Database Standard

Data Format Converter

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Introduction

NeuroCheck Data Format Converter in general

A so called Data Format Converter (abbreviated DFC) is a communication driver that converts data that is generated in NeuroCheck into a format that is suitable to a certain kind of hardware or file and vice versa. For a detailed introduction of Data Format Converter and the communication flow see NeuroCheck User Manual (chapter data exchange).

Database Data Format Converter

The NeuroCheck Database Data Format Converter is used for data exchange to and from a local database. It reads data like target values for check routine parameterization from a database storage or writes check results or measured values into a database archive.
This Database Data Format Converter offers input- and output data pins but no process pins. The data between NeuroCheck and database are exchanged via the NeuroCheck Data registers.

The most common types of databases are supported, see page Supported_Databases for a list of supported database vendors.

Use cases of the Database Data Format Converter

1. Type table / Reading data sets

   Normally a database contains several data sets, structured in rows. For a certain NeuroCheck inspection you want to read such a data set to configure a universal check routine for a specific type (variant). Doing so a single check routine can be used to handle a huge amount of different parts.
   To choose a data set from database a key is used to identify the data set (row) in database. That key can be a simple ID or combined conditions. The key has to be determined from NeuroCheck before, it can be calculated from image, e.g. using classification or simply read from PLC via field bus, ethernet, etc..
   The selected data set is stored inside the NeuroCheck Data Register and can be used as usual for data input.

2. Writing result values

   The database can also be used as result storage. The measured values are collected in NeuroCheck Data Register, e.g. with consecutive numbering or time stamp, while inspection run. Every cycle a data set is written to database as a new row in a specified table. The data can be used for trend visualization using different database tools or just as protocol storage.

Other Resources

For sample projects or further white paper documentations ask the NeuroCheck Support team please.

Supported Databases

NeuroCheck supports the most important but not all databases with this communication driver. The table below lists the currently supported databases. Please do not hesitate to contact your NeuroCheck partner for details or new developments on this communication driver.

	Database Type	32 bit	64 bit	Data provider
	Microsoft® Access®	X	X	ODBC (x86 only), OleDb
	Microsoft® Excel®	X	X	ODBC, OleDb
	Microsoft® SQL Server®	X	X	ODBC (x86 only), SqlClient
	Oracle® MySQL®	X	X	ODBC, MySqlClient

Installation

Supported operating systems

You can use the NeuroCheck Database Data Format Converter with all operating systems NeuroCheck itself supports.

- Microsoft® Windows® 7 (32 bit and 64 bit)
- Microsoft® Windows® 8 (32 bit and 64 bit)
- Microsoft® Windows® 8.1 (32 bit and 64 bit)

NeuroCheck Database Data Format Converter

For Installation of the NeuroCheck Database Data Format Converter complete the following steps.

1. Extract all files from the zip archive to their respective destination folders:

   - Copy all files located within the `/Binaries` directory to the main NeuroCheck installation directory (e.g., `C:\Program Files\NeuroCheck 6.2\`).

   - Copy all files located within the `/Documentation` directory to the `/Documentation/Help` subdirectory within the NeuroCheck installation directory (e.g. `C:\Program Files\NeuroCheck 6.2\Documentation\Help\`).

2. Configure the data format converter as new converter in NeuroC heck:

   a. In NeuroCheck, open the Data Format Converter Manager (Menu **System** | **Data Format Converter Manager**)

   b. Click **New ...** to start the NeuroCheck **Data Format Converter Wizard**.

   c. Select option **Database** on the first page and continue.

   d. On the second page, select **Data Format Converter for databases** and continue.

   e. Select the new converter node.

   f. Choose **Properties ...** to open the converter settings dialog and configure the settings for your application (see Converter Properties).

   g. Close the properties dialog with **OK**.

3. Close the NeuroCheck **Data Format Converter Manager** with **OK**.

Database Server Installation

For the Installation of the database server please refer to the specific manuals of the database vendor.
For usage of Microsoft® Access® or Microsoft® Excel® databases there is a special installation required, in addition or instead of Microsoft® Office® installation. Please refer to the following chapter.

Microsoft Access Database Engine Redistributable

For Microsoft Excel and Microsoft Access databases the database engine for OleDb and ODBC is required. The installation of 32 bit Microsoft Office products contains that database engines (but not the 64 bit Microsoft Office products). So if no Microsoft Office is installed on the target system or you are using a 64 bit operating system please install the Microsoft Access Database Engine 2010 Redistributable, you will find them using the link below. Please choose your language and start the download. For installation please start the installer, there are no more inputs required.

http://www.microsoft.com/en-us/download/details.aspx?id=13255

But please note that you cannot install that Access Database Engine Redistributable on a 64 bit operating system with a 32 bit version of Microsoft Office installed.
Sadly most office computers will have a 32 bit office version even on a on a 64 operating system.
In this case you have to reinstall Microsoft Office as a native 64 bit version.

Licensing

This section describes the licensing mechanism for this NeuroCheck Data Format Converter.
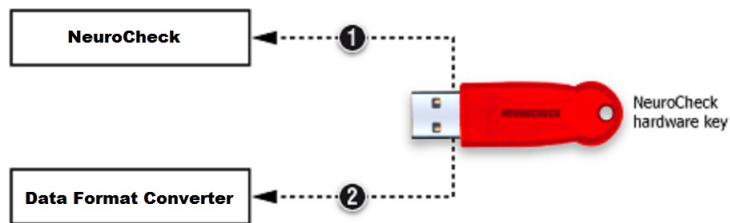
1. Protection of NeuroCheck

NeuroCheck requires a valid license which is provided as hardware security key (dongle).
You obtain the standard NeuroCheck license by purchasing the software from your local NeuroCheck dealer.

### 2. Protection of Database Data Format Converter

In addition to the standard NeuroCheck license, also a license for the NeuroCheck **Database Data Format Converter** is required. The protection of the Data Format Converter is stored as special flag in the same dongle as for the NeuroCheck license. The Data Format Converter allows a couple of read or write operations in demo mode, then a message box informs about the missing license. You have to confirm that message box before a new set of executions is possible.

In order to get the license for the Database Data Format Converter, please contact your local NeuroCheck partner. The license can be added to a standard NeuroCheck license by remote-programming of the dongle. The remote-programming works in the same way as a NeuroCheck update.

How to use

Sample for data flow structure (reading)

Normally for each column in database table (but not the 'key' column) an input pin is configured in NeuroCheck Database Data Format Converter. These input pins are connected to input register cells in Data Register Manager. That pins are the data set used in check routine for data input. One more pin is required for that information retrieval: the Key, normally a free register cell. The Key is taken from the NeuroCheck Database Data Format Converter to determine the row of the database table. That data set (the configured columns in that row) is delivery to the pins and into the input registers in Data Register Manager.
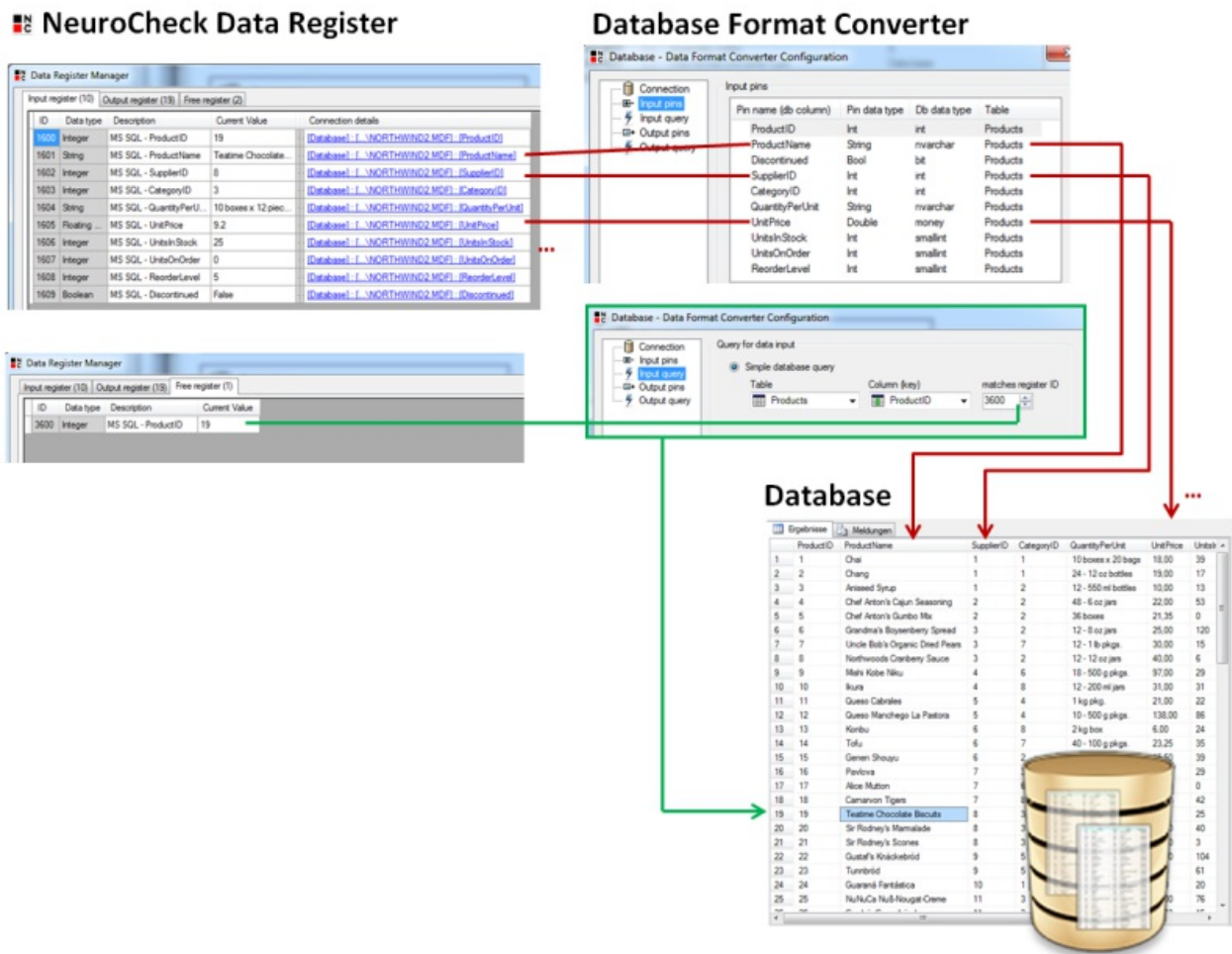
Database Characteristics

> For some of the individual databases there a specific rules, syntax or features you should notice. You will find a list of that points for your used database type below.

Microsoft® Access®

- If you construct you own SQL syntax using the user defined SQL query string put the table name in squared bracket. Example:
  SELECT Last_Name FROM [Contacts] WHERE First_Name = 'Mary';

Microsoft® Excel®

Microsoft® Excel® is not a real database like the others. You can not expect all features and comfort you may be familiar with other serious databases.

- You can not open the Excel® file while NeuroCheck is running using the NeuroCheck Database Data Format Converter, the file is looked. You have to close NeuroCheck to modify the Excel® file.

- Please avoid cell types 'Standard' in Excel® if you can define the Excel® file format yourself. Use 'Text' or 'Number' instead.

- Microsoft® Excel® does not support the data type integer, all numbers are floating point numbers.

- Do not use space characters in column headers.

- You can not use write protected Excel® files.

- You can not use password protected Excel® files.

Microsoft® SQL Server®

- Look for Microsoft® Management Studio (Express) as data management tool.

- Use Windows® Authentication as Authentication Mode in Microsoft® SQL Server.
  If you have to use SQL Server Authentication instead you have to change the Integrated Security in connection string for SqlClient from
  `Integrated Security=True;` to `user id=MyUserName;password=MyPassword;`

- …

Oracle® MySQL®

- …

Other databases

Other than the named databases are not tested from NeuroCheck. Anyway, perhaps you can configure other databases using the type 'Custom' in connection settings.

Troubleshooting

One column in database are not detected using the 'Add from table' button. What can I do?

- In rare cases an exotic data type of a column in database are unknown and not provided in the automatically generated list.
Please create the pin manually using the 'Add' button and choose the appropriate data type of the column in database. If you are unsure about that data type, pin type String should ever work.

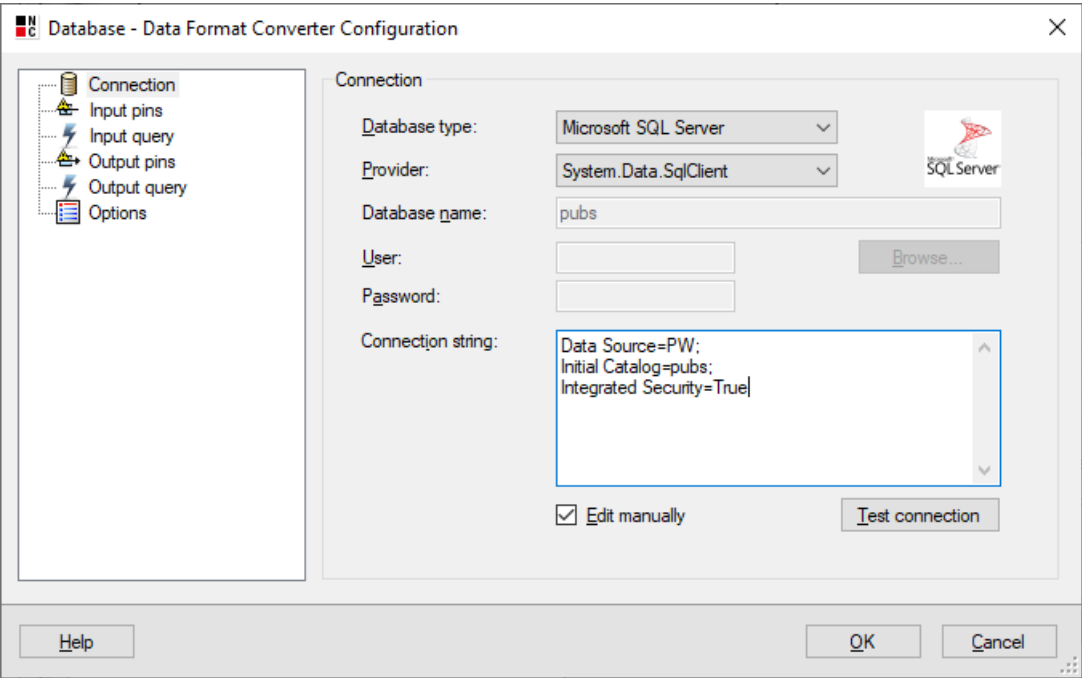**Can I access databases on the Local Area Network?**

- Microsoft® Access® and Microsoft® Excel® are designed as local databases only. In theory you can access them mapping a network drive to the directory of the database file, but we do not recommend to do so.
If you are using Microsoft® SQL Server® or Oracle® MySQL™ you can modify the connection string in connection settings page in properties dialog of NeuroCheck Database Data Format Converter. Set the server address to the remote SQL server instance.

How can I write NULL values into database?

- Writing NULL into a database is not possible. The NeuroCheck data registers only support the simple data types boolean, integer, floating point and string values.

Converter Properties Dialog: Connection

⊡ Screenshot of Properties Dialog

On this page you can configure the database connection.

Element	Description
Database type	Select here the type of database you want to work with. The following databases are supported: • Microsoft® Access® • Microsoft® Excel® • Microsoft® SQL Server® • Oracle® MySQL® If you want to connect to a different database select entry Custom. In this case you have to choose a data provider and specify the connection string independently.
User defined SQL query string	In this mode you can specify your own user defined SQL query in a string register. At runtime that SQL query is used instead of the manually defined simple database query. Here you have all the flexibility of SQL syntax, e.g. you can create a nested SQL query (using JOINs) over more than one table. The simple database query is limited to one source table.
Provider	The list shows all supported data provider for the selected database type.
Database file name Database name	In case of file base databases (e.g. Microsoft® Access®) you can set the file path using the browse button on the right. In case of more serious databases just enter the name of the database as shown in your DMS (database management system).
User / Password	Please note that Excel® files must not be password protected.
Connection String	Here the fundamental connection string for accessing the database is shown. Normally the connection string is build automatically using the information above. If you want to use a not listed database (database type Other) you have to construct the connection string for your own, you probably will find the required connection string in web at you database vendors home page.

Element	Description
Edit manually	If you have to modify the connection string, e.g. for special database formats or extended properties, set this option. In this case the connection string is used and stored as entered.
	Please ensure that you have configured the database name in the connection string.
	// Provider System.Data.SqlClient: "Initial Catalog="
	// Provider MySql.Data.MySqlClient: "Database="
	// Provider System.Data.Odbc: "Dbq="
Test connection	Here you can test the link connection to database using the connection settings on this page. If an error occurs the error message from the data provider is shown.

Converter Properties Dialog: Input Pins
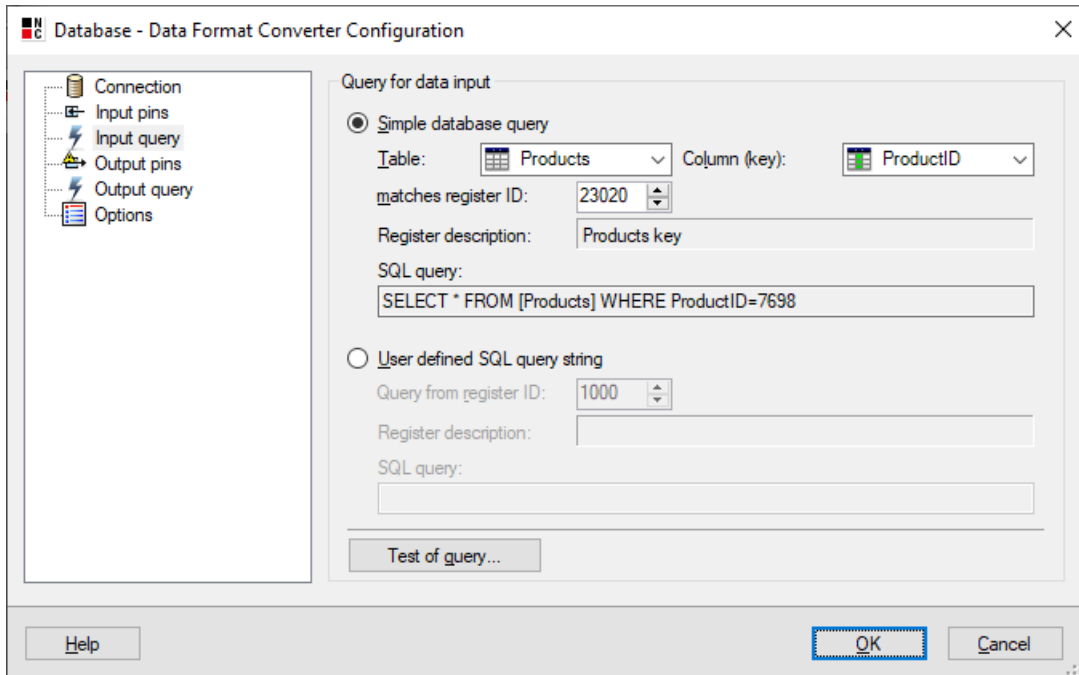
☑ Screenshot of Properties Dialog
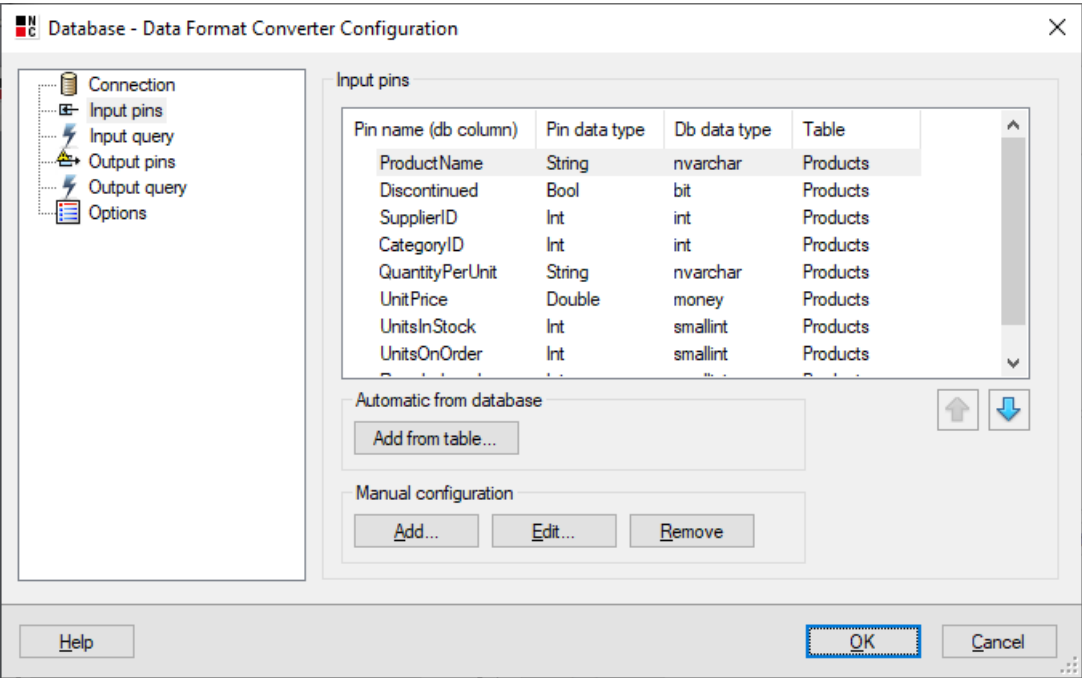
On this page you can configure the input pins for reading from database.
A pins points fix to a specific column in a database table, the row of that table is determined at runtime using the Input Query.

Element	Description
Input Pins	Shows the list of configured input pins for reading from database. Use button Add or Add from table to insert new data pins. The list shows the following columns. • **Pin name (database column):** The name of the pin is the column name of the database table. Using automatic pin construction the pin name is automatically generated from the column name of the table. If you edit the pin name manually keep in mind that the pin name must exactly match the column name in database. The column name must not have contain space characters. • **Data type:** The data type of the pin (Boolean, Floating point, String). The origin database data type is shown in parentheses. Both data types may differ, because NeuroCheck only supports a subset of the quantity of the database data types. Microsoft® Access® and Microsoft® Excel® only shows numerics whereas serious databases shows human readable data types. • **Table:** Shows the table name the pin belongs to.
Add from table	Click here to show the Column Select Dialog to select columns from an automatically generated list of available pins in database.
Add ...	Click here to define manually a new pin in the Data Pin Dialog and append it to the list.
Edit ...	Click here to open the Data Pin Dialog to edit the currently selected pin manually.
Remove	Click here to remove the selected pin(s) from the list.
Up	Click here to swap the currently selected pin with the pin above.
Down	Click here to swap the currently selected pin with the pin below.

Converter Properties Dialog: Input Query

☑ Screenshot of Properties Dialog

On this page you can configure the input query to select one data set from database.
While a pins points fix to a specific column in a database table, the row of that table is determined at runtime.

Element	Description
Simple database query	In this mode you can interactive configure the database query without any SQL knowledge. You just select a table from database and specify the WHERE-Clause, which looks up a single data set (row) from database.
Table	Select here the table the data are read from.
Column (key)	Select here the column which matches the key from register.
Matches register ID	Select here the register ID which value will be used to look up the key in the configured column in database table.
SQL query preview	Shows the SQL query which will be used at runtime to determined the data set (row) in database.
User defined SQL query string	In this mode you can specify your own user defined SQL query in a string register. At runtime that SQL query is used instead of the manually defined simple database query. Here you have all the flexibility of SQL syntax, e.g. you can create a nested SQL query (using JOINs) over more than one table. The simple database query is limited to one source table. Also see User Defined Queries.
Query from register ID	Select here the register ID of the string register which contains the whole SQL query.
Test read	Opens the Input Test Dialog to verify the SQL query.

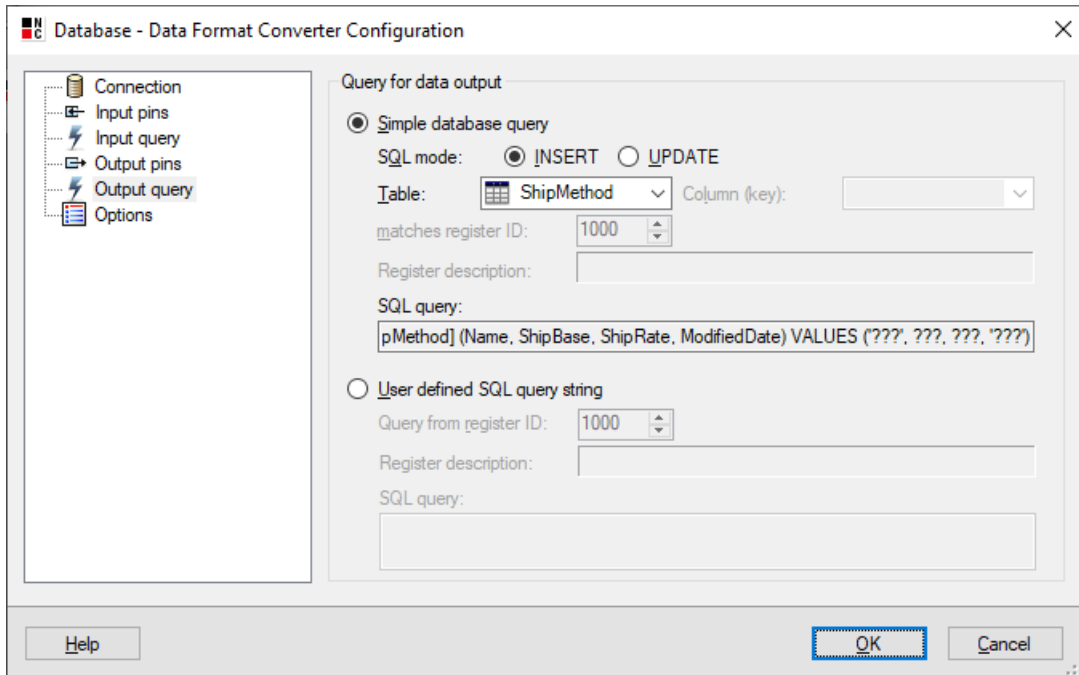# Converter Properties Dialog: Output Pins

☑ Screenshot of Properties Dialog
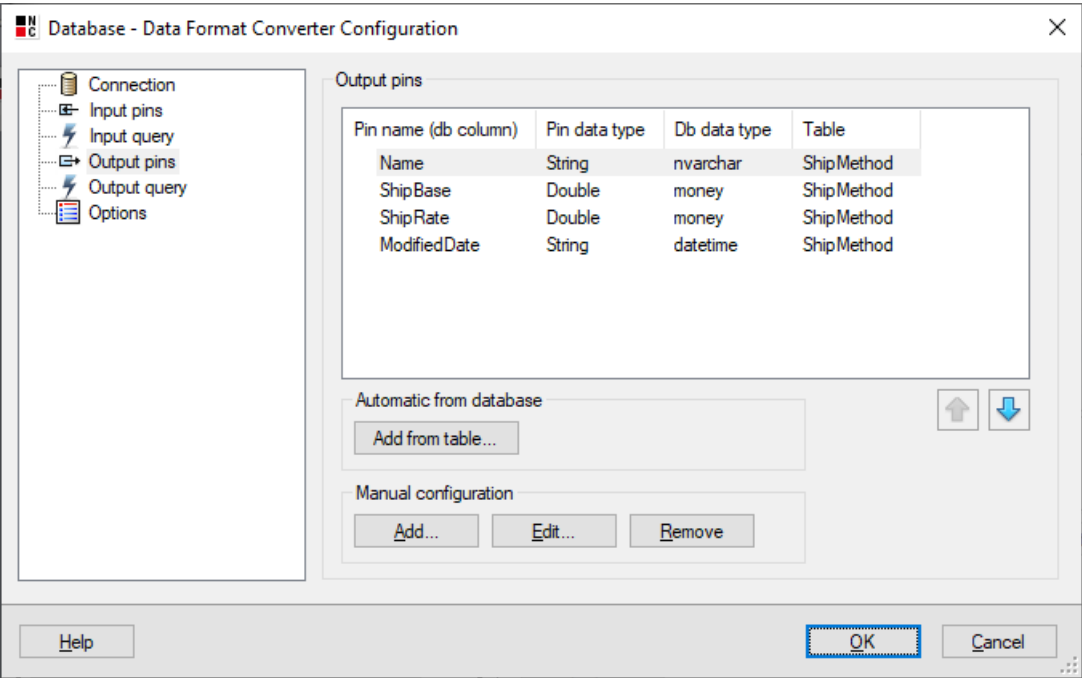
On this page you can configure the output pins for writing into database.
A pins points fix to a specific column in a database table, the row of that table is determined at runtime using the Output Query.

Element	Description
Output Pins	Shows the list of configured output pins for writing into database. Use button Add or Add from table to insert new data pins. The list shows the following colums. • **Pin name (database column):** The name of the pin is the column name of the database table. Using automatic pin construction the pin name is automatically generated from the column name of the table. If you edit the pin name manually keep in mind that the pin name must exactly match the column name in database. The column name must not have contain space characters. • **Data type:** The data type of the pin (Boolean, Floating point, String). The origin database data type is shown in parentheses. Both data types may differ, because NeuroCheck only supports a subset of the quantity of the database data types. Microsoft® Access® and Microsoft® Excel® only shows numerics whereas serious databases shows human readable data types. • **Table:** Shows the table name the pin belongs to.
Add from table	Click here to show the Column Select Dialog to select columns from an automatically generated list of available pins in database. If there are already pins configured in output list of pins, the added pins have to be from the same database table.
Add ...	Click here to define manually a new pin in the Data Pin Dialog and append it to the list.
Edit ...	Click here to open the Data Pin Dialog to edit the currently selected pin manually.
Remove	Click here to remove the selected pin(s) from the list.
Up	Click here to swap the currently selected pin with the pin above.
Down	Click here to swap the currently selected pin with the pin below.

Converter Properties Dialog: Output Query

⊡ Screenshot of Properties Dialog

On this page you can configure the output query to write or update one data set in database.

Element	Description
Simple database query	You just select a table in database the data set will be written to.
SQL mode	Select here the writing mode, if the data set should be appended (INSERT) or replaced (UPDATE) in database. • **INSERT:** Writes a new data set (row) in database. Missing columns (not configured pins) are set to database default value. • **UPDATE:** Modifies an existing data set (row) in database. The configured pins are updated others are retained.
Table	Select here the table the data are written to.
Column (key)	Only for UPDATE-mode. Select here the column which matches the key from register.
Matches register ID	Only for UPDATE-mode.
SQL query preview	Shows the SQL query which will be used at runtime to determined the data set (row) in database.
User defined SQL query string	In this mode you can specify your own user defined SQL query in a string register. At runtime that SQL query is used instead of the manually defined simple database query. Here you have all the flexibility of SQL syntax. Also see User Defined Queries.
Query from register ID	Select here the register ID of the string register which contains the whole SQL query.

User Defined Queries

Input and output queries can be completely user defined by providing a custom query string from register (see Input Query/Output Query). The query string supports placeholders for register values. To dynamically insert a register value into the query add a placeholder into the query, i.e.:

```
INSERT INTO table1 (column1) VALUES ({S1234})
```

A placeholder consists of the register data type (String (S), Integer (I), Boolean (B), Double/Float (F)) and the register ID enclosed in curly brackets, e.g. {S1234}. For the above example the placeholder will be replaced by the string value of register 1234 before execution of the user defined query.

To assign the results of an input query to the correct pins, the result columns of the query will be matched against the input pin names. Also ensure to configure a table name for the pins which matches the table of the query result. If the query is not directly related to a table (e.g. when using a JOIN) the pin table name may be empty.

Converter Properties Dialog: Options

⊟ Screenshot of Properties Dialog
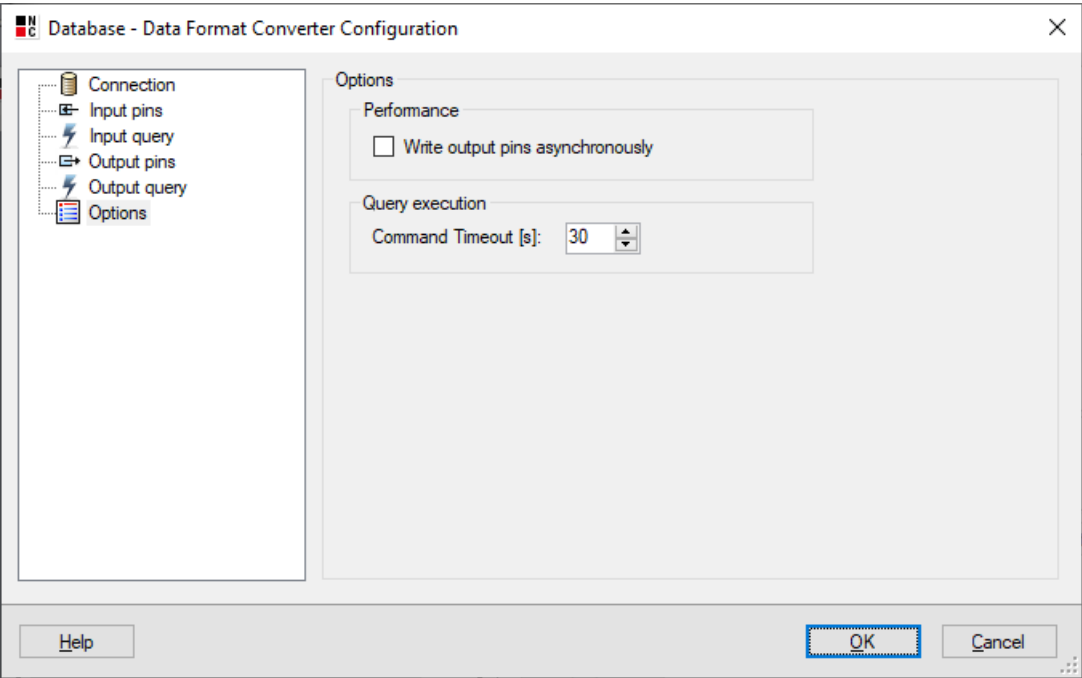
On this page you can configure the output query to write or update one data set in database.

| Element	Description
Write output pins asynchronously	Performs the output asynchronously in a Fire and Forget behavior.In this mode you cannot evaluate the result of the operation. In high-speed applications, you need to ensure that the database is not overclocked.
Command Timout	Wait time (in seconds) before terminating the attempt to execute a command (sql query).

Data Pin Dialog
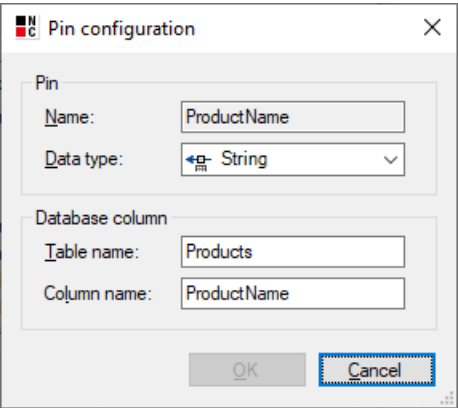
You can specify the properties of a pin. The dialog is used for the creation of a new pin as well as for editing an existing pin. The dialog is opened by clicking the buttons Add ... or Edit ... on the pages Input pins or Output pins.

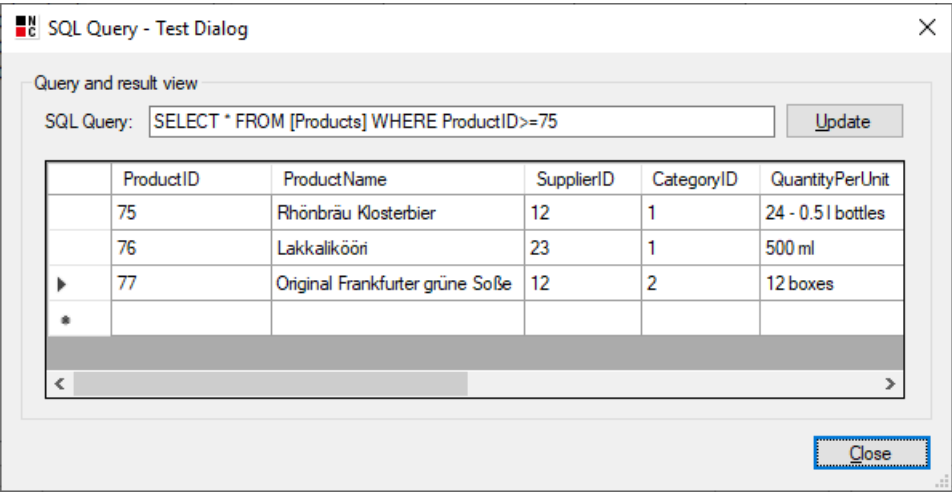| Element	Description
Name	The pin name is generated from column name
Data type	Specify here the pin data type. Please note that this data type must match the data type of the column of the database. If there are no exact data type representations the data type of the database column must be at the least convertible to the pin data type. Possible values are: • **Boolean:** The pin is used to exchange a Boolean value as data. • **Integer:** The pin is used to exchange an integer value as data. • **Float:** The pin is used to exchange a floating point value as data. • **String:** The pin is used to exchange a string value as data.
Database column	
Table name	The name of the table the pin (the database column) belongs to. Please note that the Microsoft® Excel® table names has the postfix $.
Column name	The name of the column the pin points to. The column name must not contain space characters.

Column Select Dialog

⊡ Screenshot of Dialog
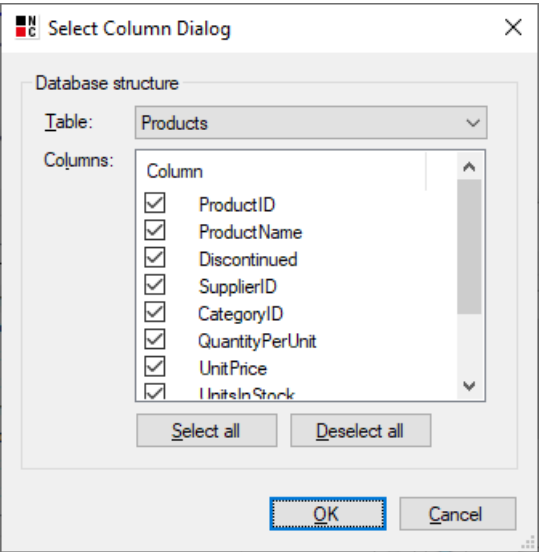
Here you select the columns from a list of all automatically detected columns in database. For each database column a NeuroCheck pin is created. The dialog is opened by clicking the buttons Add from table ... on the pages Input pins or Output pins.

Element	Description
Database structure	
Table	Select here the table of the database the which columns should be shown below.
Columns	Shows the list of columns of the configured database table. Activate the columns you want to take over into the list of pins.
Select all	Activates all the database column names in dialog.
Deselect all	Deactivates all the database column names in dialog.
OK	Creates a pin for every activated database column and closes the dialog.
Cancel	Closes the dialog without modification of the list of pins.

Input Test Dialog

⊟ Screenshot of Dialog

Here you can test the query generated from the Database Data Format Converter or set in the NeuroCheck Regsiter (if user defined).

Element	Description
SQL query	Here the SQL query generated from the Database Data Format Converter is shown. You can modify and execute the SQL query to fine tune the query for later use as user defined query.
Update	Executes the query and shows the results in the list below. All results are shown even if more than one match is found in database. On runtime the Database Data Format Converter takes the first match in that case.
Result list	Shows the read results.

Info Dialog

This dialog displays information about the NeuroCheck Database Standard Data Format Converter.

Element	Description
Description	The description of the Data Format Converter
File	The driver assembly name the Data Format Converter
Version	The version of the data format converter
Copyright	The copyright of the data format converter

Support Services

For technical support, please contact your local NeuroCheck partner or NeuroCheck GmbH:

Phone: +49 (0) 7146 - 89 56-40
E-Mail: support@neurocheck.com
Web: www.neurocheck.com

Before contacting us, please provide some important information about your system:

- **Information about your NeuroCheck installation and your PC setup:**
  Use the NeuroCheck Diagnostics tool to check your installation and computer configuration.
  The NeuroCheck Diagnostics is installed in the "Tools" folder within your NeuroCheck installation.

- **Log file information:**
  Logging for NeuroCheck can be activated in **System** > **Software Settings** > **Diagnosis** > **Logging**.

System	
Test	▶
Device Manager	
Data Format Converter Manager	
Remote Control	
Data Register Manager	
Software Settings	
Security Profiles	
Switch Security Profiles...	Ctrl+W
Import Configuration...	