



## Specialist Working Group for Recurrence Prevention Measures (2<sup>nd</sup> meeting)

---

### Total smart exchange

Tokyo Stock Exchange, Inc.

November 20, 2020

1. Opening Remarks
2. Explanation from the Secretariat

[Contents]

(1) Enhancement of Information Provision in the Event of a System Failure

(2) Development of Rules Regarding Handling of Orders and Procedures for Resuming Trading in the Event of a System Failure, etc.

- Clarification of Cases for Implementing Non-Acceptance of Orders, Trading Suspension, etc.
- Handling of Orders Entrusted by Customers in the Case of Order Cancellation by the Exchange
- Handling of Orders Affected by Invalidation of Already Accepted Orders by the Exchange
- Inconsistency resolution by a system reboot

(Reference Material) Responses at Selected Exchanges

3. Discussion
4. Closing

# **(1) Enhancement of Information Provision in the Event of a System Failure**

---

- ✓ To enhance information provision to market participants, including investors, in the event of a system failure, we will draw up an "Information Provision Policy in the Event of a System Failure" with the following pillars below, based on comments received regarding the system failure on October 1, 2020. We plan to make improvements as required through incident management such as carrying out testing and drills for system failure scenarios, among others.
- ✓ First, we aim to begin operations with arrowhead (information provision will begin with a test run together with system testing for users scheduled in Jan. 2021 and live operations from Feb. 2021). Enhancing information provision to other JPX systems are also under consideration.

Location of  
posted  
information

Launch a dedicated web page on the JPX website to post information compiled on the system failure along with further developments.

Updated  
frequency

As with the current Target system, information will be updated as progress is made as well as every 30 minutes even if there has been no progress.

Published  
contents

Ensure that adequate information is disclosed by predetermining each disclosure step in the event of a system failure, such as detection of a system failure, operational impact such as a trading suspension, resuming operations, responses for the next day and disclosing according to the steps.

Information  
dissemination

In addition to the existing email notifications from Target and emails sent to contact person(s) in the event of a system failure, we will ensure leads to the JPX website by using social media such as Twitter.

# Details of Draft Policy (1)

Item	Description	Notes
<p>1. Location of posted information</p>	<p>(1) JPX website                      - A web page will be launched to enable various stakeholders to access information compiled specific to system failure. It will include information such as whether trading is affected and details of system failure.                      - If trading is affected as in the case of a trading suspension, an alert for notification will be conspicuously posted on the homepage to bring attention to it.</p> <p>(2) Target                      - If trading is suspended, notification will be issued through Target in addition to (1).</p>	<p>- See below for an image of the dedicated web page.                      - In the event of a system failure that does not affect operations, such as when an automatic switchover normally occurs, a notification will not especially be posted on the homepage.</p>
<p>2. Updated frequency</p>	<p>(1) JPX website                      - The first notification will be posted immediately after a failure is detected and as soon as the extent of impact, etc. is confirmed. (However, if order acceptance must be suspended immediately, such as in the case of a trading server failure, the first notification will be posted even if confirmation of the failure impact has yet to be fully completed.)                      - Afterwards, whenever the extent of impact, event summary, etc. updates, that information will also get updated each time.                      - Even if there are no developments in the situation, it will be updated every 30 minutes from the most recent update with a status of no updates.</p> <p>(2) Target, email to a contact person(s) in the event of a system failure, Twitter                      - When the JPX website is updated, the information will also be sent through these tools. (push-based information delivery)</p>	<p>- Even if system recovery occurs immediately, "a system failure occurred but is now restored" notification will be posted.</p> <p>- Emails will be sent to email address of "contact person(s) in the event of a system failure" registered via arrowface (Up to three (3) addresses can be registered.)</p>

# Details of Draft Policy (2)

Item	Description	Notes
3. Published contents	<p>The following information will be disclosed on the JPX website:</p> <ul style="list-style-type: none"> <li>✓ Operational status of arrowhead and ToSTNeT system (whether trading is affected or not)</li> <li>✓ Details of the system failure such as the affected system(s), the extent of impact, and event summary</li> <li>✓ Updated information in chronological order, etc.</li> </ul> <p>The above disclosure steps assume the following:</p> <ol style="list-style-type: none"> <li>(1) Event detection (system failure)</li> <li>(2) Operational impact (possible event in the future in addition to an event occurring at that time)</li> <li>(3) Possibility of a trading suspension</li> <li>(4) Trading suspension</li> <li>(5) Expected timing of trade resumption (in the case of a trading suspension)</li> <li>(6) When trade resumption is determined, the resumption procedures and schedule (in the case of a trading suspension)</li> <li>(7) Trading schedule on the next business day, etc.</li> </ol>	<p>- Information in English will be promptly disclosed after being disclosed in Japanese.</p> <p>- Every effort will be made to provide details of the failure or causes. However, in case the situation is not identifiable immediately, information sent on systems operations, impact on trading and its recovery will take priority.</p>
4. Information dissemination	<ol style="list-style-type: none"> <li>(1) Target, email to contact person(s) in the event of a system failure           <ul style="list-style-type: none"> <li>- Notification will also be issued via Target and email to contact person(s) in the event of a system failure, as before.</li> </ul> </li> <li>(2) Twitter           <ul style="list-style-type: none"> <li>- For information on system failure that will affect trading, Twitter (official JPX account) will also be used to inform the general public of information posted on the JPX website.</li> </ul> </li> </ol>	

# (Ref.) Example of Access Channel from Front Page

Front page



**2020/10/01 08:40**  
**[Emergency Notification] Trading Suspension in the Cash Equity Market**  
[Click here for more information.](#)

Go to the web page dedicated to system failure (Details are on the next page.).

## 現物取引

**Web page dedicated to system failure**

### システムインシデント

現物取引にかかるとシステムにおけるシステム障害等の情報を掲載しています。

**現在、システム障害が発生しています。(11時45分最終更新)**

### システム運行状況

#### 売買の状況

立会場引 (arrowhead)	立会外取引 (ToSTNeシステム)
X (売買停止)	X (売買停止)

#### ユーザ別の状況

取引参加者	転場ユーザ	投資家の皆様
X (売買停止)	X (全ユーザに影響あり)	X (売買停止)

なお、投資家の影響が「○」になっている場合でも、ご利用の証券会社・情報ベンダ等によって一部サービスに影響が生じている可能性があります。詳細は、ご利用の証券会社・情報ベンダ等にお問い合わせください。

### システム障害の詳細

1, 対象システム	arrowhead, ToSTNeT, FLEX
2, 発生日時	2020年10月1日 07時10分頃
3, サービス影響	<p>[arrowhead]</p> <ul style="list-style-type: none"> <li>・東証、名証、福証、札幌の取引</li> </ul> <p>[ToSTNeT]</p> <ul style="list-style-type: none"> <li>・全ての取引 (ToSTNeT-1, ToSTNeT-2, ToSTNeT-3, 立会外分売)</li> </ul> <p>[FLEX]</p> <ul style="list-style-type: none"> <li>以下の全てのサービス</li> <li>・ FLEX Standard WB</li> <li>・ FLEX Standard</li> <li>・ FLEX Full WB</li> <li>・ FLEX Full</li> </ul>
4, 影響範囲	<ul style="list-style-type: none"> <li>・ 全取引参加者</li> <li>・ 全相場報道システム利用者</li> </ul>
5, 連絡概要	<ul style="list-style-type: none"> <li>・ FLEXにおいて7:10に配信する予定の送信開始電文およびそれ以降の電文が配信できていない。</li> <li>(9:31更新)</li> <li>・ arrowheadおよびToSTNeTにおいて、取引所に対する緊急連絡の通報確認を行いました。</li> <li>・ FLEXにおいて、一部のマルチキャストグループの送信確認を行いました。</li> </ul>
6, ユーザにご対応いただくこと	<ul style="list-style-type: none"> <li>・ 備前の目録が立っていないことから、再録に向けてご対応についてご案内できません。続報をお待ちください。</li> <li>(8:39更新)</li> <li>・ 上記事象を踏まえ、全取引所・全銘柄の売買停止を決定しています。</li> <li>(11:45更新)</li> <li>・ 終日売買を停止します。明日以降の予定については、別途ご案内します。</li> </ul>
7, その他	<ul style="list-style-type: none"> <li>・ 状況の進展にかかわらず、本ページを定期的にアップデートいたします。</li> </ul>

# (Ref.) Example of a System Failure Web Page on JPX Website

## Impact on trading and by users at a glance

### System Operational Status

#### Trading status

Auction (arrowhead)	Off-auction (ToSTNeT system)
Failure (trading suspended)	Normal (trading available)

#### Trading status by users

Trading participants	Market users	Investors
Failure (trading suspended)	Failure (all users affected)	Failure (trading suspended)

## Detailed information for trading participants and system vendors

### (For trading participants/system vendors) System failure details

1. Affected system(s)	arrowhead, ToSTNeT, FLEX
2. Date and Time of occurrence	around 07:10 (JST) on October 1, 2020
3. Impact on service	[arrowhead] - All trading on Tokyo Stock Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange, and Sapporo Securities Exchange
4. Extent of impact	- All trading participants - All market information system users
5. Event summary	- FLEX has been unable to distribute messages to be distributed after 07:10.
6. Support to users	- As we are unable to determine when systems will be restored, we are unable to inform of the trading resumption time. Please wait for further updates.
7. Others	- This page is regularly updated regardless of the progress of the situation.

## Update history

### Updated information

Time	Description
10:00	Regarding today's system failure, we are unable to estimate at this time when we will be able to resume normal operations. The schedule will be provided later.
9:31	The market information disseminated earlier today is invalid. We are unable to estimate at this time when we will be able to resume normal operations.
9:01	Trading on ToSTNeT has also been suspended. We are unable to estimate at this time when we will be able to resume normal operations. *Trading on Osaka Exchange is being conducted as usual.
8:39	Due to a failure in dissemination of market information, trading for all issues on Tokyo Stock Exchange will be suspended today. We are unable to estimate at this time when we will be able to resume normal operations.
8:23	Currently, we are working on restoring the system but unable to determine when it will be completed. Impact on trading will be informed of later. Orders are being accepted.
8:01	Start of communication transmission at 7:10 could not be established in most of the multicast groups in FLEX. Impact on trading will be informed of later.



# (Ref.) Main Comments about Oct. 1 System Failure

Main comments received from the Council, the Working Group, etc. on information provision since the system failure are as follows:

Category	Main Comments
Information provision tool	<ul style="list-style-type: none"><li>- Information should be provided on the website so that call center operators can refer to it.</li><li>- It is difficult to find information on a failure. Make information easier to find.</li><li>- It was difficult to reach TSE and ask about the situation - needs to be improved.</li></ul>
How to access information	<ul style="list-style-type: none"><li>- Please consider using social media, etc.</li><li>- It would be good if information was available via easy to access channels such as Twitter for retail investors.</li><li>- When notifications from TSE arrive, some recipients may take time before sharing them with other relevant people within the company, creating a time lag.</li></ul>
Contents of information provision	<ul style="list-style-type: none"><li>- On the day, no information was available on the cause nor an expected recovery time.</li><li>- Information should be provided so that a diverse range of stakeholders would consider it transparent.</li><li>- Information should be provided in English almost simultaneously to that in Japanese.</li></ul>
Timing of information provision	<ul style="list-style-type: none"><li>- The status should be provided at regular intervals.</li></ul>

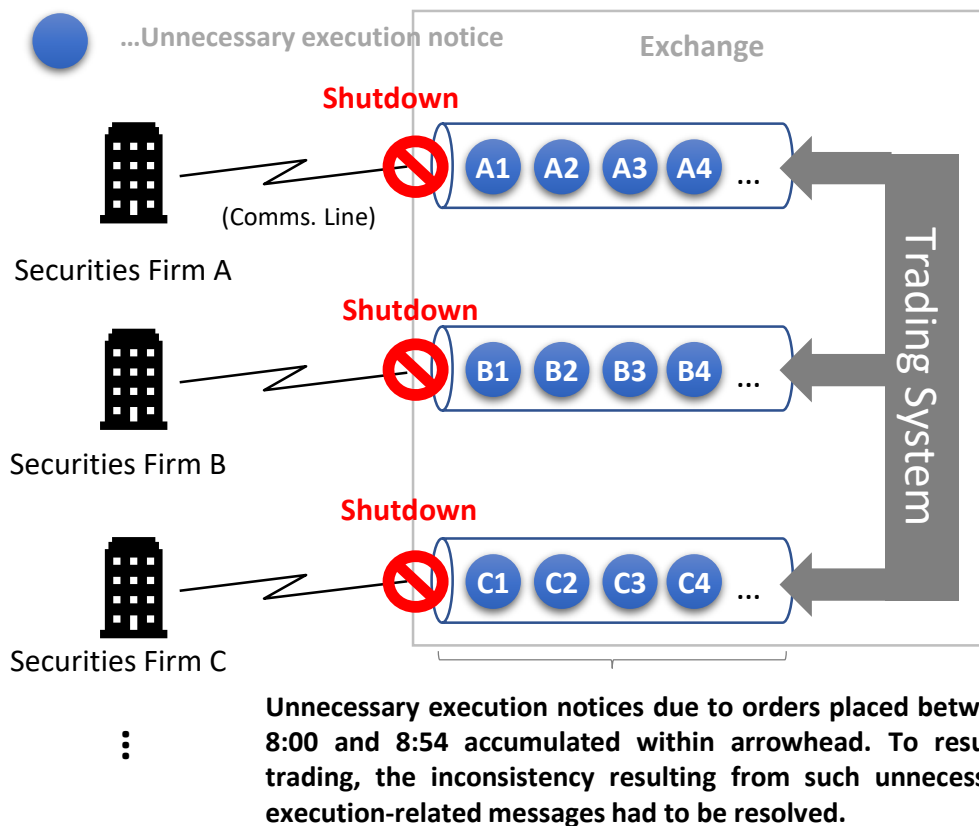
## **(2) Development of Rules Regarding Handling of Orders and Procedures for Resuming Trading in the Event of a System Failure, etc.**

---

## Main cause of the full-day trading suspension on Oct. 1

A trading suspension could not be implemented as normal via the trading administration function, and unnecessary execution notices accumulated within the trading system, which led to the inconsistency between rules-based handling and the system. As such, the main cause was that the rules for resuming trading in such a case had not been developed.

### October 1 (Image)



## Recurrence prevention measures and basic approach to recovery

### TSE's efforts to prevent message inconsistency

- In the case of a system failure that requires a trading suspension, the Exchange will expand measures to ensure the implementation of a trading suspension to prevent inconsistency between rules-based handling and the system (improve functions and establish procedures).
- In addition, the Exchange will develop measures to prevent system failures that will lead to a trading suspension (development of procedures for hardware device switching, switching tests, etc.).

### Basic approach to recovering operations

- The basic policy will be that, even in the case of message inconsistency due to system failure, the Exchange will retain orders as far as possible and implement measures for resuming trading.
- We propose that the WG examines, in terms of both the rules and systems, (i) measures for cases where the Exchange cannot be expected to resolve the inconsistency on its own, and (ii) recovery measures that can be taken in the event of an inconsistency, taking into account the impact on trading participants.

# Matters to be Discussed by the Working Group

With the aim of developing the necessary rules, etc. for (i) preventing inconsistency between rules-based handling and the system and (ii) the smooth resumption of trading, we propose that the WG discusses the following matters.

#	Item	Outline
<b>1</b>	<b>Development of rules for handling orders to enable trading to resume on the day of the system failure, etc.</b>	
1-1	Clarification of cases for implementing non-acceptance of orders, trading suspension, etc.	In the case where the impact of a system failure cannot be foreseen with the acceptance of orders (or where inconsistency might occur), we propose to stop accepting orders. The WG will discuss and clarify means to implement such measures.
1-2	Handling, etc. of orders entrusted by customers in the case of order cancellation by the Exchange	The Exchange will clarify the handling of resending entrusted orders in the case where the Exchange has no choice but to cancel already accepted orders, so as to achieve a smooth resumption of trading.
<b>2</b>	<b>Development of procedures for resuming trading in the case of an irregular trading suspension</b>	
2-1	Handling of orders affected by invalidation of already accepted orders by the Exchange	In the case where the Exchange deems that emptying the order book will contribute to a smooth resumption of trading, manual invalidation of already accepted orders by the Exchange should be considered as one means of resolving inconsistency.
2-2	Inconsistency resolution by a system reboot	Since there may be situations where inconsistency could be resolved by rebooting the system, the Exchange will clarify system handling and consider procedures for resuming trading in a system reboot.
2-3	Clarification of handling in the event of inconsistency in order execution data, etc.	In preparation for inconsistency in execution data, etc. confirmed by trading participants and those confirmed by the Exchange, which result from a system failure during a trading session, the Exchange will clarify how to handle such inconsistency in advance.

Discuss in future meetings

## **1-1. Clarification of Cases for Implementing Non-Acceptance of Orders, Trading Suspension, etc.**

---

## Known Issue

- For the October 1 system failure, if order acceptance had been stopped at 8:00 (JST), trading could have started without inconsistency between the rules-based handling and the systems.

## Present Situation

- Even when trading is suspended, if orders are accepted, trading can be resumed smoothly by accepting cancellation orders, etc\*<sup>1</sup>. Thus, on October 1, we started to accept orders at 8:00 as usual on the assumption that even if there was a trading suspension, orders would continue to be accepted.

- "Trading suspension with orders not accepted" is implemented when orders cannot be processed appropriately, such as when there is abnormality in the processing of order acceptance and executions.

\*<sup>1</sup> If orders are not accepted, errors will also be returned for cancellation orders, etc. In addition, as trading participants are unable to place orders from customers to the Exchange during such a trading suspension, orders will accumulate at the trading participant (orders are returned as errors). Thus, a longer period of time needs to be set aside for order acceptance in preparation for resumption of trading.

## Proposed Response

- Before starting order acceptance: If a failure occurs and its impact cannot be estimated, we would like to stop accepting orders of all issues from a fixed time based on certain sets of response measures\*<sup>2</sup>.

- After starting order acceptance: If a failure occurs and its impact cannot be estimated, we would like to stop accepting orders of all issues as in the same policy as in the case of before starting order acceptance\*<sup>3</sup>.

\*<sup>2</sup>: For response measures, refer to the next page.

\*<sup>3</sup>: For handling of already accepted orders, refer to P.23.

# Response Measures for Not Starting Order Acceptance

Three possible measures for not starting order acceptance are described in a table below. Depending on the failure situation, etc., the most appropriate measures will be implemented in the following priority:

	Tentative Measures for Order Non-Acceptance	Points for Discussion
First priority	<p>Change the start time of order acceptance and do not send the market administration message (Order Status: Accepting Orders) at the normal time.</p> <p>*If orders are placed in the above condition, an acceptance error (Outside Order Acceptance Hours) will be returned.</p> <p>*A market administration message (Order Status: Accepting Orders) is sent out at the altered start time of order acceptance.</p>	<p>We assume that trading participants use the market administration message as a trigger for order placement and can respond without any problems, but are there any concerns about this?</p>
Second priority	<p>Send the market administration message (Order Status: Accepting Orders) but do not accept orders.</p> <p>*If orders are placed in the above condition, an acceptance error (such as (1) During Temporary Halt, (2) No Order Allowed for the Participant, or (3) Prohibition of Orders from Virtual Server) will be returned. Furthermore, (1) will be a case of a trading suspension with orders not accepted. In such case, Warning Information Message (Warning Information Type: Trading Halt (Not Accepting Orders)) is sent.) In addition, in FLEX, an ST tag (Not Accepting Orders) is disseminated.</p>	<p>We assume that many systems use the market administration message as a trigger for order placement. In such case, since orders are returned as errors, trading participants will have to respond, such as by placing the orders again. Are there any other concerns?</p>
Third priority	<p>Disconnect virtual servers before the start of order acceptance.</p> <p>*For resumption, a market administration message (Order Status: Accepting Orders) is sent after virtual servers reconnect.</p>	<p>Once order placement is possible, orders will not be returned as errors. However, we assume that trading participants will need to conduct some operations to reconnect their virtual servers. Are there any concerns about this?</p>

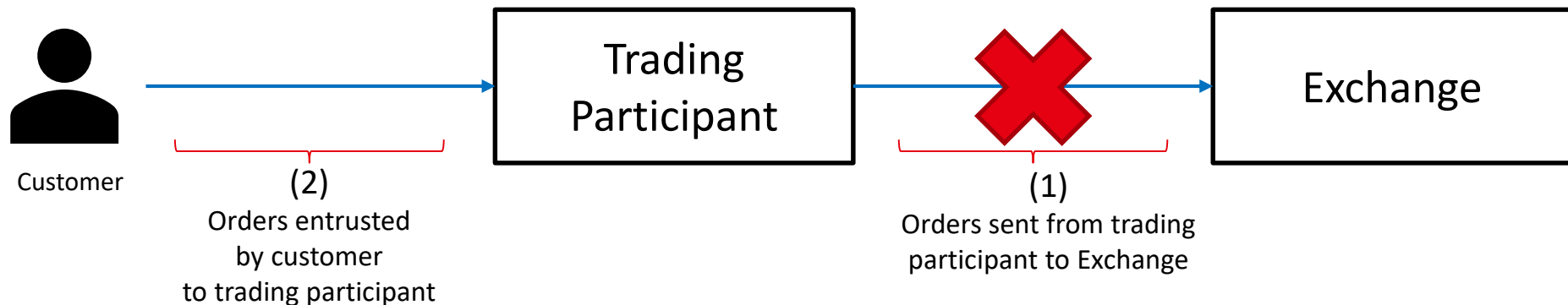
## **1-2. Handling of Orders Entrusted by Customers in the Case of Order Cancellation by the Exchange**

---



# Summary of Current Situation

- Depending on the type of system failure, we expect there to be situations where on trading resumption the Exchange will have no choice but to cancel orders it has already accepted from trading participants.
- The relationships between customers, trading participants, and the Exchange when the Exchange cancels orders are as below.



- (1) Orders sent from the trading participant to the Exchange  
→ Cancelled (according to the provision of Rule 3 of the Rules Concerning Bids and Offers)
  - (2) Orders entrusted by the customer to the trading participant  
→ Remain valid in principle even in the case of a trading suspension (Rule 8 of the Brokerage Agreement Standards)\*
- The above (1) and (2) are separate rights and obligations. The cancellation of either (1) or (2) does not automatically lead to cancellation of the other, so even if (1) is cancelled as a result of a trading suspension implemented due to a system failure, (2) will remain valid in principle.\*

\* For certain types of customer or order conditions, etc., the trading participant can include in its terms and conditions a special clause to the effect that the trading participant will cancel entrusted orders when trading is suspended or the Exchange has cancelled orders. Trading participants can also invalidate entrusted orders on an order-by-order basis if specifically instructed by the customer.

## Rules Concerning Bids and Offers

### Rule 3. Validity of Bid/Offer

A bid/offer shall become invalid at the time of the close of the trading sessions of the day; provided, however, that, where trading is halted pursuant to the provisions of Rule 29 of the Business Regulations, the validity of a bid/offer may be specified on a case-by-case basis.

## Brokerage Agreement Standards

### Rule 8. Effectiveness of Orders at Time of Resumption of Trading

A customer's order shall remain effective for the effective period of such order, for which instruction has been made by the customer, as prescribed in the provisions of the preceding two (2) rules, and even in the event that the Exchange halts securities trading; provided, however, that the same shall not apply, where the customer has given instruction that the order be cancelled in such event.

- As indicated in page 17 above, even when the Exchange cancels orders, customer's orders entrusted with the trading participant remain valid. As such, to carry out their duty as an entrustee, the trading participant should in principle resend these orders.
- However, depending on order conditions, etc., resending orders may be inappropriate.
- In this respect, in order to enable smooth responses at the time of a system failure, special clauses, etc. could stipulate how orders should be handled depending on order conditions and trade types, etc. or attributes of the trading participant's system, making clear in advance whether it is necessary for the trading participant to resend orders.

\*If the terms and conditions, etc., agreed by the trading participant and the customer include provisions like the following examples, the necessity of resending orders should be decided in accordance with such provisions.

(Example 1) If the above (1) is cancelled by the Exchange, the trading participant shall resend orders for the same issues and prices

(Example 2) If the above (1) is cancelled by the Exchange, the trading participant shall not resend orders on the same day

- TSE will revise its rules as indicated below in order to clarify how trading participants should handle customer orders, etc. when the Exchange cancels orders:
  1. The Exchange will clearly stipulate in its rules that the Exchange may cancel orders from trading participants which are already accepted, not only in cases of trading halts but also system failures, etc.
  2. The Exchange will clarify in its rules that whether it is necessary for the trading participant to resend orders should be decided according to the special clauses, etc. that are in place.
- ✓ "As for whether or not it is necessary for the trading participant to resend orders, if there is a prior arrangement between the trading participant and the customer or a prior instruction from the customer, the trading participant shall follow such arrangement or instruction."
  - \*If this is covered by the terms and conditions, such terms and conditions will apply if there is a prior arrangement between the trading participant and the customer.
- In addition, the Exchange will revise its rules on an as-needed basis, including the following:
  - Giving examples of types of entrusted orders for which resending would be inappropriate from the perspective of "instruction from the customer"; etc.

## (Ref.) Examples of Orders for which Resending is inappropriate

- For example, in the case of orders with conditions, if the trading participant simply resends the order with the initial conditions after resumption of trading, such order could possibly be executed under conditions different from those the customer originally instructed.
- If a system failure were to occur during the period from before the opening auction until the end of the morning session, and trading were then to resume at 2:00 p.m. after a reboot of the trading system, timings of executions, etc. for orders with conditions would be as shown below.

### Types of orders with conditions that can be sent to TSE and timing of execution after trading resumption, etc.

Order type	Timing of execution	Timings in relation to the customer's original instruction
On-open orders	<ul style="list-style-type: none"> <li>• Executed at the opening auction after trading resumption</li> </ul>	If a trading participant accepts orders where execution is specified to happen at the opening auction in one of either the morning session or in the afternoon session, it can be assumed that, if a customer has entrusted an order to be executed at the opening auction in the morning session, the customer would not want the order to be executed at the opening auction in the afternoon session after trading resumes.
On-close orders	<ul style="list-style-type: none"> <li>• Executed at the closing auction after trading resumption</li> </ul>	If a trading participant accepts orders where execution is specified to happen at the closing auction in one of either the morning session or the afternoon session, it can be assumed that, if a customer has entrusted an order to be executed at the closing auction in the morning session, the customer would not want the order to be executed at the closing auction in the afternoon session after trading resumes.
Funari orders	<ul style="list-style-type: none"> <li>• Becomes valid during Zaraba (continuous auction). If not executed during Zaraba, executed at the closing auction</li> </ul>	While the customer intended for the order to be executed at the closing auction in the morning session, the order could possibly be executed at the closing auction in the afternoon session.

## **2-1. Handling of Orders Affected by Invalidation of Already Accepted Orders by the Exchange**

---

## Known Issues

- Depending on the nature of the system failure, one option may be for the Exchange to manually invalidate already accepted orders in order to recover operations.
- While there is already a function for the Exchange to manually invalidate individual orders, an operation using such function under the system failure has not been established between the Exchange and trading participants.
  - \* An invalidation result notice with invalidation reason code "invalidated by exchange" will be sent to trading participants.
  - \* This function is only for cases of problems on the trading participant side (e.g., a system failure, etc. leads to erroneous order placement and a cancellation order cannot be sent) and is not normally used. In addition, we have yet to provide opportunities to test this invalidation pattern in user connection tests, etc.

## Proposed Response

- As a policy for response to an exchange-side system failure, we propose to have a function to manually invalidate already accepted orders if it is necessary to recover operations.
- In addition, in terms of response at trading participants, when they receive invalidation reason code "invalidated by exchange", we will expect them to check the handling of the affected orders before deciding whether to submit the orders again.

\* Handling for cases where invalidation notices cannot be returned will be discussed in P.25.

## 2-2. Inconsistency resolution by a system reboot

---



## Known Issues

Rebooting the exchange trading system was an option to recover operations in the case of the Oct. 1 system failure, where trading was not expected to resume based on predetermined recovery procedures. However, there is the need to establish proper handling for such cases of system reboot based on the current system specifications because it would involve resetting all sequence numbers, and the Exchange might not be able to send out invalidation result notices for already accepted orders.

### **(1) If the Exchange cannot return invalidation result notices**

While we would like to have the Exchange manually invalidate already accepted orders, depending on the system failure, if the Exchange is unable to return notice messages, trading participants will be expected to invalidate the orders on their side upon receiving communication from the Exchange by means other than messages (\*).

\* Trading participants will be expected to internally invalidate all orders prior to a certain time or invalidate individual orders upon receiving the order acceptance numbers from the Exchange.

### **(2) Alteration of schedule**

The schedule for the trading hours after a reboot is expected to be altered. All events such as start of participant online, start of order acceptance (morning/afternoon session), start/end of trading session (morning/afternoon session), are expected to occur. (The altered schedule will be communicated in advance, and the times for each period may be shortened as needed.)

### **(3) Resetting of sequence numbers**

Since unique values in the system such as notice sequence numbers, etc. will be reset due to a reboot, measures will be needed to ensure that the sequence numbers do not overlap before/after the reboot.

### **(4) FLEX information**

Sequence numbers will be reset, and information will be disseminated based on the operational schedule after the reboot.

The above is based on a reboot before the start of trading. If there is a reboot after the start of trading, execution-related and other matters will also need to be considered.

We will consider the above matters in discussions on the procedures, etc. for the resumption of trading after a reboot.

## Matters to Note for Reboot (To Be Discussed)

# Reference Material

---

# Responses at Selected Exchanges<sup>1</sup>

	NYSE	LSE	DB	SGX	Euronext	HKEx	TSE
Rules on order cancellation (Whether the exchange can decide to cancel already accepted orders in the case of a system failure, etc.)	○ Rule 17	○ Rule 2104 in Order Book Trading Rules Section	△ Article 59 (Depending on the type of suspension, all orders may be cancelled.)	○ rule 8.13.5	△ or — Harmonised Rules 4202/3 <sup>2</sup> in Rule Book I	○ Rule 204.(11) Rule 572	△ Rule 3 <sup>4</sup> of Rules Concerning Bids and Offers
Rules on methods of notification concerning order cancellation (How the exchange notifies the trading participant of the cancellation of already accepted orders)	○ Rule 17 - The rules stipulate that the exchange shall provide "notice of the cancellation" when cancelling orders.	△ 6.9.2; 11.6, etc. in MIT201 (In principle, a corresponding message is sent to the trading participant when an order is cancelled; however, under certain circumstances, the exchange may cancel an order without a corresponding confirmation being sent to a participant.)	○ Article 77(6) - The rules stipulate that "the companies shall electronically be informed".	○ Practice Note 8.13 and 8.15 (The exchange will notify Trading Members of the status of their unmatched orders before the lifting of a market suspension.)	△ or — Harmonised Rules 4202/3 <sup>2</sup> in Rule Book I (Unexecuted orders shall be cancelled, as set forth in one or more Notices. <sup>3</sup> )	—	—

<sup>1</sup> Compiled based on information available on each exchange's website, etc.

<sup>2</sup> The rules stipulate that unexecuted orders shall be cancelled upon the occurrence of certain events that are likely to substantially affect the price of a security. As such, this rule may not have specifically considered system failure.

<sup>3</sup> Individual notifications do not seem to have been sent out for order cancellations in relation to the system failure on October 19, 2020.

<sup>4</sup> A bid/offer shall become invalid at the time of the close of the trading sessions of the day; provided, however, that, where trading is halted pursuant to the provisions of Rule 29 of the Business Regulations, the validity of a bid/offer may be specified on a case-by-case basis.

# Responses at Selected Exchanges

	NYSE	LSE	DB	SGX	Euronext	HKEx	TSE
Time period before resumption of trading (Order acceptance time)	-	<b>At least 20 minutes</b>  MIT201 11.5	-	<b>At least 15 minutes</b>  (Adjust Phase) Practice Note 8.13 and 8.15	-	-	<b>In principle, 30 minutes</b>  (Internal manuals)
Requirements, etc. for trading (market) suspension and resumption of trading	<ul style="list-style-type: none"> <li>Although, in principle, exchanges strive to resume trading with as many remaining customer orders as possible, they also foresee situations where there is order cancellation, etc. In cases where there is difficulty in sending cancellation notification messages, some exchanges notify cancellation by other means.</li> <li>Since the criteria to suspend/resume trading (market) are not published, such decision seems to be made based on each exchange's internal criteria.<sup>5</sup></li> <li>If certain internal criteria of an exchange are met, the exchange may resume trading even though not all trading participants can respond.</li> </ul>						Comprehensive consideration of the share of trading value (generally above 50%), attributes of trading participants, and other factors

<sup>5</sup> The criteria are thought to be pre-determined by each exchange and may include not only quantitative criteria, such as share of trading value, but also qualitative criteria, such as attributes of securities companies.