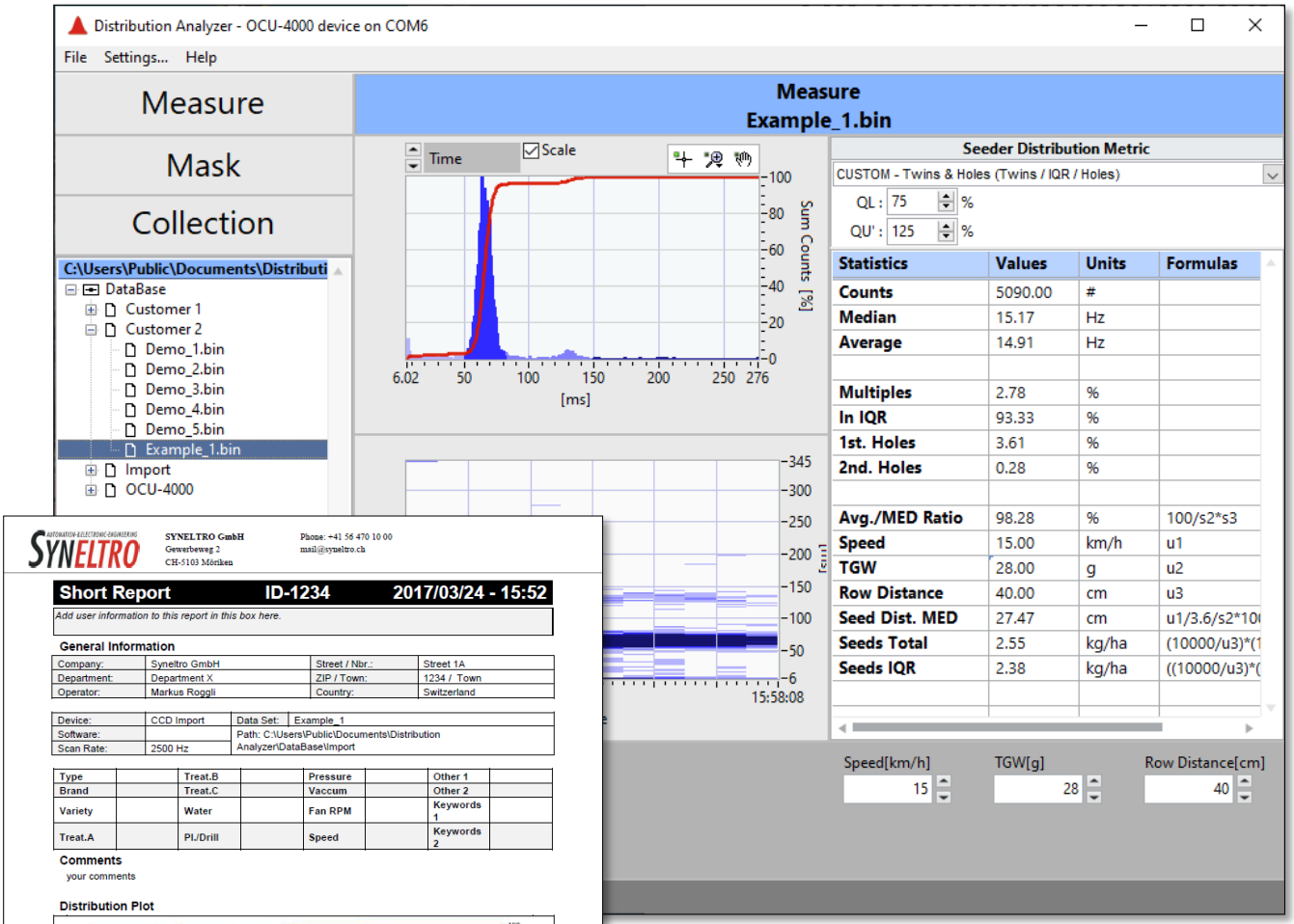
Distribution Analyzer Manual

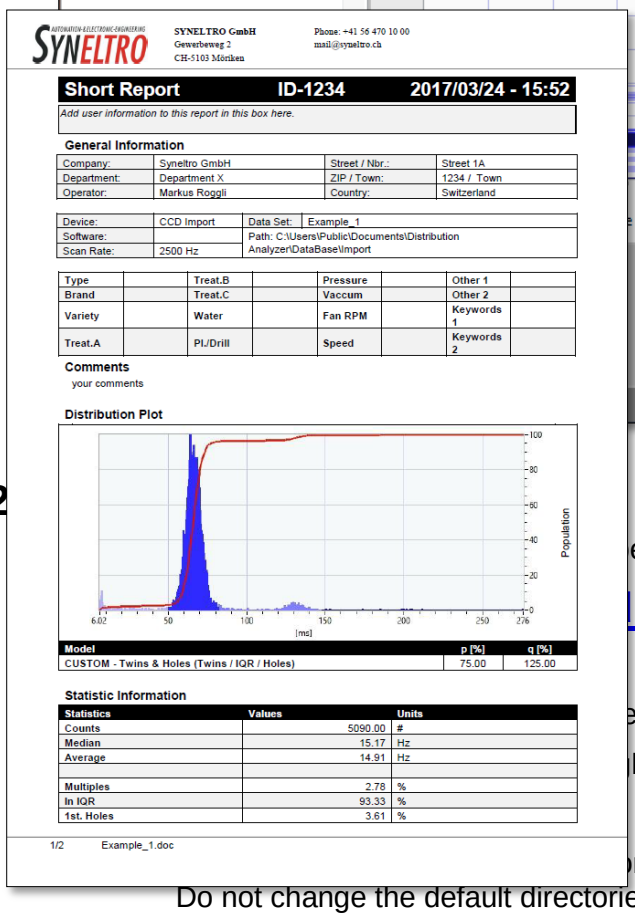
Content:

1 About the Software Application

The **"Distribution Analyzer"** application is a software tool for recording chronological, temporal sequences of objects captured by a specific hardware. The software stores and manages all the data sets in a way that the user has easy access to its data at any time. Different statistical analysis methods are available to compare the data sets and/or to create user specific reports.

Read this manual carefully before make use of the software. This user guide presents an overview of the application's features and gives step-by-step instructions for completing a variety of tasks. Read also the hardware related **"OCU-4000 Operating Manual"** to complete your knowledge about the whole measurement application and its correct us





e.

2

e downloaded from the following link:

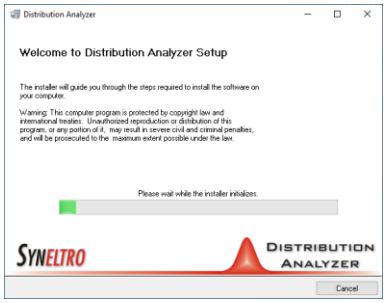
lucts/OCU-4000 (select the tab **"Downloads"**)

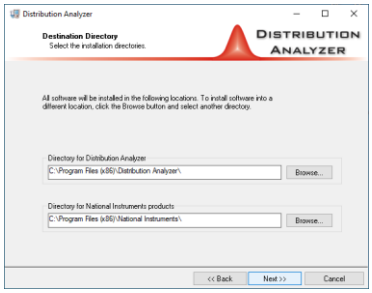
e and run **"DA Installer.exe"**

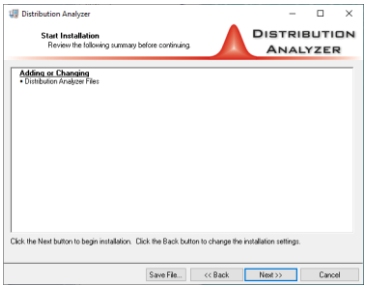
h the installation.

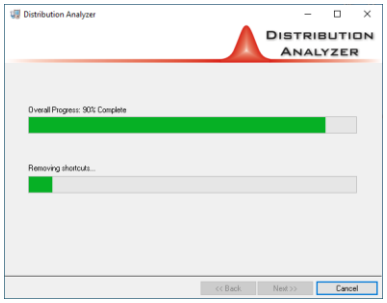
n the computer
Do not change the default directories in the dialogs
Reboot your OS if requested by the installer at the end

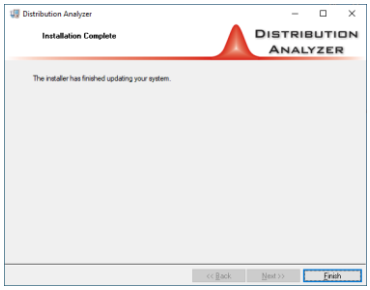
Follow the instructions of the dialogs and wait until the installation has completed.





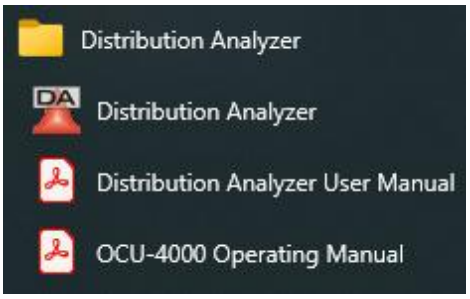






The installer has created new entrances in your start menu under programs:

- Program Distribution Analyzer
- Distribution Analyzer User Manual
- OCU-4000 Operating Manual

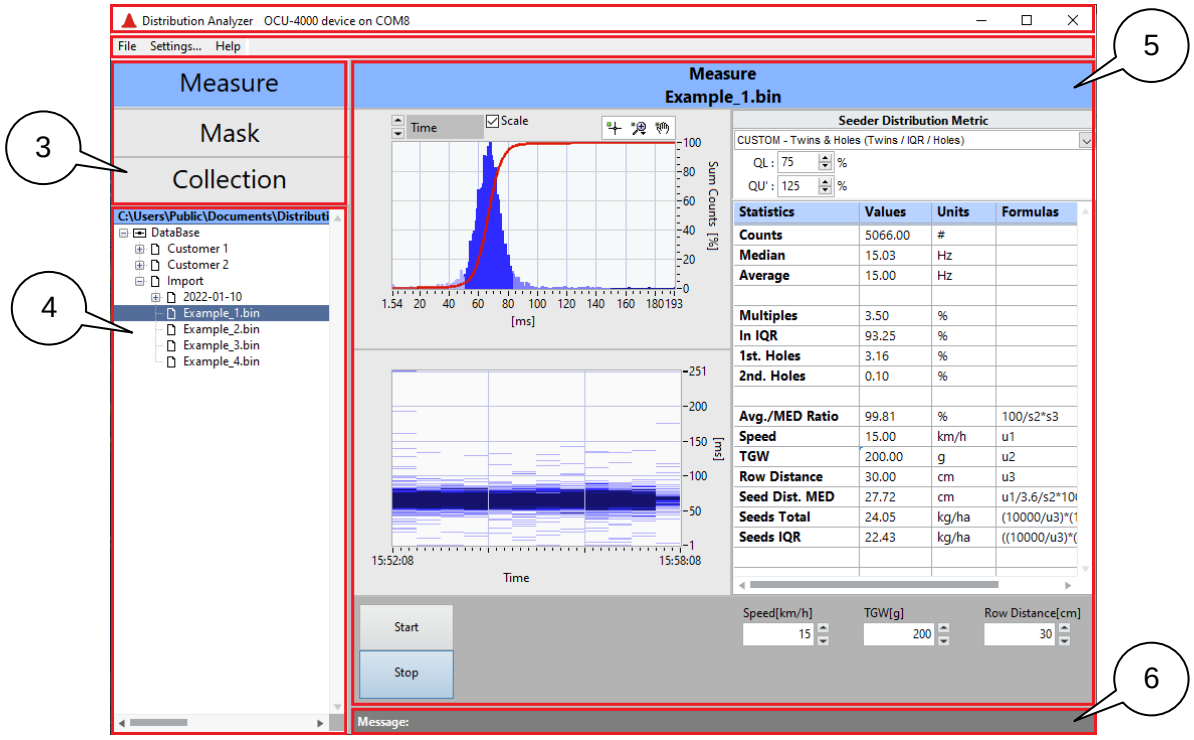


And also a link on our desktop, to start the software click on this symbol  and wait until the program starts up.

3 Software Overview

The software interface is organized in six zones:

1. Windows title bar with information about the connected device
2. Menu to control the software functions
3. Module selection to show the selected module interface
4. Data base, to navigate and select the data sets
5. Sub panel area, containing the selected module
6. Status bar to shows additional information



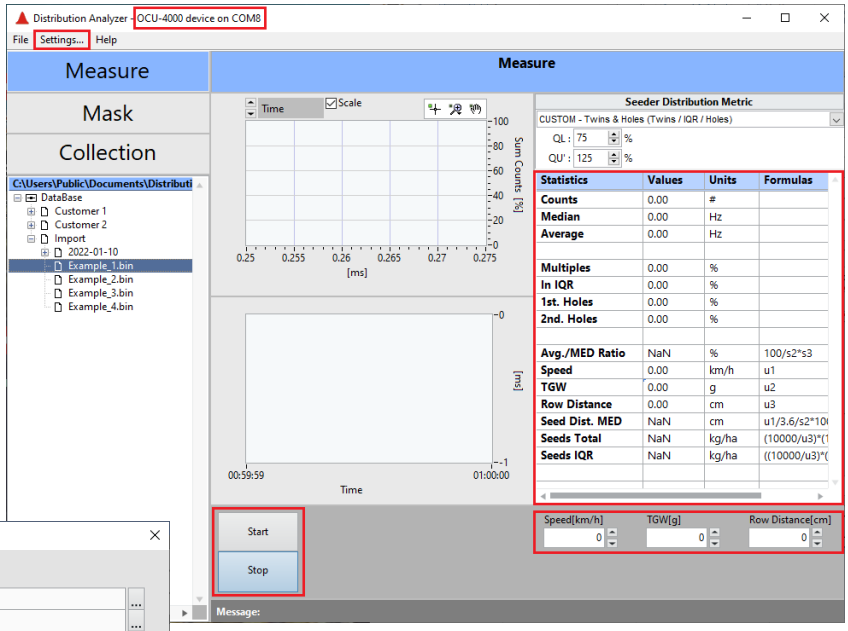
The software consists of three modules:

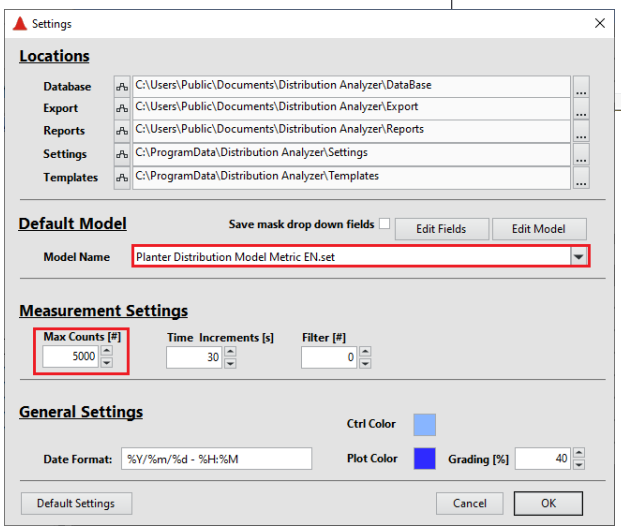
- **Measure:** Data acquisition and visualization
- **Mask:** Additional information dialog for each data set
- **Collection:** Container to compare data sets against each other

All modules are active and can be used in parallel at any time. This allows for example to fill in the mask data while a measurement is running. The next chapter describes the modules in more details.

3.1 Measure Module

The module **"Measure"** is the entry point to start the measurements. The software automatically detects a valid USB device on the virtual com port and shows the device name and the assigned com port in the title bar.





User Fields

Before starting a measurement, the correct measurement settings must be loaded.

The currently active measurement settings can be checked by open the dialog **"Settings"** from the menu **"Settings…"**.

The software always loads the last selected setting on start up.

If a device is connected, a new measurement can be started by pressing the button "**Start**". The software immediately starts to show the actual number of counts and calculates the statistic data.

The measurement stops if the button **"Stop"** has been pressed or if the actual count value is equal or larger as defined in **"Max Counts [#]"**.

The **"User Fields"** below the statistic tab can be filled in at any time, before, while and after the measurement is running. Depending on the used formulas they affect the values in the table **"Statistics"** and are calculated on the fly. This gives the convenient ability to make what-if analysis.

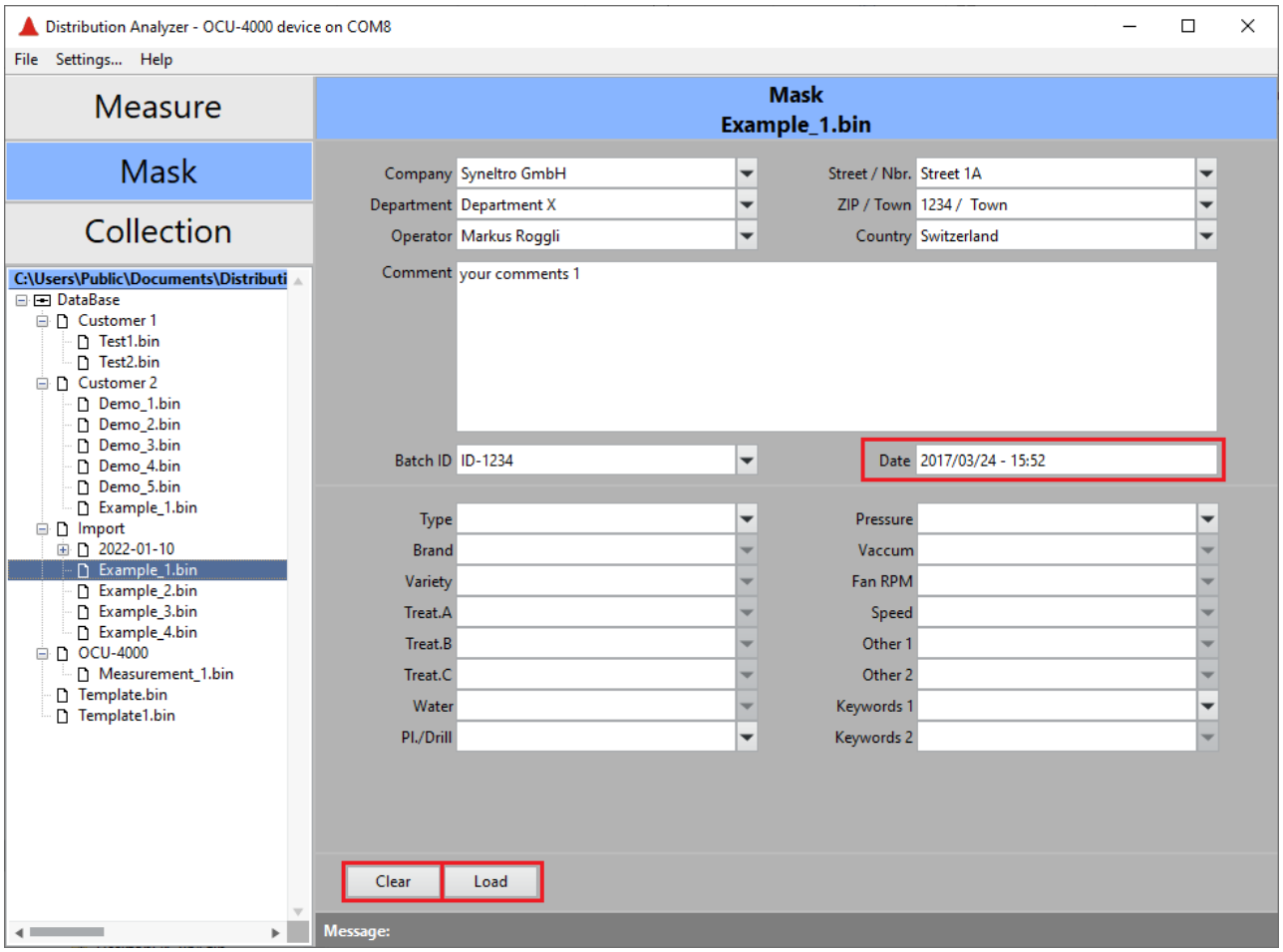
Information how to setup a specific measurement is explained in more details in chapter **4 Program Settings**.

After the measurement is done and all information has been filled up, the data set needs to be saved by pressing **"CTRL+S"** or by navigating inside the menu **"File > Save"** or if a new file name is needed **"CTRL+A"** respectively **"File > Save As"**.

3.2 Mask Module

All additional information for the measurement is filled in, in the **“Mask Module”**. Most fields are drop down controls. This means, each time a new text is typed into a field, the value is stored in the drop down menu and can be re-selected on the next measurement which needs the same property value. This helps to avoid spelling mistakes or different names for the same meaning. This becomes even more important, if data sets are compared against each other in the **“Collection Module”**, explained in the next chapter.

Navigation through the fields can be done by selecting each field with the mouse or by using the **“Tab”** key on the keyboard.



The control field **“Date”** cannot be over written by hand, it represent the time when the measurement recording started, and is filled in automatically, when a new measurement has been initialized in the **“Measure Module”**. The button **“Clear”** deletes all content in the mask fields, except for the date field.

With the **“Load”** button, the user can select an existing data set and use its mask field values as a template for the new measurement.

The mask data are not automatically deleted if a new measurement has been started. The main reason for this implemented behavior is the idea to keep most of the information the same for repeated measurements. As example only the batch or the comment field needs to be re-written.

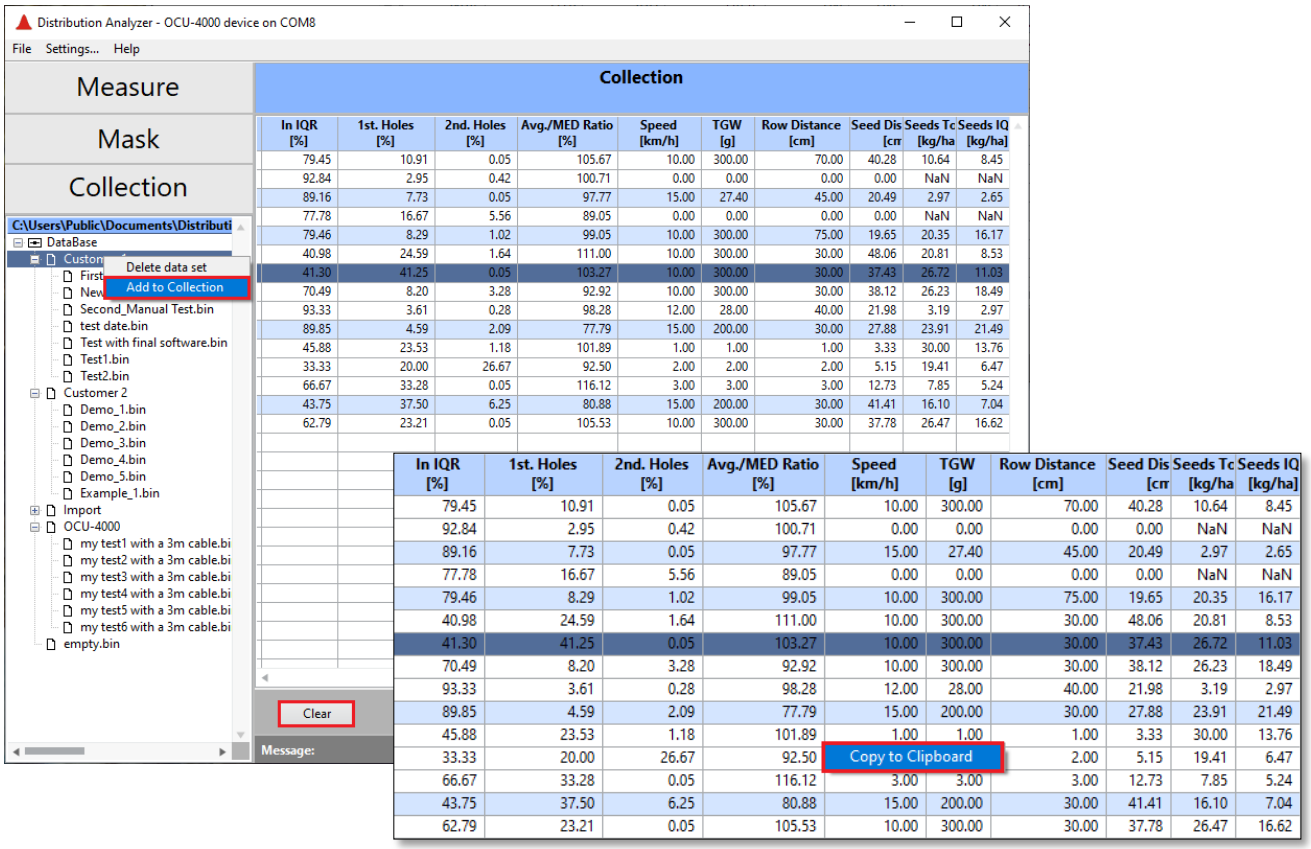
More information about doing measurements is explained in chapter **6 Measurement**

3.3 Collection Module

This module acts as a container for the data sets. To load one or multiple data sets into the collector, do a right mouse click on the **DataBase** tree. This brings up a menu with two options:

- **Delete data set** Deletes a data set from the disk.
- **Add to Collection** On a directory, adds the whole content, on a file just the file.

The table shows the data from each measurement, the information from the mask and the calculated static data. This allows comparing different data sets.



In IQR [%]	1st. Holes [%]	2nd. Holes [%]	Avg./MED Ratio [%]	Speed [km/h]	TGW [g]	Row Distance [cm]	Seed Dis [cm	Seeds Tc [kg/ha	Seeds IQ [kg/ha]
79.45	10.91	0.05	105.67	10.00	300.00	70.00	40.28	10.64	8.45
92.84	2.95	0.42	100.71	0.00	0.00	0.00	0.00	NaN	NaN
89.16	7.73	0.05	97.77	15.00	27.40	45.00	20.49	2.97	2.65
77.78	16.67	5.56	89.05	0.00	0.00	0.00	0.00	NaN	NaN
79.46	8.29	1.02	99.05	10.00	300.00	75.00	19.65	20.35	16.17
40.98	24.59	1.64	111.00	10.00	300.00	30.00	48.06	20.81	8.53
41.30	41.25	0.05	103.27	10.00	300.00	30.00	37.43	26.72	11.03
70.49	8.20	3.28	92.92	10.00	300.00	30.00	38.12	26.23	18.49
93.33	3.61	0.28	98.28	12.00	28.00	40.00	21.98	3.19	2.97
89.85	4.59	2.09	77.79	15.00	200.00	30.00	27.88	23.91	21.49
45.88	23.53	1.18	101.89	1.00	1.00	1.00	3.33	30.00	13.76
33.33	20.00	26.67	92.50	2.00	2.00	2.00	5.15	19.41	6.47
66.67	33.28	0.05	116.12	3.00	3.00	3.00	12.73	7.85	5.24
43.75	37.50	6.25	80.88	15.00	200.00	30.00	41.41	16.10	7.04
62.79	23.21	0.05	105.53	10.00	300.00	30.00	37.78	26.47	16.62

For further analysis with third party tools, the data can be exported over the clip board. A right mouse button click on the table opens the menu **"Copy to Clipboard"**. This will transfer all data to the windows clipboard. The data can then be pasted (**"CTRL+V"**) into MS Excel and further analyzed or visualized there.

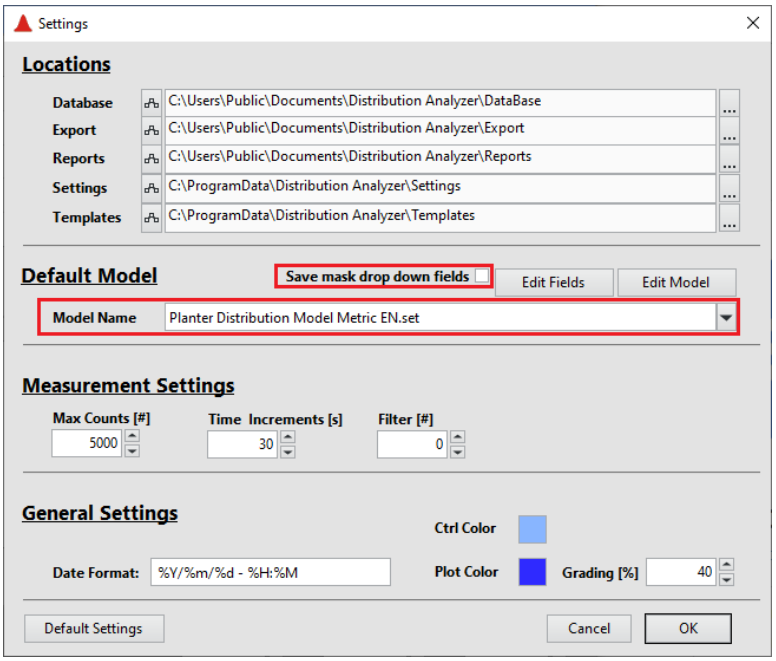
The button **"Clear"** removes the whole content form the table. To remove a single file double click on the data set which is no longer needed. Adding files can be done at any time by the method described before. Data sets are inserted below the current selection.

Some rows might be different colored. This happens, if data sets have been added with other model settings. For example, different names, imperial or metric units or if more statistic formulas have been added to the statistics table in the **"Measurement Module"**. How these modifications can be done is explained in chapter **7 Customized Model Templates.**

Normally, all entrances are unmarked and have exactly the same header names. Marked data sets give a hint to the user that something is different. By selecting one time an unmarked and then a marked data set, the column header will change on certain cells. All data sets with exactly the same properties are not marked and appear in white.

Note: The exported data to the clipboard uses the column header from the data set which is currently selected. If no row is marked, this note can be ignored since all data sets have the same header.

4 Program Settings



The dialog to the right opens if you select **"Settings…"** from the menu.

In the section **"Locations"** all paths are defined. If the database needs to be on a server, edit the path to your need or click on the button **"..."** and browse to the location.

e.g. **\\Server\DataBase_2022**

In the section **"Default Model",** assign the model you need for the measurement.
With the check box **"Save mask drop down fields"** active, the software stores new entries in the drop down fields of the **"Mask Module"**. It is recommended to uncheck this box and edit the drop down fields manually in the appropriate model file to keep your drop downs clean and organized. Read chapter **7 Customized Model Templates** for more detailed information.

The section **"Measurement Settings"** contains three global settings:

- **Max. Counts [#]**
  After the number in **"Max.Counts"** is reached, the software stops the measurement. The measurement can be stopped by the user at any time with the **"Stop"** button.
- **Time Increments [s]**
  This is the time interval, each time a new histogram is started in the **"Time"** plot of the **"Measurement Module".** To get enough data for a good histogram, do not set this value too low, 30 seconds seems to be a good start value.
- **Filter [#]**
  This values blocks counting the next object for a certain time. If smaller particles or dust disturb the measurement, a slightly higher value might improve the measurement quality.

Blocking Time = Filter value x 0.25ms, (e.g. a value of 4 equals to 1mili second)

The last section **"General Settings"** contains:

- **Date Format:** Any order is allowed here, e.g. year/month/day or other separators.
- **Ctrl Color** This color defines the main control color and its darker and brighter value
- **Plot Color** This color defines the plot color and its darker and brighter value
- **Grading [%]** Is the grading in % each color gets darker or brighter

Note: Date format codes have leading zeros as necessary to ensure a constant field width. An optional # modifier before the format code letter removes the leading zeros from the following format codes: %#X, %#y. The # modifier does not modify the behavior of any other format codes.

Press the **"OK"** button to accept the new settings or press **"Cancel"** to reject them.

All program settings are stored by default on the following location: "C:\ProgramData\Distribution Analyzer"

- **Distribution Analyzer.ini:** Contains the settings in the dialog box above
- **Settings:** Files to define the model settings
- **Templates:** Word document templates (***.dot**) for the reports

The button **"Default Settings"** deletes the file **"Distribution Analyzer.ini"** and creates a new one with all the default settings in the dialog box. If setting files or word templates are corrupted because of wrong user interaction in the editors or in MS Word, the corresponding directories can be deleted. On the next software restart, the missing directories will be recovered to its original state. Copies of the original settings and templates are located here: **C:\Program Files (x86)\Distribution Analyzer\Support**. **Do not delete or change these files!**

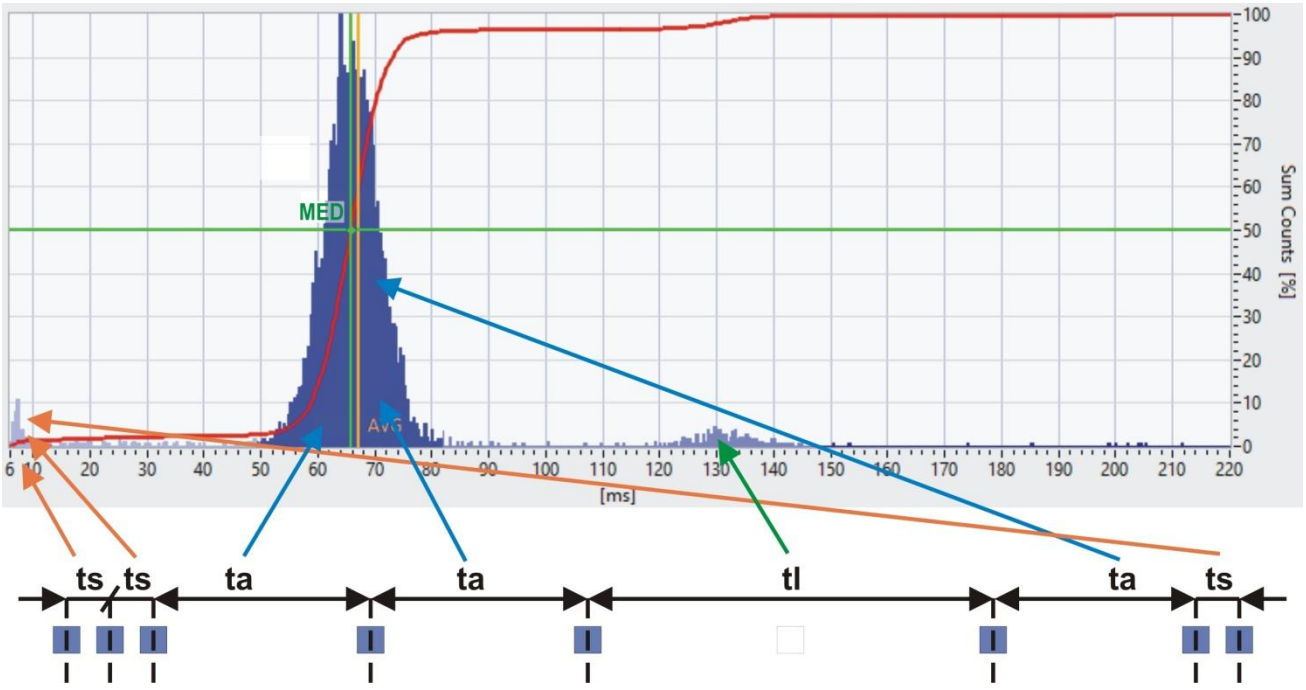
Note: Customized user templates will then be lost, save these files first if still needed!

5 Statistic Models

The following subchapters assume some knowledge in statics.

5.1 Histogram

The image below illustrates how multiples and gaps are placed in the histogram.



- Multiples (ts) time of short object distance
- IQR: (ta) time of an average object distance
- Gaps (tl) time of a long distance

All objects are captured in relative time (ts, ta, tl) to each other by the sensor and placed in the bins of the histogram. Short times are to the left, average time distances in the middle and longer ones to the right. The red plot shows the integrated population of the distribution on the y-axis. It represents the summation all bin values on the x-axis and normalize it to 100%.

5.2 Type of Models

Four different statistical models have been implemented to qualify the distribution of the data set. The models are based on quantiles that partition the entire data set accordingly. The quantiles are always centered around the median value of the distribution.

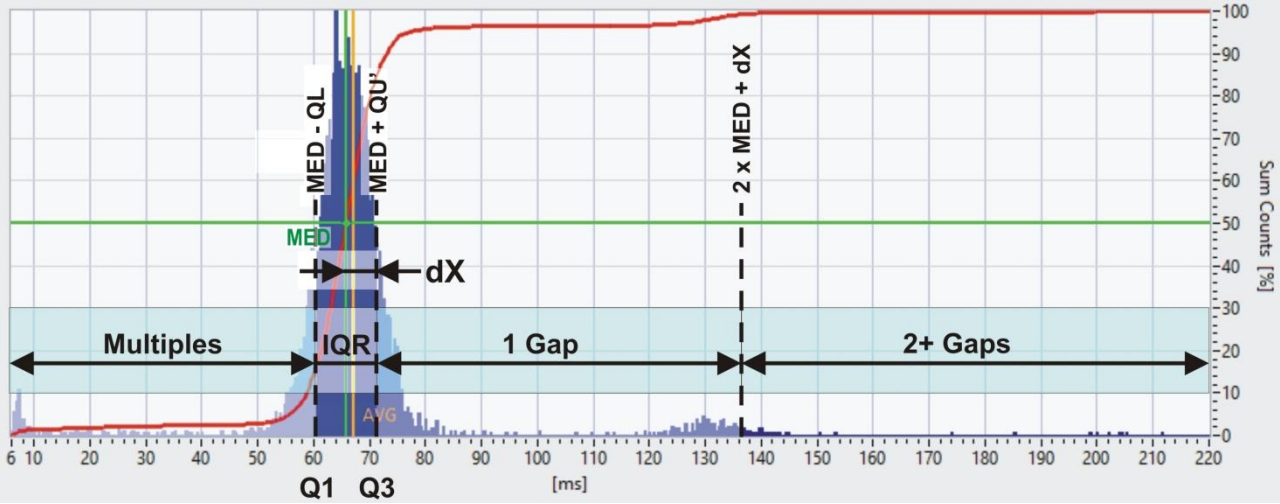
- q: Lower quantile below the median (**QL**)
- p: Upper quantile above the median (**QU'**)

Model Type	Multiples [%]	IQR [%] [1)]		Gaps [%]
1) Standard Quartiles	25	25	25	25
2) Standard Quantiles	50-q	q	q	50-q
3) Custom Quantiles	50-q	q	p	50-p
4) Custom Quantiles	Multiple	q×MED	p×MED	Gaps

Note 1): interquartile range (Q1 to Q3)

The first model simply divides the distribution into four quartiles, each with a span of 25%.

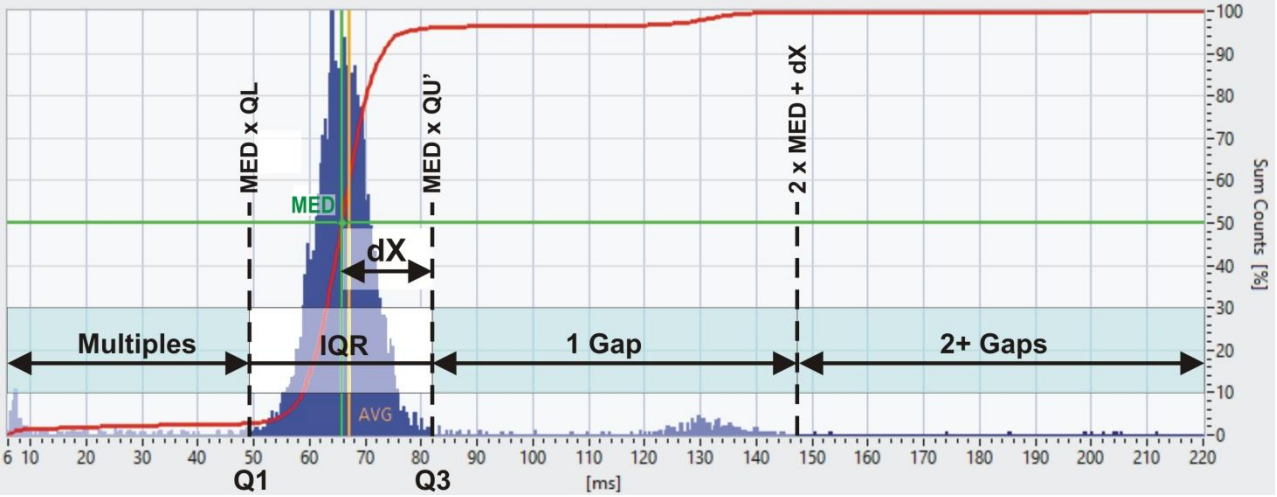
The second model has the option to define a quantile **QL** and **QU** below and above the median with exactly the same partition size **(q)**. This model can be used if a Gaussian distribution needs to be qualified. A **QL** value of 34.15% defines an **IQR** range of 68.3% which corresponds to one sigma. The plot below shows such a model setting.



On the x-axis you can read out that 68.3% of the population has a distance variation from 60ms to 71ms. The median is around 65.5ms (green cursor) and the average around 67ms (yellow cursor). The closer average and median are, the more Gaussian the distribution is.

The third model allows to setup different quantiles below and above the median **(p and q)**. All three models described so far, calculate the Q1 and Q3 values by adding or subtracting a certain percentage from the median value which is at exact 50% of the population.

The fourths model differs in how Q1 and Q3 are calculated. It calculates the Q1 and Q3 values based on a percentage of the median value on the x-axis. This model is a bit more flexible to define Gaussian models with outliers on both sides of the main distribution.



In the plot above the median on the x-axis is around 65.5ms. QL is set to 75% of MED and QU' is set to 125%.

- Q1 = 65.5ms × 0.75 = 49.1ms
- Q3 = 65.5ms × 1.25 = 81.9ms

In general, the quantile below Q1 contains objects which were closer together and the quantile above Q3 objects with a larger distance to each other.

In addition, the quantile above Q3 is split into two separated regions:

- **1 Gap:** Contains objects, mostly with a distance of 2×MED to the neighbor object
- **2+ Gaps** Contains objects with even more distance to the neighbor object

5.3 Interpretation of Statistic Data

- Counts: Number of counted objects during the measurement
- Median: Represents the middle values (50% point) of the whole data set in Hz
- Average: Is the average distance value in Hz for each object of the whole data set

To convert the values from Hz to milliseconds **[ms]**, simply calculate:

$$t[ms] = \frac{1}{freq\,[Hz]} \times 1000$$

Or to get the distance multiply with the speed:

$$d[m] = \frac{1}{freq\,[Hz]} \times speed[\frac{m}{s}]$$

The next four values represent the amount in percent for each quantile of the whole population and depend on the model chosen, as described in the chapters before. The sum of all four values results in 100% of the whole population.

CUSTOM - Quantiles (Multiples / qMED // pMED / Gaps)

QL : 75 %

QU' : 125 %

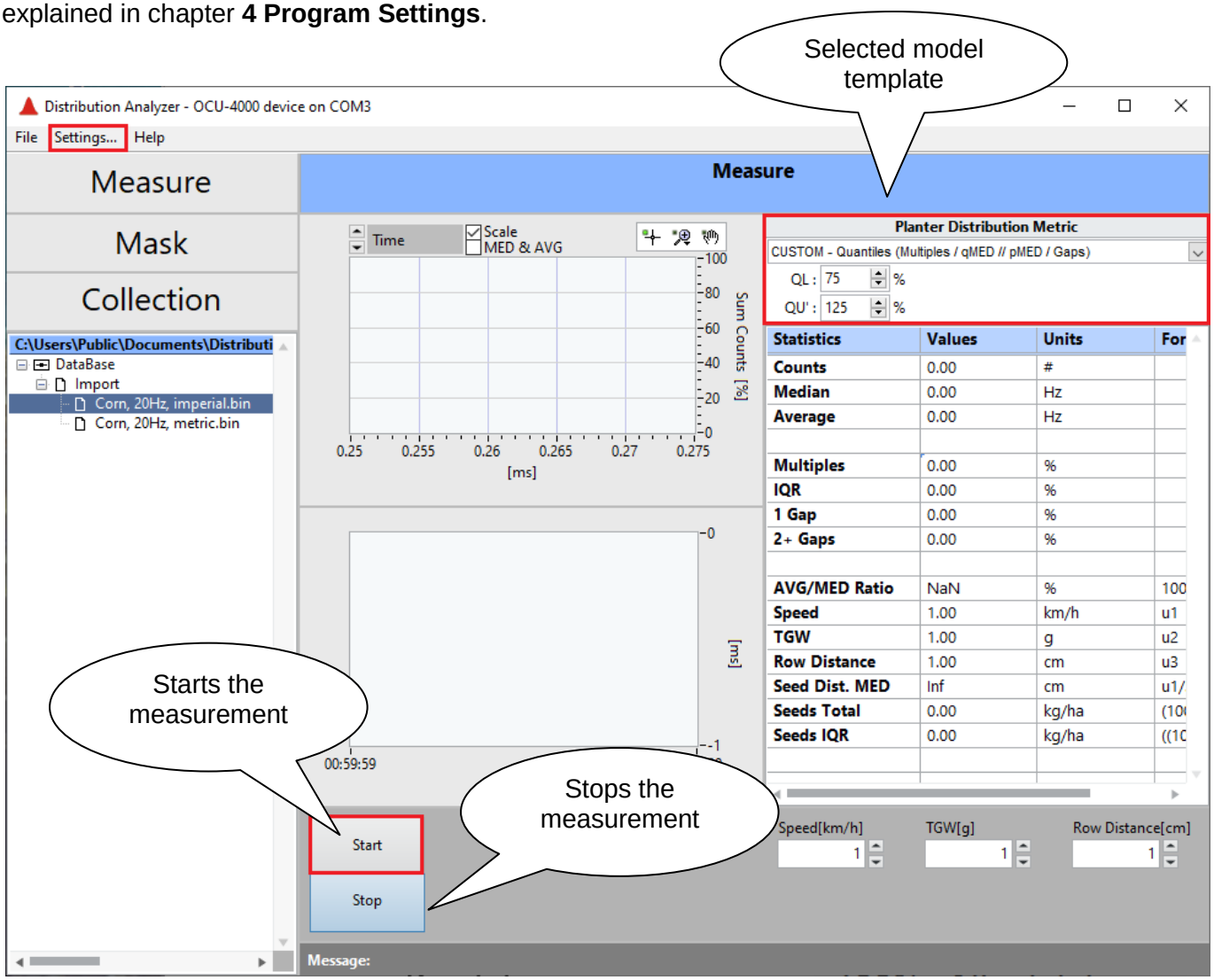
Statistics	Values	Units
Counts	5090.00	#
Median	15.21	Hz
Average	14.91	Hz
Multiples	2.78	%
IQR	93.33	%
1 Gap	3.61	%
2+ Gaps	0.28	%

All the values in the statistic table above can be used in user defined formulas as described in chapter **7 Customized Model Templates**.

6 Measurement

6.1 Setup the measurement

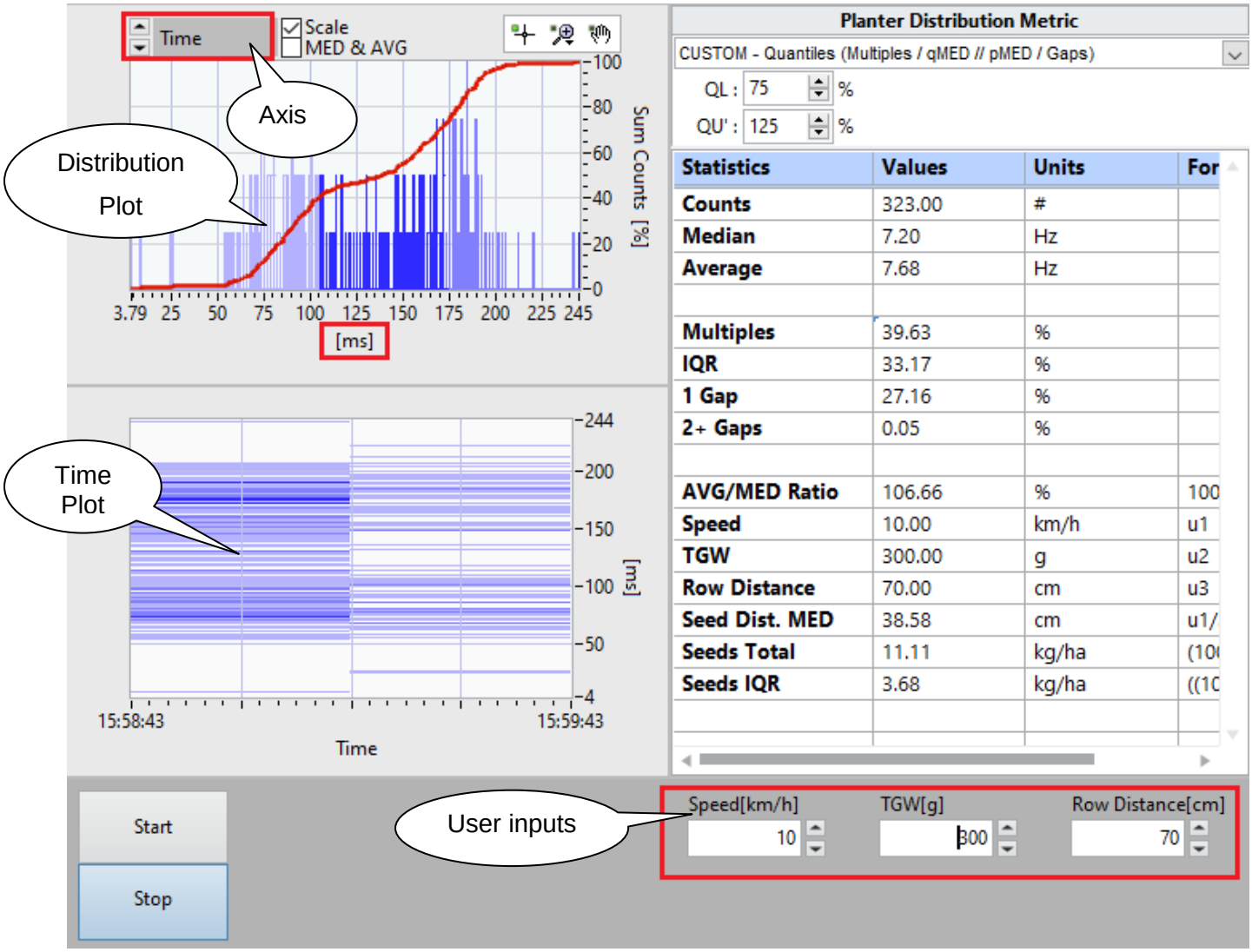
Before you start a new measurement, make sure, a device is connected (title bar shows the device and its assigned com port). Next, check if the correct model template is selected for the measurement as explained in chapter **4 Program Settings**.



Note: To get good measurement results, place the sensor in a way that the objects are not touching the sensor!

6.2 Start the measurement

The measurement can now be started by pressing the **"Start"** button. The distribution plot shows the whole population. The axis can be changed by the user at any time, during and after the measurement. This is also valid for the user inputs. The changes are visible immediately on the statistics fields. The field **"Counts"** shows the actual counted objects that have passed the sensor.



The time plot shows the time line, separated into blocks of N seconds (see **"Time Increments [s]"**) and shows the start an actual time of the measurement. It can be used to show changes over long measurements (see chapter **0**

Timeline Plot).

The measurement stops, if **"Max Counts [#]"** has been reached or if the "**Stop"** button has been pressed. After the measurements is done, press **"CTRL S"** or use the menu **File > Save** to save the data set.

Additional information can be found in chapter **3.1 Measure Module** and chapter **4. Program Settings.**

Note: During an on-going measurement, it is allowed, to fill out the data in the **"MASK"** module.

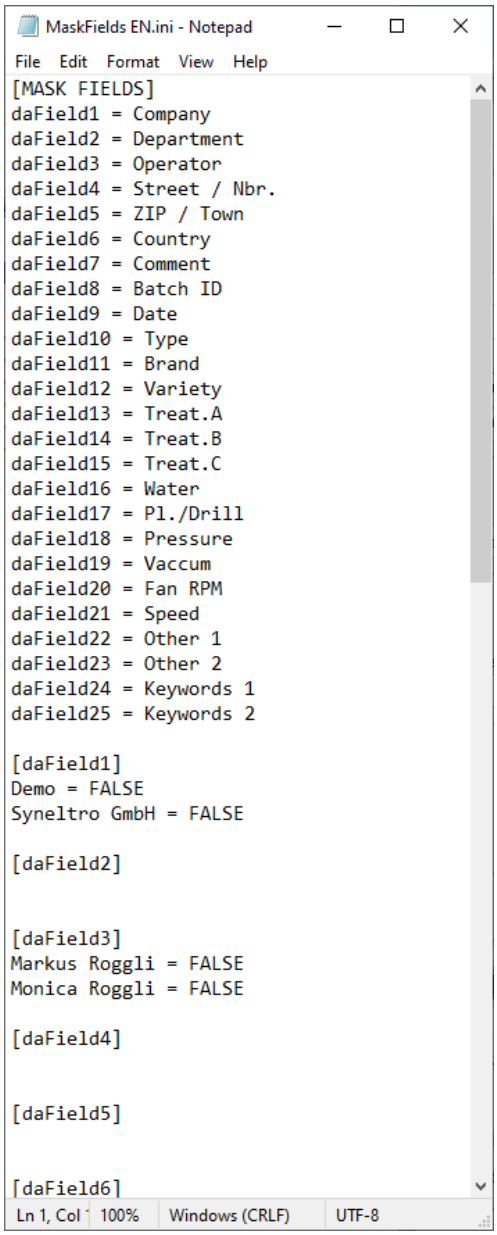
7 Customized Model Templates

By default, the software provides four model templates to measure and analyze the data:

- Normal Distribution Model Imperial EN — Standard distribution, imperial, English
- Normal Distribution Model Metric EN — Standard distribution, metric, English
- Planter Distribution Model Imperial EN — Planter distribution, imperial, English
- Planter Distribution Model Metric EN — Planter distribution, metric, English

If you need a customized model template, it is best to copy an existing template. The following two files are needed to define a complete model template:

File for Mask Fields (*.ini)	File for Model Fields (*.set)

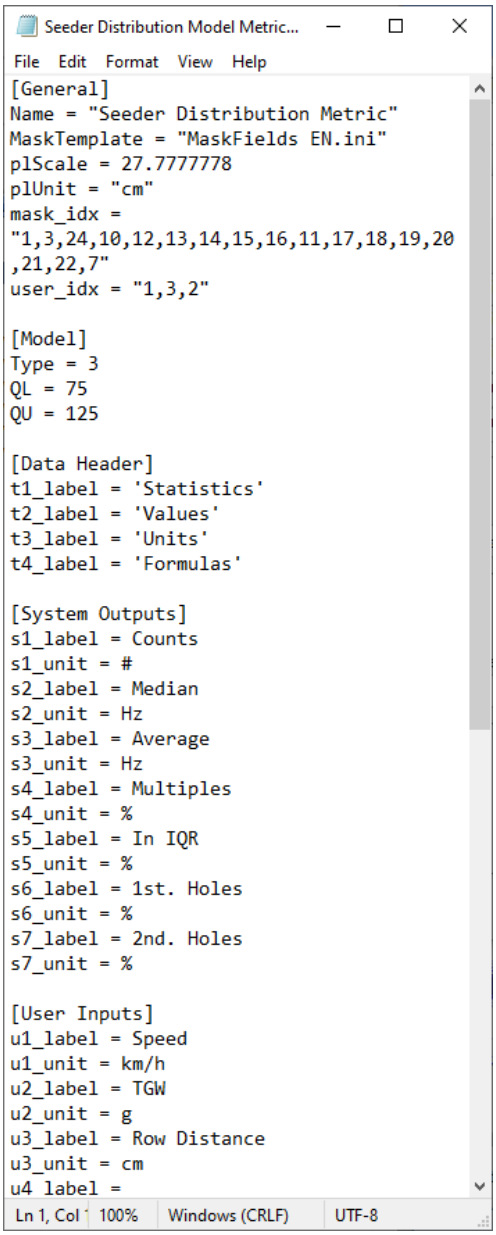


MaskFields EN.ini - Notepad

File Edit Format View Help

```
[MASK FIELDS]
daField1 = Company
daField2 = Department
daField3 = Operator
daField4 = Street / Nbr.
daField5 = ZIP / Town
daField6 = Country
daField7 = Comment
daField8 = Batch ID
daField9 = Date
daField10 = Type
daField11 = Brand
daField12 = Variety
daField13 = Treat.A
daField14 = Treat.B
daField15 = Treat.C
daField16 = Water
daField17 = Pl./Drill
daField18 = Pressure
daField19 = Vaccum
daField20 = Fan RPM
daField21 = Speed
daField22 = Other 1
daField23 = Other 2
daField24 = Keywords 1
daField25 = Keywords 2

[daField1]
Demo = FALSE
Syneltro GmbH = FALSE

[daField2]


[daField3]
Markus Roggli = FALSE
Monica Roggli = FALSE

[daField4]


[daField5]


[daField6]
```

Ln 1, Col 1 | 100% | Windows (CRLF) | UTF-8



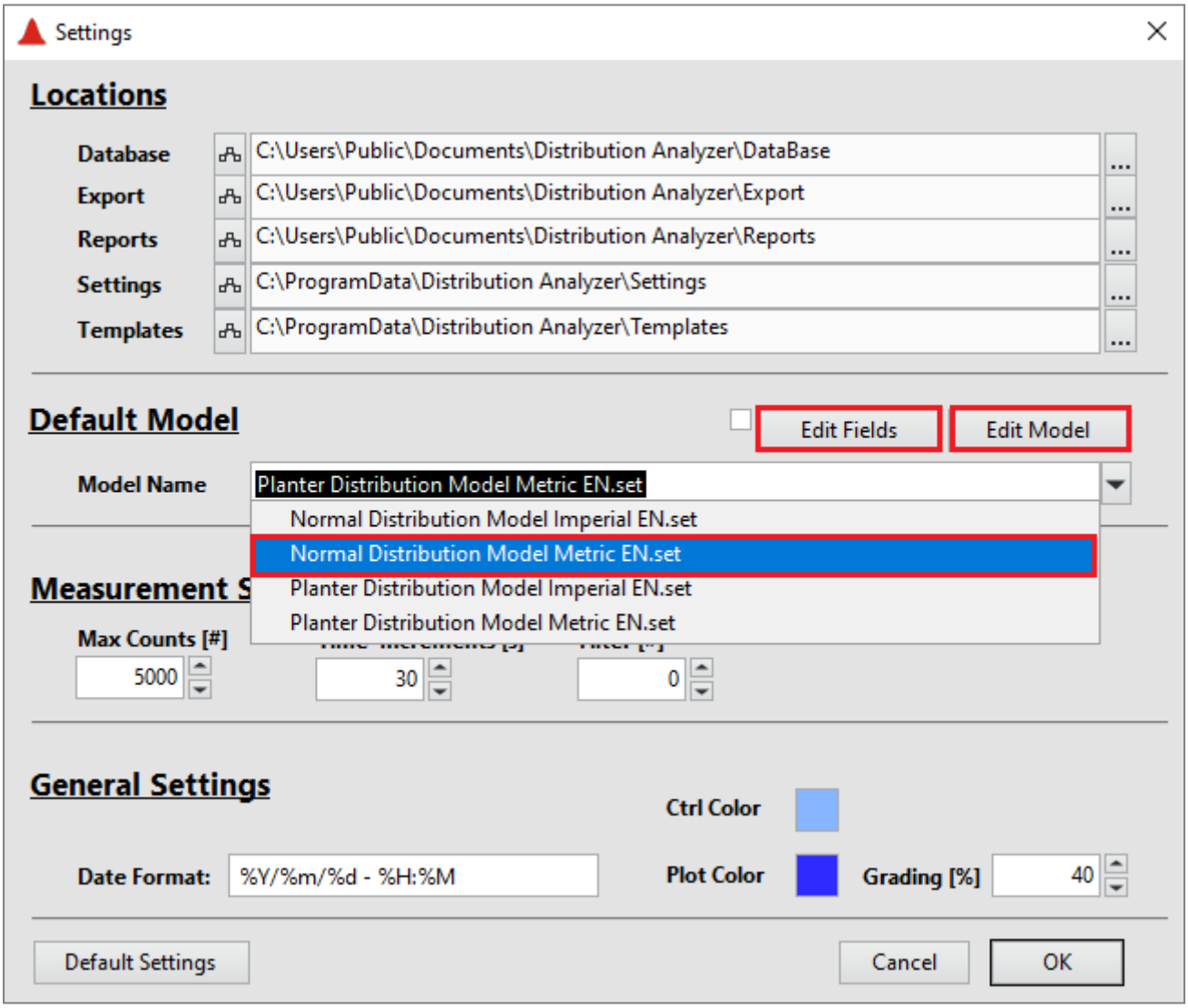
Seeder Distribution Model Metric...

File Edit Format View Help

```
[General]
Name = "Seeder Distribution Metric"
MaskTemplate = "MaskFields EN.ini"
plScale = 27.7777778
plUnit = "cm"
mask_idx =
"1,3,24,10,12,13,14,15,16,11,17,18,19,20
,21,22,7"
user_idx = "1,3,2"

[Model]
Type = 3
QL = 75
QU = 125

[Data Header]
t1_label = 'Statistics'
t2_label = 'Values'
t3_label = 'Units'
t4_label = 'Formulas'

[System Outputs]
s1_label = Counts
s1_unit = #
s2_label = Median
s2_unit = Hz
s3_label = Average
s3_unit = Hz
s4_label = Multiples
s4_unit = %
s5_label = In IQR
s5_unit = %
s6_label = 1st. Holes
s6_unit = %
s7_label = 2nd. Holes
s7_unit = %

[User Inputs]
u1_label = Speed
u1_unit = km/h
u2_label = TGW
u2_unit = g
u3_label = Row Distance
u3_unit = cm
u4_label =
```

Ln 1, Col 1 | 100% | Windows (CRLF) | UTF-8

The first file is an INI file and opens if the button **“Edit Fields”** is pressed.



This is the file to define the field names and the values of the drop down inside the **“Mask Module”** and/or for the reports. Inside the file is a section called **[MASK FIELDS]** with 25 unique keys **<daFieldx = name>**:

[MASK FIELDS]

daField1 = Company

…

daField25 = Keywords 2

For each control field in the **"Mask Module"** which has a drop down option, a section can be defined **[daFieldx]**, with a key value for each drop down value **<name = FALSE>**. The word False is just needed for completeness of the data structure and has no effect.

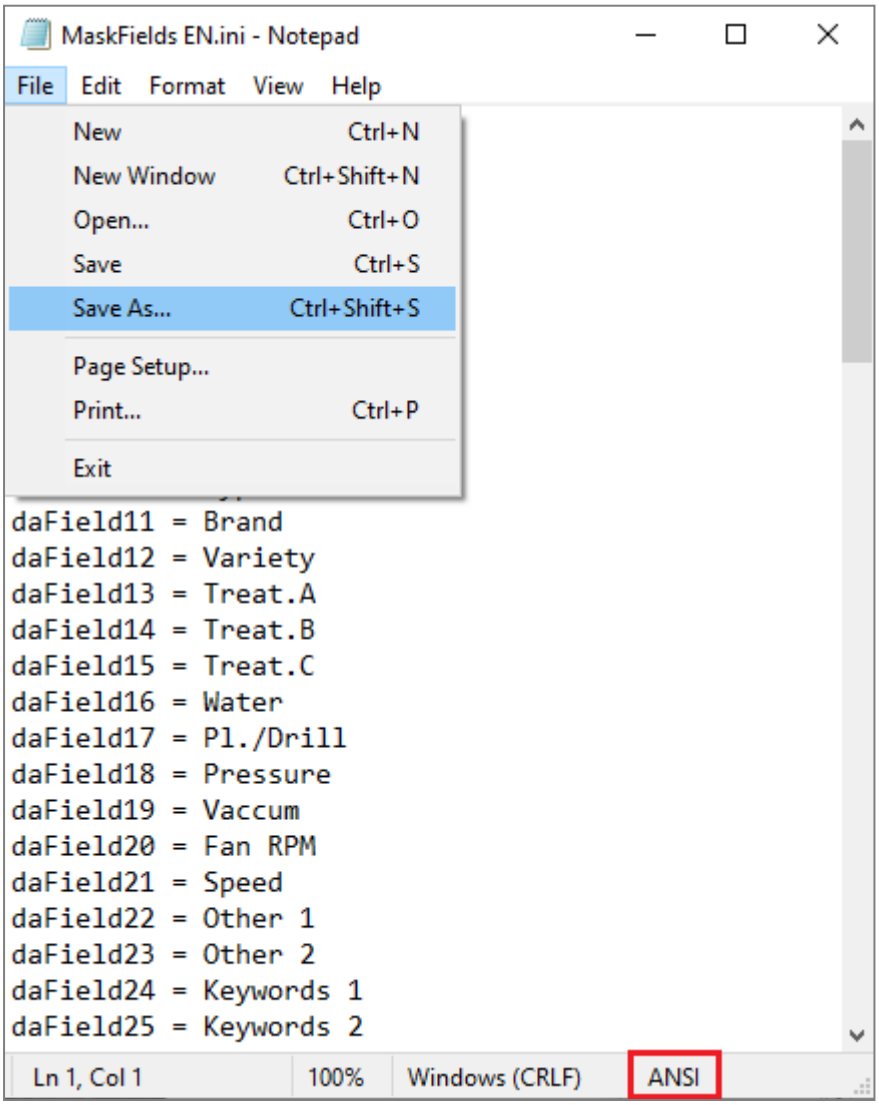
[daField1]

Company 1 = FALSE

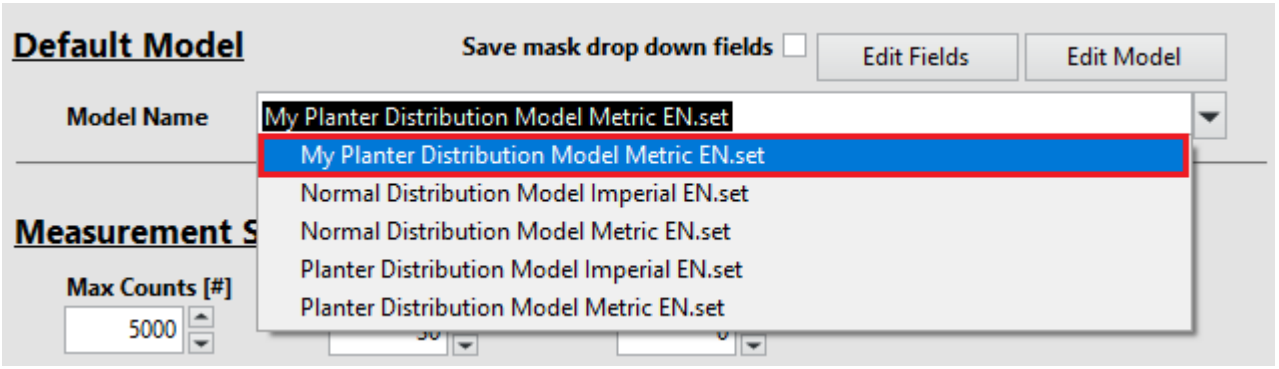
Company 2 = FALSE

Company 3 = FALSE

Before changing this file, make a copy with **"Save As..."** and save the file to the location **.\Settings**. Select **Encoding ANSI** if you need special chars used in other languages than English and remember the new file name, it needs to be written into the second file as described later.



The next step is to copy the file containing the model information and the user formulas. Press the button **"Edit Model"** and save the file with **"Save As...** to the location **.\Settings**." with a file name describing the model. Also here select Encoding ANSI if special chars are needed.



In the drop down of the **"Model Name"** select the new model. The next step is important; it links the file for the **"Mask Module"** to your new model file and defines a model name. Press the button **"Edit Model"** to open the new created model file (*.set). In the editor, change the red text to your needs and save the file again.

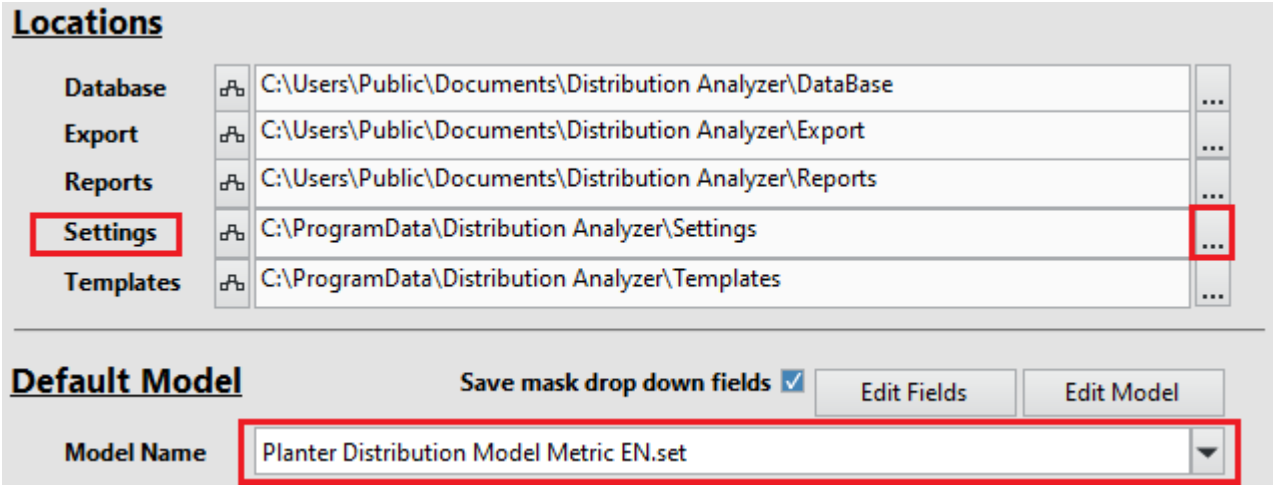
[General]

Name = "My new model name"

MaskTemplate = "My MaskFields EN.ini"

All model files can link to the same mask template (*.ini), whenever possible this workflow is recommended. It makes it easier to compare different data sets against each other. This was already discussed in chapter **3.3 Collection Module**.

Note: To delete unused custom model files, click on the button with the three dots right to the **Settings** path under **Locations** and delete the files (*.set / *.ini) in this folder. After that, close the dialog. Make sure you have selected a model that still exists under **"Model Name"**.



7.1 Define User Inputs

There are six user defined input controls available. They are part of the model settings and are therefore defined in the model file ***.set**. If you open again the current model with the button **"Edit Model"** you will find the section **[User Inputs].**

[User Inputs]

u1_label = Speed

u1_unit = mph

u2_label = TGW

u2_unit = g

u3_label = Row Distance

u3_unit = in

u4_label =

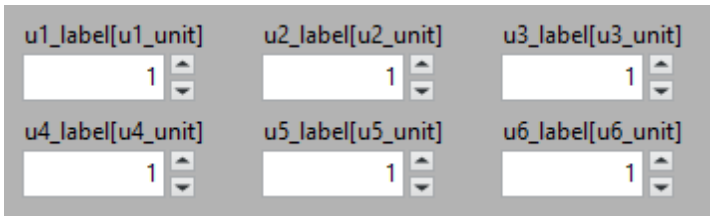
u4_unit =

u5_label =

u5_unit =

u6_label =

u6_unit =

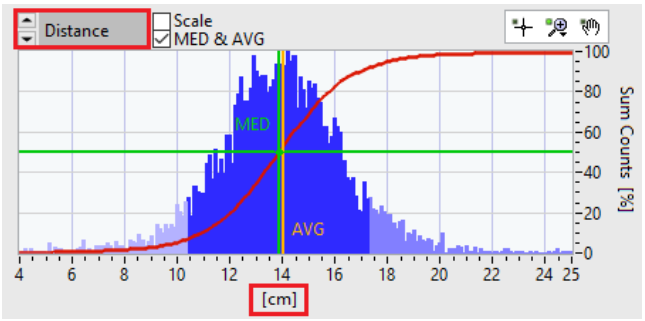


If a field is not needed and should not show up, assign nothing to the **uX_label**, like you can see in the example section above for the labels u4, u5 and u6.

The assignment and location of the six user fields and there units is shown in the image above.

Note: The field **ui1** is a bit special and is foreseen to represent speed, ether the speed of a machine, a conveyor belt, or another transport system. The unit can be free chosen but must be scaled to the unit used on the distribution plot, see image below. All other fields **(u2 to u6)** have no limitations and can be used w/o restrictions in the user formulas.

The additional scaling is done in the red marked keys inside the model file.



[General]

Name = "Planter Distribution Metric"

MaskTemplate = "MaskFields EN.ini"

plScale = 27.7777778

plUnit = "cm"

$$xAxis[unit1] = u1\ value[unit2] \times plScale \times \frac{1}{freq\ [Hz]}$$

In the table below are some examples how to setup the correct values.

u1_label	u1_unit	u1 value	plScale	plUnit	freq	xAxis
Speed	km/h	10	27.778	cm	20Hz	13.89cm
Speed	m/s	2.778	1.00	m	20Hz	0.138m
Speed	mph	6.214	17.615	in	20Hz	5.47in

7.2 Define the statistic Table

The user fields and the fields from the statistics table can be used to create your own user formulas to show additional information in the reports.

The following sections and keys are defined in the model file and are assigned as follows:

[Data Header]

t1_label = Statistics

t2_label = Values

t3_label = Units

t4_label = Formulas

[System Outputs] (Remark: always a pair of keys per row)

s1_label = Counts

s1_unit = #

s2_label = Median

s2_unit = Hz

s3_label = Average

s3_unit = Hz

s4_label = Multiples

s4_unit = %

s5_label = IQR

s5_unit = %

s6_label = 1 Gap

s6_unit = %

s7_label = 2+ Gaps

s7_unit = %

[User Outputs] (Remark: always a triple of keys per row

y1_label = AVG/MED Ratio

y1_unit = %

*y1_formula = 100/s2*s3*

y2_label = Speed

y2_unit = mph

y2_formula = u1

y3_label = TGW

y3_unit = g

y3_formula = u2

y4_label = Row Distance

y4_unit = cm

y4_formula = u3

y5_label = Seed Dist. MED

y5_unit = cm

*y5_formula = u1/3.6/s2*100*

y6_label = Seeds Total

y6_unit = kg/ha

y6_formula = (10000/u3)(100/(u1/3.6/s2))*u2/1000000*

y7_label = Seeds IQR

y7_unit = kg/ha

y7_formula = ((10000/u3)(100/(u1/3.6/s2))*u2/1000000)*s5/100*

This results in the following table representation in the software:

t1_label	t2_label	t3_label	t4_label
s1_label		s1_unit	
s2_label		s2_unit	
s3_label		s3_unit	
s4_label		s4_unit	
s5_label		s5_unit	
s6_label		s6_unit	
s7_label		s7_unit	
y1_label		y1_unit	y1_formula
y2_label		y2_unit	y2_formula
y3_label		y3_unit	y3_formula
y4_label		y4_unit	y4_formula
y5_label		y5_unit	y5_formula
y6_label		y6_unit	y6_formula
y7_label		y7_unit	y7_formula

Statistics	Values	Units	Formulas
Counts	5008.00	#	
Median	20.00	Hz	
Average	19.82	Hz	
Multiples	7.24	%	
IQR	84.84	%	
1 Gap	7.73	%	
2+ Gaps	0.20	%	
AVG/MED Ratio	99.06	%	100/s2*s3
Speed	10.00	km/h	u1
TGW	300.00	g	u2
Row Distance	75.00	cm	u3
Seed Dist. MED	13.89	cm	u1/3.6/s2*100
Seeds Total	28.81	kg/ha	10000/u3*100*3.6/u1*s2*u2/1000000
Seeds IQR	24.44	kg/ha	10000/u3*100*3.6/u1*s2*u2/1000000*s5/100

7.3 Creating user Formulas

There are seven measurement values **(s1 to s7)** and six user values **(u1 to u6)** which can be used to create N user defined output values (**yn**) based on formulas. The software has already predefined defined templates for metric and imperial. This is a good staring point how formuals are realzed and implemented in new templates.

Example formula for the seed weight per hectares inside IQR:

$$\boldsymbol{y7} = \frac{\boldsymbol{10000}}{\boldsymbol{u3}} \times \frac{\boldsymbol{100 \times 3.6}}{\boldsymbol{u1}} \times \frac{\boldsymbol{s2 \times u2}}{\boldsymbol{1000000}} \times \frac{\boldsymbol{s5}}{\boldsymbol{100}}$$

Remark: Output results **yn** cannot be used in the formulas, only **sx** and **ux** are allowed.

8 Creating Reports

The reports are based on MS-Word templates. The values from the measurement are filled in by Bookmarks and can be places everywhere in the report.

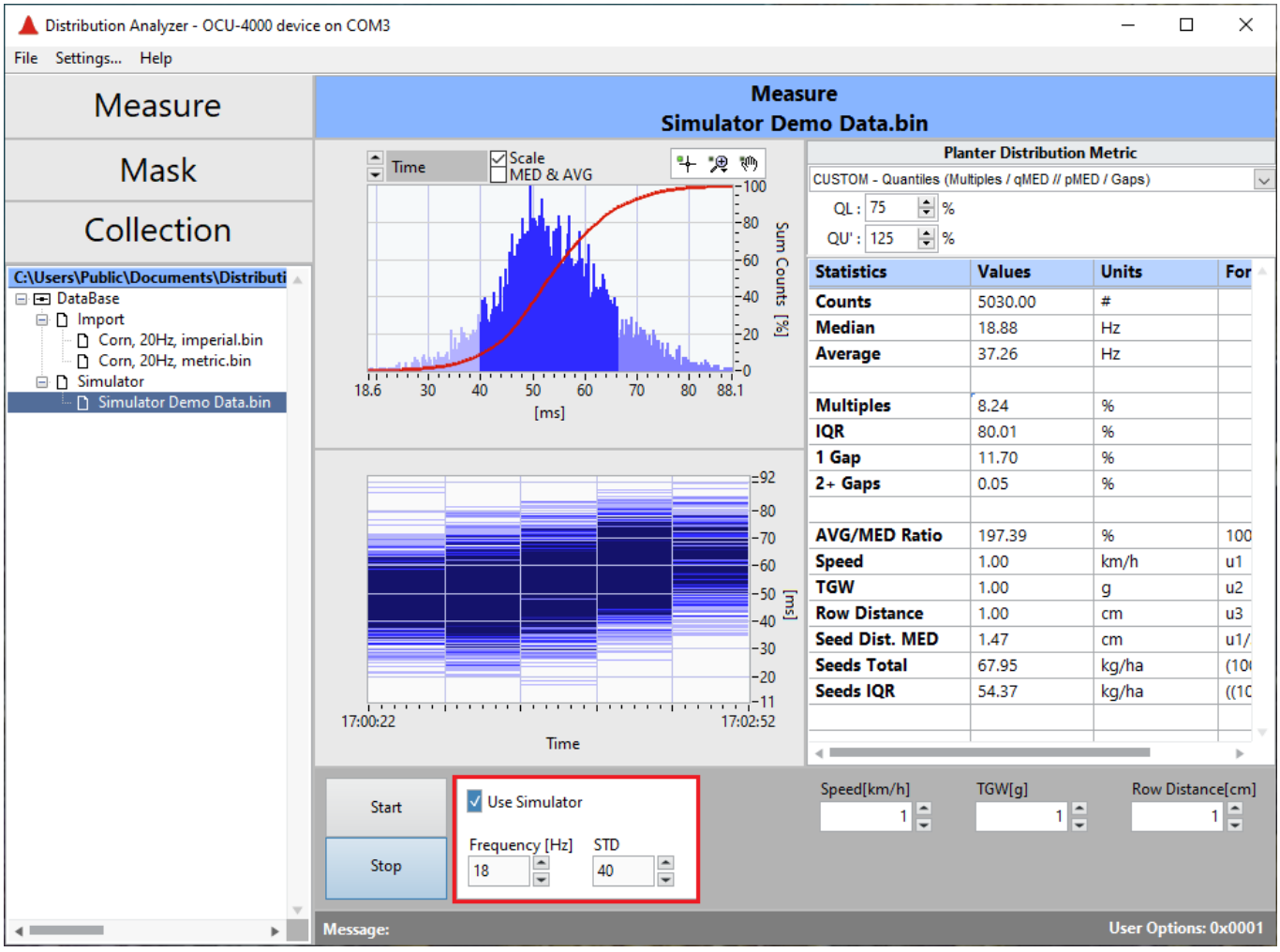
9 Special Functions

9.1 Simulator

There is a hidden build in function to allow simulate "**what if analysis"** based on Gaussian distributed seeding data. To make the feature visible the following changes need to be made in the Distribution Analyzer.ini file:

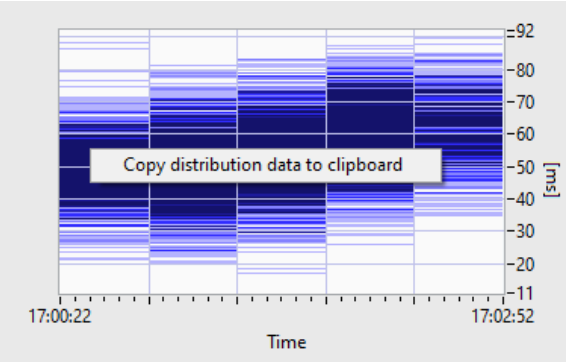
[Distribution Analyzer]

User = 1



9.2 Timeline Plot

A right mouse click on the plot, transfers the timeline data into the clipboard.



This data can then be pasted directly in to MS Excel for further processing/visualization of the data over time.

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	DST [h]	Time Zone [h]	Local Time [date]	Counts [#]	Median [Hz]	Average [Hz]	Multiples [%]	IQR [%]	1 Gap [%]	2+ Gaps [%]	AVG/MED Ratio [%]	Speed [km/h]	TGW [g]	Row Distance [cm]	Seed Dist. MED [cm]	Seeds Total [kg/ha]	Seeds IQR [kg/ha]
2	0	1	15:52:08	573	19.79	19.10	8.21	80.39	10.18	1.22164	96.53	10	300	75	14.04	28.49	22.91
3	0	1	15:52:38	598	19.98	19.93	7.23	85.23	7.49	0.05	99.78	10	300	75	13.90	28.77	24.52
4	0	1	15:53:08	598	19.91	19.93	6.50	88.22	5.23	0.05	100.12	10	300	75	13.95	28.67	25.29
5	0	1	15:53:38	596	20.04	19.87	6.18	86.45	7.32	0.05	99.13	10	300	75	13.86	28.86	24.95
6	0	1	15:54:08	598	20.00	19.93	7.86	83.95	8.03	0.167224	99.67	10	300	75	13.89	28.80	24.18
7	0	1	15:54:38	598	20.19	19.93	5.63	86.19	8.13	0.05	98.72	10	300	75	13.76	29.08	25.06
8	0	1	15:55:08	597	20.05	19.90	7.35	85.26	7.22	0.167504	99.27	10	300	75	13.86	28.87	24.61
9	0	1	15:55:38	600	20.22	20.00	7.96	83.35	8.65	0.05	98.89	10	300	75	13.74	29.12	24.27
10	0	1	15:56:08	250	19.79	19.67	6.80	84.67	8.13	0.4	99.41	10	300	75	14.04	28.50	24.13