



# US Equity Trade Only Minute Bar Adjusted Guide

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**algoseek | the market data company**

We provide research market data for machine learning and quantitative trading



## CONTACT US

We are here to help you do great things with our market and reference data. For questions, feedback, and other concerns, you may reach our team of experts through the following contact information:

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## INTRODUCTION

algoseek Trade Only Adjusted Minute Bar data is built from trades for all listed stocks, ETNs, ETFs, ADRs, and funds from 16+ US exchanges and marketplaces. This dataset contains OHLC prices and additional fields for pricing adjusted by corporate events during the full trading session, including pre- and post-market hours.

For all information about corporate events applied to adjust the data and implemented logic for adjusting, see the 'Corporate Events' section.

## DATA SOURCE

algoseek Trade Only Minute Bar datasets are built from “as-is” tick data collected from live SIP feed algoseek’s co-located ticker plant servers in Equinix NY2 and NY4 data centers, connected with 10Gb fiber for low latency.

The Securities Information Processor (SIP) includes Tape A and Tape B covered by the Consolidated Tape Association (CTA) plan and Tape C covered by the Unlisted Trading Privileges (UTP) plan. The SIP links the US markets by processing and consolidating all protected bid/ask quotes and trades from every trading venue into a single and easily consumable data feed.

The SIP disseminates and calculates critical regulatory information, including the National Best Bid and Offer (NBBO), as well as other important regulatory information such as short-sale restrictions and regulatory halts. In the highly fragmented world of US equities, the SIP is an easy way for people to get a view of the current state of the market.

## STANDARD AND NO-FINRA/TRF VERSIONS

Two versions of Equity Trade Only Adjusted Minute Bar datasets are available for algoseek clients:

**Standard Minute Bar:** includes all trades from the SIP feed

**No-FINRA/TRF and Odd Lots:** includes only trades executed on public exchanges and excludes all FINRA/TRF reports and odd lot (less than 100 shares) trades

### FINRA TRF

Equity trades are executed on Public Exchanges (e.g. NASDAQ, BATS, NYSE, ARCA, etc.) and off the public exchanges in Dark Pools, Broker-Dealer internal crossing, and Block Trades.



The Regulation National Market System (NMS) requires all trades to be reported. There are currently three FINRA Trade Reporting Facilities (TRF) affiliated with registered national securities exchanges that provide FINRA members with a mechanism for reporting transactions affected otherwise than on an exchange.

Regulation NMS allows up to 10 seconds after the Trade execution time for the trade report to be sent to an exchange's TRF for publication. The delay can result in TRF Trade reports printed on the market data feed being out of the current NBBO.

### Round Lot and Odd Lot

A round lot (or board lot) is a normal unit of trading of a security, which currently is 100 shares of stock in the US. Any quantity less than 100 shares is referred to as an odd lot. Odd lots are not subject to the Regulation NMS rules requiring execution to be within the current NBBO. Broker-dealers send odd lots to the exchange paying the most rebate per share and not the best execution price. *Odd lot executions can create unrealistic high/low trade prices in an OHLC bar.*

### The No FINRA and Odd Lots Minute Bars

By excluding TRF trades and odd lot trades, the no-FINRA/TRF and Odd Lots Trade Only Minute Bar dataset provides “clean” and easy-to-use data for hedge funds and market makers to trade and backtest trading algorithms based on the trades from Public Exchanges.

## DATA ORGANIZATION AND FILE FORMAT

Data files are in CSV (Comma-Separated Values) format. An individual CSV file is created for each active ticker on each trading day, and these data files are arranged in a flat-file database by date and then by ticker. If there are no trades during the entire day for a ticker, an empty CSV file with no bars will be created.

There are two data aggregation options for these datasets:

**tradedate:** one CSV file with data per symbol per trading day

**SecId:** one CSV file with data for all trading days per Security ID - a unique security identifier used by algoseek that remains unchanged when the ticker changes

Both aggregation options provide the same data fields.



algoseek provides Equity market data in plain text CSV files. The first row of the CSV file is a fixed header, and then rows of data corresponding to individual bars (Table 1).

Data files are organized with one file per symbol per trading day or by SecId. For example, all trade bars for IBM or AAPL tickers on March 3, 2020, are each stored in a separate CSV file under a tradedate aggregation. In the case of SecId-based aggregation, all data for the security with an ID 33449 (AAPL) for a single year is stored in a single CSV file.

Due to the large dataset size, each CSV file is gzip-compressed, so the uncompressed data is on average seven times larger than the compressed.

**Table 1: Sample Trade Only Minute Bar Adjusted Data**

|                                  |           |           |           |
|----------------------------------|-----------|-----------|-----------|
| <b>SecId</b>                     | 33449     | 33449     | 33449     |
| <b>Date</b>                      | 20200825  | 20200825  | 20200825  |
| <b>Ticker</b>                    | AAPL      | AAPL      | AAPL      |
| <b>TimeBarStart</b>              | 09:30     | 09:31     | 09:32     |
| <b>FirstTradePrice</b>           | 498.76    | 499.58    | 499.35    |
| <b>HighTradePrice</b>            | 500.75    | 500.75    | 499.38    |
| <b>LowTradePrice</b>             | 498.57    | 498.55    | 496.96    |
| <b>LastTradePrice</b>            | 499.63    | 499.2     | 497.3106  |
| <b>VolumeWeightPrice</b>         | 499.11041 | 499.59889 | 497.78382 |
| <b>Volume</b>                    | 1059318   | 305868    | 434849    |
| <b>TotalTrades</b>               | 8387      | 5379      | 8305      |
| <b>FirstTradePriceAdjusted</b>   | 124.69    | 124.895   | 124.8375  |
| <b>HighTradePriceAdjusted</b>    | 125.1875  | 125.1875  | 124.845   |
| <b>LowTradePriceAdjusted</b>     | 124.6425  | 124.6375  | 124.24    |
| <b>LastTradePriceAdjusted</b>    | 124.9075  | 124.8     | 124.3276  |
| <b>VolumeWeightPriceAdjusted</b> | 124.7776  | 124.8997  | 124.446   |
| <b>VolumeAdjusted</b>            | 4237272   | 1223472   | 1739396   |

Table 2 below summarizes the name, description, and data type for each data field (column) in the Equity Trade Only Adjusted Minute Bar CSV file.



Table 2: CSV File Fields Schema

| Field                     | Type (Format)     | Description                                                                                              |
|---------------------------|-------------------|----------------------------------------------------------------------------------------------------------|
| SecId                     | integer           | algoseek unique security identifier                                                                      |
| Date                      | string (yyyymmdd) | Trading date in yyyymmdd format                                                                          |
| Ticker                    | string            | Symbol name                                                                                              |
| TimeBarStart              | string (time)     | Start Time of the Bar. For minute bars, the format is HH:MM. For the second bars, the format is HH:MM:SS |
| FirstTradePrice           | decimal           | Price of the first trade                                                                                 |
| HighTradePrice            | decimal           | Trade with the highest price                                                                             |
| LowTradePrice             | decimal           | Trade with the lowest price                                                                              |
| LastTradePrice            | decimal           | Price of the last trade                                                                                  |
| VolumeWeightPrice         | decimal           | Volume weighted average price                                                                            |
| Volume                    | integer           | Total number of shares traded                                                                            |
| TotalTrades               | integer           | Total number of trades                                                                                   |
| FirstTradePriceAdjusted   | decimal           | Backward adjusted price of the first trade                                                               |
| HighTradePriceAdjusted    | decimal           | Backward adjusted trade with the highest price                                                           |
| LowTradePriceAdjusted     | decimal           | Backward adjusted trade with the lowest price                                                            |
| LastTradePriceAdjusted    | decimal           | Backward adjusted price of the last trade                                                                |
| VolumeWeightPriceAdjusted | decimal           | Backward adjusted volume weighted average price                                                          |
| VolumeAdjusted            | integer           | Backward adjusted total number of shares traded                                                          |

## Time Range

The Trade Only Adjusted Minute Bar dataset covers the entire trading day from the start of pre-market trading to post-hour trading (ET time):

**Pre-Market Hours:** 04:00:00 to 09:30:00 (excluding)

**Market Hours:** 09:30:00 to 16:00:00 (excluding)

**Post-Market Hours:** 16:00:00 to 20:00:00

**Note:** During holidays e.g., Christmas Eve or early market closure for other reasons, trading only happens half-day at 13:00:00. Download algoseek's early closing date list from AWS



S3 storage at `s3://us-equity-market-holidays/earlycloses.csv` (or use a direct link [us-equity-market-holidays.s3.amazonaws.com/earlycloses.csv](https://us-equity-market-holidays.s3.amazonaws.com/earlycloses.csv)). algoseek provides a reference list for US holidays when the stock market is closed at `s3://us-equity-market-holidays/holidays.csv` (direct download link: <https://us-equity-market-holidays.s3.amazonaws.com/holidays.csv>).

**Timestamps in Excel.** Excel fails when importing timestamp fields, as Excel automatically tries to convert milliseconds and nanoseconds to Excel time format. Import timestamp fields as Text instead.

## Bar Notes

**Time Bar Start Format:** One-second bar 13:03:01 is from time greater than 13:03:01 to less than 13:03:02.

One-minute bar 11:04 is from time greater than 11:04 to less than 11:05.

**Single Event:** For bars with only one trade,

`FirstTradePrice = HighTradePrice = LowTradePrice = LastTradePrice`

**Price Field Example:** If two trades occur with the first trade price higher than the second trade price, then,

`FirstTradePrice = Price of the first trade`

`HighTradePrice = Price of the first trade`

`LowTradePrice = Price of the second trade`

`LastTradePrice = Price of the second trade`

**VolumeWeightPrice:** the volume-weighted price is calculated as a dollar volume a sum of all trades divided by the total number of shares traded.

$$\frac{\text{sum}(\text{Trade\_Shares} \times (\text{Trade\_Price} - \text{NBBOMidpoint}))}{\text{sum}(\text{Trade\_Shares})}$$

## Skipped Bars

The bars are trade-based, so there is no quote-related data, and a bar is only created when there is at least one trade during the bar period. When there are no trades during certain minutes, the timestamps are skipped, as exhibited in Table 3.



Table 3: Trade Only Adjusted Minute Bar Sample Data

|                                  |          |          |          |
|----------------------------------|----------|----------|----------|
| <b>SecId</b>                     | 3753921  | 3753921  | 3753921  |
| <b>Date</b>                      | 20200924 | 20200924 | 20200924 |
| <b>Ticker</b>                    | GAL      | GAL      | GAL      |
| <b>TimeBarStart</b>              | 10:06    | 10:13    | 10:25    |
| <b>FirstTradePrice</b>           | 38.157   | 38.16    | 38.1     |
| <b>HighTradePrice</b>            | 38.157   | 38.16    | 38.1     |
| <b>LowTradePrice</b>             | 38.157   | 38.16    | 38.1     |
| <b>LastTradePrice</b>            | 38.157   | 38.16    | 38.1     |
| <b>VolumeWeightPrice</b>         | 38.157   | 38.16    | 38.1     |
| <b>Volume</b>                    | 100      | 100      | 105      |
| <b>TotalTrades</b>               | 1        | 1        | 1        |
| <b>FirstTradePriceAdjusted</b>   | 38.157   | 38.16    | 38.1     |
| <b>HighTradePriceAdjusted</b>    | 38.157   | 38.16    | 38.1     |
| <b>LowTradePriceAdjusted</b>     | 38.157   | 38.16    | 38.1     |
| <b>LastTradePriceAdjusted</b>    | 38.157   | 38.16    | 38.1     |
| <b>VolumeWeightPriceAdjusted</b> | 38.157   | 38.16    | 38.1     |
| <b>VolumeAdjusted</b>            | 100      | 100      | 105      |

This implies there were no trades during the bar period 10:07 through 10:12, and between 10:13 and 10:25.

Fewer bars will be displayed for thinly traded stocks or outside regular market hours due to a lack of activity. When only the header row is present, the security was not traded at all during the day.



## Corporate Events

Table 4: Corporate Event's effect on Price and/or Volume

| Corporate Event                                                                                                                                                                                                                  | Affects Price | Affects Volume |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|
| Bonus issue in the same class                                                                                                                                                                                                    | Yes           | Yes            |
| Bonus issue in a different class                                                                                                                                                                                                 | Yes           | No             |
| Capital Reduction                                                                                                                                                                                                                | Yes           | Yes            |
| Consolidation                                                                                                                                                                                                                    | Yes           | Yes            |
| Distribution                                                                                                                                                                                                                     | Yes           | No             |
| Cash Dividend                                                                                                                                                                                                                    | Yes           | No             |
| Script dividend in the same class                                                                                                                                                                                                | Yes           | Yes            |
| Script dividend in a different class                                                                                                                                                                                             | Yes           | No             |
| Partial liquidation                                                                                                                                                                                                              | Yes           | No             |
| De-merger                                                                                                                                                                                                                        | Yes           | No             |
| Entitlement in the same class                                                                                                                                                                                                    | Yes           | No             |
| Entitlement in a different class                                                                                                                                                                                                 | Yes           | No             |
| Capital Return                                                                                                                                                                                                                   | Yes           | No             |
| Rights in the same class                                                                                                                                                                                                         | Yes           | No             |
| Rights in a different class                                                                                                                                                                                                      | Yes           | No             |
| Security Swap                                                                                                                                                                                                                    | Yes           | Yes            |
| Reclassification                                                                                                                                                                                                                 | Yes           | Yes            |
| Any subdivision (by any stock split, stock dividend, reclassification, recapitalization or otherwise) or combination (by the reverse stock split, reclassification, recapitalization, or otherwise) of the Class A Common Stock. | Yes           | Yes            |

## DAILY UPDATES

algoseek's Equity Trade Only Minute Bar Adjusted dataset contains backward adjusted prices and volume. Whenever a new corporate event (e.g., dividend, split, etc) is published for a SecId, all data for this SecId is rebuilt. In this case, you need to re-download the data for this security.



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To access the list of updated SecIds for a specific trading day, please follow this s3 file path:  
`s3://bucket_name/daily-changes/yyyymmdd.csv`

`bucket_name` can be one of the following:

`us-equity-1min-trades-adjusted-secid-all`

`us-equity-1min-trades-adjusted-secid-yyyy`

where yyyy - year, mm - month, and dd - day.

There are a couple of ways to keep the data updated:

1. If you work with the data aggregated by SecId and would like to have the whole history for a specific security in one file, you can use the AWS CLI SYNC command on the `us-equity-1min-trades-adjusted-secid-all` bucket. This setup will download only files from the S3 bucket that are different from the local copy. To sync your local directory and S3 bucket, please make sure to point the SYNC command to your local copy of the dataset. In the meantime, this approach may be expensive (\$80 per month for the universe of 12000 tickers) if you regularly update the full universe of securities. To overcome it, please check the approach below.
2. You can work with the data aggregated by SecId and by year. In this case, you can use AWS SYNC on `us-equity-1min-trades-adjusted-secid-yyyy` buckets that you need, where yyyy is the year. If you still need to keep the whole history for each security in a single file, you can merge them on your side locally. It will be cheaper than updating data using the `us-equity-1min-trades-adjusted-secid-all` bucket (\$10 versus \$80 per month for the universe of 12000 tickers).
3. If you are working with the data aggregated by trade date, you can run the SYNC command for each `us-equity-1min-trades-adjusted-yyyy` bucket separately.
4. Also, algoseek provides a Python [script](#) that you can use to keep data updated for both aggregation types: by SecId and by ticker. Using this script, you can easily update data for a list of tickers or SecIds, and merge all data for each SecId.

## Daily Update Time

Data aggregated by trade date is built by 3 am T+1 ET.

Data aggregated by SecId is built by 5 am T+1 ET.



## **APPENDIX A. FREQUENTLY ASKED QUESTIONS**

### **Why do I see empty files with just a header line for some tickers?**

An empty file is created for some tickers with low liquidity, with no trades during the trading day, but Bid/Ask quotes were published.