



# POWERFACTORY

# PowerFactory 2021

# Getting Started

**POWER SYSTEM SOLUTIONS**  
MADE IN GERMANY

# F2021

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## 1 Introduction

This document guides you through the first steps after you downloaded the software from the *DlgSILENT* download area (<https://www.digsilent.de/en/downloads.html>) for registered users. Please read this document carefully before starting the installation.

For more details on the installation and advanced configuration topics refer to the *Advanced Installation and Configuration Manual* which is also available for download.

## 2 System Requirements

DlgSILENT *PowerFactory* is an application for standard Windows operating systems. Both a 32-bit and a 64-bit version are available. For running *PowerFactory* efficiently the computer should be equipped with, as a minimum:

- Operating system:
  - Windows 8.1 or Windows 10
  - Windows Server 2012, Windows Server 2012 R2, Windows Server 2016, or Windows Server 2019
  - .NET Framework 4.5
  - The 64-bit version of *PowerFactory* requires a 64-bit operating system
  - The 32-bit version will run on both architectures

Note: Installation on Windows 8.1 requires KB2999226. To install through Windows Update, make sure you install the latest recommended updates and patches from Microsoft Update before you install the Windows SDK.

- Processor with 2 GHz
- Main memory of 2 GB RAM
- Hard disk space of 2 GB plus additional 5 GB per user
- SVGA graphic card with a resolution of at least 1280x1024 pixels

Additional requirements:

- Internet connection for licence activation, transfer and regular licence validity checks (every 30 days)
- Administrator privileges for the installation process

Optional requirements for data export / import:

- MS Excel 2010 or newer
- MS Access 2010 or newer with ODBC drivers with the same architecture (32 or 64 bit) as *PowerFactory*

Optional requirements for Multi-User Database

- Microsoft SQL Server Database
  - SQL Server 2012, 2016, 2017 or 2019
  - ODBC drivers for SQL Server (typically shipped with the operating system)
- Oracle Database
  - Oracle Client 19c, 18c, 12c Release 2, or 12c Release 1 with the same architecture (32 or 64 bit) as *PowerFactory* (both full client and Instantclient are supported)

- Oracle server
  - \* Oracle Client 19c supports: Oracle Server 19c, 18c, 12c Release 2, 12c Release 1, 11g Release 2
  - \* Oracle Client 18c supports: Oracle Server 19c, 18c, 12c Release 2, 12c Release 1, 11g Release 2
  - \* Oracle Client 12c Release 2 supports: Oracle Server 19c, 18c, 12c Release 2, 12c Release 1, 11g Release 2
  - \* Oracle Client 12c Release 1 supports: Oracle Server 19c, 18c, 12c Release 2, 12c Release 1, 11g Release 2
- Fast network (100 Mbit/s or higher) with low latency (<1ms) connection between the database server and the machines where *PowerFactory* is running.

Optional requirements for Python scripting:

- Python version 3.6, 3.7, 3.8 or 3.9 with the same architecture (32 or 64 bit) as *PowerFactory*

## 3 Installation

Depending on the purchased edition the installation procedure differs slightly:

### ► Single User Edition / Demo Version

- Run the *PowerFactory* installer on your computer and follow the on-screen instructions. If you are unsure which components to install, select the “Complete” installation type.
- Activate your workstation or demo licence as described in Section 4.1.

### ► Multi User Edition / Team Edition

- Run the ***Licence Server Components*** installer on the machine that acts as licence server.
- Activate your network licence on the server machine as described in Section 4.1. After successful activation you will be asked whether you want to enable the licence server (if it is not yet enabled). Clicking ‘yes’ makes the licence available throughout the network such that it can be used by all *PowerFactory* installations on other PCs in the network.
- Run the *PowerFactory* installer on *all workstation computers* and follow the on-screen instructions. If you are unsure which components to install, select the “Complete” installation type.

Please download and run the appropriate installation packages from the *DlgSILENT* download area for registered users as indicated above.

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**Note:** The licensing technology of *PowerFactory* has been changed with the release of *PowerFactory* 2016. If you intend to use your licence also with former versions (15.2 or previous), refer to the corresponding section of the *Advanced Installation and Configuration Manual*.

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## 4 Setup and Configuration

After installation of *PowerFactory 2021* the *PowerFactory* setup assistant starts automatically. This tool will guide you through the initial configuration steps or through the migration from former versions respectively. All settings applied via the setup assistant can later be changed in the *PowerFactory* configuration or in the **Licence Manager** (for details refer to the *Advanced Installation and Configuration Manual*).

Depending on already installed *PowerFactory* versions, the licence contents and your decisions the setup assistant will offer relevant settings to prepare the first startup of *PowerFactory*.

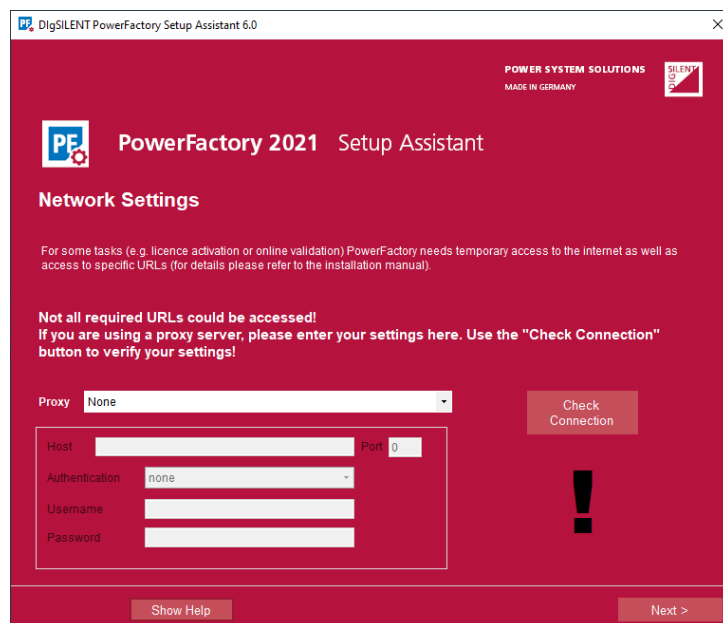
At any time, you can navigate back and forth through the setting dialogues using the *Back* and *Next* buttons.

### 4.1 New Installation

#### Network Settings

Licence transfer operations (activation, update, deactivation) as well as the regular licence validation every 30 days require internet access to specific URLs. The network settings page performs a check to verify that all required URLs are accessible by the program.

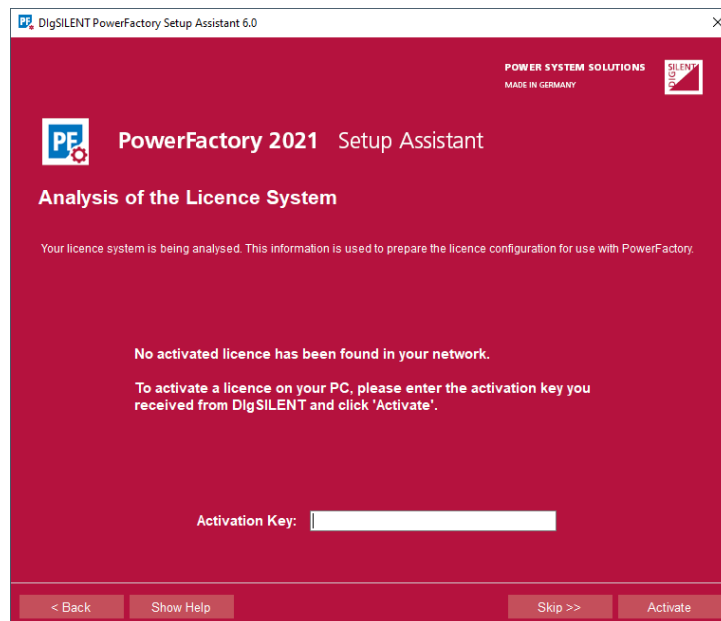
In case a proxy server is used to access the internet, the check might fail initially. In this case a mask is shown where you can enter the used proxy data and repeat the check.



In case the internet connection cannot be verified at this point, some operations like licence activation will not be offered during the setup and have to be applied manually afterwards if needed.

#### Analysis of the licence system

On entering this page, your local PC as well as the local network are searched for already activated licences. If no *PowerFactory* licence has been activated neither on your PC nor in the local network you will be asked to enter the activation key you received from *DigSILENT* in order to activate the licence on the local PC.

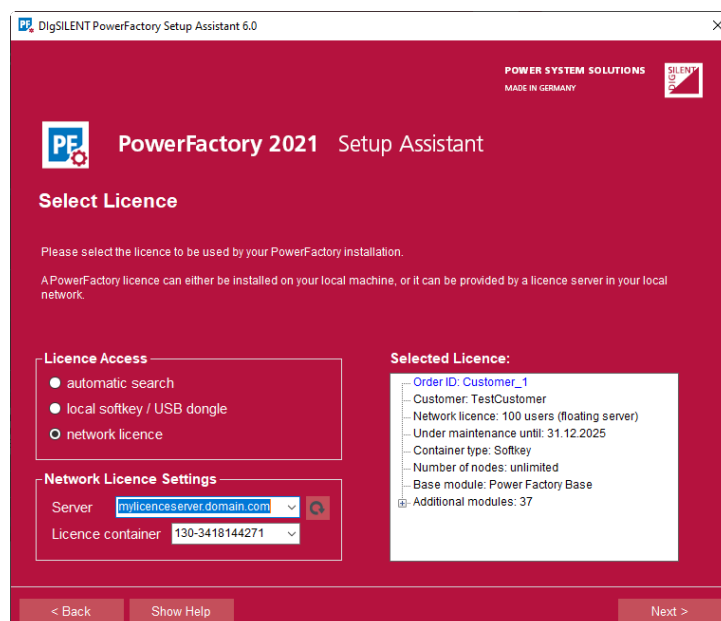


In case a multi-user licence has already been activated in the network, you will be guided to the 'Select Licence' page.

## Select Licence

On this page you can select the licence to be used by your *PowerFactory* installation:

- *Automatic search*: can be used if there is only one licence available in the company or if you want to use different licences depending on whether your PC is connected to the company network or not, for example.
- *Local Softkey / USB dongle*: allows to specify the use of a local licence.
- *Network licence*: is the right choice if you want to use a specific licence in the company network.



## Database Settings

If the selected licence includes the usage of a multi-user database (Team Edition) this page is shown up, allowing to enter all database settings before the first start of *PowerFactory*.

- *Service*: The database service that hosts the PowerFactory database.
- *Username*: User for establishing the connection. Corresponds to the schema name for Oracle.
- *Password*: Password for the database user.
- *Database name*: SQL Server only. The database that should be used.
- *ODBC driver*: Oracle only. The name of the ODBC driver.
- *Vault directory*: Optional. Used for sharing project data like result files and the archiving functionality.
- *Oracle client path*: Oracle Only. Path to the Oracle client libraries.

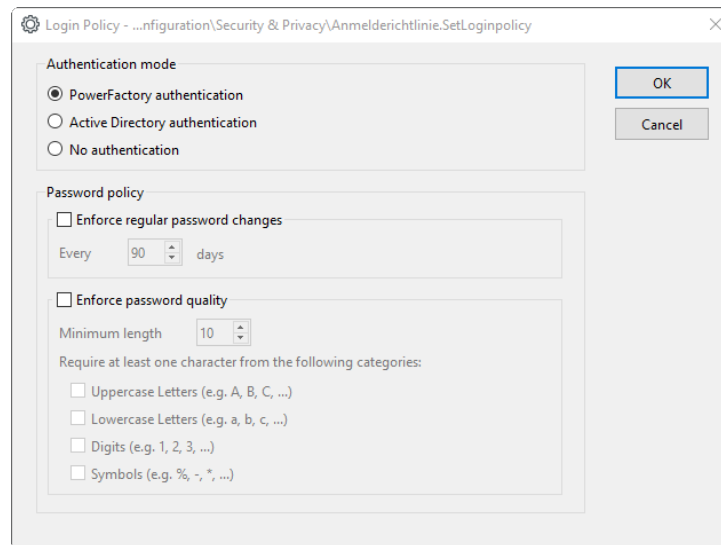
After this page, the setup assistant finishes and *PowerFactory* can be started.

## Initial Setup in *PowerFactory*

In case a multi-user database has been configured in the database settings step this database will have to be initialized with the first startup of *PowerFactory* with connection to this database. During this first *PowerFactory* start the user will see an initial setup dialog:



Within this dialog the user will be forced to set a *PowerFactory* administrator password and a database unlock key to finish database initialization. This dialog will be followed by the SetLoginpolicy dialog:

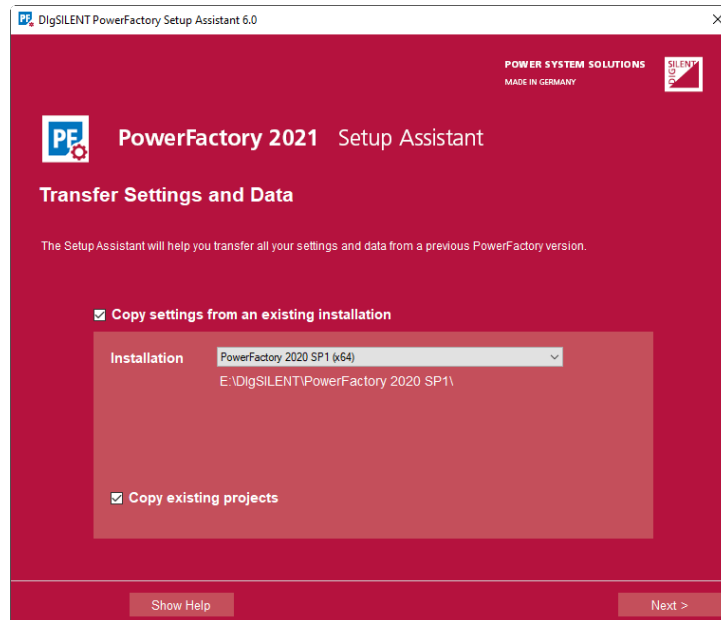


This dialog allows to select the preferred authentication mode (please refer to the corresponding section in the *Advanced Installation and Configuration Manual* for details).

## 4.2 Upgrade from a former version

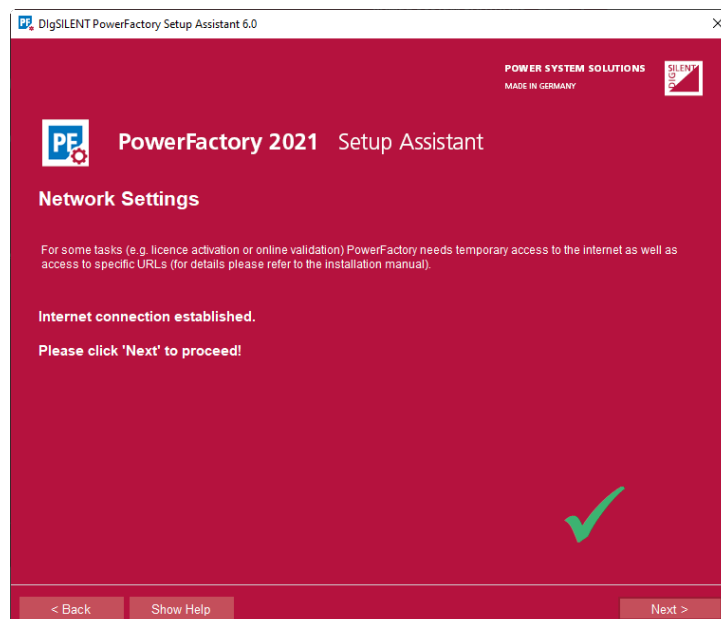
### Transfer Settings and Data

This page will only be shown if a former installation of *PowerFactory* is detected. It will help you to transfer the settings and data of an existing installation to the newly installed version.



### Network Settings

Licence transfer operations (activation, update, deactivation) as well as the regular licence validation every 30 days require internet access to specific URLs. The network settings page performs a check to verify that all necessary URLs are accessible by the program.

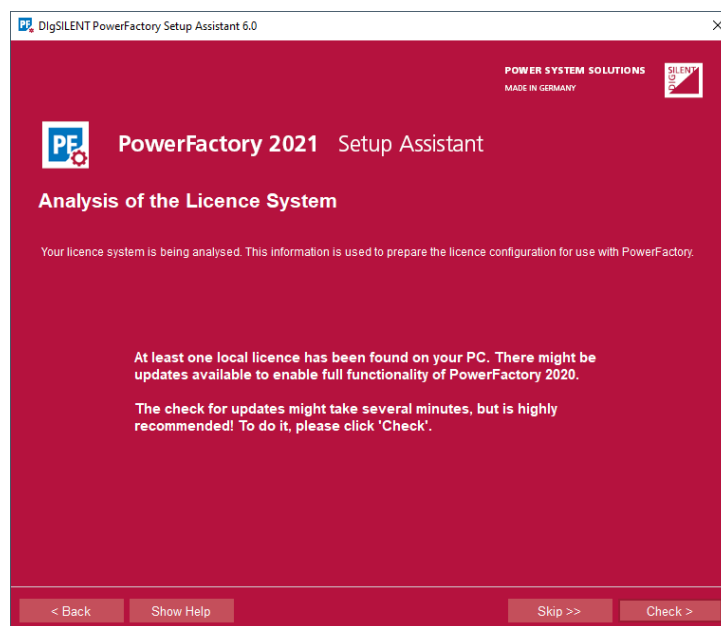


In case the internet connection cannot be verified at this point, some operations like the licence update are not offered during the setup and have to be applied manually afterwards if needed.

### Analysis of the licence system

On entering this page, your local PC as well as the network are searched for already activated licences. In case there is an active licence found on the local PC you will be offered to search for available updates for this licence.

**Note:** It is highly recommended to immediately apply available updates as newly introduced functionality in *PowerFactory* might only be available after updating the licence.

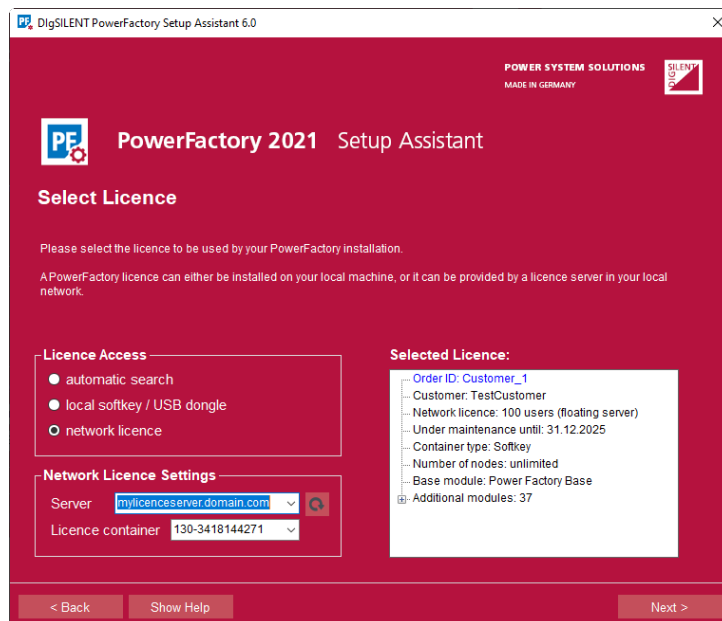


In case there are active licences found in the network you will be guided to the 'Select Licence' page where you can choose the licence to be used.

### Select Licence

On this page you can select the licence to be used by the *PowerFactory* installation:

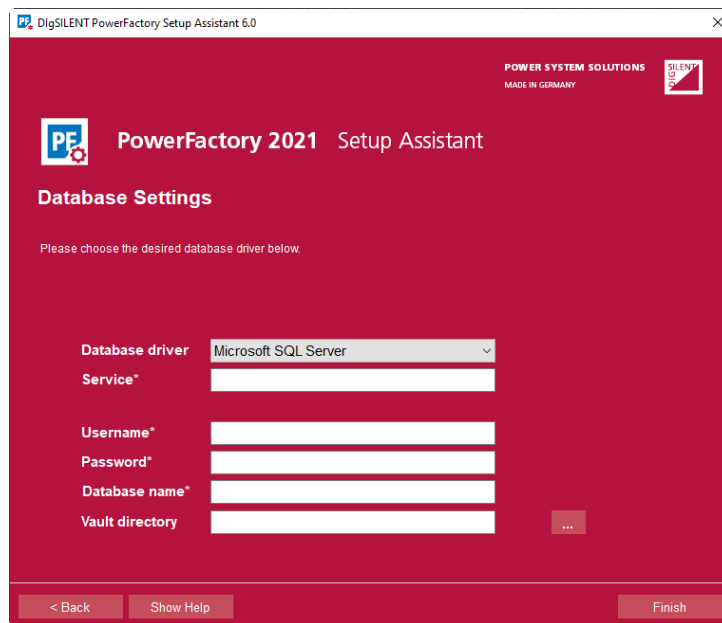
- *Automatic search*: can be used if there is only one licence available in the company or if you want to use different licences depending on whether your PC is connected to the network or not, for example.
- *Local Softkey / USB dongle*: allows to specify the use of a local licence.
- *Network licence*: is the right choice if you want to use a specific licence in the company network.



## Database Settings

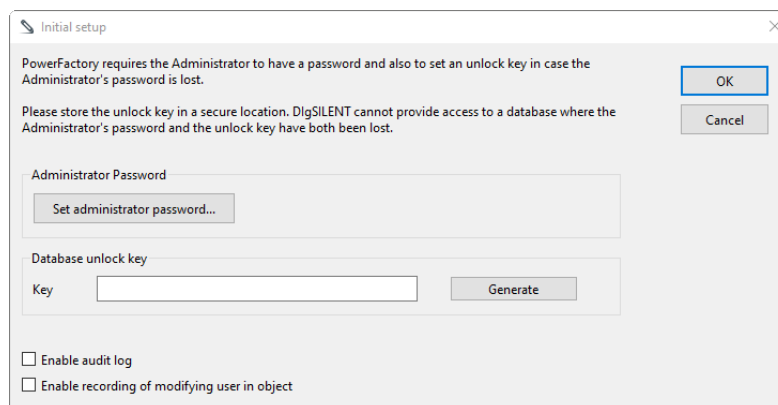
If the selected licence includes the usage of a multi-user database this page is shown up, allowing to enter all database settings before the first start of *PowerFactory*.

- *Service*: The database service that hosts the PowerFactory database.
- *Username*: User which should be used for connections, corresponds to the schema name for Oracle.
- *Password*: Password for the database user.
- *Database name*: SQL Server only. The database that should be used.
- *ODBC driver*: Oracle only. The name of the ODBC driver.
- *Vault directory*: Optional. Used for sharing project data like result files and the archiving functionality.
- *Oracle client path*: Oracle Only. Path to the Oracle client libraries.



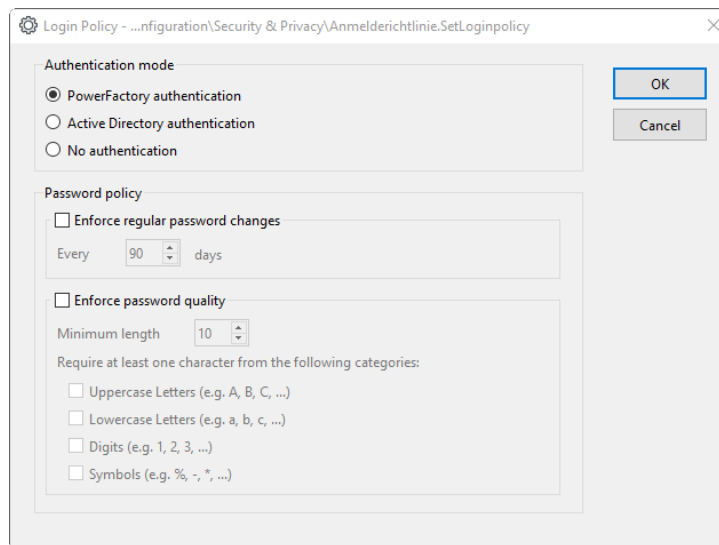
### Initial Setup in *PowerFactory*

In case a multi-user database has been configured in the database settings step and this database does not yet have a database unlock key set (which is true for all databases from *PowerFactory* versions prior to *PowerFactory 2021*), the user will see an initial setup dialog during the first *PowerFactory* start with connection to this database:



While typically an administrator password has already been set for an existing database, the user will be forced to set a database unlock key to finish database migration.

This dialog will be followed by the SetLoginpolicy dialog:



This dialog allows to select the preferred authentication mode (please refer to the corresponding section in the *Advanced Installation and Configuration Manual* for details).

## 5 Maintenance

A valid maintenance contract allows you to install and run the latest *PowerFactory* versions. From *PowerFactory* 2019 the handling of maintenance has been integrated into the existing licence system. This automatically allows the use of any new version released within that maintenance period.

With the prolongation of a maintenance contract you will receive a licence update, which you then apply using the **Licence Manager**.

For all customers with a valid maintenance contract at the time of *PowerFactory* 2019 Release, a licence update has been issued. If not already done for usage of *PowerFactory* 2019, please apply this update to your licence before using *PowerFactory* 2021. Updates can be applied in the course of the setup assistant after installation of a new *PowerFactory* version (see 4.1) or using the **Licence Manager** (please refer to the corresponding section in the *Advanced Installation and Configuration Manual* for details).

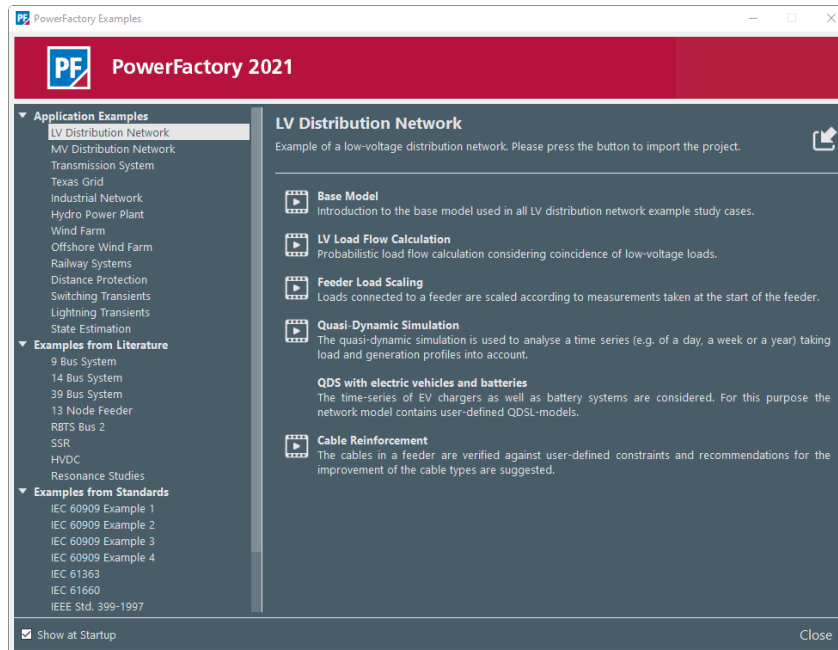
## 6 Documentation

All documentation for the tutorial, program handling and power system modelling, as well as information related to the database structure is included in the *PowerFactory* Tutorial and *User Manual* (including detailed descriptions of each model as Technical Reference Notes) of the online help. Instructions for using the online help can be found in Chapter Documentation and Help System, Section: Getting Help of the *User Manual*.

## 7 Examples

When starting *PowerFactory*, a window providing a list of application examples is displayed. Every example comes with an explaining document which can be opened by pressing the corresponding document button. Additional videos are available for demonstrating the software handling and its functionalities.

The *PowerFactory* Examples window is automatically displayed when starting the application. You can prevent this by unchecking the option *Show at Startup* at the lower left corner of the window. Moreover, you can also open the Examples window by selecting *File* → *Examples...* in the main menu.



The respective calculation results can be found in the graphic window as well as in the output window located in the lower part of the workspace. The corresponding study cases can be activated via the data manager or project overview window. Further examples are available for download under our **Knowledge base** section on the *DlgSILENT* Support Centre (<https://www.digsilent.de/en/support.html>).

## 8 Watching example videos without internet access

Since the release of *PowerFactory* 2018, the videos for the examples mentioned in section 7 are hosted online and therefore require internet access to be watched. If you wish to watch these videos offline, you can easily install the example videos to your system by following these steps:

- Download the example videos installation package for your installed *PowerFactory* version from the *DlgSILENT* download area. Please note that each specific *PowerFactory* version has a corresponding example video installation package.
- The downloaded example video installation package is a simple *Windows Installer* (MSI) file which can be executed by double-clicking on it. The installer will check whether the matching *PowerFactory* version is installed and determine its installation directory.
- If a matching *PowerFactory* installation is detected, the installer will display its installation directory. As the example videos have to be inserted into specific locations in an existing *PowerFactory*

installation, it is neither necessary nor possible to choose a different installation directory for the videos. Click **Next** and then **Install** to start the example video installation. After the installation is completed, click **Finish** to close the installer.

- If no matching *PowerFactory* installation is found, the installer will display an error message that shows which *PowerFactory* version was expected. In that case, please close the installer and download the matching version of the video examples installation package from the *DlgSILENT* download area.

After having successfully installed the example video package for your *PowerFactory* version, you can watch the videos in *PowerFactory* by clicking the corresponding video buttons in the Examples window, as described in section 7.

The example videos package may be removed or reinstalled anytime. The package also offers a repair option, which will restore any example video that was accidentally deleted or corrupted. If you wish to remove all *PowerFactory* components from your system, please remember to remove the example videos package separately.

## 9 Knowledge Base

The *Knowledge Base* is a database that contains useful information about *PowerFactory*, based on an FAQ format. It is available for all users (whether registered or not) at <https://www.digsilent.de/en/faq-powerfactory.html>.



# ABOUT DIGSILENT

DIGSILENT was founded in 1985 and is a fully independent and privately owned company located in Gomaringen close to Stuttgart, Germany. DIGSILENT continued expansion by establishing offices in Australia, South Africa, Italy, Chile, Spain, France, the USA and Oman, thereby facilitating improved service following the world-wide increase in usage of its software products and services. DIGSILENT has established a strong partner network in many countries such as Mexico, Malaysia, UK, Switzerland, Colombia, Brazil, Peru, China and India. DIGSILENT services and software installations are used in more than 150 countries.

## POWERFACTORY

DIGSILENT produces the leading integrated power system analysis software PowerFactory, which covers the full range of functionality from standard features to highly sophisticated and advanced applications including wind power, distributed generation, real-time simulation and performance monitoring for system testing and supervision. For various applications, PowerFactory has become the power industry's de-facto standard tool, due to PowerFactory models and algorithms providing unrivalled accuracy and performance.

## STATIONWARE

StationWare is a central asset management system for primary and secondary equipment. In addition to handling locations and devices in a user-definable hierarchy, the system allows manufacturer-independent protection settings to be stored and managed in line with customer-specific workflows. It facilitates the management of a wide variety of business processes within a company and centralises the storage of documents. StationWare can be integrated seamlessly into an existing IT environment and the interface with PowerFactory enables the transfer of calculation-relevant data for protection studies.

## MONITORING SYSTEMS

Our Power System Monitoring PFM300 product line features grid and plant supervision, fault recording, and power quality and grid characteristics analysis. The Grid Code Compliance Monitoring PFM300-GCC system also offers compliance auditing of power plants with respect to grid code requirements. This monitoring and non-compliance detection provides the complete transparency and assurance required by both plant operators and utilities.

## TESTING AND CERTIFICATION

The DIN EN ISO/IEC 17025 accredited DIGSILENT Test Laboratory for NAR Conformity carries out measurements in accordance with FGW TR3 on the operational type 1 generation plant (directly coupled synchronous machines). These measurements are carried out in accordance with the "individual verification procedure" as required by the German grid connection guidelines VDE-AR-N 4110/20/30. DIGSILENT has many years of international expertise in the field of generation and consumption/load systems testing. The in-house developed and produced measuring systems enable the testing laboratory to offer customised measuring solutions for a wide range of power plants and applications.

## SERVICES

DIGSILENT GmbH is staffed with experts of various disciplines relevant for performing consulting services, research activities, user training, educational programs and software development. Highly specialised expertise is available in many fields of electrical engineering applicable to liberalised power markets and to the latest developments in power generation technologies such as wind power and distributed generation. DIGSILENT has provided expert consulting services to several prominent PV and wind grid integration studies.