Nasdaq Nordic
INET Pre-Trade Risk Management
Service Guide 3.7

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1 Document Scope

This document describes the Nasdaq Nordic Pre-Trade Risk Management (PRM), offered by Nasdaq Stockholm AB, service and details the steps to complete to order the service, prepare for its use in production and the procedure for its support and configuration management.

PRM is offered as an additional service under Nasdaq Nordic Member Rules (NMR) and terms not defined in this document shall have the same meaning as set forth in the NMR.

1.1 Document History

Date	Revision	Change Description
2010-08-11	1.0	Document Created
2010-08-19	1.1	Minor changes
2010-09-03	1.2	Advise to always use Max Order Value and procedures for unblocking accounts
2010-09-17	1.3	Clarified config. Options for Fat Finger Price Check
2010-10-26	1.4	Added limitation for Nordic@Mid Order handling and removal of price check on passive orders
2010-11-29	1.5	Added PRM Administration Interface, Restricted List of Market Segment and support for Nordic@Mid and Pegged Orders and PRM Acceptance Confirmation Statement.Trade Support desk for ongoing PRM configuration management requests and emergency actions
2010-12-20	1.6	Made use of PRM Administration Interface mandatory for PRM customers
2011-03-03	1.7	Added FIX Drop on-disconnect safeguard and limitation for Nordic Order Routing executions on away markets
2011-06-13	1.8	PRM Blow-through protection Fat finger price deviation check on passive orders
2012-03-23	2.0	Native FIX and new PRM controls and enhancements for automated trading flow
2012-08-27	2.1	FTP site for uploading restricted symbol list
2013-05-15	2.2	Clarified config. Options for Fat Finger Price Check and the latency impact Updated NASDAQ OMX contact information
2014-02-24	2.3	Added information about Fat Finger Check during auctions and Market Order Restriction
2015-06-02	2.4	PRM Audit Report information added. Nasdaq contact details updated.
2015-11-16	2.5	Added information on Market Order Protection in Calls. Nasdaq contact details updated.
2016-01-18	2.6	Name of the Nasdaq legal entity changed. The section for market order protection in calls updated
2016-08-24	2.7	Added a definition of a limit value to the maximum order per second per order entry port

Date	Revision	Change Description
		section. Added information about the Fat Finger Multiplier
2017-09-18	2.8	Clarified the validation of market orders when maximum order value or daily accumulated value checks are enabled.
		Update to Fat Finger check in continuous trading: An opening auction price is used for the validation when continuous trading begins. If an auction price is not available previous day's closing price is used.
		Added information about intraday FTP upload for restricted symbols
		Trading operations contact details updated to operator@nasdaq.com
2018-09-17	2.9	Clarified the definition of latency impact
2019-02-05	3.0	Clarified the definition of latency impact
2021-11-11	3.1	Updated with information regarding PRM administration interface
2022-12-05	3.2	Update to reflect the changed behavior of order re-pricing after the introduction of the OUCH5.
2023-11-27	3.3	Updated with information on alternative logic to define User Ids to be covered by a PRM account. Clarifications regarding thresholds for Market order protection in auctions check. Updated Email contact information.
2024-05-27	3.4	Introduction of PRM API including removing Nordic Workstation as PRM Administration interface.
		Updates to available features introduced in connection to PRM API.
2024-06-17	3.5	Update due to introduction of Auction Specific Max Order Value and Quantity checks.
2025-06-16	3.6	Update due to introduction of new in house PRM Administration Interface in Nasdaq Member Portal.
2025-09-26	3.7	Minor update due to changes in FTP connectivity details

2 Welcome to Nasdaq Nordic Pre-Trade Risk Management Service

2.1 Background

In today's marketplaces there is an increased focus on risk management and specifically on pre-trade risk management in relation to new market access models such as Sponsored Access and Direct Market Access (DMA).

At the same time speed of response and latency are getting more and more important, especially when algorithmic and program trading methodologies form the base of a customer's business.

As a leader in trading and data technology for the financial industry, Nasdaq has developed a Pre-Trade Risk Management service that provides customers of its Nordic marketplaces a Pre-Trade Risk Management solution that adds no latency.

2.2 Overview

Nasdaq Nordic Pre-Trade Risk Management provides member firms with the ability to facilitate pre-trade protection.

Using PRM, member firms can set various constraints on orders and control their trading activity and the trading activity of their clients and customers, including prevention of potentially erroneous transactions.
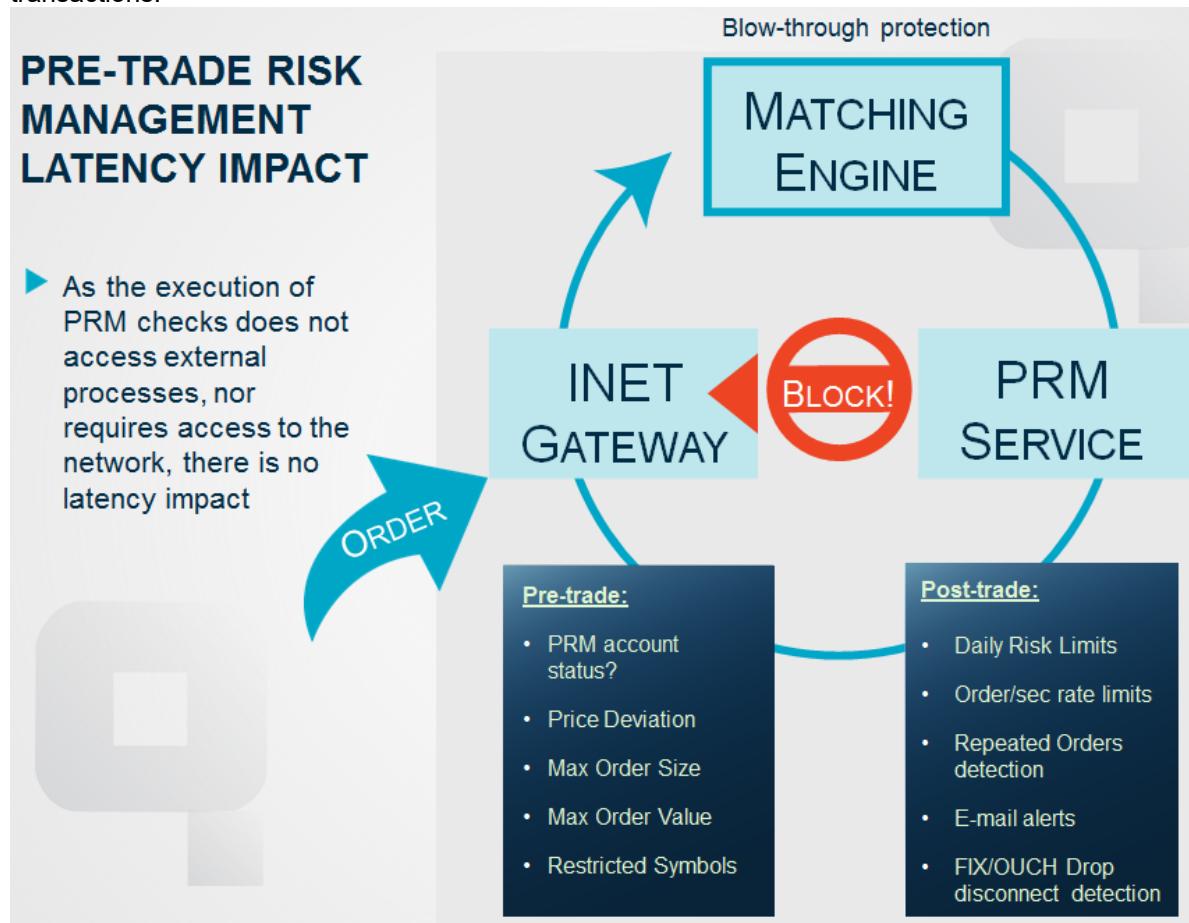
PRM consists of a number of *pre-trade* and *post-trade* controls that can be combined in a flexible way.

Pre-trade controls validate orders prior to allowing them into the matching engine. PRM is flexible, using a set of parameters to determine if the order should be allowed into the market.

Post-trade controls are implemented directly in the INET trading system based on the internal real-time stream of data. As soon as a trade or an order has breached any of the post-trade risk limits, the PRM service will immediately lock the affected account.

When orders are rejected, PRM provides customers with clearly defined reasons for rejection.
A PRM administration interface provides members with the ability to directly control and update most of the risk limits of their PRM configuration, including the ability to quickly cancel all orders and reject new ones for a specific account.

Notifications via E-mail can be generated by the PRM services to alert customers about warning levels being reached or limits being breached.

2.3 Latency

The PRM software is an integrated part of the code of the OUCH and FIX ports. As the execution of PRM checks does not access external processes nor requires access to the network, there is no latency impact.

2.4 Key benefits

- **Speed.** PRM is fast, adding no latency to order roundtrip time.
- **Accuracy.** PRM functionality includes real-time price information to ensure that the most accurate information is available for validating orders.
- **Flexibility.** PRM is flexible and manages protection on one or many ports and account levels.

2.5 Sponsored Access and PRM

Nasdaq Nordic PRM module and its PRM administration interface are particularly suited for Members who offer clients Sponsored Access or low-latency DMA and it fulfills the requirements for pre-trade control towards their sponsored clients.

For Sponsored Access setup, the PRM service can be combined with the FIX DROP on-disconnect safeguards, where the host would automatically cancel open orders and reject new ones for individual sponsored clients, in the case where the FIX DROP feed used by the sponsoring Member to monitor the client's activity gets disconnected (gracefully or ungracefully).

3 Nasdaq Nordic PRM Service Offering

3.1 PRM Account

Nasdaq Pre-Trade Risk Management service provides:

1. Fat Finger Price Check
2. Maximum Order Quantity Check
3. Maximum Order Value Check
4. Daily Accumulated Values Checks
5. Restricted Symbol List Check
6. Restricted Market Segment List Check
7. FIX Drop on-disconnect safeguard
8. Blow-through protection for PRM Accounts
9. Maximum orders per second per order entry port
10. Maximum orders per second per symbol and PRM Account
11. Detection of repeated order generations per symbol and PRM Account
12. Notifications via e-mail for risk limit breaches and warning levels
13. FTP site for uploading restricted symbol list per PRM Account
14. Market Order Restriction (during auctions)
15. Market Order Protection in calls

With the exception of the Fat Finger Price check for continuous trading and the maximum orders per second per order entry port, all other type of checks are configured on a PRM Account basis.

A PRM Account is always associated to one specific Market Participant Identifier (MPID). A PRM Account can consist of one, several or all of the members User IDs.
A User ID can belong only to one PRM Account.

There are two alternative ways to select user IDs included in a PRM account:

1. User IDs included in the PRM account and hence covered by the selected PRM checks.
2. User IDs excluded from the PRM account and hence not covered by the selected PRM checks. With this exclusion logic all users except the excluded users are included in the PRM account.

The client shall select one of the above alternatives for a PRM account and define the User scope in the order form available in Member Portal.

If no User IDs are defined in a PRM account (included or excluded), all User IDs associated to the MPID are included to the PRM account and selected PRM account related checks.

A PRM Account configuration is active cross all order entry ports regardless of the protocol used.

Active checks and their limits can be configured for each PRM Account as described in the next sections.

Please note that for a given PRM Account, Maximum Order Quantity and Value and Daily Accumulated limits will be set only on a currency basis. It is not possible to set limits on individual order books, group of order books or market segments.

Reject reasons will apply according to OUCH and FIX protocol specifications.

3.2 Fat Finger Price Check (continuous trading)

Fat Finger Price Checks allows you to compare the price of an incoming order against the current last sale. If the order deviates more than a given threshold (%) set on the order book, the order will be rejected.

The PRM system applies different thresholds for *Aggressive* and *Passive* orders, defined as:

- *Aggressive order:* is a Buy order whose price is equal or higher than the last paid or a sell order whose price is equal or lower than the last paid.

- *Passive order:* is a Buy order whose price is lower than the last paid or a sell order whose price is higher than the last paid.

The thresholds applied by the PRM system for *Aggressive* and *Passive* orders are published on our member web at: https://www.nasdaq.com/solutions/pre-trade-risk-management-for-inet-nordic

Order price validation is only active for orders entered during continuous trading and which are eligible for continuous trading. An opening auction price is used for the validation when continuous trading begins. If an auction price is not available previous day's closing price is used.

PRM validations are done upon order entry, pegged orders and reserve orders are not validated following automatic price adjustments by the INET Trading System.

Fat Finger Price Check cannot be enabled or disabled on a PRM Account level. The available options are:
- Individual OUCH ports
- Individual FIX ports
- all existing ports

Therefore this type of check cannot be enabled just for an individual User ID or a subset of User IDs of a Member.

Thresholds for Fat Finger Price Checks are set by Nasdaq Nordic. Members can adjust their thresholds with an optional parameter that is used for multiplying the default thresholds set by Nasdaq Nordic. Members can choose a multiplier value between 0% and 999% (with no decimals). For instance, if a value of 200% is chosen the default thresholds are multiplied by 2. Different multiplier values can be selected for aggressive and passive thresholds. The same multipliers are applied for all ports under the MPID where fat finger check is enabled. Changes to the default thresholds by Nasdaq Nordic will be communicated via IT Exchange Notices.

Limitations
The multiplier is not available for SA client Fat Finger configuration. Since the multiplier is enabled by MPID members that have SA clients trading under the member's MPID are unable to have it enabled for their own ports.

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3.3   Fat Finger Price Check (auctions)

It is possible to set an additional Fat Finger Price Check for a PRM account that allows you to compare the price of an incoming order against the closing price of the previous day during opening auctions. During other auctions the comparison is made against the current last sale. If the order deviates more than a given threshold (%) set on the order book, the order will be rejected.

The functionality applies to orders entered (or modified) during the auction period in all types of auctions, i.e. including intraday auctions (scheduled, volatility guards and halt releases).

The PRM system applies same thresholds for *Aggressive* and *Passive* orders, defined as:

- *Aggressive order:* is a Buy order whose price is equal or higher than the last paid or a sell order whose price is equal or lower than the last paid.

- *Passive order:* is a Buy order whose price is lower than the last paid or a sell order whose price is higher than the last paid.

The thresholds percentages are the same percentages that are used as the static volatility guards in INET continuous trading and they are applied for *Aggressive* and *Passive* orders. The list of current static volatility guards can be found on Nasdaq Nordic's Market Model:
https://www.nasdaq.com/market-regulation/nordics/member-rules

Thresholds for Fat Finger Price Checks are set by Nasdaq Nordic. No customer specific parameters are allowed.

Changes to the thresholds will be communicated via IT Exchange Notices.

3.4   Maximum Order Quantity Check

Maximum Order Quantity Check provides Members with the ability to check order volume against a pre-set value for a PRM Account, e.g. if the order volume is set to be max 10 000 and an order has more than 10 000 shares, it will be rejected.

Different Maximum Order Quantity values can be set on different PRM Accounts for the same Member. Therefore, it is possible to assign different limits to different User IDs within an MPID as long as the User IDs are assigned to different PRM Accounts.

Different Maximum Order Quantity thresholds shall be specified for each currency. As an example, Members could request that for order books trading in SEK that the maximum order size should be less or equal to 100 000 shares while for order books trading in EUR the limit should be less or equal to 200 000 shares.

It is possible to configure separate Maximum Order Quantity values to be valid during any Auction phase. The Maximum Order Quantity in Auctions check is applied for orders sent during a period the order book is in auction state. Maximum Order Quantity in Auctions thresholds shall be specified for each currency. In case the PRM Account does not have a value set for Maximum Order Quantity in Auctions, the values set for general Maximum Order Quantity check applies also during auctions.

3.5 Maximum Order Value Check

Maximum Order Value Check controls the maximum order value allowed per order. Maximum value is defined as the shares of an order multiplied by the price limit of the order. Any total that is greater than the maximum value set in the configuration will result in a rejection of the order.

Different Maximum Order Values can be set on different PRM Accounts for the same Member. Therefore, it is possible to assign different limits to different User IDs within an MPID as long as the User IDs are assigned to different PRM Accounts.

When ordering the service, Members shall specify a Maximum Order Value for each currency. The value of the incoming order will be checked against the given Maximum Order Value specified for the currency the order book is traded on.

If Maximum Order Value is set to zero the validation will not be performed on orders placed on order books trading in that currency.

It is possible to configure separate Maximum Order Value check to be valid during any Auction phase. The Maximum Order Value in Auctions is applied for orders sent during a period the order book is in auction state. Maximum Order Value in Auctions thresholds shall be specified for each currency. In case the PRM Account does not have a configuration set for Maximum Order Value in Auctions, the values set for general Maximum Order Value check applies also during auctions.

Last paid price is used for calculating the order value for Market orders.

Exceptions:

- If last paid price does not exist previous day's closing price is used
- Best ask price is used for buy market orders if it's higher than the last paid price
- Best bid price is used for sell market orders if it's higher than the last paid price

PRM validations are done upon order entry, pegged orders and reserve orders are not validated following automatic price adjustments by the INET Trading System.

3.6 Daily Accumulated Values Checks

The daily cumulative checks involve monitoring a series of counters for each group of order book with the same currency.

Different Daily Accumulated Values checks can be set on different PRM Accounts for the same Member. Therefore, it is possible to assign different limits to different User IDs within an MPID as long as the User IDs are assigned to different PRM Accounts.

Limits are individually configured for each currency per PRM Account for the following gross counters:

Total Risk Value	Total traded value including all open orders in the market
Total Traded Value	Total traded value

Total Open Orders Value	Total value of all open orders in the market
Traded Buy Value	Total value bought
Traded Sell Value	Total value sold
Open Orders Buy Value	Unexecuted total value allowed for the buy orders currently in the market
Open Orders Sell Value	Unexecuted total value allowed for the sell orders currently in the market

Table 1- Counters for Accumulated Values Checks

If a limit value is set to zero the counter is turned off and the PRM does not validate orders.

Please note that counters based on open orders (i.e. Total Risk Value, Total Open Orders Value, Open Orders Buy and Sell Value) are considering also aggressive orders and IOC orders in addition to the passive orders posted in the book.

Last paid price is used calculating the order value for Market orders.

Exceptions:

- If last paid price does not exist previous day's closing price is used
- Best ask price is used for buy market orders if it's higher than the last paid price
- Best bid price is used for sell market orders if it's higher than the last paid price

PRM validations are done upon order entry, pegged orders and reserve orders are not validated following automatic price adjustments by the INET Trading System.

Breaching Accumulated Value limits and locking of PRM Account

When an Accumulated Value limit for a currency is breached, the PRM Account is locked (i.e. new orders are rejected) for all the order books traded on the affected currency.
PRM will still allow the Member to enter orders on order books traded on other currencies until their respective Accumulated Value limits are breached.

When a PRM Account is locked for a currency, even if the Member reduces its exposure below the breached limit (e.g. by cancelling some open orders), it will remain.

Members that wish to resume trading can do so via the PRM Administration Interface or can contact EMO@nasdaq.com to have the PRM Account unlocked for the affected currency.

The breached limit for the affected currency may have to be updated prior to unlocking the PRM Account.

When a PRM Account is locked for a currency, Members can still cancel existing open orders or reduce their volume. Any other order modification will be prevented.

Please note that if no action is taken when a currency limit is breached for a PRM Account, on the next trading day the PRM Account will be unlocked and order entry will be allowed for the order books traded on that currency.

Please be advised that PRM is NOT designed to cancel open orders (and thereby preventing future executions of orders already residing on the book) once a limit is surpassed. PRM will only prevent new orders from being accepted; previous orders in the matching engine before the limit was surpassed can still be executed or cancelled.

An incoming order that breaks a limit will always be accepted by the Trading System and will be the signal for the rejection of following orders on order books traded on the affected currency. For this reason, Members are advised to always set a limit for the Maximum Order Value to control by how much an Accumulated Value Check limit could be breached by an incoming breaking order.

For more information on how the Accumulated Value Checks work please refer to the

Appendix I – Examples on Daily Accumulated Values Checks

Limitations:
Members are encouraged to consider the limitations stated below when defining the limits for the value based checks:

- In the case of order entry over multiple ports at virtually the same time, the order that breaks the limit can under certain circumstances be followed by one additional single order entered over another port.

- The counters reported in Table 1 do not include manually reported trades nor trades occurred on away markets as a result of Nasdaq Nordic Order Routing service

- All the accumulated values are counted for each individual currency only and therefore there are no global cross-currency counters available.

3.7 Restricted Symbol List Check

Restricted Symbol List Checks allow users to prevent trading on certain symbols. Any orders on symbols that are on the restricted list will be rejected.

Different Restricted Symbol Lists can be set on different PRM Accounts for the same Member. Therefore, it is possible to configure different restricted lists to different User IDs within an MPID as long as the User IDs are assigned to different PRM Accounts.

3.8 Restricted Market Segment List

In addition to the list of restricted symbols, it is possible for Members to provide a list of restricted Market Segments in order to impose wider trading restrictions (e.g. prevent trading on non CCP-cleared instruments or specific instrument types).

Any order placed on a symbol belonging to a restricted Market Segment will be rejected.

3.9 FIX Drop On-Disconnect Safeguards

It is possible to configure a FIX Drop port to automatically cancel all open orders and prevent order entry for one or more PRM Accounts in case of a disconnect event is detected by the host (e.g. client application crashed, network problem and/or client logged out).

When the FIX Drop connection is re-established by the Member's FIX client, there will be no automatic resumption of order entry for the blocked PRM Account/s.
Members shall re-activate order entry by using the PRM Administration Interface.

If a FIX client never connects to a FIX Drop Port during a day, the PRM Service will never act on the related PRM Accounts and therefore, will take no action to cancel open orders or to prevent order entry.

3.10 Blow-through Protection for PRM Accounts

By enabling this protection, PRM customers would indicate whether orders originated from a given PRM Account (e.g. a sponsored client) need to be protected from the risk of unintentionally triggering Nordic Volatility Guards in the INET Nordic systems.

When the matching engine executes an aggressive order originated by the PRM Account, it would stop executing the order 1 (one) price level before the level that would trigger the Nordic Volatility Guard.

Any remaining unfilled volume of the original order would be cancelled with a specific reason code.

This protection is automatically applied on each order connected to the given PRM Account and does not trigger any block to the client order flow. The protection is applied only on the individual order that would trigger a Nordic Volatility Guard and does not affect other subsequent orders originated by the same PRM Account.

For more information on Nordic Volatility Guards, please refer to:
https://www.nasdaq.com/market-regulation/nordics/member-rules

3.11 Maximum Order/sec per Order Entry Port

By enabling this control on a FIX our OUCH order entry port, it will be possible to define a maximum order per second limit value. The limit value includes order entries, modifications and cancelations. This control is supposed to automatically intercept possible problems with an algorithm that results in abnormally high order rates and thus limit the impact on the market.
The Member shall decide the most appropriate limit value for each port based on the trading activity expected and the past history in terms of peak order rates observed.
The PRM Service will monitor the order rate for each port based on a 1 second sliding time window.

Should the limit be breached, the following actions will be taken on the affected port:
- Reject new incoming orders on the affected port

- *Optional*: cancel all open orders submitted via the affected port (port specific option)

Limitations

It is not possible to view or administrate this control via the PRM Administration Interface. Customers shall contact MAC@nasdaq.com to modify the limit.

3.12 Maximum Order/sec per Symbol

For a PRM Account, it is possible to define a maximum order/sec limit that will be monitored on each individual symbol and across all order entry ports.

This control will be active on a PRM Account (i.e. across all order entry ports that are used). The PRM Service will monitor the order rate for each symbol based on a 1 second sliding time window.

The goal with this control is to capture abnormal aggregated order/sec rates on a symbol resulting from orders submitted via a PRM Account through multiple order entry ports.

It will not be possible to set different max order/sec limit for each symbol.

Should the limit be breached, the following actions will be taken for the affected PRM Account:
- PRM Account will be locked and new orders will be rejected on all symbols
- It will still be possible to cancel open orders
- *Optional*: automatically cancel all open orders for the PRM Account on all symbols

Customers cannot unlock the PRM Account via the PRM Administration Interface, but are advised to contact EMO@nasdaq.com once the root cause of the excessive order generation has been identified and resolved.

Limitations

It is not possible to view or administrate this control via the PRM Administration Interface. Customers shall contact MAC@nasdaq.com to modify the limit.

3.13 Repeated Order Generation Control

For a PRM Account it is possible to detect situations where the same order is being generated repeatedly by the client's trading system.

This misbehavior of an algorithm may occur at low order rates and may not be captured by the other PRM order rate controls.

When activated on a PRM Account, the PRM service will have a counter for each symbol. The counter is increased each time a new order submitted by the PRM Account on a symbol is a *repeated order*.

A *repeated order* is considered an order on the same symbol, side and with the same price and quantity as the previous one.

The counter for a symbol is reset to zero as soon as a new order is placed on the symbol with a different side or price or volume.

When the counter reaches a given limit (same for all symbols, e.g. 200 repeated orders on the same symbol), the PRM Service will submit an e-mail notification (see chapter 3.16) and optionally restrict the PRM Account from trading the affected symbol by adding it to the intraday active restricted symbol list. The customer will still be able to trade on other symbols.

This control can be administrated via the PRM Administration Interface.

Trading on the restricted symbol can be reactivated via PRM Administration Interface by removing the symbol from the intraday list of restricted symbols.
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3.14 Market Order Restriction

It is possible to specify which PRM accounts are prohibited from using market orders during auctions.

This functionality applies to:

- Market price orders entered during the auction period only. This includes:
    - Client entered market price orders (whether they specify a cross type or not)
    - Market pegged orders
    - all types of auctions, i.e. including intraday auctions (scheduled, volatility guards and halt releases)
- The functionality does not apply to:
    - Order sent, re-pegged or otherwise modified by the system before the auction period
    - Market-On- or market pegged orders entered before the auction period
    - Orders with extremely aggressive prices.
    - Imbalance orders.
    - Market-on-close orders

3.15 Market Order Protection in Calls

Market Price Orders (a.k.a. Market Order) can in some situations move the Equilibrium Price (EP) and hence the auction uncross price considerably. This functionality makes is possible to validate the theoretical impact of Market Price Orders in auctions.

The validation is applicable during all auctions and can be enabled by PRM account.

The PRM Market price order validation assesses the theoretical impact on the Equilibrium Price (EP) of any type of incoming Market Price Order entered during opening and closing calls or any other call auction and rejects those Orders if they fail the validation.

Details of the Market price order validation

The validation consists of two separate checks. They both assess the theoretical impact on the EP if the order would hit the book and reject the order if the theoretical outcome exceeds pre-defined thresholds. The thresholds are based on the liquidity bands used for Auction extensions.

Market price orders are validated according to the principle:

Buy Market price orders are be validated towards the potential increase (+) of the EP.

Sell Market price orders are be validated towards the potential decrease (-) of the EP.

"EP to EP" check

This check validates an EP change compared to current EP. The check rejects the order if the EP would change more than an EPEPmodifier * Auction extension thresholds used for the opening auction.

Nasdaq Nordic global configuration:

The EPEPmodifier: 50%

Auction extension thresholds used for the opening auction

Example:

If share XYZ's opening auction extension threshold was 6% the EP to EP check would validate that the EP would not move more than 3% from previous EP (50% x 6%)

"EP to Reference price" check

This check validates the EP change compared to a Reference price.

The Reference price is constituted by the INET Reference price for the opening auction. This price is typically previous days close adjusted for CA. For the closing auction the reference price is constituted by the last sale price in continuous trading.

In event of uncrossed books; the Reference price check will be performed even though an Equilibrium Price does not exist. However there must be at least one opposite order in the book, otherwise there is nothing to value towards. In such case the market order will be accepted.

The Reference price check requires that the order book is in an auction state. If the order book is in pre-trading state there is no validation active.

The check rejects the market price order if the EP would change more than a REFmodifier * Auction extension thresholds used for the opening auction.

Nasdaq Nordic global configuration:

REFmodifier in opening: 500%

REFmodifier in closing or any other call auction: 100%

Auction extension thresholds used for the opening auction

Example:

By using the share XYZ as an example again, the EP to Reference price check would validate that the EP would not move more than 6% (100% x 6%) from last sale price in the closing auction and 30% (500% x 6%) in the opening auction.

For details on the auction extension thresholds please visit our website. Additionally, please find EP to EP check and EP to Reference Price Check thresholds in the below table[1]:

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[1] Auction Extension threshold in Opening auction is subject to change and valid thresholds are reflected in valid Nasdaq Nordic INET Market Model.

Market	Instrument group	Auction Extension threshold Opening auction	Auction EP to EP check threshold	Auction EP to Ref. Price threshold (Opening/ Other Auctions)
Nasdaq Copenhagen, Helsinki and Stockholm	OMXS30/OMXH25 / OMXC25 shares	+/-6%	+/-3%	+/-30%/6%
	Other shares and ETFs* or all Danish Investment Funds*	+/-10%	+/-5%	+/-50%/10%
	Other Equity-like Instruments or First North instruments** or liquidity group C shares or spread >= 3%	+/-20%	+/-10%	+/-100%/20%
	Penny instruments	+/- 50/80/100/200 %	+/- 25/40/50/100 %	+/- 250/400/500/1000% / +/-50/80/100/200%
	First North Tracker Certificates Non-MMO Market Segment (Stockholm only)	+/-40%	+/-20%	+/-200%/40%
Nasdaq Tallinn, Vilnius and Riga	Shares and Fund Units	+/-20%	+/-10%	+/-100%/20%
Nasdaq Iceland	OMXI8 and selected shares	+/-6%	+/-3%	+/-30%/6%
	Other shares and ETFs	+/-10/20%	+/-5/10%	+/-50/100% +/-10/20%

3.16 PRM Notifications via E-mail

The PRM Service can automatically send by e-mail alerts to a list of pre-defined recipients connected to a PRM Account in the following cases:

- if any of the Accumulated Daily counters reaches a warning threshold of 80% of the configured limit
- if any of the Order Rate counters reaches 80% of the configured limit (i.e. per port or per symbol limits)
- if any of the Accumulated Daily counters is breached
- if any of the Order rate limits is breached
- if a Repeated Order Generation condition is detected.

The administration of e-mail addresses (add/remove/update) is performed only by Nasdaq Nordic personnel. It is therefore not possible for customers to view or administrate the list of recipients via the PRM Administration Interface.

The PRM E-mail notification service is provided on a best effort basis and Nasdaq makes no guarantee to the delivery.

Examples of the subject of PRM e-mail notifications:

Nasdaq PRM: Accumulated Daily Limit BREACH for PRM account GP30PR with reason Over Daily Open Order Total Value, on currency EUR

Nasdaq PRM: Repeated order BREACH on symbol ERIC B for PRM account GP30PR

Nasdaq PRM: Accumulated Daily Limit alert for PRM account GP30PR with reason Over Daily Open Order Total Value, on currency SEK

Limitations.
It is not possible to view or administrate this service via the PRM Administration Interface. Customers shall contact MAC@nasdaq.com to modify the list of recipients.

3.17 Trading Sessions

All checks are active during all trading sessions (pre-pen, continuous trading, intra-day auction and closing auction) except for Fat Finger Price Check, which can be activated only for continuous trading.

3.18 PRM Administration Interface

Nasdaq Nordic offers a PRM Protocol for external application as a public API. This possibility enables clients to connect to the PRM service with their own applications to manage their PRM account settings.

The PRM Administration Interface includes a functionality to monitor accumulated counters for relevant PRM checks. Please find below the overview of available API functionality.

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In addition to PRM API, Nasdaq Nordic offers an in-house PRM Administration Interface in Nasdaq Member Portal. Please find more information about the in-house PRM Administration Interface in Appendix II in this document.

The PRM Administration Interface allows customers:
- To view and amend the PRM Account limits per currency for all checks except the Fat Finger Price check.
- Intraday emergency Block/unblock of order entry for a PRM Account.
- Cancellation of all open orders for a PRM Account
- Block and Cancel all open orders with a single command for a PRM account
- To identify any breached limit for the daily accumulated risk values.
- To unlock a PRM Account that has breached the limit for an accumulated value on a currency
- A visibility to identify other checks that a customer has chosen

Technical documentation:

- PRM protocol specification: INET Nordic Protocol Specifications webpage

- Connectivity Guidelines: European Market Connectivity webpage

Ports for the PRM protocol can be ordered by subscribing via the INET Nordic Port Request Form, available in Member Portal.

Limitations

Amendments to PRM controls and settings submitted via the PRM Administration Interface are only valid intraday and will be reverted back to the previous settings for the next trading day. In case client wants to amend PRM settings persistently, a form shall be submitted through Member Portal.

Please refer to the table in chapter 3.21 for the list of controls and settings that customers can administrate directly via the PRM Administration Interface.

Blocking a PRM Account via the PRM Administration Interface is an action applied only for the current trading day. If the block of a PRM Account needs to be applied persistently for several trading days, customers shall contact MAC@nasdaq.com by following the procedures described in chapter 0

3.19 FTP Site for Uploading Restricted Symbol List

Nasdaq Nordic offers PRM customers the possibility to upload a list of restricted symbols, one list per PRM Account.

Members may upload new files (in csv format) for during the trading day. The files will processed in every 5 minutes starting at CET 07:45. The file retention time is unlimited and since the file name is constant, the same file will be used until the client actively replaces or removes the existing file. The

PRM system will read any existing file and activate trading restrictions on all valid symbols listed in the file. FTP upload will always override symbol restrictions the customer has made manually via PRM Administration Interface.

Specification for the FTP upload file is available at the INET Nordic Protocol Specifications webpage.

3.20 PRM Audit Report

Nasdaq Nordic provides customers with a subscription of daily audit report where they can track their PRM activity (limit changes and breaches etc.). The files are available on an SFTP server in a csv format every day approximately 22:30 CET. The files are created each trading day of the Nasdaq Nordic markets. If there are no PRM activity during a given day the file will be empty (just the header will be appear).
Access is granted with a username and a password. The file is delivered to our external SFTP server at the following address:

 sftp://<your_username>:_<password>_@nordicftp.nasdaq.com

To access above URL, please whitelist the following IPs:
- 217.73.7.18 (Primary IP), 217.73.2.18 (Secondary IP)

To access the file, software that supports SFTP protocol is needed.

Example: To access file, use the link above and replace the username and the password.

Example of PRM Audit report

MPID	PrmAccount	Action	Item	Currency	OldValue	NewValue	Date	Time
GP29	GP29Q1	Multiplier Update	Fat Finger Multiplier Passive	N/A	100	200	2024-05-18	4:10:35.834937409
GP29	GP29PR	Order Reject	Restricted Symbol	EUR	N/A	N/A	2024-05-18	9:55:25.181317408
GP29	GP29PR	Account Change	Trigger Restrict Symbol On Repeated Order Generation	N/A	Y	N	2024-05-18	16:47:40.024364138
GP29	GP29P1	Limit Change	Open Order Buy Value	SEK	0	20	2024-05-18	17:38:36.638040926
GP29	GP29P1	Breach Lock	Over Daily Open Order Buy/Sell Value	SEK	N/A	N/A	2024-05-18	17:38:49.038829471
GP29	GP29P1	Order Reject	Over Daily Open Order Buy/Sell Value	SEK	N/A	N/A	2024-05-18	17:38:49.899882186

Limitations
The report does not include information on orders canceled or fat finger violations during continuous trading.

3.21 Summary of PRM Configurability

The table below provides a summary of the configuration granularity available via PRM Administration Interface.

Type of Check	Port	User ID	Currency	Trading Session	Via PRM Admin
Fat Finger – Price Check (continuous trading)[1]	Yes[2]	No	No	continuous trading Only	No
Max Order Quantity Check & Max Order Quantity for Auctions	No	Yes	Yes	All	Yes
Max Order Value Check & Max Order Value for Auctions	No	Yes	Yes	All	Yes
Daily Accumulated Values Check	No	Yes	Yes	All	Yes
Restricted Symbol List Check	No	Yes	N/A	All	No
Restricted Market Segments	No	Yes	N/A	All	No
FIX/OUCH Drop disconnect	Yes	Yes	N/A	All	No
Blow-through protection	No	Yes	N/A	continuous trading Only	Yes
Max orders/sec per port	Yes	No	N/A	All	No
Max orders/sec per Symbol	No	Yes	N/A	All	No
Repeated Order Generation	No	Yes	N/A	All	Yes
E-mail Notifications	N/A	Yes	N/A	All	No
FTP site for symbol list	N/A	Yes	N/A	N/A	No
Fat Finger Price Check (auctions)	No	Yes	N/A	auctions only	Yes
Market Order Restriction	No	Yes	N/A	auctions only	Yes
Audit Report	No	No	All	All	No
Market Order Protection in Calls	No	Yes	N/A	auctions only	Yes

(1) Fat Finger Price Check limits are set globally by Nasdaq.
(2) On individual OUCH or Native FIX ports
(3) Can only be enabled/disabled per MPID. It is not possible to set MPIDs specific limit

3.22 Pricing

Pricing is according to the Nasdaq Nordic Technical Service Price list available at the European Market Connectivity webpage.

The ports for PRM Administration Interface will be provided free of charge users engaged exclusively in risk management and compliance.

4 Nasdaq Nordic PRM Application and Go-live Process

Step One: **Determine your PRM Requirements**

☐   Determine which checks and services you want to enable

☐   Determine on which User ID and/or MPIDs they should be enabled (i.e. define the PRM Accounts)

☐   For Fat Finger Price Checks, determine which configuration option should be enabled (e.g. individual OUCH port, all FIX ports).

☐   Define the limits per currency (except for Fat Finger Price check)

Step Two: **Order PRM service**

☐   Fill out the PRM Request Forms and submit via Nasdaq Member Portal.

Customers shall submit separate PRM Request Forms for production and for the test environment (NTF).

☐   Order optional PRM ports for the PRM protocol via the INET Nordic Port Request Form.

Step Three: **Test in NTF the PRM functionality**

☐   Contact Nasdaq cash equity operations team at EMO@nasdaq.com to plan your PRM acceptance tests on the configuration you have ordered

☐   Execute the PRM acceptance test with the support from our technical support team

☐   Submit the PRM Service Customer Acceptance Statement Form via Member Portal.

☐   Any updates to the original PRM configuration (checks and limits) shall be requested via the Pre-Trade Risk (PRM) Request Form in Member Portal.

Step Four: **Confirmation of PRM Production setup**

☐   Receive notification from Nasdaq Member & Account Configuration team (MAC@nasdaq.com) that your PRM configuration has been enabled in production.

5 PRM Support and Configuration management

For technical support please contact: EMO@nasdaq.com or call +46 8 405 6410.

Members are required to use the PRM Administration Interface to update the PRM limits intraday, to unblock PRM Accounts and for emergency actions (block/unblock or mass cancel orders for a PRM Account).

For updates to the PRM limits that cannot be handled via the PRM Administration Interface (see table 3.21), customers are required to follow the procedures below.

In the event that the PRM Administration Interface is not available, Members that need to perform PRM emergency actions or urgent configuration changes can contact EMO@nasdaq.com by following the procedure below.

For changes to the PRM service, please provide a written request by email to: MAC@nasdaq.com.

The written change request shall consist of a PRM Request Form properly filled out in all its parts. The Member is fully responsible for ensuring that all the mandatory information is accurate and in accordance with Nasdaq specifications.

Intraday change requests shall clearly indicate whether the change is to be considered valid only for the current day or shall continue to be valid for the coming trading days. If the intraday change only concerns the current day, the previous limits will be re-applied on the following trading days.

When changes to the PRM parameters are to be implemented, the Member shall consider the request complete once:
- ***(i)   In the EMO@nasdaq.com view a properly filled written request is received from the Member, and***
- ***(ii) The Member has placed a follow up call to the Exchange Services at Nasdaq Nordic at +46 8 405 6410 and got a confirmation that the request has been received***

Provided that (i) and (ii) have been followed by the Member and Nasdaq, the Member shall be entitled to assume that the change request will be implemented within no later than (30) thirty minutes and any resulting failure by Nasdaq to action Member's instructions shall constitute a failure on Nasdaq part to reach the normal care standards under rule 3.8.1 (as amended, updated or replaced from time to time) of the NMR. In case of liability for Nasdaq it shall be limited to 100 000 Euro in relation to the PRM service provided to the Member.

Emergency action to block/unblock or mass cancel orders for a PRM Account

Members are required to use the PRM Administration Interface to perform emergency actions such as block/unblock or mass cancel orders for a PRM Account.

In the event that the PRM Administration Interface is not available, Members can place a call to the Exchange Services at Nasdaq Nordic at +46 8 405 6410 and after proper identification, provide clear

indication of: the action requested, the relevant PRM Accounts/s and whether the action, if applicable, is to be considered valid only for the current day or shall persist for the coming trading days.
The Member will get a confirmation about the request being implemented while being on the line.

PRM Change Request for Sponsored Access

Members utilizing PRM as their sole pre-trade validation system for sponsored clients must have the following checks activated at all times: *Fat Finger Price Check, Accumulated Value Checks, Maximum Orders per second (per port or per symbol), Maximum Order Quantity or Maximum Order Value*.

For the avoidance of doubt, The Member and Account Configuration team at Nasdaq will not accept PRM change requests that would disable any of aforesaid validations for a PRM Account active on sponsored clients order flows.

5.1 Service Hours for Change Requests

Exchange Services will process PRM change requests during the following time intervals:

	Start	**End**
Normal Trading Days	8:30 am CET	17:30 CET
Half Trading Days	8:30 am CET	13:00 CET

Updates to the service hours for change request will be communicated via IT Exchange Notices.

Contact details for technical questions and intraday changes:

Cash Equity Operations:
Email: EMO@nasdaq.com
Tel. +46 8 405 6410

Contact details for PRM requests and persistent changes:

Member & Account Configuration:
Email: mac@nasdaq.com

Appendix I – Examples on Daily Accumulated Values Checks

Base scenario#1: For the order books trading in SEK the Total Traded Value limit is 100 000 SEK, Total Open Orders Value limit is 100 000 SEK, Total Risk Value limit is 100 000 SEK.
50 000 SEK have been executed and there are 40 000 SEK in open orders value.

Example 1) – incoming 10 000 SEK order.

Result: the order is accepted but new orders will be rejected (reached Total Risk Value limit of 100 000 SEK) on SEK order books. The Member still has an exposure of 50 000 SEK in open orders in the market and has traded for 50 000 SEK.

Example 2) – incoming 20 000 SEK order.

Result: the order is accepted but any following order will be rejected (exceeded Total Risk Value limit) on SEK order books. The Member still has an exposure of 60 000 SEK in open orders in the market. The total risk for the Member is 110 000 SEK (50 000 SEK traded value and 60 000 SEK in open orders).

Example 3) – Out of 40 000 SEK in open orders value, 30 000 SEK is executed. Now the Total Traded Value is 80 000 SEK and 10 000 SEK is in open orders value.
Incoming 20 000 SEK order.

Result: the order is accepted but any following order on SEK order books will be rejected (exceeded Total Risk Value limit).

Base scenario#2: For the order books trading in SEK the Total Open Orders Value limit is 1 000 000 SEK. No orders are in the market and no trades had been done on SEK order books.

The user enters a Bid order 300 000 SEK followed by an aggressive IOC Bid order   for 800 000 SEK. The aggressive IOC order is executed immediately.
The PRM Account of the user is now locked because for a short time the User had breached its Total Open Orders Value limit when it submitted its aggressive order.

Appendix II – Pre-Trade Risk Management (PRM) Administration Interface user guide

Revision History

Revision	Published	Author(s)	Summary of Changes
1.0	16 APR 2025		Initial version.

1. General

Nasdaq Nordic Pre-Trade Risk Management (PRM) service provides Members with the ability to facilitate pre-trade protection. Using PRM, Members can set various constraints on orders and control their trading activity and the trading activity of their clients, including prevention of potentially erroneous transactions. PRM Customers are provided with a PRM Administration Interface accessible via the Nasdaq Member Portal.

The interface allows PRM customers to:

- View the PRM Account limits per currency for all PRM checks except the Fat Finger Price check.
- Amend the PRM Account limits
- View the actual values for the daily accumulated counters.
- Intraday only emergency block/unblock of order entry for a PRM Account.
- Cancellation of all open orders for a PRM Account.
- Unlock a PRM Account that has breached the limit for an accumulated value on a currency.

The current version of PRM Administration Interface supports updates to the PRM configuration intraday only. Persistent overnight changes shall be requested by sending an order form via Member Portal.

Viewing and managing the list of restricted Market Segments and restricted Symbols is not supported by the current version of the PRM Administration Interface.

Before using the PRM Administration Interface, users are advised to read this PRM Service Guide document also available at:
https://www.nasdaq.com/solutions/pre-trade-risk-management

The PRM Pre-Trade Risk Management Administration Interface is an optional module available only to Members subscribing to the PRM service.

To request access to the PRM Administration Interface in Nasdaq Member Portal, submit request form https://memberportal.nasdaq.com/client/requests/new/PrmAccount-new or contact Member & Account configuration team at MAC@nasdaq.com

2. PRM Administration Interface

PRM Administration Interface is available in Nasdaq Member Portal, under "My Firm" in the main menu. The PRM Administration Interface page consists of following sections:

1. PRM Environment and Accounts
2. Account details and emergency block
3. Currencies and Risk limits
4. Settings
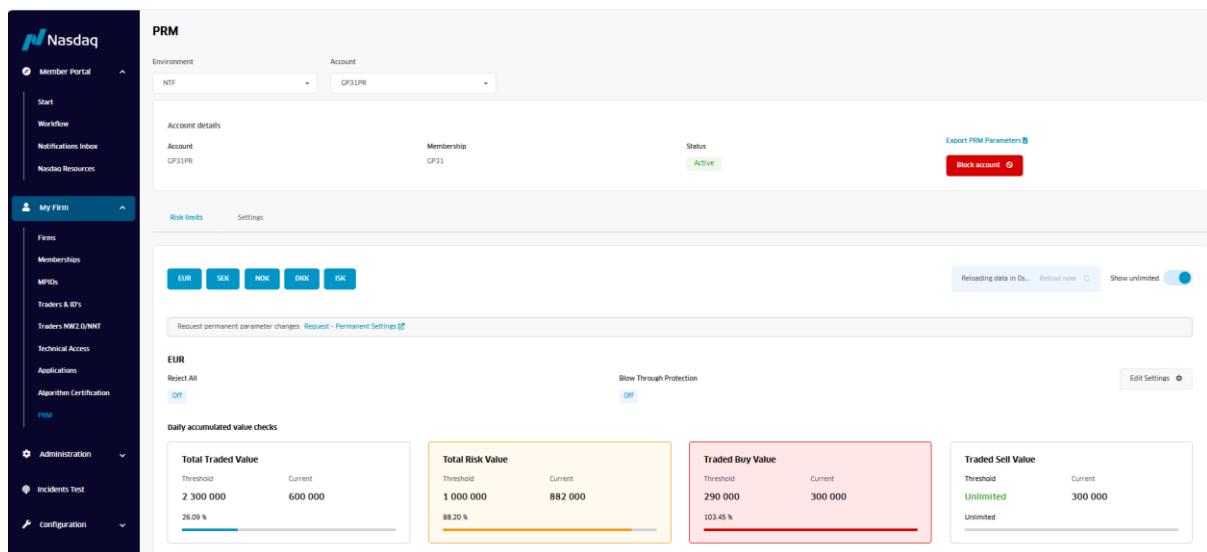
2.1 PRM Environment and Accounts

"Environment" lets select Test or Production (if applicable) environment.
"Account" lets select applicable accounts (if more than one is available).

General Communication: This content contains non-sensitive information

2.2 Account details and Emergency Block

Account details are shown along with current Account Status ("Active", "Blocked" or "Blocked and canceled"). "Export PRM Parameters" gives extract of existing PRM account(s) persistent configuration and configured limits.

NOTE: limits applied during the trading day may differ from persistently configured limits

Block Account

Block account button will open a confirmation window, where the user is prompted to select a type of block with two alternatives

1. Block account and cancel open orders
2. Block account (open orders will not be canceled)

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Block account

Are you sure you want to block account?

Choose Block account or Block account and Cancel Orders.

| Close | Yes, Block account and cancel orders | Yes, Block account |

Once the PRM account is blocked, the status will change to "Blocked and Cancelled" or "Blocked", depending on which type of account block is chosen.

Account details

Account	Membership	Status	
GP31P8	GP31	Blocked and cancelled	Export PRM Parameters
			prm.account.details.request-link
			Unblock account ▸

Unblock Account

When a PRM account is blocked, "Unblock account" appears to the "Account details section".

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Account details

Account	Membership	Status
GP31P8	GP31	Blocked

Export PRM Parameters

prm.account.details.request-link

Unblock account ▶

Cancel orders ⊘

Confirmation window appears once confirmation is sent by pushing the "Yes, Unblock account" button.

Unblock account ✕

Are you sure you want to unblock account?

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vestibulum id ligula porta felis euismod semper.

Close   **Yes, Unblock account** ▶

2.3 Currencies and Risk Limits

This section allows setting Risk limits for specific trading currencies (configured in respective PRM account).

NOTE: view details are updated automatically every 15 seconds, and user can update them manually by clicking the reload button anytime.

Reload now ↻

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View of Currencies can be enabled/disabled by clicking on currency
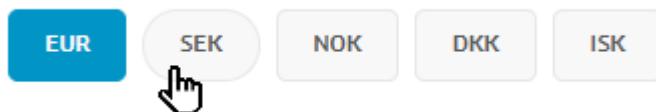
Selected currencies with configured risk values are then shown.
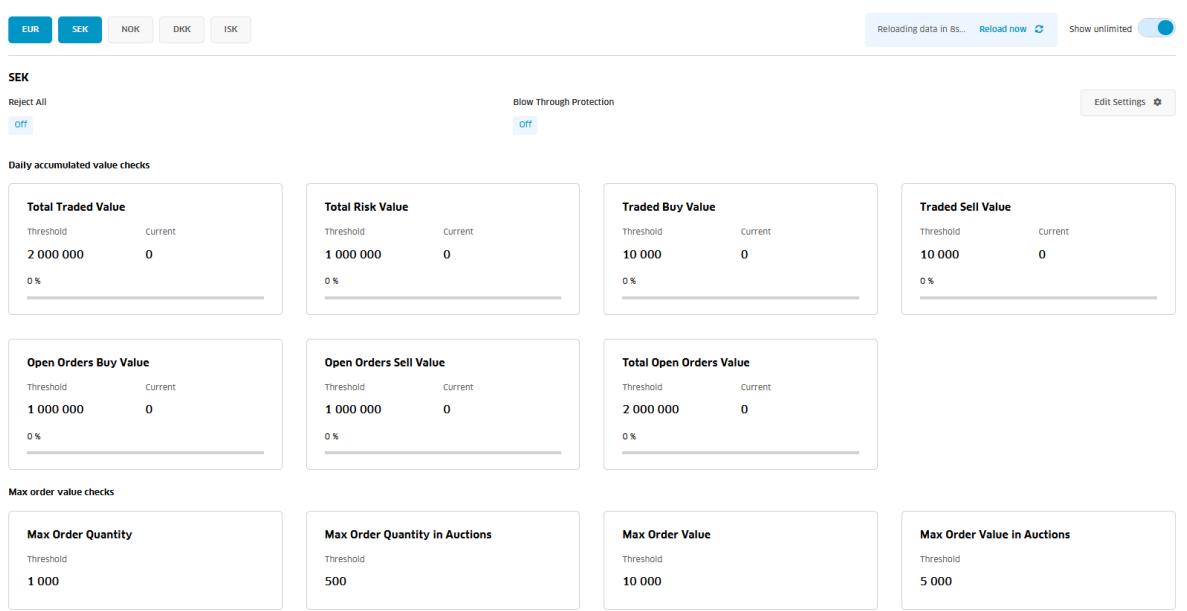
NOTE: Member may choose to hide the risk checks that have no values set by disabling the "show unlimited" setting.

Daily accumulated value checks change color depending on the level of threshold reached:

Limit not utilized shown in grey	Limits below 80% show in blue/white	Limits from 80-99% show in yellow	Limits breached shown in red
Total Traded Value Threshold 555 555 Current 0 0 %	**Total Risk Value** Threshold 70 000 Current 48 900 69.86 %	**Total Traded Value** Threshold 32 200 Current 32 100 99.69 %	**Traded Buy Value** Threshold 10 000 Current 16 100 161.00 %

To update setting, click on desired option/value, and adjust the setting (or disable/enable Limit), then Save new option:

Manage threshold for Traded Buy Value   ✕

Limit threshold

Enter new threshold value

1000000

Close   **Save**
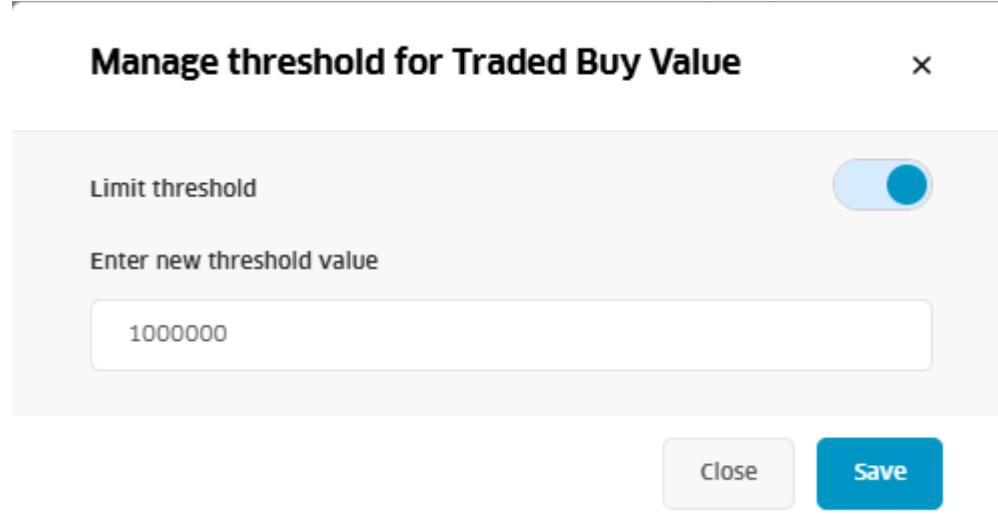
The new option/value will be applied immediately after confirmation:

Manage threshold for Traded Buy Value   ✕

Are you sure you want to change the threshold?
Old value: 1000000, New value: 88888

Close   **Yes, I am sure**
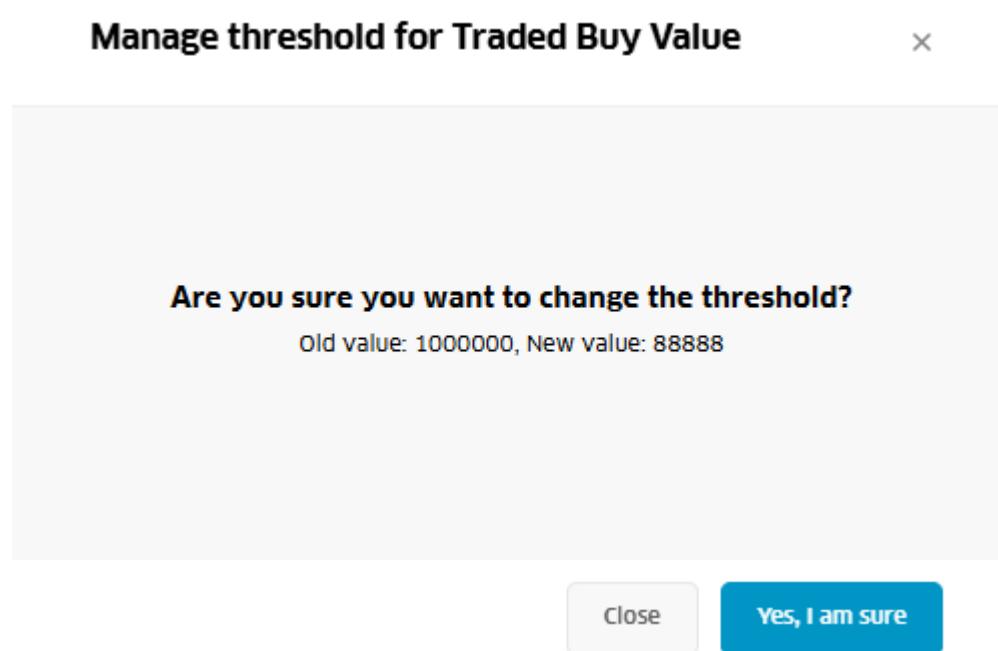
NOTE: view details are updated automatically every 15 seconds and can be updated manually by clicking "Reload Now" button anytime.

Reload now ⟳

2.4 Settings

Settings section allows the member to change PRM account settings:

Risk limits	Settings

Settings

Order settings

Repeated Order Generation	11

Protection Settings

Trigger Restrict Symbol On Repeated Order Generation	true
In Auction Market Order Protection	true
In Auction Market Order Prevention	true
In Auction Fat Finger Protection	true

Edit ✎

Order settings

Repeated Order Generation - Maximum number of orders per second before restricting symbol from trading for PRM account.

Refer to *Nasdaq Nordic PRM Service Guide, section 3.13 Repeated Order Generation Control* for more information on functionality

Protection Settings

Trigger Restrict Symbol On Repeated Order Generation – True/False
Refer to *Nasdaq Nordic PRM Service Guide, section 3.14 Market Order Restriction* for more information on functionality

In Auction Market Order Protection – True/False
Refer to Nasdaq Nordic PRM Service Guide, section 3.13 Repeated Order Generation Control for more information on functionality

In Auction Market Order Prevention – True/False
Refer to Nasdaq Nordic PRM Service Guide, section 3.15 Market Order Protection in Calls for more information on functionality

In Auction Fat Finger Protection – True/False
Refer to Nasdaq Nordic PRM Service Guide, section 3.3 Fat Finger Price Check (auctions) for more information on functionality