

BTS[®]

Quick Reference Guide Turquoise

Manual

July 2016

Version 1.3



London
Stock Exchange Group

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1 Revision History

Date	Version	Description	Author
15 th October 2014	1.0	First release	Borsa Italiana
12 th May 2015	1.1	Second release	Borsa Italiana
28 th April 2016	1.2	Minor updates and replace of BTS with BTS [®] registered trademark	Borsa Italiana
5 th July 2016	1.3	Screenshot replacement due to Order Type field introduction	Borsa Italiana

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2 Introduction

BTS[®] is a multi market client application that works as a trading and information front-end for equities and derivatives markets.

Both broker and market maker functionality is supported, as well as additional functions to help activity control, supervision and post trading activities.

Algorithmic trading capabilities are also provided to enforce sophisticated trading and quoting strategies.

The following markets are currently supported:

- Borsa Italiana Cash Markets
- Borsa Italiana Derivatives Markets
- London Stock Exchange Cash Markets
- London Stock Exchange Derivatives Market
- Oslo Børs Derivatives Market
- EuroTLX
- Turquoise

2.1 Scope

This document provides basic information to use BTS[®] specifically in respect to Turquoise MTF. General information about BTS[®] functionality can be found in [BTS Reference guide](#).

Further information about specific functions (e.g. authorization) can be found in dedicated manuals available on the BTS[®] page (<http://www.borsaitaliana.it/borsaitaliana/gestione-mercati/bts-bittradingstation/bts.en.htm>).

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2.2 References

- [BTS Reference guide](#)
- [Authorization Service Guide](#)
- [BTS Strategy Service for IDEM](#)

3 Turquoise

Turquoise operates a Multilateral Trading Facility (MTF) with a discrete trading platform for cash equities. Members of Turquoise can access the equity platform providing they have the appropriate post-trade arrangements in place.

The Turquoise Equity platform offers the secondary trading of Pan-European and US equities, Exchange Traded Funds, Global Depositary Receipts, American Depositary Receipts, Exchange Traded Currency funds and Exchange Traded Commodity funds. Turquoise Equities comprises of the Turquoise Integrated Order Book and Turquoise Dark Midpoint Order Book, each covering some 4,200 securities (including 175 liquid US equities, ETFs, GDRs and ADRs) over 19 countries, including all major European markets, Czech, Hungary and the United States. Turquoise supports member-choice of central clearer under an interoperable CCP model.

Turquoise also supports unique features which differentiate it from other similar markets, such as **Turquoise Uncross™**.

Turquoise also operates as an investment firm which is used for the provision of **Turquoise Block Discovery™**.

In the following a high level summary is provided as a short reference for a better understanding of Turquoise functionality in the current BTS® implementation.

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Disclaimer: The content of this chapter is provided for information purposes only. In case of discrepancies with official Turquoise documentation provided in <http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>, the official source provided by Turquoise via their website should be used and can be accessed for reference in the link provided.

3.1 Turquoise Order Books

Turquoise operates two discrete Order Books:

- The **Integrated Order Book** – which is transparent on a pre-trade and post-trade basis
- The Turquoise **Dark Midpoint Order Book** – which is transparent on a post-trade basis only

Most of the securities are available for trading in both books, however some are available only in the Integrated Order Book.

The **Integrated Order Book**:

- supports continuous trading and executes persistent Orders on a Price, Display type, Time priority basis;
- is transparent pre-trade and post-trade, and a full depth-of-book feed including all displayed persistent orders and all trades are published to Participants and market data vendors.
- supports persistent Order types are Limit Orders (displayed), Iceberg Orders (partly displayed), LIS Hidden Orders (non-displayed). Supported non-persistent Order types, all of which are non-displayed, are IOC/FAK Orders, FOK Orders and Market Orders.

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Minimum Accepted Quantity (MAQ) is supported on non-persistent Order types only.

The **Dark Midpoint Order Book** is a 'Dark' Price-referencing Order Book:

- All trades take place at a Security's Primary-market Midpoint Price (PMP). When a well-formed PMP is not available, no matching occurs (e.g. because a Security is in an auction phase on its Primary market);
- It executes persistent Orders on a Size, Time priority basis, and offers both Continuous and **Turquoise Uncross™** trading (see picture below) which helps achieve larger fill sizes.

It is transparent post-trade but not pre-trade, and hence only trades are published. All Orders are non-displayed.

The Dark Midpoint Order Book operates with two matching modes:

- Continuous – allowing the submission and matching of both persistent and non-persistent Order types
- **Turquoise Uncross™** – allowing the submission and matching of persistent Order types only during **Turquoise Uncross™** events, which occur repeatedly intraday

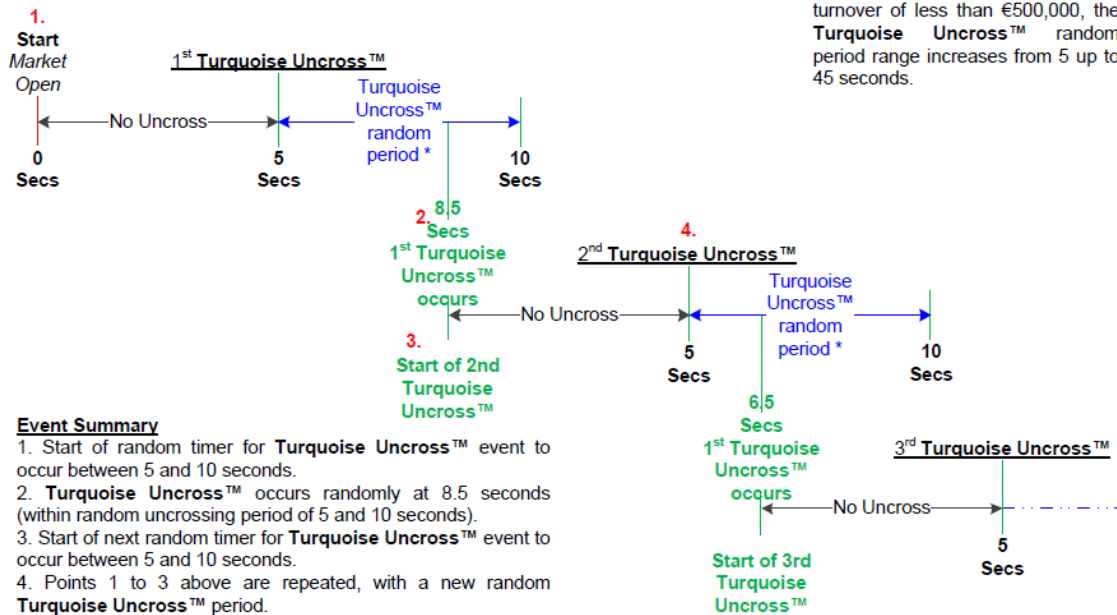
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Turquoise Uncross™ – Liquid Stock Example

Example: **Turquoise Uncross™** occurs randomly every 5-10 seconds for Sanofi (SANp)

* Note: For less liquid securities which have an average daily turnover of less than €500,000, the **Turquoise Uncross™** random period range increases from 5 up to 45 seconds.



Event Summary

1. Start of random timer for **Turquoise Uncross™** event to occur between 5 and 10 seconds.
2. **Turquoise Uncross™** occurs randomly at 8.5 seconds (within random uncrossing period of 5 and 10 seconds).
3. Start of next random timer for **Turquoise Uncross™** event to occur between 5 and 10 seconds.
4. Points 1 to 3 above are repeated, with a new random **Turquoise Uncross™** period.

Persistent Orders can be designated to trade in one or both of Continuous trading and **Turquoise Uncross™**, and by default will be eligible for both.

Orders designated for **Turquoise Uncross™** only will not interact with non-persistent Orders. This provides Participants with discretion over whether to interact with immediacy demanding flow, or to constrain interaction to patient flow. Non-persistent Orders are only accepted for Continuous trading.

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3.2 Turquoise Block Discovery™

3.2.1 Introduction to Turquoise Block Discovery™

Turquoise Block Discovery™ facilitates the trading of larger “Parent” or “Block” Orders by seeking and identifying block matching opportunities, between **Block Indications (BI)** (with a quantity above or equal to the **Minimum Indication Size (MIS)** threshold) and **Block Discovery Notification (BDN)**. Where matches are identified, Participants are required to convert their BIs by submitting firm **Qualifying Block Orders (QBO)** to the MTF, designated as eligible for existing **Turquoise Uncross™** events that already exist as part of the MTF Dark Midpoint Order Book to trade at the Midpoint of the **Primary Best Bid and Offer (PBBO)**.

The conversion of BIs into firm QBOs is monitored by a system of “**Reputational Scoring**” and surveillance which will immediately exclude Participants who do not meet the **Reputational Score Threshold**. Participants that do not meet the Reputational Score Threshold but want to be re-included must contact Turquoise Client Support and meet set criteria.

As **Turquoise Block Discovery™** matches are consummated in the MTF, Participants using the **Turquoise Uncross™** feature of Turquoise Dark Midpoint Order Book, but not electing to participate in **Turquoise Block Discovery™**, may nonetheless benefit from additional liquidity contributed by those who do participate in **Turquoise Block Discovery™**.

To access **Turquoise Block Discovery™**, individual BIs/BDNs must be submitted with explicit instructions to participate.

It is possible for a customer to access both the existing Turquoise Dark Midpoint Order Book and **Turquoise Block Discovery™** for a single Order, but this is not be the default behaviour. For Orders sent to Turquoise Dark Midpoint Order Book that are not explicitly flagged for

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participation in **Turquoise Block Discovery™**, the characteristics of the current Turquoise Dark Midpoint Order Book (including matching logic, priority, etc.) do not change.

3.3 Event Model

Turquoise Block Discovery™ follows the following event flow:

1. Participant's submission of BIs and BDNs¹.
2. Ahead of a **Turquoise Uncross™** in the MTF, matching of BIs and BDNs to identify possible block trading opportunities.
3. Where potential matches are identified, request Participants to submit firm QBOs to Turquoise MTF via Order Submission Requests (OSR).
4. Short window for Participant's submission of firm QBOs to the Turquoise MTF.
5. Matching of orders by Turquoise MTF in the **Turquoise Uncross™**.
6. Composite Reputational score is updated with Event Reputational Score.

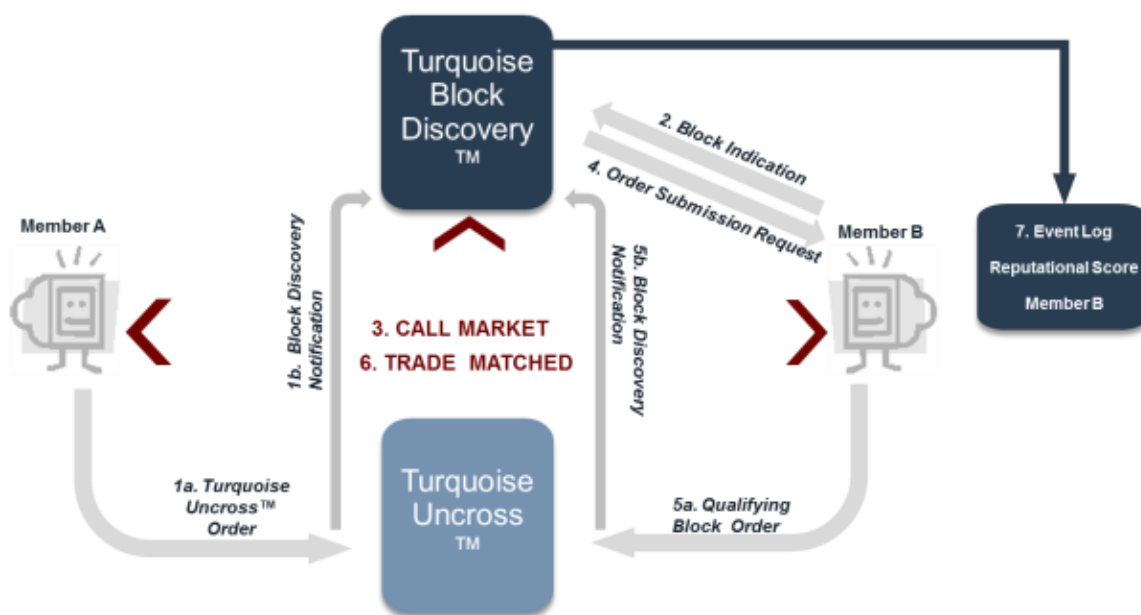
In the following a short description about the steps to be followed is provided, along with a reference to BTS® input elements; a more detailed description about BTS® usage is given later on in the next main chapters.

¹ A BDN is an order sub type and corresponds to a live order submitted to the dark book and is eligible for participation in **Turquoise Block Discovery™**.

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1 – **Order+BDN/BI submission:** Orders/BIs are entered into BTS® via Order Entry/new BI window. Order entry window allows users to send an order + BDN (regular order + BDN sub type, see picture on left side '1a' and '1b'), whilst the new BI window allows users to send a BI (see picture on right side '2'). No BDN or BI information is sent to any other Participant.

2 – **BI/BDN matching ahead of a Turquoise Uncross™ event:** On receipt of a Call Market, **Turquoise Block Discovery™** identifies potential matches where the Minimum Execution Size of the Participant's BI has been met.

The counterparty matching opportunity could either be a BDN (corresponding to a firm order already in the MTF), or a BI subject to immediate firming-up upon demand.

3 – **OSR issued to matching BI owners:** If a potential match is identified involving a BI, the Participant is sent an OSR requesting they firm up (submit) their QBO to Turquoise MTF.

If the counterparty matching opportunity is also a BI, then the counterparty will also receive an

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OSR and their matched BI will be expired automatically.

No details regarding nature of counterparty order+BDN/BI is provided, no information is sent to any other Participant. OSRs messages are received and managed automatically by BTS[®] servers.

4 – **QBO submission to Turquoise MTF:** OSR recipients have up to 450ms (being the Order Submission Interval 500ms (+/- 1ms), less a 50ms delay) to submit a firm QBO to the MTF: BTS[®] handles this phase transparently and automatically for the user.

5 – **Orders matching:** When the **Turquoise Uncross[™]** takes place executions are confirmed, and un-matched residuals of Orders submitted for the single **Turquoise Uncross[™]** only are expired. Participants receive execution reports which can be seen in BTS[®] Trading Manager window.

6 - **Composite Reputational Scores update:** Composite Reputational Scores are updated for each Participant receiving an OSR. Participants are advised of their Composite Reputational Score on the next OSR that they receive, BTS[®] reports the Score in the Trading Manager window.

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4 MARKET INFORMATION AND TRADING

4.1 Price Info

The screenshot shows the 'Price Info' window with the following sections:

- Instrument Selector:** A dropdown menu set to 'Turquoise' and a search field.
- Market Data Table:** A table with columns: Seg., Curr, ISIN, Instr, Phase, BSize, Bid, Ask, ASize, LastTrdPrc, LastTrdSize, LastTrdTime, High, Low, CumSize, NumTrades. A 'Price Info' label is overlaid on the table.
- Price Depth:** A table showing bid and ask orders with columns: BNO, BSize, Bid, Ask, ASize, Qty.
- Order Depth:** A table showing bid and ask orders with columns: BSize, Bid, Ask, ASize, Qty.
- Ticker:** A table showing trade details with columns: Filter Off, TOTAL TRADES, VISIBLE TRADES, Instr, Prc, Size, Time, Amount, Type.
- Orders Entry:** A form with fields for Instrument (TSCOL [Turquoise]), Size (5,000), Prc (360.8 @ 0.0001), Order Type, Validity, Capacity, Auto CO, and Customer. A large 'Enter Order' button is at the bottom.

The **Price Info** window displays real-time market data for a set of financial instruments selected by the user and allows order entry as well. The **Price Info** window can be opened by selecting the corresponding command in the Market Information menu. The window is made up by six four sections/areas: **Instrument Selector**, the **Watcher** panes, two **Market** (Prices and Orders) **Depth** panes, the embedded **Ticker**, and the **Orders Entry** pane.

Detailed information about the Price Info window can be found in the [BTS Reference guide](#).

In the following specific information relevant to Turquoise market is provided.

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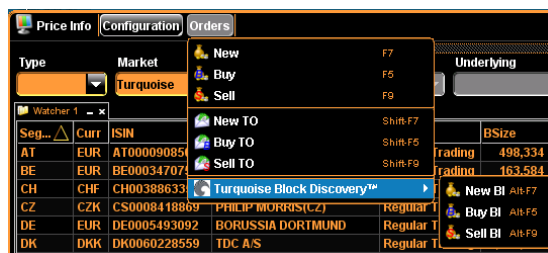
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4.2 Order entry and Block Indication (BI) submission

It is possible to use pre-defined keys for quickly activating the Order Entry window as a separate window. Specifically, the available shortcuts for Turquoise instruments are the following:

Action	Shortcuts
Buy Order	F5
Sell Order	F9
New (Buy and Sell)	F7
New Trigger Order	Shift F7
Buy Trigger Order	Shift F5
Sell Trigger Order	Shift F9
Turquoise Block Discovery™ - New BI	Alt F7
Turquoise Block Discovery™ - Buy BI	Alt F5
Turquoise Block Discovery™ - Sell BI	Alt F9

The Order Entry window can be also activated from the pop-up displayed when selecting the 'Orders' button (see side picture).



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Upon selection a window appears where it is possible to enter Order Data and trigger an order event:

Some fields are related specifically to Turquoise orders, in the following some information is provided to enable the user to relate the field as displayed in the Order Entry window with the Turquoise Trading Service Description documentation.

For more detailed information please refer to Turquoise documentation :

<http://www.lseg.com/markets-products-and-services/our-markets/turquoise/information-centre/document-library>

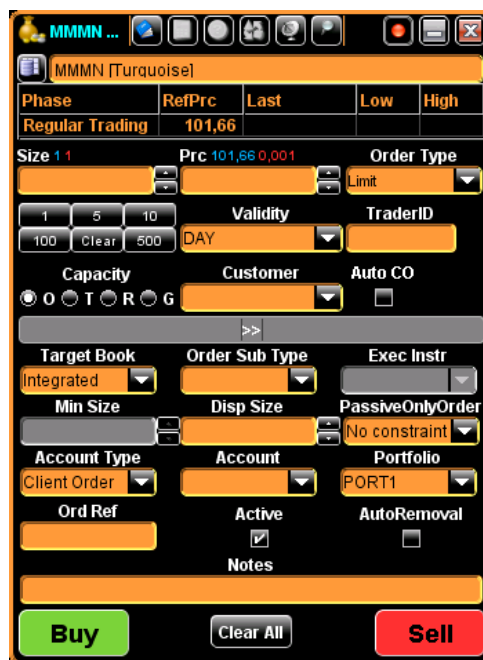
- **Target Book:** each instrument is represented on two distinct books, and in addition Dark Lit Sweep routing instruction:

- **Integrated**
- **Dark Midpoint**
- **Dark Lit Sweep**

- **Exec Instruction:** (Dark Midpoint only) states the trading phase(s) the order will participate, by default this field is blank that is accepted as **Continuous + Turquoise Uncross™** by the Market:

- **Continuous only:** Orders submitted will be open to immediate execution against contra persistent Orders during Continuous Trading;

- **Turquoise Uncross™ only:** Can be selected by Participants on Order entry whereby its Order will only be open to matching against contra-side Orders resting in the Dark Midpoint Order Book during the randomised **Turquoise Uncross™** events.



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Turquoise Uncross™ only can also be used by Participants on BI (or BDN) entry whereby its BI (or BDN) will only be open to matching against resting contra-side BIs/BDNs in **Turquoise Block Discovery™** events.

- **Continuous + Turquoise Uncross™**: Orders submitted will be open to immediate execution against contra persistent orders during Continuous Trading and any unexecuted volume, and will rest on the book, open to Continuous matching and to matching occurring during the randomised **Turquoise Uncross™** events.
- **Turquoise Uncross™ + Continuous**: Orders will not participate during Continuous trading and will wait to take part in the next **Turquoise Uncross™**. Any remainder will be expired after the **Turquoise Uncross™**.

The Execution Instruction attribute is only applicable to Day, GTC, GTT and GTD Orders (Validity field).

- **Order Sub Type**: two different "Types of Order" can be specified, by default this field is blank and not considered:
 - **Order + BDN** (Dark Midpoint book only): A normal order and a BDN are simultaneously generated;
 - **Random Peak Size** (Integrated Book only): for Iceberg Orders the reload size is random, being its peak value given in the Disp Size field.
- **Passive Only Order**: orders will be accepted only if specific conditions are met, otherwise they are cancelled:
 - **No constraint (provided as default value)**;
 - **No match with visible contra order**;
 - **Setting/joining BBO**;
 - **Setting new visible BBO**;
 - **Within 1 visible price-point**;

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- **Within 2 visible price-points.**
- **Min Size** (Minimum Acceptable Quantity (MAQ) Lit Book and Minimum Execution Size (MES) Dark Midpoint): The Order’s MAQ or MES that is to be matched as a minimum during Continuous Trading or matched during **Turquoise Uncross™** events.
- **Disp Size** (Integrated Book only): for Iceberg orders it states the size to be displayed on the book.
- **Validity:**
 - **GFA - Good for Auction** (Dark Midpoint only): GFA Orders only take part in the **Turquoise Uncross™**. They are expired either after attempting to match during the **Turquoise Uncross™** it is scheduled to participate in or at the time of the scheduled **Turquoise Uncross™** if the **Turquoise Uncross™** fails to happen due to a WFMC failure for example;
 - **GTT - Good Till Time:** An Order with an Expiry Time which will rest passively until executed or until the expiry time (or end of trading day) has been reached;
 - **GTD - Good Till Date + Expiry Time:** A GTD Order with Expiry Time will be treated as a Day Order, expiring at the time specified that day or the close of the normal trading day on the day on which it was entered;
 - **Day:** A Day Order is valid until close of the normal trading day on the day on which it was entered (Default value).

The 'New BI' order entry window is slightly different, due to the different parameters required to characterize **Turquoise Block Discovery™** Block Orders.

In this window User can enter the details of BI and QBO.



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QBO details will be stored by BTS[®] server and automatically sent in response to an Order Submission Request (OSR) received from **Turquoise Block Discovery™** (converting the BI into a firm QBO).

- **BI Details :**
 - **BI Size** : Size specified for BI;
 - **BI Prc** : Price specified for BI;
 - **BI MinSize** : MAQ specified for BI.

- **QBO Details :**
 - **QBO Size** : Size specified for QBO;
 - **QBO Prc** : Price specified for QBO ;
 - **QBO MinSize** : MAQ specified for QBO.

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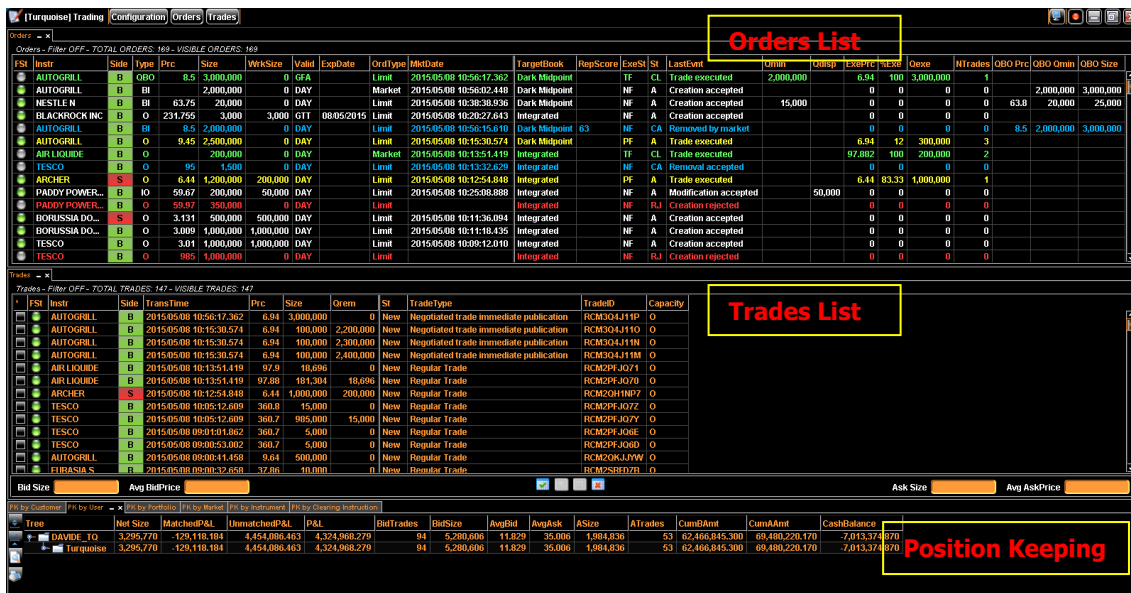
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5 TRADING MANAGER WINDOW

The **Trading Manager** window allows to perform all trading operations. It shows orders and trades for a single market, which can be selected via the **Markets** option in the **Configuration** menu. Several **Trading Manager** windows can be opened for one or more markets.

Depending on the functionality level set for the group the user belongs to the **Trading Manager** window displays only the orders and trades related to the user (functionality level: operator) or all the orders and trades of all users belonging to the same member (functionality level: member).

The **Trading Manager** is made out of three sections: **Orders** (upper), **Trades** (middle) and **Position Keeping** (lower).



Detailed information about the Trading Manager window can be found in the [BTS Reference guide](#).

Specific Turquoise information has been added, which is reflected into newly introduced columns, the Column Naming reflects the field name in the Order Entry window, in addition information taken from market answers is reported.

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