

# Microsoft® Excel® spreadsheet for M-Bus data collection and processing

Manual version: 1.11 EN  
11. 1. 2023



**JC Elektronika s.r.o.**

# Introduction

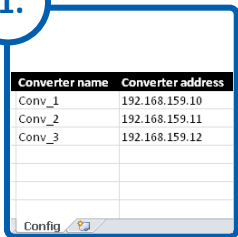
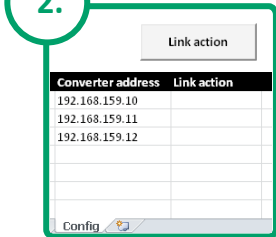
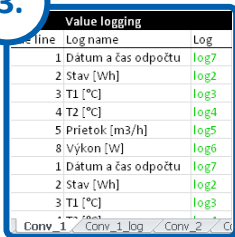
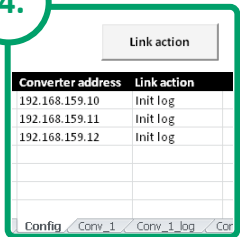
Data from M-Bus meters connected to our smart Ethernet converters can be directly linked into, logged and processed in Microsoft® Excel®. No additional software or macro is required to open or format the CSV exports from the converters. We offer a simple Excel® spreadsheet file named *JC-E\_readout\_<version>\_EN.xlsm* which fulfils basic functions of a readout application.

Supported are Microsoft Office® versions 2007 and higher. The source code of all macros is provided under the GPL license. It can be modified without any limitations and used for free even for commercial purposes.

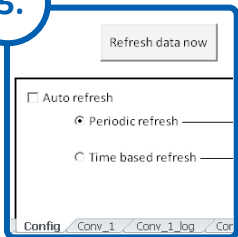
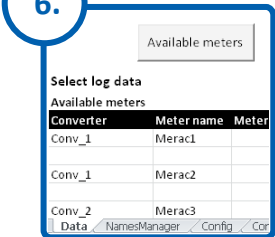
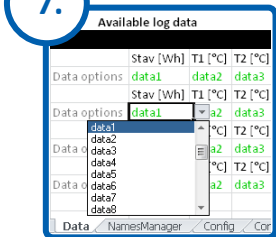
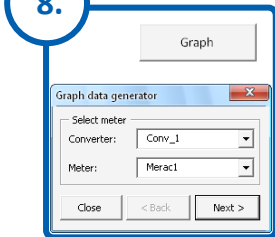
In order to use this form of readout the converters must be set to the *Smart M-Bus application* mode. The *Web Interface a Telnet* manuals for our converters contain details on how to set this mode.

## Usage and settings description

### Steps for linking the converter exports to the xls file

<p><b>1.</b></p> 	<p><b>2.</b></p> 	<p><b>3.</b></p> 	<p><b>4.</b></p> 
<p><b>Add converter links</b> Fill in Converter names and IP addresses</p>	<p><b>Press <i>Link Action</i></b> Empty cell or <i>Add link</i> action will create Import &amp; Log sheets</p>	<p><b>Configure logging</b> Fill in log options</p>	<p><b>Press <i>Link Action</i></b> <i>Init log</i> action verifies log options creates log headers</p>

### Collecting meter data Filtering the logged meter data

<p><b>5.</b></p> 	<p><b>6.</b></p> 	<p><b>7.</b></p> 	<p><b>8.</b></p> 
<p><b>Collect data</b> Use manual or auto refresh to obtain meter data</p>	<p><b>Press <i>Available meters</i></b> Gathers available meters and options to filter their log data</p>	<p><b>Set data filter</b> Choose which log data should be filtered out</p>	<p><b>Press <i>Graph</i></b> Filter out the logged data for the desired time period</p>

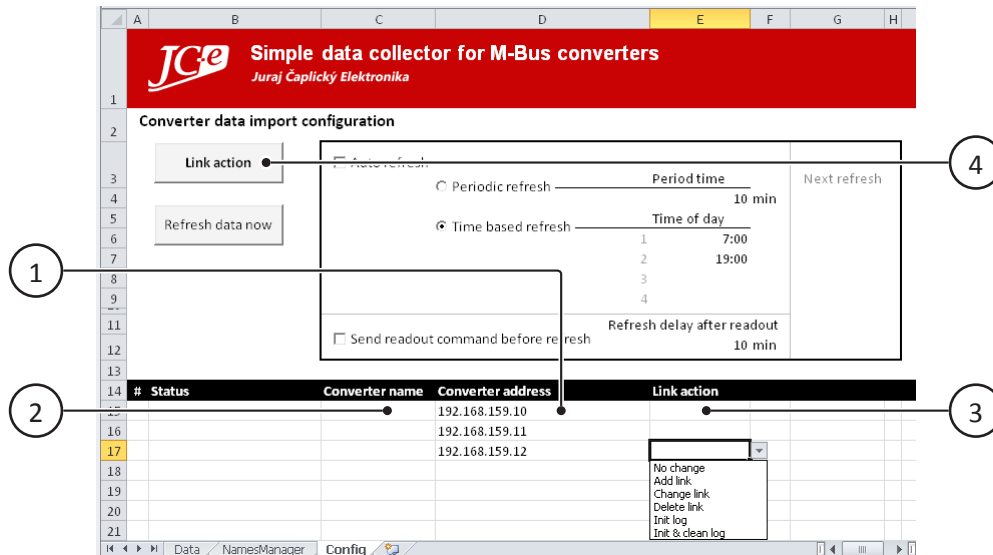
### Important notes

See [page 9](#).

## Linking the converters to the xls file

When opening the file it is necessary to enable macros and data connections (if CSV imports were already linked).

All that is needed to add the converters initially is to fill out the *Converter addresses* (1), *Converter names* (2), leave the *Link action* (3) cells empty and press the *Link action* button (4). The next step should be configuring the *Log and meter names settings* in the newly created sheets with the CSV imports.



Config sheet with the main settings.

### 1 - Converter address column

Converter IP addresses are entered into this column, these provide the links for the data imports. It is possible to enter any number of links. The first link must be directly under the caption and there must be no empty rows between links.

### 2 - Converter name column

Is the name of the CSV import sheet and the log sheet with added *\_log* suffix. Automatically generated names will be used for converter names which were not filled in. These names must not be changed manually after linking. It is necessary to use an action in *Link action* (4) column.

### 3 - Link action column

This column determines what action will the *Link action* (4) button perform. An empty cell has the same meaning as the *Add link* action. Actions can be chosen from the dropdown menu available in this column. Available actions are:

- *No change* - The final state after setting up the log options. The action performed by the *Link Action* button will skip rows with this setting.
- *Add link* - Creates the data link. Adds new sheet with a data connection to the CSV export of the converter and a new log sheet. The names of the sheets are set according to the *Converter name* (3) column.
- *Change link* - Change the IP address of the data link. The CSV import and log sheets will not be removed. Log settings will be retained.
- *Delete link* - Removal of the linking. CSV import and log sheets will be removed.
- *Init log* - Formats the header of the log sheet according to the log setting on the CSV import sheet. This option is automatically set after successful linking action. The settings on the CSV import sheet determine what will be logged and must be properly configured to collect the meter data.

- *Init & clean log* - Same as *Init log* with added clearing of all data on the log sheet.

**Warning:** This action does not require any user confirmation.  
The data will be erased without notification.

#### 4 - Link action button

Performs all actions set in the *Link action* (3) column.

**Note:** The *Status* column is filled out automatically. Depends on action performed on the link.

## Log and meter names settings

The log options are located on individual CSV import sheets. Logging for each converter needs to be set up individually, however the configuration can be easily copied.

The configuration on the CSV import sheet applies to the log sheet with the same name with a *\_log* suffix.

#### 1 - Meter name column

Meter names can be entered into this column. This information is not part of the CSV import. Similar to the log settings this is just internal data of this XLS file. Names of all meters can be changed globally on the *NamesManager - meter names management* sheet.

#### A - Meter Info section

Basic meter information log settings section. Rows represent the columns from the first part of the CSV import. This section does not divide logging for each individual meter. For example enabling the logging of the *Meter status* will log status of all available meters.

#### 2 - Log

Log enabling and simultaneously the column number in the log sheet.

Logging of the given item will be disabled if the cell is left empty or will contain the text *no log*. This option can also be selected from the dropdown menu.

To enable logging a cell must contain the text *log + n*. Where *n* is the number of the column in the log sheet. Column *log1* is the first column after the mandatory log data (Date and time, Log status and Meter ID), which means the fourth column in the log sheet.

**Warning:** Log column numbers must not repeat within the same Meter ID.

	A	B	C	D	E	F	G	H	I	J
1	Date & Time	Log Status	Meter ID	Status merača	Stav [Wh]	T1 [°C]	T2 [°C]	Prietok [m3/h]	Výkon [W]	Dátum a čas odpočtu
2	15.1.2015 15:40	OK	1	1	39174100	35.51	29.48	0.9042	6307	15.1.2015 15:30
3	15.1.2015 15:40	OK	2	1	24175300	34.71	28.62	0.7378	5219	15.1.2015 15:30
4										

Log sheet with initiated log settings.

**3 - Log name**

This is where a column title for the log sheet can be entered. If no name is provided and logging is enabled the title will be filled in automatically according to the *Info name* (4) column.

**4 - Info name**

This is an information column. It contains title copies of all the items which can be logged from the first part of the CSV import.

**B - Value logging section**

Meter values logging section. Individual values from each meter can be set for logging here. The log configuration uses a special setting method resilient to meter malfunctions and dropouts when the CSV import will not contain data from the inaccessible meters.

**5 - Log**

Same as *point 2 - Log*.

**6 - Log name**

This is where a column title for the log sheet can be entered. If no name is provided and logging is enabled the title will be automatically obtained according to the *Meter\_id* (8) and *Value line* (7) from the CSV import column under the *Value name* (10) title. Explanation in next points.

**7 - Value line**

Line is a row of a single meter. Line number 1 means the first row of a new meter ID in the second part of the CSV import (9). Each new meter ID has a line number 1, following with 2, 3, 4 etc. until a new meter ID or end of the CSV import occurs.

**8 - Meter\_id**

Meter ID. Equates to meter\_id in the second part of the CSV import (9).

**Note:** The log settings are just ordinary cells and can be copied using a multi-cell selection. Multiple cells can be selected and copy pasted into the desired place. It is also possible to edit or copy the settings into multiple sheets at once. Multi-sheet editing can be performed by selecting all the desired log sheets by holding the Ctrl key + clicking on the desired log sheet tabs at the bottom.

The following pictures demonstrate how a log configuration is set up.

Import sheet

A	B	C	D	E	F	L	M	N	O	P	
1	Name: test	IP: 192.168.159.10	MAC: 00:80:A3:91:EF:31				<b>Meter info logging</b>				
2	Meter_id	Status	MBus Address	OK	ERR	SN	Info name	Log name	Log		
3	1	1	126	2	2	13677420	Meter_id				
4	2	1	132	2	2	13675410	Status				
5							MBus Address				
6	Meter_id	Value name	Value	Units	Storage	Tarrif	OK				
7	1	Time point	19.11.2014 14:56	date	0	0	ERR				
8	1	Energy	39174100	Wh	0	0	SN				
9	1	Flow temp.	35.51	°C	0	0	Type				
10	1	Return temp.	29.48	°C	0	0	Manuf.				
11	1	Volume flow	0.9042	m <sup>3</sup> /h	0	0	Version				
12	1	Temp. difference	6.03	°C	0	0	Meter status	Status merača	log1		
13	1	On time	35	day	0	0	Meter name				
14	1	Power	6307	W	0	0	<b>Value logging</b>				
15	2	Time point	19.11.2014 14:57	date	0	0	Meter_id	Value line	Log name	Log	
16	2	Energy	24175300	Wh	0	0	1	1	1	Dátum a čas odpočtu	log7
17	2	Flow temp.	34.71	°C	0	0	1	2	2	Stav [Wh]	log2
18	2	Return temp.	28.62	°C	0	0	1	3	3	T1 [°C]	log3
19	2	Volume flow	0.7378	m <sup>3</sup> /h	0	0	1	4	4	T2 [°C]	log4
20	2	Temp. difference	6.09	°C	0	0	1	5	5	Prietok [m3/h]	log5
21	2	On time	35	day	0	0	1	8	8	Výkon [W]	log6
22	2	Power	5219	W	0	0	2	1	1	Dátum a čas odpočtu	log7
23							2	2	2	Stav [Wh]	log2
24							2	3	3	T1 [°C]	log3
25							2	4	4	T2 [°C]	log4
26							2	5	5	Prietok [m3/h]	log5
27							2	8	8	Výkon [W]	log6

Principle of Value line configuration.

Import sheet

M	N	O	P
<b>Meter info logging</b>			
2	Info name	Log name	Log
3	Meter_id		
4	Status		
5	MBus Address		
6	OK		
7	ERR		
8	SN		
9	Type		
10	Manuf.		
11	Version		
12	Meter status	Status merača	log1
13	Meter name		
<b>Value logging</b>			
15	Meter_id	Value line	Log name
16	1	1	Dátum a čas odpočtu
17	1	2	Stav [Wh]
18	1	3	T1 [°C]
19	1	4	T2 [°C]
20	1	5	Prietok [m3/h]
21	1	8	Výkon [W]
22	2	1	Dátum a čas odpočtu
23	2	2	Stav [Wh]
24	2	3	T1 [°C]
25	2	4	T2 [°C]
26	2	5	Prietok [m3/h]
27	2	8	Výkon [W]

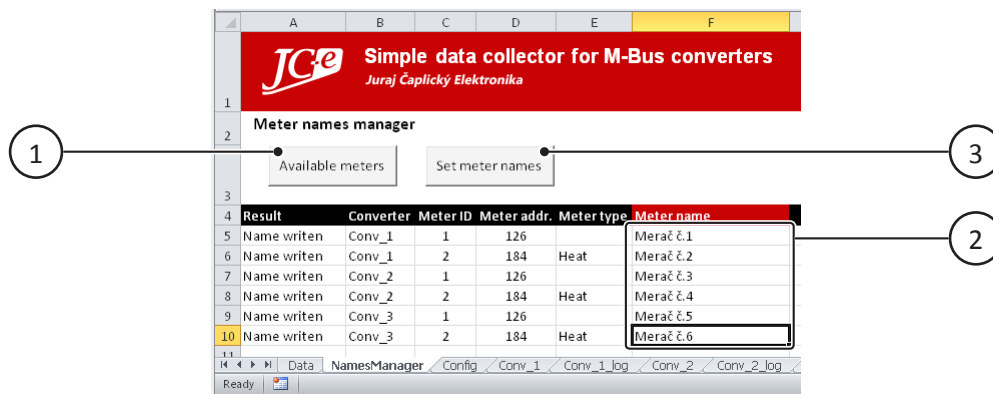
  

Log sheet

First 3 columns are always filled			log1	log2	log3	log4	log5	log6	log7	
A	B	C	D	E	F	G	H	I	J	
1	Date & Time	Log Status	Meter ID	Status merača	Stav [Wh]	T1 [°C]	T2 [°C]	Prietok [m3/h]	Výkon [W]	Dátum a čas odpočtu
2	15.1.2015 15:40	OK	1	1	39174100	35.51	29.48	0.9042	6307	15.1.2015 15:30
3	15.1.2015 15:40	OK	2	2	24175300	34.71	28.62	0.7378	5219	15.1.2015 15:30
4										

Principle of log column configuration.

## NamesManager - meter names management



### 1 - Available meters button

This button needs to be pressed first. It will create a list of currently available meters. Meter details including meter names are obtained from the CSV import sheets.

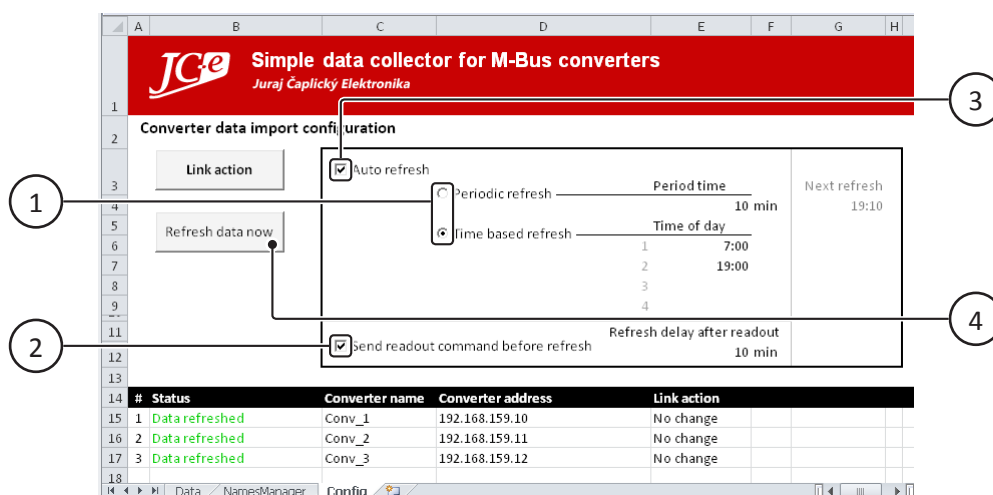
### 2 - Meter name column

The current meter names are displayed in this column. It also allows setting the meter names. The desired name can be just entered to the appropriate cell and the change is stored by pressing the *Set meter names* (3) button.

### 3 - Set meter names button

Writes all meter names from the *Meter name* (2) column into the appropriate CSV Import sheets.

## Automatic and manual data refresh



### 1 - There are two modes of automatic data refresh to choose from:

- **Periodic refresh** - This is a simple continuous repetition in a given time interval which will start immediately after checking the *Auto refresh* (3) checkbox.  
The time interval is entered into the cell under the *Period time* label. The time is in minutes and is in the range of 1 to 2 147 483 647.
- **Time based refresh** - The data refresh will be performed every day at the entered time of day. It is possible to enter 1 to 4 points in time of a day during which the refresh will be performed. The time points can be entered in any order. A 24 hour time format is used (e.g. 13:00) where 0:00 is midnight.

## 2 - Send readout command before refresh checkbox

This feature should not be normally used for auto refresh. It was designed for specific, not very common scenarios and to provide a remote *Read now* type of functionality found in the converter's Web Interface.

This command forces the converters to perform an immediate readout of the meters and thus retrieve the current values from the meters instead of the values collected by the converters during their internal readout cycles. The readout takes a while and depends on communication speed, number and type of meters and amount of data. It is necessary to wait for the finish of the readout so that the current values will be collected in the converters and be available for export. This wait time can be entered in the cell under the *Refresh delay after readout* label. The value is in minutes. The waiting time depends on the aforementioned factors and needs to be optimized for each individual application. The default setting is 10 minutes.

The readout command will be sent to all connected converters. This will be followed by a delay which will take the entered amount of minutes after which the automatic data refresh (CSV import refresh) and logging will start.

It is possible to obtain the information about the finish of the meter readout from the converters however due to simplicity this functionality is not provided in this XLS macro.

## 3 - Automatic refresh checkbox

This checkbox turns on and off the automatic data refresh.

It is necessary to choose the refresh mode first and set the time or points in time. Also turning on the *Send readout command before refresh* (2) feature and setting the delay time must be performed before turning on the automatic refresh.

**Warning:** The automatic refresh must be turned off before changing any of its settings! It is possible to change the settings on the fly, however this is not recommended and the automatic refresh should be turned off before changing any of its settings.

## 4 - Refresh data now button

Manual data refresh. Performs data refresh from all converters and ads them to logs immediately after being pressed. Currently not bound to the *Send readout command before refresh* (2) feature.

**Note:** The cell under the label *Next refresh* label is an indicator of the next automatic data refresh time.

## Data processing and filtering

The screenshot shows the Excel interface for data collection and processing. The main window is titled "Simple data collector for M-Bus converters" by Juraj Čaplický Elektronika. It features a "Data filter and graph creator" section with "Available meters" and "Graph" buttons. Below this is a "Select log data" section containing a table of available log data. The table has columns for Converter, Meter name, Meter ID, and Available log data. The data is organized into rows for different converters (Conv\_1, Conv\_2) and their respective meters (Merac1, Merac2, Merac3, Merac4). Each row includes "Data options" for selecting specific data points (data1 through data12). A dropdown menu is open, showing a list of data points from data5 to data12. The interface also includes a "Data" menu and a "NamesManager" window.



### 1 - Available meters button

Creates a list of available meters with log filtering options for each meter.

### 2 - Data options row

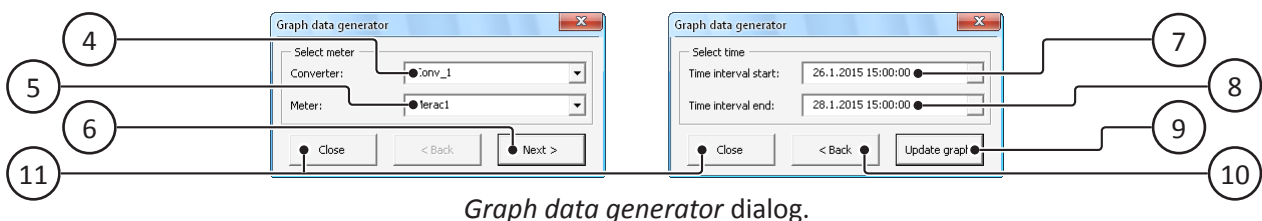
A list of all available columns from the log sheet will be created for each meter. Entering the text *data + n* or choosing it from the in-cell dropdown will select the appropriate log to be included as data source for processing or graph creation. Data will not be collected if the cell is left empty. The number *n* is the column number in the *Data* sheet. The log data will be collected into this column under the list of meters. The first column will contain the date and time of logging, *data1* thus represents the second column on the sheet.

The cells in these rows can be copy pasted in order to duplicate the settings for all meters. The current implementation of filtering has its own meter selection so individual meters can have the same data filtering options or multiple meters can collect data into the same column since only one meter is always filtered.

Multiple log data from a single meter marked for collection into the same column will be overwritten. The *data + n* number must be chosen carefully to avoid this scenario.

### 3 - Graph button

This button opens the *Graph data generator* dialog. It performs the filtering of all the log data according to the options in the meter list and the time interval which is selected in step 2 of this dialog.



Graph data generator dialog.

### 4 - Converter dropdown

Allows to choose of converter i.e. log sheet from which to collect the log data.

### 5 - Meter dropdown

Allows to choose the meter on the selected converter.

### 6 - Next button

Log sheets data filtering will start by pressing this button. The program will go through the log sheet of the selected meter and will pick the values according to the options in the meter list on the *Data* sheet. The data will be collected for the entire log period. The choice of a specific time interval will then be available in the next step.

Filtering a large amount of data can take a while during which the dialog will show the message *Filtering....* After a successfully finishing the filtering the dialog will be changed to the next step - choice of time interval.

If the data will be found, the initial time interval will be set to the entire available time interval from the first to the last found entry and the graph will be automatically refreshed to show this interval.

### 7 - Time interval start dropdown

The beginning of the time interval.

### 8 - Time interval end dropdown

The end of the time interval. The end date must not be before the start date.

### 9 - Update graph button

Changes the graph source data range. This action also redraws the graph using the new range.

## 10 - Back button

Return to the previous step, choice of converter and meter.

## 11 - Close button

Closes the dialog.

# Possibilities of modifications and program changes

The entire program is divided into separate independent modules which do not need each other.

This enables replacement of entire modules such as data processing with your own macros without the need of modifying the import or logging code.

The core of the entire application is the ImportEngine module, Config sheet and FormProgress dialog. This forms the entire functionality of the linking management and logging operations. Meter names management: NamesManager module and NamesManager sheet. Log data filtering and graph creation: GraphEngine and FormGraphData dialog.

## Advice on how to work with CSV exports

- This program utilizes the data connection function with an external file. This functionality is available in Excel® on the *Data* tab in the Ribbon in the *Get External Data* group with the button *From Text*. The same tab also contains a *Connections* button which allows to view the currently linked data sources.
- When a CSV file is opened using a normal file open method and Excel® does not recognize the data separator (;) and does not split the text into separate cells the *Text to Columns* button on the *Data* tab on the Ribbon can be used. This function also exist in VBA for use in macros.

## Important notes

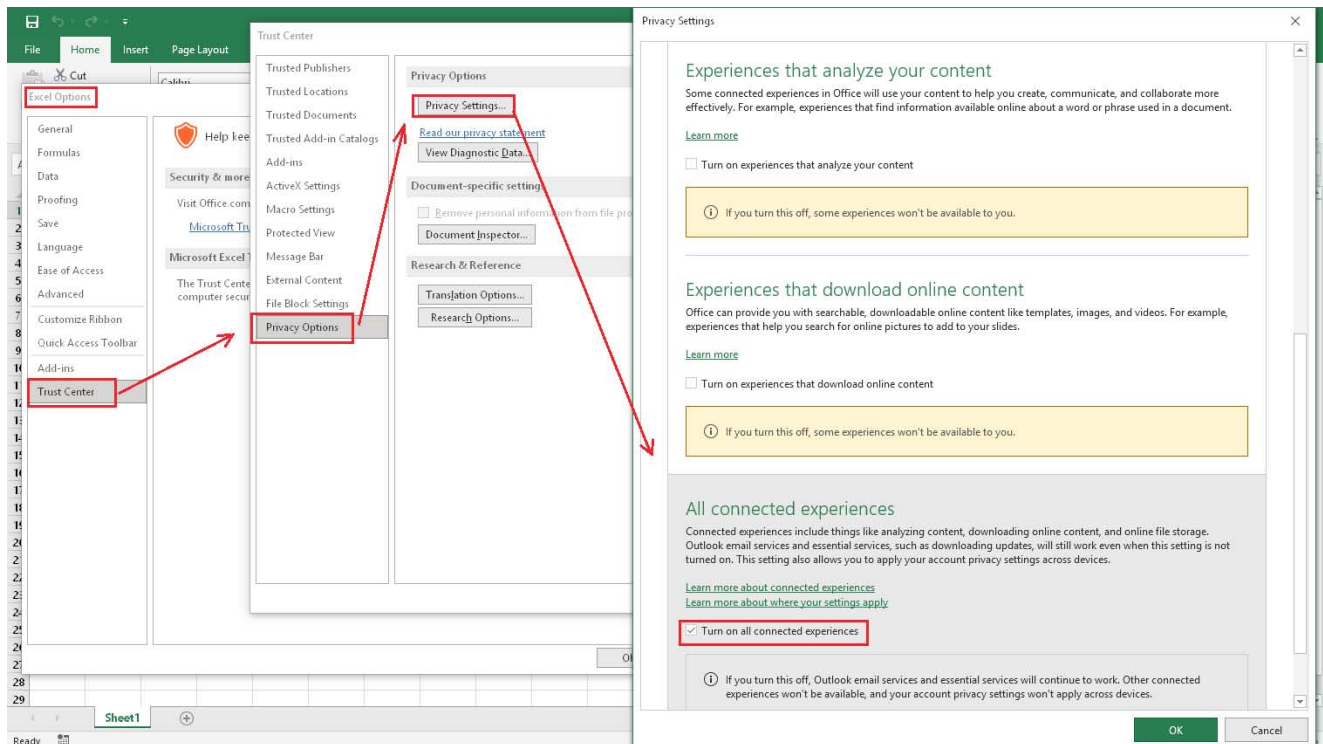
- **Very Important:** Do not create any of your own custom worksheets after the *Config* sheet.

If you need additional worksheets add them before the *Config* sheet. The macro addresses the CSV import and log sheets by a numeric offset from the *Config* sheet and thus would fail to access the proper sheets if any were added after it manually by the user.

Worksheets can be added at the right-most last log sheet position only if no new links will be created, but it is still more preferable to place any custom sheets before the *Config* sheet.

- Do not manually delete entire rows in the *Config* sheet. The macro looks for converter links starting from a fixed position on row 15.
- Excel 2019® requires the option of *All connected experiences* to be turned on so that the CSV export can be reached. This option is usually turned on by default but it could be turned off in some business environments. To turn it on follow these steps:
  1. In the main ribbon choose *File > Options*.
  2. In *Excel Options* choose *Trust Center*.
  3. In *Trust Center* choose *Privacy options*.
  4. On the *Privacy options* sub-screen click on the *Privacy Settings...* button.
  5. In *Privacy Settings* dialog scroll down to *All connected experiences*.
  6. Check the *Turn on all connected experiences* checkbox.
  7. Click the *OK* button.

See picture below.



Excel 2019® options *Turn on all connected experiences*.

## Disclaimer

This program is provided as is, without any warranty.

We do not hold responsibility for:

- I. Faults and failures of operation caused by incorrect use or change of source code.
- II. Errors in data and loss of data caused by bugs in the program, incorrect configuration or incorrect use.
- III. Functionality of the program with other than our own hardware.

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