understand the functioning and the effects of the mechanism. Such information should as a minimum include the elements set out in paragraph 59.

2.6 Meaningful Reporting

60. As per Article 48(5) of MiFID II, Member States should ensure that trading venues provide to their competent authority technical details regarding the functioning of the circuit breakers. Trading venues should also report material changes that affect the implemented mechanism. These reports should include relevant details such as the triggering events, duration of trading halts, and any significant market developments during the halt period.

Principle #11: An NCA should ensure that each trading venue under its jurisdiction reports on the calibration of circuit breakers and trading halts in a way that permits the NCA to assess its effectiveness.

61. To analyse the consistency of the application of the circuit breakers and existing models, ESMA provides a template for reporting the implementation of the circuit breakers. The reporting to ESMA should be done on an annual basis. NCAs should take a more granular approach regarding level of details to be provided to them in order to be able to assess the effectiveness of the mechanisms.

Annex I: Principles

Principle #1: An NCA should ensure that each trading venue under its jurisdiction has in place at least one type of circuit breakers, i.e., either trading halts or price collars or both. However, in the case of liquid instruments NCAs should generally require that both types of circuit breakers are expected to be in place.

Principle #2: An NCA should ensure that each trading venue under its jurisdiction has for each type of circuit breaker (trading halts and/ or price collars) in place two types of mechanisms (i) circuit breakers referenced to a static reference price (static circuit breakers) and (ii) circuit breakers referenced to a dynamic reference price (dynamic circuit breakers) except if the trading venue can demonstrate that volatility is adequately managed with only static or only dynamic circuit breakers.

Principle #3: An NCA should ensure that each trading venue under its jurisdiction periodically reassesses the adequacy of the type of circuit breakers (trading halts, price collars or both) including reassessing having in place only one type of circuit breakers (either static circuit breakers or dynamic circuit breakers). The NCA should ensure that the trading venue will adapt its mechanisms if market conditions, or market developments require so.

Principle #4: An NCA should ensure that each trading venue under its jurisdiction has a statistically supported and documented methodology, considering the non-exhaustive list of elements defined in paragraphs 12 and 13 in Section 5.1 of the Guidelines when calibrating its circuit breakers. More specifically:

- to determine the circuit breakers mechanism and calibrate its parameters the following elements should be considered: (i) the liquidity profile and the quotation level of the financial instrument, (ii) the volatility profile of the financial instrument, (iii) the trading venue mode and rules, (iv) the internal references, i.e. prices determined inside the venue which are then available to calibrate circuit breakers for the specific instrument, (v) the external references (i.e. cross-asset and cross-market conditions) and (vi) the number of times the mechanism was used in the previous years on their platforms.

Principle #5: An NCA should ensure that each trading venue under its jurisdiction has a clear methodology which clarifies:

- the ordinary frequency of the updates of the static reference price as well as the conditions of when and how extraordinary updates of the static reference price are possible;
- the ordinary frequency of the updates of the dynamic reference price the conditions of when and how extraordinary updates of the dynamic reference price are possible.

Principle #6: An NCA should ensure that each trading venue under its jurisdiction sets tighter boundaries for price variations allowed under dynamic circuit breakers compared to static circuit breakers.

Principle #7: An NCA should ensure that each trading venue under its jurisdiction takes into account the liquidity of the financial instrument of related asset classes or instruments on other trading venues, when determining the following elements of a circuit breaker: (i) the price variation allowed by the static and dynamic thresholds, (ii) the static and the dynamic price to be used, and (iii) the frequency of their updates.

Principle #8: An NCA should ensure that each trading venue under its jurisdiction has an update-policy in place. This update-policy should clarify how the trading venue will warrant the appropriateness of the mechanism over time. Such policy should provide for a periodic, at least annual, review and update, if needed, of the methodology itself and of the parameters that are used as an input to the methodology. NCAs should ensure that trading venues anticipate when and how to incorporate the consequences of ad hoc events affecting the parameters or the methodology to warrant its ongoing appropriateness.

Principle #9: An NCA should ensure that each trading venue under its jurisdiction includes in the annual self-assessment specificities concerning the timing and process to update the parameters of the methodology and the methodology itself. In addition, the annual self-assessment should clarify which changes or amendments to the parameters and methodology have been made over the assessed year.

Principle #10: An NCA should ensure that each trading venue under its jurisdiction discloses information which is easily accessible on its website and enables the public to understand the functioning and the effects of the mechanism. Such information should as a minimum include the elements set out in paragraph 59.

Principle #11: An NCA should ensure that each trading venue under its jurisdiction reports on the calibration of circuit breakers and trading halts in a way that permits the NCA to assess its effectiveness.

Annex II: Visualisations

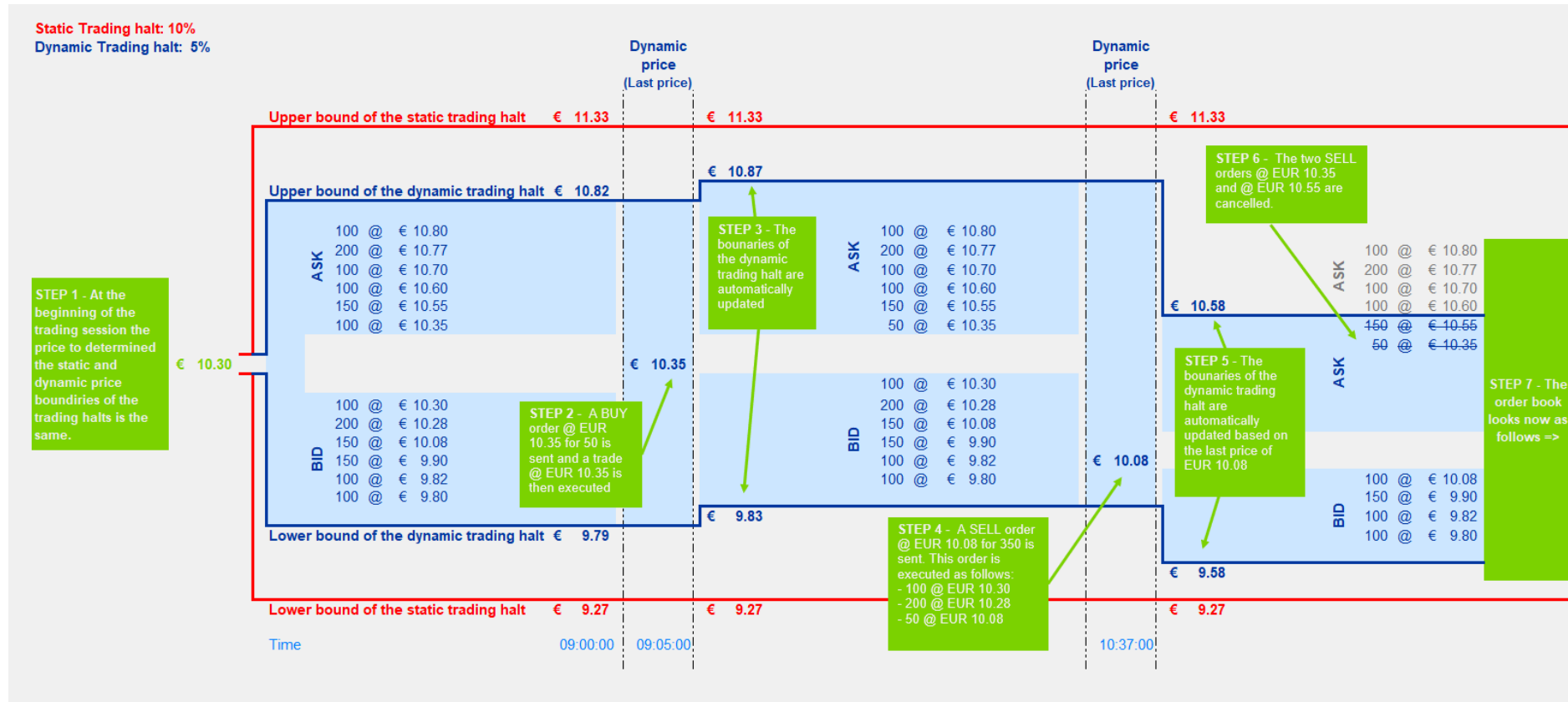
FIGURE 2 – EXAMPLE OF STATIC PRICE COLLAR - TYPE I

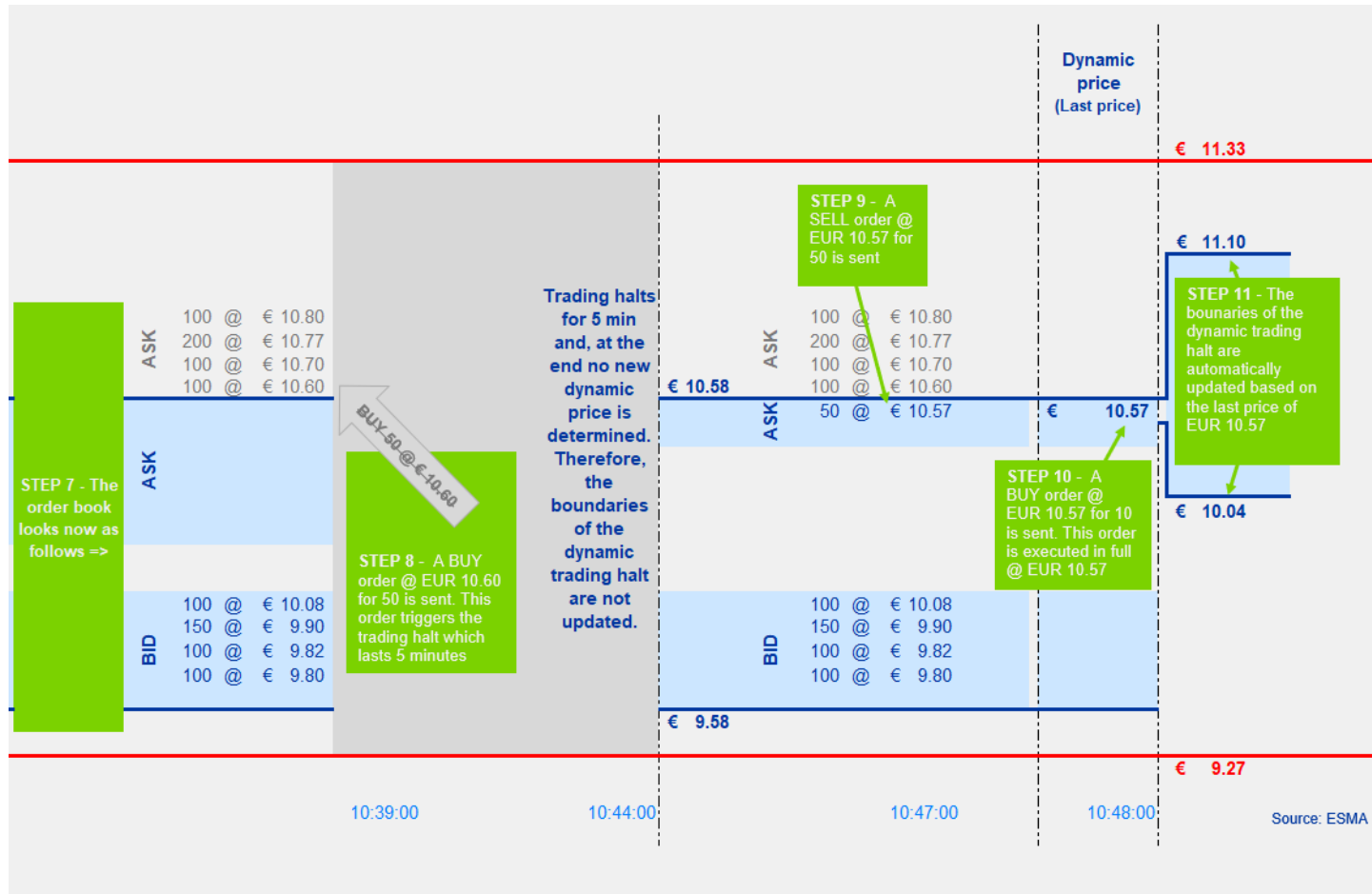


FIGURE 3 – EXAMPLE OF STATIC PRICE COLLAR - TYPE II



FIGURE 4 – EXAMPLE OF STATIC AND DYNAMIC TRADING HALTS - TYPE I.1

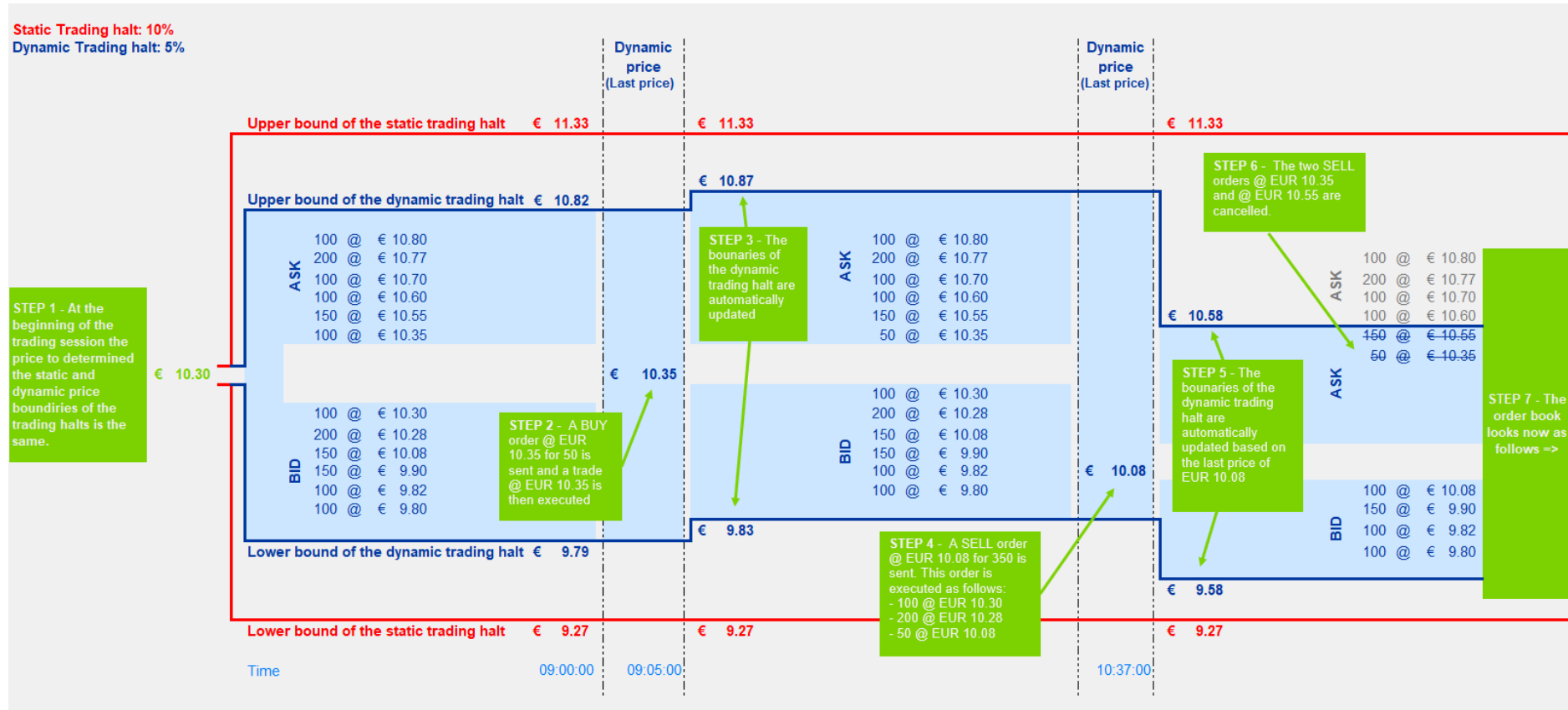


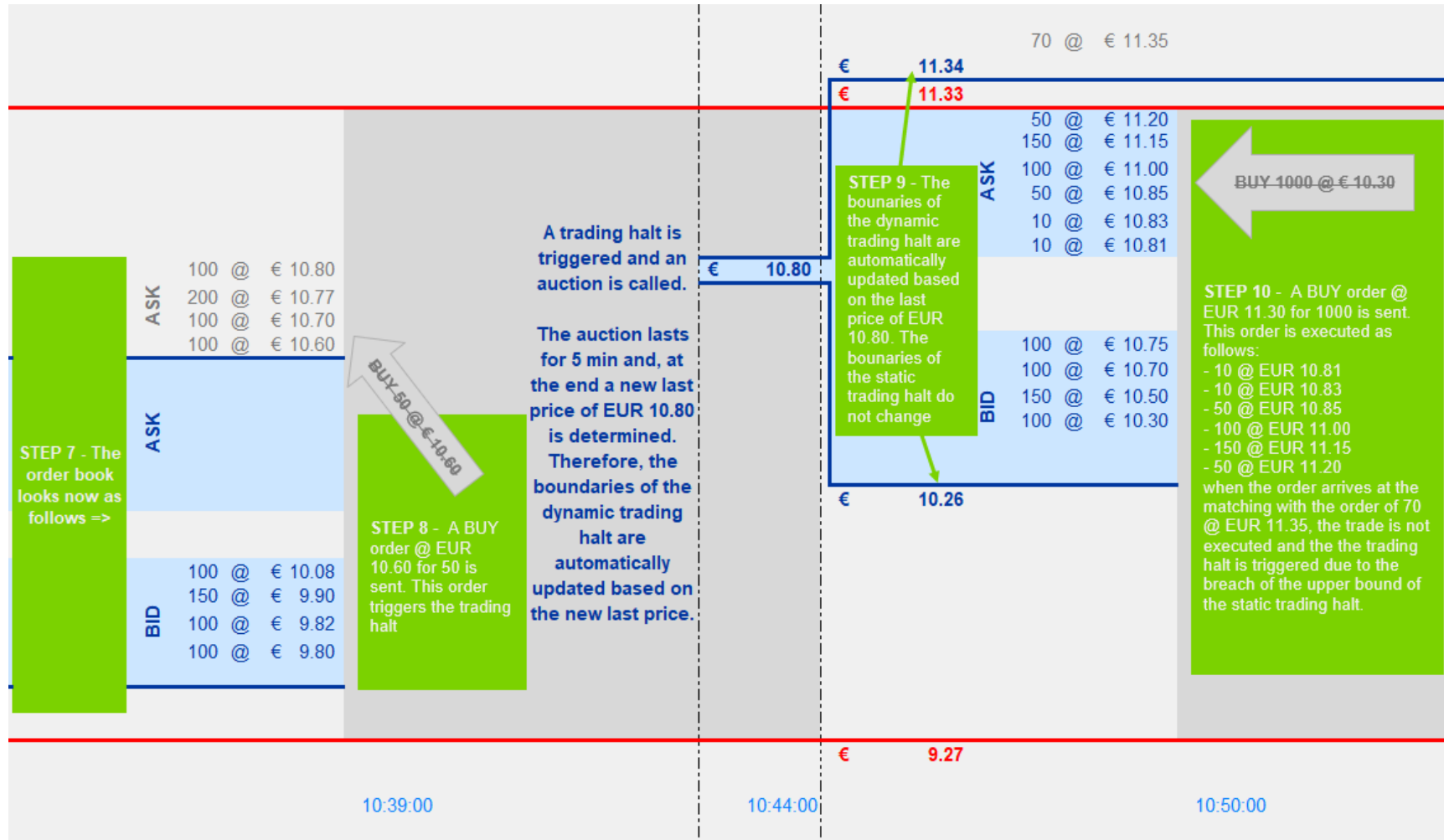


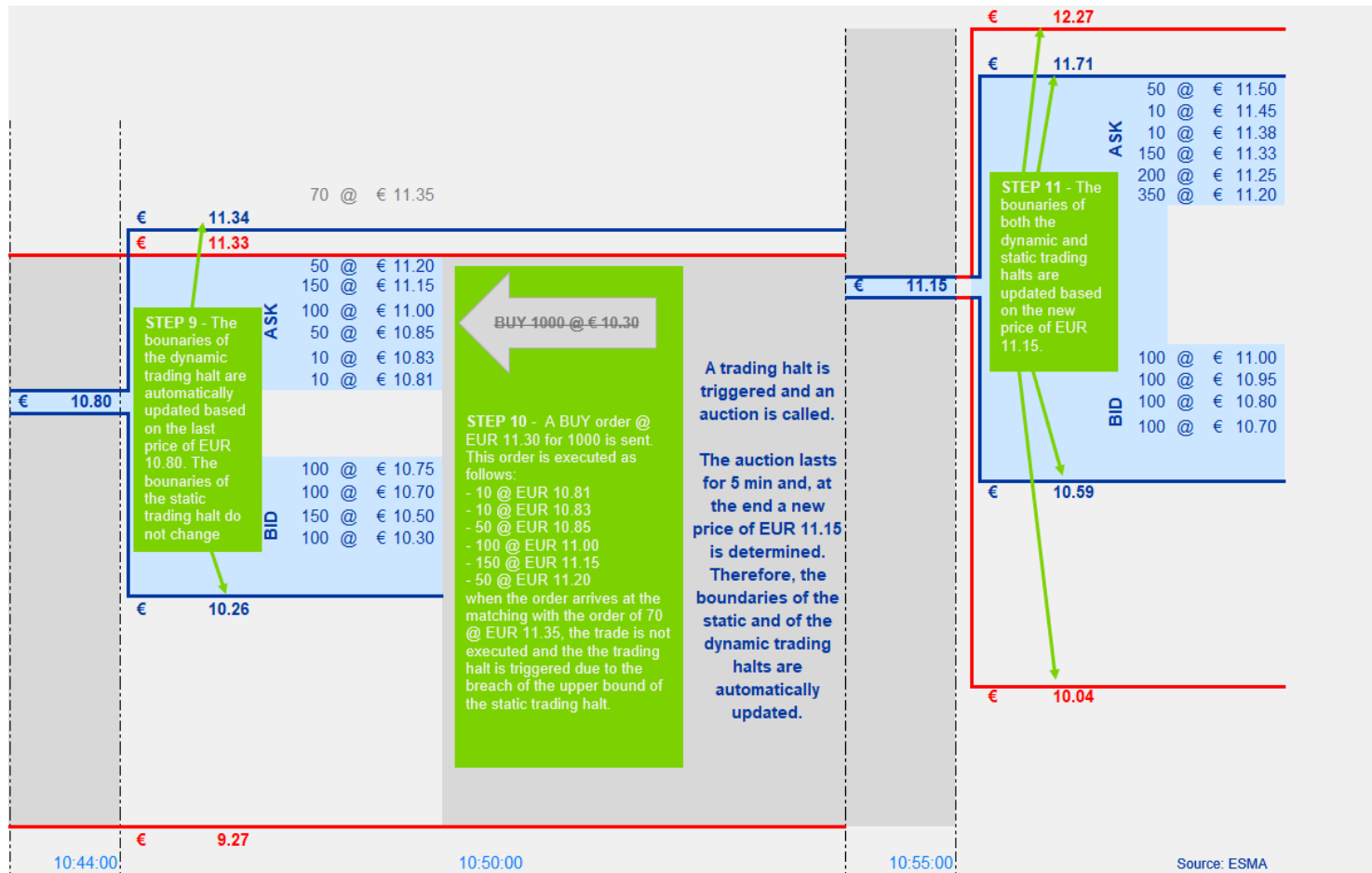
This figure provides an example of (i) the automatic update of the boundaries of the dynamic trading halts following the execution of a trade, (ii) the breach of the boundaries of the dynamic trading halts which triggers a trading halt of 5 minutes. At the end of the trading halt a new last price is not determined (the halt did not provide for an auction allowing such determination). Therefore, the boundaries of the dynamic trading halts are not updated.

In this example the boundaries of the static trading halt are not breached. Therefore, they are not updated over the course of the trading day.

FIGURE 5 – EXAMPLE OF STATIC AND DYNAMIC TRADING HALTS - TYPE I.2







This figure provides an example of (i) the update of the boundaries of the dynamic trading halts following the execution of a trade (the same as in the example in the previous figure), (ii) the breach of the boundaries of the dynamic trading halts which triggers a trading halt and, differently from the example in the previous figure, an auction is called for 5 minutes. At the end of the auction a new price is determined and, the boundaries of the dynamic trading halts are automatically updated. Finally, (iii) an example of the breach of the static the boundaries is provided.