**Introduction**

Welcome to the exciting world of SpiritIT eXLerate!

Using SpiritIT eXLerate, you are able to create your complete real-time HMI applications completely from the well-known and most popular Microsoft® Excel environment.

This manual is the installation manual with which a developer is able to install and setup SpiritIT eXLerate.

There are two reference manuals:
- This ‘Installation manual’, with the installation and setup guide and the control center reference.
- The ‘Advanced topics reference’ manual with various additional information about the built-in Wizards & Tools, the worksheet- and VB function reference, database management system extensions, and various other topics.

**For more information**

All publications of SpiritIT eXLerate are available for free download from:

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<td>SpiritIT eXLerate installation manual</td>
<td>IM/eXL-EN</td>
</tr>
<tr>
<td>SpiritIT eXLerate advanced topics reference manual</td>
<td>CM/eXL-EN</td>
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<td>SpiritIT eXLerate release notes</td>
<td>RN/eXL-EN</td>
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1 Introduction

1.1 SpiritIT eXlerate

SpiritIT eXlerate is a full-featured real-time HMI software package, based on Microsoft Excel. Many functions, features and wizards have been added to the default Excel functionality. With SpiritIT eXlerate, you are able to develop full-featured real-time Human Machine Interface applications for visualizing your production process in a convenient and familiar spreadsheet environment, and yet for the operator generate a robust and more than complete application.

In a SpiritIT eXlerate application, which is stored in just one single file, you can:

- Obtain real-time values from external devices, such as flow computers, process controllers, and other devices, directly into a spreadsheet cell utilizing the available communication drivers.
- Visualize the obtained data in a display page using the powerful possibilities of Excel.
- Animate shape objects, such as a bar graph, with the real-time data. Shapes may be created with the office shape library, or may be imported from external tools, such as Microsoft® Visio.
- Create many types of alarms for a tag, which can be printed, logged on disk or shown on a window on the display.
- Trend these values, for an historical overview of a value, in a real-time or historical trend graph.
- Perform extensive calculations on the obtained data, using directly an '=' formula in Excel.
- Generate professional-looking reports of the obtained, derived and all other data, graphics and tables as available in SpiritIT eXlerate.
- Create additional Visual Basic for Applications code, with which you can create your own dialogs, functions and subroutines.
- Add database functionality in your application utilizing one of the available database standards, such as, MySQL (which is also as embedded database), SQL Server or any other OLEDB type driver.
- Secure your applications, so an operator is restricted in his Windows environment.
- Skip going through a steep learning curve as is required for all other process visualization software packages. And there is no programming required to do so.
- Trouble-shoot in an open environment, without black boxes.
- Do much more, utilizing the fully open architecture of the Microsoft Office.

1.2 Purpose of this manual

This SpiritIT eXlerate 2016 installation manual is written for a variety of readers:

Application Developers, setting up their computers for developing eXlerate applications. He or she is assumed to be acquainted in general with visualization software.

System Integrators, setting up computers with SpiritIT eXlerate for real-time HMI systems to be used at end-customers.

IT departments of companies who are centralized managing software installations on systems. Both types of readers are assumed to be familiar with the environment of Microsoft Excel.

Where the more generally interested reader is expected to be commonly acquainted with Excel, the application developer is assumed to have a thorough understanding of at least the following aspects of Excel:

- Worksheet/workbook organization
- Named ranges, tables
- '=' Worksheet formula syntax
- Cell formatting
- Macro recording and playback

Although not absolutely required, a programmer is also assumed to have a good understanding of the programming environment of Visual Basic for Applications.

When one of the above areas is looking unfamiliar to the application programmer, looking for one of the - more than many – excellent study books on Microsoft Excel would be a great idea.

1.3 Reference manuals Overview

Installation manual

This manual is on installing eXlerate and all related required software on a new computer system, as well as configuring the system and eXlerate options for running SpiritIT eXlerate applications.

In chapter Installation of eXlerate the user is acquainted with hardware and software requirements for SpiritIT eXlerate, the available options, and explains how to install the software on the computer. The content of the end-user license agreement is added for convenience. In this chapter, the usage of the License number and corresponding authorization key are explained.

In chapter eXlerate Control Center a full explanation is given on using the SpiritIT eXlerate Control center program.

In chapter eXlerate Application control the user is introduced to the concept of SpiritIT eXlerate and its basic ingredients.
Application reference manual

This manual is setup both as a manual in which a newcomer is quickly introduced with the principles and techniques of real-time application development, as well as a reference manual, in which all details of application engineering can be found.

In this volume describes many topics, such as setting up the communication, utilizing calculation worksheets, configuring and structuring your application.

This manual also gives detailed information on how to use the various wizards and tools during your application development.

In 'Troubleshooting', help is offered when things might not work out the way you have expected.

Flow-X functions Reference

With eXLerate flow, gas and liquid properties calculations are available as spreadsheet functions, provided that the 'embedded Flow-Xpert Math library' license option is activated.

eXLerate also provides Virtual Flow Computer (VFC) functionality, similar to functions of actual flow computers. The VFC spreadsheet functions require the optional 'Virtual Flow computer support' license.

These fluid properties and Virtual Flow Computer functions are described in Flow-X Manual IIIb - Function Reference CM_FlowX.FR.

Note: For compatibility reasons the Flow-Xpert license option enables the deprecated xlMath functions starting with prefix 'xl'.

1.4 Document conventions

Specific keys, i.e. function keys, editing keys, cursor direction keys etc., are presented with the text on top of the key enclosed between '<' and '>' characters. For example <F1> refers to function key 1 while <Esc> refers to the key with the text 'Esc' imprinted. Sometimes the user is assumed to press two keys simultaneously. If this is the case those keys are specified separated by a '-' character. So when <Ctrl-F1> or <Ctrl-a> appears in the text the user should press and release the keys <Ctrl> and <F1> or <Ctrl> and <a>-key simultaneously.

When the book symbol as displayed at the left appears in the text in this manual, a reference is made to another section of the manual. At the referred section, more detailed, or other relevant information is given.

When in this manual a symbol as displayed at the left appears in the text, certain specific operating instructions are given to the user. In such as case, the user is assumed to perform some action, such as the selection of a certain object, worksheet, or typing on the keyboard.

A symbol as displayed at the left indicates that the user may read further on the subject in one of the sample workbooks as installed on your machine.

When an important remark is made in the manual requiring special attention, the symbol as displayed to the left appears in the text.
1.5 Abbreviations

Throughout this document the following abbreviations are used:

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>AI</td>
<td>Analog Input</td>
</tr>
<tr>
<td>AO</td>
<td>Analog Output</td>
</tr>
<tr>
<td>API</td>
<td>Application Programming Interface</td>
</tr>
<tr>
<td>ASCII</td>
<td>American Standard Code for Information Interchange</td>
</tr>
<tr>
<td>COM</td>
<td>Component Object Model</td>
</tr>
<tr>
<td>CPU</td>
<td>Central Processing Unit</td>
</tr>
<tr>
<td>DAC</td>
<td>Digital to Analog Converter</td>
</tr>
<tr>
<td>DCE</td>
<td>Distributed Computing Environment</td>
</tr>
<tr>
<td>DCS</td>
<td>Distributed Control System</td>
</tr>
<tr>
<td>DDE</td>
<td>Dynamic Data Exchange</td>
</tr>
<tr>
<td>DI</td>
<td>Digital Input</td>
</tr>
<tr>
<td>DLL</td>
<td>Dynamic Link Library</td>
</tr>
<tr>
<td>DO</td>
<td>Digital Output</td>
</tr>
<tr>
<td>EGU</td>
<td>Engineering Units</td>
</tr>
<tr>
<td>EIA</td>
<td>Electrical Industries Association</td>
</tr>
<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
</tr>
<tr>
<td>HART</td>
<td>Highway Addressable Remote Transducer</td>
</tr>
<tr>
<td>HMI</td>
<td>Human Machine Interface</td>
</tr>
<tr>
<td>I/O</td>
<td>Input/Output</td>
</tr>
<tr>
<td>IEEE</td>
<td>Institute for Electrical and Electronics Engineers</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organization</td>
</tr>
<tr>
<td>MES</td>
<td>Management Execution System</td>
</tr>
<tr>
<td>MMIC</td>
<td>Machine Identification Code</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ODBC</td>
<td>Open Data Base Connectivity. A standardized application programmer’s interface (API) for databases. It supports Visual Basic, Visual C++, and SQL for Access, Paradox, Text, Excel and many more database standards.</td>
</tr>
<tr>
<td>OEM</td>
<td>Original Equipment Manufacturer</td>
</tr>
<tr>
<td>OLE</td>
<td>Object Linking and Embedding.</td>
</tr>
<tr>
<td>OSI</td>
<td>Open System Interconnection.</td>
</tr>
<tr>
<td>OPC</td>
<td>OLE for Process Control.</td>
</tr>
<tr>
<td>P&amp;ID</td>
<td>Piping and Instrumentation Diagram</td>
</tr>
<tr>
<td>PC</td>
<td>Personal Computer</td>
</tr>
<tr>
<td>PCB</td>
<td>Printed Circuit Board</td>
</tr>
<tr>
<td>PLC</td>
<td>Programmable Logic Controller.</td>
</tr>
<tr>
<td>RPC</td>
<td>Remote Procedure Call</td>
</tr>
<tr>
<td>RS232</td>
<td>EIA standard for point to point serial communications in computer equipment</td>
</tr>
<tr>
<td>RS422</td>
<td>EIA standard for two-wire differential unidirectional multi-drop serial</td>
</tr>
<tr>
<td>RS485</td>
<td>EIA standard for two-wire differential bidirectional multi-drop serial</td>
</tr>
<tr>
<td>RTU</td>
<td>Remote Terminal Unit</td>
</tr>
<tr>
<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>SQL</td>
<td>Standard Query Language</td>
</tr>
<tr>
<td>SVC</td>
<td>Supervisory Computer</td>
</tr>
<tr>
<td>TTL</td>
<td>Transistor-Transistor Logic</td>
</tr>
<tr>
<td>UART</td>
<td>Universal Asynchronous Receiver &amp; Transmitter</td>
</tr>
<tr>
<td>URL</td>
<td>Uniform Resource Locator</td>
</tr>
<tr>
<td>VBA</td>
<td>Visual Basic for Applications.</td>
</tr>
<tr>
<td>XLL</td>
<td>Excel Link Library.</td>
</tr>
<tr>
<td>XML</td>
<td>Extensible Markup Language.</td>
</tr>
</tbody>
</table>

SpiritIT eXLerate 2016 is OPC DA 2.05 compliant, and ABB is a member of the OPC Foundation.
### 1.6 Terms and definitions

Throughout this manual the following additional terms and definitions are used:

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asynchronous</td>
<td>A type of message passing where the sending task does not wait for a reply before continuing processing. If the receiving task can't take the message immediately, the message often queued until it can be processed.</td>
</tr>
<tr>
<td>ActiveX</td>
<td>A family of Microsoft object technologies, formerly called OLE, based on the Common Object Model (COM), serving nowadays as the foundation of many internet products. See also COM/DCOM/OLE.</td>
</tr>
<tr>
<td>C/C++</td>
<td>C is a low-level compiled programming language popular for real-time applications because of its precision and rapid execution times. C++ is an object-oriented superset of C.</td>
</tr>
<tr>
<td>Client/server</td>
<td>A network architecture in which each computer or process on the network is either a client or a server. A server share their resources with clients. A client does not share any of its resources, but it requests content or service from a server. Clients, therefore, initiate communication sessions with servers, which await incoming requests.</td>
</tr>
<tr>
<td>Device</td>
<td>A piece of computer hardware used to put information into and get information out of the computer.</td>
</tr>
<tr>
<td>Driver</td>
<td>A driver communicates with the device to get data and set data. They act as a translator between a hardware device and the applications or operating system.</td>
</tr>
<tr>
<td>Engineering units</td>
<td>Engineering units as used throughout this manual refers to the units of a tag, for example 'bar', or 'ºC'.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>A family of computer networking technologies commonly used in local area networks (LAN). Ethernet is widely used in industry and homes, and interworks well with Wi-Fi.</td>
</tr>
<tr>
<td>Event</td>
<td>An action or occurrence recognized by software, generated or triggered by the user, by the system or in other ways. For example, user keystrokes and mouse clicks, a change of a data point value or timer.</td>
</tr>
<tr>
<td>Exception</td>
<td>An anomalous or exceptional condition, such as a hardware interrupt or software error-handler, that changes a program's normal flow execution.</td>
</tr>
<tr>
<td>Peer-to-peer</td>
<td>A type of computing or networking in a distributed application architecture that partitions tasks or workloads between peers. Peers are equally privileged, equipotent participants. Peer-to-peer is sometimes shortened to the term P2P.</td>
</tr>
<tr>
<td>Polling</td>
<td>A method of updating data in a system, where one task sends a message to a second task on a regular basis, to check if a data point has changed. The second task sends the requested data back to the first task. This method is effective when there are few data points. Otherwise exception handling is generally faster.</td>
</tr>
<tr>
<td>Protocol</td>
<td>An agreed-up format for transmitting data between two devices. In this context, a protocol references to the Data Link Layer in the OSI 7-Layer Communication Model.</td>
</tr>
<tr>
<td>Query</td>
<td>In SCADA/HMI terms a message from a computer to a slave/server in a master/slave or client/server configuration, utilizing the message protocol with the purpose to request for information.</td>
</tr>
<tr>
<td>Real-time</td>
<td>The characteristic of determinism applied to computer hardware and/or software. A real-time process must perform a task in a determined length of time. The phrase &quot;real-time&quot; does not directly relate to how fast the program responds, even though many people believe that real-time means real-fast.</td>
</tr>
<tr>
<td>Real-time database</td>
<td>A flat database designed for quick, deterministic response. Not to be confused with a relational database. A real-time database is like a hub--a lively transfer point where data is updated and sent virtually instantaneously, from and to many processes at the same time. In SpiritIT eXLerate, the contents of the real-time database can be stored in the system registry to avoid shutdown and startup problems in an application.</td>
</tr>
<tr>
<td>Registry</td>
<td>A database that contains information required for operation of Windows and installed programs and applications.</td>
</tr>
<tr>
<td><strong>Resource</strong></td>
<td>Any component of a computer that can be utilized by software. Such as: RAM, CPU time, disk space, real-world time, serial devices, network devices; and other hardware as well as O/S objects such as semaphores, timers, file descriptors, files, etc.</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Synchronous</strong></td>
<td>A type of message passing where the sending task waits for a reply before continuing processing.</td>
</tr>
<tr>
<td><strong>System registry</strong></td>
<td>The registry in Windows is an internal register, in which many properties and values from the operating system, such as class definitions, file associations, file types etc. are stored. The system registry is also used as a replacement of the older ‘.ini’ files, in which a specific program can store its settings.</td>
</tr>
<tr>
<td><strong>Tag</strong></td>
<td>A ‘tag’ as used within this document refers to a data point existing in the tag database, with a number of properties, such as its I/O address, current value, engineering units, description, alias name, and many others.</td>
</tr>
<tr>
<td><strong>Visual Basic</strong></td>
<td>A graphical programming language and development environment created by Microsoft in 1990, and currently the de-facto standard for scripting in applications like Microsoft Office. All macros in Office are created in Visual Basic.</td>
</tr>
<tr>
<td><strong>Web Server</strong></td>
<td>A computer that has server software installed on it and is used used to deliver web pages to an intranet/Internet.</td>
</tr>
</tbody>
</table>
2 Installation of eXLerate

This chapter guides the user through the installation process of Spirit\textsuperscript{IT} eXLerate. It lists the required hardware and software, explains the installation process and the license options and process.

2.1 Hardware requirements

Spirit\textsuperscript{IT} eXLerate runs best on a computer with at least an Intel Core i5 processor with a clock-speed of 2.5 GHz or higher and a minimum of 4 GB or more of RAM installed. The better the CPU performance, the higher the clock speed and the more memory is available, the better the system performance.

The use of multi-threaded calculations is limited in excel and eXLerate. It is preferred to have a processor with higher clock-speed rather than a processor with more cores. For larger or more complex applications, processors with a clock-speed of 3.4GHz or higher is recommended.

Multitouch displays are not supported with eXLerate.

2.2 BIOS settings

On runtime systems that require continuous operations it is recommended that the following options are set in the BIOS:

- Power options - Resume operation after a power failure.
- Never boot from CD, USB devices or network.
- Change the boot order to always boot from hard drive first.

2.3 Software requirements

Prior to install and run Spirit\textsuperscript{IT} eXLerate 2016, the following software needs to be installed:

- Microsoft Windows Operating System:
  - Windows 10 - version 1803 or newer
  - Server 2019 - version 1809 or newer
  - Server 2016 - version 1607 or newer

Both 32-bit and 64-bit Operating Systems are supported.

- Microsoft .NET Framework 4.7.2 or later https://dotnet.microsoft.com/download/dotnet-framework/thank-you/net472-offline-installer
- Microsoft Office (Excel):
  - Office 2019
  - Office 2016
  - Office 365

Only the 32-bit editions of Microsoft Office are supported. Spirit\textsuperscript{IT} eXLerate it will not run on a 64-bit edition of Microsoft Office.

In order to use eXLerate Terminal Services, you need a Microsoft Office Volume License, see http://www.microsoft.com/licensing.

We recommend installing English versions, although other languages will also work.

Always make sure that the latest updates are installed to ensure optimal stability and protection.

2.4 Microsoft Windows Configuration

Microsoft Windows users

A Windows Standard User can run the Spirit\textsuperscript{IT} eXLerate program. During installation administrative rights are needed. The installer program will show a pop-up for administrator name and password when these are required.

We recommend having at least two local users account configured in Windows, one being a member of the Administrators group and one being a member of the Standard Users group. You can configure users from Control Panel\All Control Panel Items\User Accounts.

Microsoft Windows Kiosk mode

On runtime systems it might be required to have eXLerate continuously running in an orderly manner with groups of people working in shift needing to have instantaneous access. We call this the Kiosk mode: eXLerate will automatically run when a computer starts and a (specific) user logs into Windows. Additional security levels will be provided by eXLerate and the application.

This requires additional Windows settings to be configured. First of all, set up Windows to login with a specific Standard user. The eXLerate program will run as that user. To setup automatic logon for Windows, you can run ‘netplwiz’ and select the user to be logged on automatically and uncheck ‘Users must enter a user name and password to use this computer’. When you click OK you will be asked to provide the password twice. Also set the user account option ‘Password never expires’. On Windows Server, you can set the values for DefaultUserName, DefaultPassword and AutoAdminLogon in the registry tree HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT \CurrentVersion\Winlogon.

To avoid that the user can exit the kiosk mode, all items of the Windows Security menu (called by <Ctrl+Alt+Del> combination) should be disabled for the user account used for the kiosk mode:

- Lock computer
- Change a password (of the current account)
- Start Task Manager
• Logoff (from Windows)
These can be set in the Group Policy Editor (run "gpedit.msc") and are located in the “User Configuration\Administrative Templates\System\Ctrl+Alt+Del Options”.

Figure 2.1 Group Policy Editor
If using the Group policy Editor is not possible, the same settings can be applied from the system registry:

Create the following entries in the registry tree HKEY_CURRENT_USER\Software\Microsoft\Windows \CurrentVersion\Policies\System
• ‘DisableLockWorkstation’ as DWORD with value ‘1’.
• ‘DisableChangePassword’ as DWORD with value ‘1’.
• ‘DisableTaskMgr’ as DWORD with value ‘1’.
• ‘NoLogoff’ as DWORD with value ‘1’.

To avoid the user to switch to another account, fast user switching should be disabled. Note that this setting is global and applies for all users on the PC prepared for the kiosk mode. It can be done in the Group Policy Editor in the “Computer Configuration\Administrative Templates\System\Logon” setting “Hide entry points for Fast User Switching”. If using the Group policy Editor is not possible, the same setting can be applied from the system registry:

Set in the registry tree the following key for HKEY_LOCAL_MACHINE\Software\Microsoft\Windows \CurrentVersion\Policies\System
• ‘HideFastUserSwitching’ as DWORD with value ‘1’.

It is useful to have debugging information available in case you might have an unexpected issue with the system and require some help to analyze it. You can enable Writing debugging information from Advanced settings in Control Panel\All Control Panel Items\System, in the Advanced sytem settings – Startup and Recovery settings select Small Memory Dump.

For security reasons we recommend disabling autorun from CD’s and USB sticks.

Multitouch is not supported with eXLerate so it is recommended that multitouch is disabled. This can be done by either disabling it in Windows Configuration – Devices or by setting the system registry DWORD value Multi-TouchEnabled to 0 in the key HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Wisp\MultiTouch.

As on runtime systems the eXLerate program should be always active, set the Windows Power Options (Control Panel\All Control Panel Items\Power Options) to never put computer to sleep (processor and hard disk) and to never turn off the display. For the screensaver, either disable the ‘On resume, display logon screen’ or disable the screen saver completely.

The eXLerate program can be used for time synchronization such as between eXLerate Servers and Clients, and for setting Daylight Saving Time. Sometimes external clocks are connected with which eXLerate communicates and sets the Windows system time accordingly. Because default Windows Standard user configuration doesn’t allow this, you must enable the permission to adjust date and time. Run “secpol.msc” and go to “Local Policies\User Rights Assignment”. Double click on Change the system time, press “Add user or group” in the popup and enter the user account that will run eXLerate.

For DST changeover, eXLerate can adjust the time in a different manner than exactly on hour change to avoid fiscal integrity problems with respect to these changeovers. For this alternative to function correctly, the daylight saving option in Windows Date and time settings must be disabled.

We recommend that you disable the Sticky keys (keep modifier keys, such as Shift, Ctrl, Alt, or the Windows key, active after multiple times pressed) and Filter Keys (ignore brief or repeated keystrokes) unless you want to use these explicitly as these sometimes lead to unexpected behavior.

For Windows Server, disable the server manager. Go to Server Manager\Manage\Server Manager Properties and enable ‘Do not start server manager automatically at logon’.

For Windows Server systems, we recommend you modify the following settings, using Group Policy Editor (run “gpedit.msc”)

• Disable ‘Display shutdown event tracker’ (Computer Configuration\Administrative Templates\System)
• Disable ‘Display Error Notification’ (Computer Configuration\Administrative Templates\Windows Components\Windows)
• Enable ‘Disable Windows Error Reporting’ (Computer Configuration\Administrative Templates\Windows Components\Windows)

Network ports
For eXLerate applications to function correctly, several network ports are required. Blocking these ports, by a firewall or router, will have impact on the functionality. The table below provides a list of these ports and their purpose.
Table 2.1 List of used network ports

<table>
<thead>
<tr>
<th>Port no.</th>
<th>Service</th>
<th>Configurable</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>502</td>
<td>Modbus TCP</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>818</td>
<td>Flow-X Client</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>1947</td>
<td>HASP Driver</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>8080 – 9000</td>
<td>Web Server, HTTP</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>9666</td>
<td>xlNet</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>9666 + TS ID</td>
<td>xlNet</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Table 2.1 List of used network ports

Note that Excel itself can also perform network communication and connect/listen to network ports. This functionality depends on version of Excel and operating system and is not described here.

**Terminal Services**

Using eXLerate in combination with Terminal Services requires configuration at both the Operating System level and the eXLerate level.

In order to setup Microsoft Windows to use Terminal Services, make sure the following requirements are met.

- Install 'Remote Desktop Services' role on Windows Server.
- Purchase and install 'RDS CALs' for the users or computers which are to connect to the server.
- Set the remote desktop services setting 'Restrict each user to a single session' to 'No'.
- Create a Windows User called 'eXLerate_Remote' and give it 'Administrator' rights.

It is outside the scope of this document to describe these steps in detail. Please consult the Internet if you need information about a particular topic.

2.5 Microsoft Office installation

If you have a previous releases of Microsoft Office, it is of utmost importance that you remove this first and restart your computer before installing, this is to prevent application errors. Microsoft Office is designed in a way that it only allows one installation and once license to exist in a single device.

Installing Microsoft Office these days work online with limited choices. You must make sure that you install the 32-bit version. When selecting the installation, select Other install options, choose the language (preferable English) and the 32-bit version, and then select Install.

Your installation is finished when you see the phrase, “You’re all set! Office is installed now”.

**Terminal Services**

After installation, start Excel and activate your Office installation. Once office is activated, set these Excel options for eXLerate applications to run smoothly:

- Disable ‘Automatically Flash Fill’
- Disable ‘Enable AutoComplete for cell values’
- Enable ‘Disable hardware graphics acceleration’

You can set these option from Excel menu - File | Options | Advanced.

2.6 SpiritIT eXLerate installation

Make sure you have installed Microsoft Excel and all other required software packages prior to installing eXLerate. See the previous section Software requirements for more details.

In order to install the software onto your computer, you must run the eXLerate setup program. You can download the latest version from our website https://www.spiritit.com/downloads/.

During installation administrative rights are needed. The installer program will show a pop-up for administrator name and password when required. Select “Yes” if you see the User Account Control prompt “Do you want to allow this app to make changes to your device?”.
In the Welcome screen press the [Next] button. The End User License Agreement dialog will be displayed. Read this very carefully and when you agree, select “I accept the terms in the License Agreement” and press Next.

![Figure 2.5 eXLerate license agreement](image)

The next dialog allows you to change the installation folder s and select which features need to be installed. You can click on a feature and the purpose will be shown in the right side of the dialog. We recommend installing all the options of eXLerate 2016 program.

The project folder is the default folder for the eXLerate applications. You can also change the folder for each application after installation. The Samples are application that can be used as reference and example during engineering of an application. It is recommended to install these files on a development computer, and not to install these on a runtime system.

![Figure 2.6 eXLerate installation options](image)

After selecting the setup options, click Next to confirm and click Install in the next dialog to start the installation.

When the installation is completed, you can press Finish and then the license information will be presented.

![Figure 2.8 eXLerate installation completed](image)

### 2.7 Licensing

In all process visualization software packages, various options are based on limitations on both its functionality as well as on the number of tags that can be created within the package. These limitations are mostly for commercial aspects of the software.

SpiritIT eXLerate comes in various flavors as well, each with its specific qualifications with respect functionality and to tag database. The availability of these depends on the installed license.

#### License options

The first license option is the Operating mode. The eXLerate program has two main operating modes:

- **Development** For developing and testing applications
- **Runtime** For runtime use of the applications, with live communication values, calculations, visualization, etc.
The number of tags in eXLerate depends on the license as well. This size is however not so restricted as with other packages, since in Microsoft Excel each cell may contain a number or equation and can be presented to the user. Thus, theoretically each cell could be considered a ‘tag’. In eXLerate restrictions only apply on number of values obtained from external devices, called: real-time data. eXLerate does not limit the number or size of the worksheets in your project. The following tag count license options are available:

- 75 tags
- 150 tags
- 300 tags
- 750 tags
- 1500 tags
- 3000 tags
- 6000 tags
- 32k tags

Depending on the license, several communication protocols are available for eXLerate to be able to communicate with other devices. The most commonly used protocols are the Flow-X Client protocol, Modbus protocols (serial Master and Slave and TCP Client and Server), OPC Client and Server, HART protocol and Virtual Printer.

The network arrangement of your system also defines the license you require. We have license options for standalone systems, (redundant) server and clients and to support Terminal services.

Besides these options, various other options are available, such as real-time and historical trending, external databases, Flow-Xpert math libraries and Virtual Flow Computing for specific technologies and industries.


**Licensing System**

At the end of the installation, a dialog is presented in which you must enter the end-user name, company and system (by default the Windows configuration System name) for which the license will be granted.

Two licensing methods are available for eXLerate. You can use a software-based license which is related to your computer hardware or an USB hardware key (dongle).

**Software based license**

You can start the License Manager to view the currently installed license(s) or install software based licenses. The program can be found in the Start menu of Windows, named “License Manager”.

This will show you the end user, company and system information you entered at the end of the program installation. You may press the Edit Details button to change this information. It shows the current license status for the selected product, the installed options and the Machine Identification Code as well. This code is related to your computer hardware.

**Figure 2.10 License Manager**

To obtain a software-based license, export this information and send this information together with the purchase order or license number to us ([nl-spiritit-support@abb.com](mailto:nl-spiritit-support@abb.com)). If you don’t know which options you need or have any other questions, don’t hesitate to contact our sales or support team.

Based in this information we will generate an Authorization key and License number and send these to you. Once received, you must run the License Manager again and enter these numbers in the appropriate fields and press the Install button to activate the license. The license will then show to be Authorized and the installed license options will be shown.

**Figure 2.11 Installing a license**

If installing the license doesn’t work, please verify that:

- No Hardware-Key is attached (there is no green icon at the top)
- Both the Authorization-Key and License Number have been correctly entered.
• The date/time of your system is correct. Authorization-Keys can only be installed up to 15 days after they have been issued.
• You are installing the license onto the correct system.
• If you are still unable to install the license, please contact ABB.

If you replace (parts of) the machine on which the software is installed, the license may become invalid. A temporary license will then remain active for 14 days. In this period, you should request a new authorization key.

Hardware keys (dongles)

Alternative to software based-licenses, hardware-keys can be used as well. A hardware-key is a small device which connects to the USB port of your computer.

Hardware-keys are particularly useful for commissioning-and service personal that can take the hardware-keys with them and be always sure that they have the correct license rights for authorizing a system.

Hardware-keys can be purchased directly from ABB, please contact nl-spiritit-support@abb.com on how to obtain a licensed hardware-key.

A hardware-key can contain licenses for multiple products. Whenever the hardware-key is attached, the key overrides the software based licenses. When a hardware-key is attached, the License Manager displays a green hardware-key icon at the top of the program.

Figure 2.12 Hardware-key attached

If no green hardware-key icon is displayed, then make sure your hardware-key is properly attached and that the Hasp HL Driver is installed. Whenever a hardware-key is attached to an USB port for the first time, Windows will try to install a driver for it. When a correct driver is installed will the hardware-key function properly.

In some cases, Windows will not be able to install a driver automatically and the driver must be installed manually. For this, download and run the latest version of Sentinel HASP LDK - Windows GUI Run-time Installer from https://sentinelcustomer.gemalto.com/sentineldownloads/.

After the Setup package has been launched, the following window is displayed.

Figure 2.13 Installing Hasp HL driver

Follow the instructions of the program to install the driver. After successful installation of the driver, the License Manager should display the green hardware-key icon at the top of the program.

2.8 License agreement

In order to use this product a license is required. Please contact ABB BV for a valid license authorization key. A valid license will not expire at all.

This end user license agreement grants you the following rights:

Application Software.

You may install and use one copy of the SOFTWARE PRODUCT, or any prior version for the same operating system, on a single computer. The primary user of the computer on which the SOFTWARE PRODUCT is installed may make a second copy for his or her exclusive use on a second computer such as a portable computer. Storage/Network Use. You may also store or install a copy of the SOFTWARE PRODUCT on a storage device, such as a network server, used only to install or run the SOFTWARE PRODUCT on your other computers over an internal network; however, you must acquire and dedicate a license for each separate computer on which the SOFTWARE PRODUCT is installed or run from the storage device. A license for the SOFTWARE PRODUCT may not be shared or used concurrently on different computers.

2 OTHER LIMITATIONS.

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Support Services provided by Spirit shall be substantially
as described in applicable written materials provided to
you by Spirit, and Spirits support engineers will make
commercially reasonable efforts to solve any problem is-
SUES. Some states and jurisdictions do not allow limita-
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PRODUCT, if any, are limited to ninety (90) days.

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3 eXLerate Control Center

The main program of eXLerate is the Control Center in which all project applications are maintained, added, modified and removed, started, stopped and monitored. On runtime system any other type of program can be added to the Control Center, for example a word processor or print utility program, to make it available for operators in a secure environment.

This chapter describes the Control Center functionality: the interface, event logger, user accounts, settings and options, and application shortcuts.

3.1 Control Center functions

You can start eXLerate from the Windows Start menu. The eXLerate Control Center will start and the following window is shown after a welcome splash window.

Figure 3.1 The eXLerate Control Center

The eXLerate Control Center takes care of the following:

- eXLerate project applications control and maintenance.
- Monitoring running eXLerate program and applications.
- Storing and printing of all events generated with eXLerate program or application.
- Security by maintaining eXLerate users, associated security levels and log-in control.
- Security by preventing or allowing certain Windows actions, such as using the Windows key or task switching, depending on the user level. This allows eXLerate to be used in environments where a user is not allowed to use the computer for anything else but the running eXLerate application.
- Security by providing access to external executables, like Word or Notepad, depending on user levels, by adding these to the Application shortcut list.
- Possibility to automatically launch a project in Runtime mode, so your project may be automatically started when you start the computer.

The Control Center windows is divided into several areas:

- In the right top part, the current version and build number of the eXLerate program.
- The left-hand side shows a list with all currently defined application shortcuts.
- The center area shows either the event messages in case the Event log is selected, or the presentation image of the currently selected application.
- At the bottom left, there is a status area containing the current status of the selected application.
- At the right bottom part of the window, there is a button area with buttons: RunTime, Design, Login, Help, and Exit.

Just above the button area, there is a status section showing the last system message, the currently logged-in user, and the security level of the current user.

The icon at the left top corner gives access to the system menu, containing a menu for editing users and the editing generic eXLerate options.

Figure 3.2 System menu at the left-top part

3.2 User accounts

A user account has a user name, a password, and a security level. The security level is internally used by the Control Center itself, and can be additionally used by an application developer to create application dependent security functions.

After first installation of eXLerate, various factory-default user accounts are created. You are advised to alter these passwords for your own projects.

<table>
<thead>
<tr>
<th>User</th>
<th>Password</th>
<th>Level</th>
<th>Typical use</th>
</tr>
</thead>
<tbody>
<tr>
<td>guest</td>
<td>guest</td>
<td>10</td>
<td>View displays only</td>
</tr>
<tr>
<td>operator</td>
<td>operator</td>
<td>500</td>
<td>Daily operations</td>
</tr>
<tr>
<td>engineer</td>
<td>engineer</td>
<td>1000</td>
<td>Maintenance tasks</td>
</tr>
<tr>
<td>administrator</td>
<td>admin</td>
<td>2000</td>
<td>Full control Modify user accounts</td>
</tr>
</tbody>
</table>

Table 3.1 Default user accounts

The first time you need to log-in with the default administrator account to be able to change users and eXLerate settings. In order to login to eXLerate, click on the Login-button on the Control Center button bar at the bottom of the page. The following Login dialog is presented:
After logged in with the administrator account, you can change the users from the System Menu of the Control Center (right-clicking on the XL icon in the left top), and select ‘Edit Users…’. Users may only be created by users having the administrator level of ‘2000’. If your security level is not sufficient to modify the current user accounts, this menu option is disabled.

A pop-up with the configured users will be shown.

The usage of security levels is freely programmable. The above suggested security levels would be sufficient for most types of applications. These levels are also implemented in the off-the-shelf application templates like ‘MyTemplate.xlr’.
WARNING: Please only change the settings when well understood. Changing these parameters without a thorough knowledge of their impact may result in unpredictable behaviour and may cause application errors.

The settings are described in the next paragraphs.

System

System name

The system name is the name of the computer system in the eXlerate environment, used to identify the computer system in eXlerate applications over the network. By default, the Windows computer name is used as system name. A custom system name may be entered using this dialog. This changes only the internal name within the eXlerate environment, the Windows computer name is not affected. The system name is available in eXlerate applications as a defined object name ‘xSystemName’.

Report printer

Generated reports are printed to the Report printer name selected in this field. You can browse the system for an existing printer with the button ‘…’ on the right. Standard Windows printers are supported by eXlerate. When no printer is configured, the default Windows printer is used. Additionally, printer names defined in an eXlerate application will overrule the printer configured in the Control Center.

The condition of printers is checked every minute by eXlerate. In case a printer goes off-line or reports a warning like ‘out of paper’, you can have an eXlerate application alert the operator using the ‘exPrinterStatus()’ function.

Number of project archive files

When you save an eXlerate application, a backup file is stored in the Archive folder. This settings limits the number of backup files per project to prevent disk capacity problems. For example, when set at 25, the latest 25 archive files are maintained, and older files are removed from the archive directory. Up to 1000 backup files may be defined for each project. When all files are to be kept on disks, the value zero ‘0’ may be entered.

Event logging

The eXlerate event logger shows the events and alarms in the Control Center window, stores these on disk, and send these to the assigned printer.

Print events to

When events and alarms are to be continuously printed on paper, enter the event printer name in this dialog. You can browse the system for an existing printer with the button ‘…’ on the right. The events printer can be changed from within an application using the ‘exSetEventPrinter()’ function.

This will print the alarms / events when they occur. Note that with ‘cutting sheet’ printers this might result in a single alarm or event per page, so it is recommended to use only ‘fanfold’ printer types for immediate alarms and events printing.

Log events to

The log files, which are in fact ASCII files containing all logged events and alarms, will be stored in the directory defined here. You can browse the system for an existing path with the button ‘…’ on right.

Retain logs for

This setting specifies the number of days that log files and database records in the events table will remain available on the computer. Older files and database records will be removed by eXlerate in order to limit the size. To keep the events available forever on the computer, define a zero ‘0’. No files or database records are removed from the system by the eXlerate program.

Define colors …

This button allows for user definition of colors of event messages in the Control Center window. This feature allows easy recognition of certain event messages in a system, because a specific color can be attached to certain messages type, for example, alarm messages can be colored with white text on a red background.

Trending options

Retain trends for

Trend data will remain available on disk for the number of days specified in this setting. When set to zero ‘0’, the trend data will remain on disk forever. This is not recommended as trending and possible Windows operation and all programs will halt when the disk is full.

Generate warning at

eXlerate generates a warning when the specified percentage of disk usage is reached (disk full).

suspend trending at

eXlerate will suspend trending when the disk usage exceeds this percentage. No new data will be trended. When the disk usage is below this setting, trending is resumed. This prevents a disk-full situation, causing an unstable Windows system.

System security options

eXlerate protects tampering of the system in a running application, using the user security levels specified in this section.

Windows key level

Windows key will be disabled for users with a security
level below this level. This will block starting other tasks.

**System shutdown level**
This parameter defines at which security level System Shutdown will be enabled.

**Task switch level**
This parameter defines at which security level task switching (Alt+Tab) will be enabled.

**Debug break level**
This parameter defines at which security level the ESC-key can be used to switch to "Verify" mode when in "Run-time".

**Automatic logon / logoff options**

**Auto logon**
When the checkbox is enabled and a valid user name and password combination is provided, eXLerate will automatically logon that user upon startup.

**Auto logoff**
eXLerate monitors the activity of mouse and keyboard. When a user is logged in, and no activity is detected for the amount of time specified in this setting, the user will be automatically logged-off. When the checkbox is disabled, no automatic logoff takes place.

**Report generator options**

**Retain reports for**
This parameter defines for how long generated reports are retained on disk. By default this option is set to zero '0' which results into all generated reports are retained forever. To prevent the hard-drive from filling up, the parameter can be set to clean-up any reports that are more than x days old.

**Startup options**
On runtime systems it might be required to have eXLerate continuously running in an orderly manner (kiosk mode). With the eXLerate setting in this section, it is possibility to automatically start eXLerate and launch a specific application in Runtime mode when you start the computer.

**Install eXLerate as Program Shell**
When enabling the option to install eXLerate may as Program Shell, the program will start when the specific user logs in on Windows. The standard Windows desktop will not be available for the user to prevent a system from being used for anything else than for running eXLerate. These limitations are only applicable for appropriate user levels.

**Start shortcut**
In this setting, you can select the application that is started in runtime mode, whenever the eXLerate Control Center is started. In order for this to work, a user with a sufficient security level needs to be logged in. To do this, see the next section on Automatic Logon.

**Program shell command line arguments**
When eXLerate is set as Windows program shell, additional command line arguments may be used for tweaking the start timing, application to run and user to log-on.

**Command line arguments** on the syntax of command line arguments.

**Program buttons**
There are three additional buttons available, used for system administration\ purposes, which causes the following programs to be started: - {Cmd} Starts the Windows command process, which is the command line interpreter for Windows. - {Explorer} Starts the Windows explorer. - {TaskMngr} Starts the Windows task manager.

**Misc. settings**

**Alarm idle time**
This parameter specifies for how long the system suppresses alarms at system startup. This prevents generation/printing of many less useful alarms, being part of the startup process of a system rather than being actually alarm conditions. After this period, the alarm manager effectively starts monitoring events and alarms. When set at '0', no alarm idle time is defined at all.

**After cell kill focus**
This is an advanced option which controls how cells behave after they have been edited in runtime mode. For on-screen keyboards it may be useful to change this setting to a different value to get the desired behavior.

**Flush to registry**
eXLerate stores certain retentive data such as parameters, totals, etc... in the Windows registry. This option controls how frequently this data is physically stored on your hard-drive. By default, the option is set to 0, which means that Windows itself determines when and how often the data is physically written to your hard-drive. For instance, when the computer is very busy, Windows will flush data later on to ensure smooth system operation. By setting this option to a fixed value, the default Windows behavior is circumvented and flushing occurs at fixed intervals.

**Terminal services options**

**Enable Terminal Services Mode**
This parameter enabled Terminal Services Client Mode. This option allows you to run multiple client instances of eXLerate on a single machine using Terminal Services (=Remote Desktop).

**Run first logon of the first user as..**
When enabled, runs the first login for of the current user as a regular eXLerate session (e.g. as a Server-session). Use this option when you want to run Terminal Services on the same machine that is a duty/standby or a stand-alone server.

### 3.4 Application shortcuts

The left side of the eXLerate Control Center shows a list with application shortcuts. An application shortcut in the eXLerate Control Center is similar to a regular program shortcut in Windows, with additional properties for eXLerate.

To view and edit the application shortcut properties, select the application shortcut and right-click on it. The application shortcut menu will appear:
With this application shortcut menu, you can start the application in run mode or design mode, terminate it when it is running, add a new shortcut, delete the shortcut or modify the existing properties. (See Application operating modes for more details on different application modes.)

When selecting the ‘properties’ menu option, the Application shortcut properties dialog will show:

- **Icon**
  For each application shortcut, an icon may be selected from the icon list at the left of the dialog. Double-click on an icon to set it as the current icon. The current icon is highlighted.

- **Shortcut Name**
  The shortcut name is the name of the application shortcut as appearing in the shortcut list at the left-hand side of the Control Center main dialog. This name will be used as a key-value, under which various application parameters are stored in the system.

- **Type**
  The application type defines the kind of application defined for the shortcut. The type may be one of: ‘Windows application’, ‘eXerate Logger’, ‘eXerate Project’, ‘Windows Explorer’, ‘Task Manager’, or ‘Microsoft Excel’. For our eXerate applications, choose ‘eXerate Project’ as the default type. Other application types are available for operator convenience, in order to create a complete but restricted Windows environment.

- **Excel Edition**
  This option is available for application types ‘eXerate Project’ and ‘Microsoft Excel’. As it is possible to install multiple versions of Office on the same computer, although this is not a supported configuration by Microsoft. You can select the version to use for this application.

- **Program**
  This entry has to be entered when the shortcut refers to a ‘Windows application’ and not to an ‘eXerate project’. It is the executable to run, with the name of the executable exactly defined, including the absolute path to the executable, so the control center knows where to find the file. For the types ‘Windows Explorer’ and ‘Task Manager’ the default location and name are already entered.

- **File Path**
  The file path of an application are usually the document name, but may include other parameter as well. In case of an eXerate application, it should be the name of your project workbook, including its absolute path.

- **Presentation Picture**
  The presentation picture is the name of an image file that will be shown in the presentation area of the Control Center. When no presentation picture file is selected, the event logger will be displayed.

- **Report output path**
  The report output path defines the location where this eXerate application stores the reports when these are generated.

- **Trending path**
  This is the location where eXerate stores historical trend files. Standalone and Server systems store trend data to files in this location. Client systems retrieve trending information for the Servers and the path is ignored.

- **System database selection**
  eXerate uses the system database for event logging and to synchronize data between redundant servers. Since version 4.2, eXerate supports two types for the system databases: the embedded system database or the external system database.

- **Embedded system database**
  The embedded system database does not require any additional database server. Configuration is easy, just specify the Database path. At startup, the embedded database will be created automati-
cally if it doesn’t already exist. The embedded system database is not accessible externally.

- **External system database**
  The external database server used for the system database must be MySQL compatible and must run on the same computer where eXlerate runs. Furthermore, the storage engine must be ‘MyISAM’ for all tables. To be able to connect to the external database, you have to enter the database **Server port**, the **User name** and **User password** for the database and the **Database** name.

- **Security levels**
  An application may be started in Runtime mode, in Design mode, or may be terminated. A security level may be assigned to each action. A security level of ‘0’ means that all users are allowed to perform the associated action.

- **Watchdog protection**
  eXlerate allows you to monitor an application with a built-in watchdog mechanism. When enabled, this watchdog routine periodically checks if the application is still responding. If an application is not responding to the watchdog mechanism for the duration of the **timeout**, the control center will terminate the application, and automatically restart the application again. As the startup of an application can take a while, an **initial** delay can be set to only start the watchdog mechanism after the initial delay is elapsed.

When the current settings at the dialog are accepted with the ‘OK’-button, all settings are stored. With ‘Cancel’, the previous settings are retained.

### 3.5 Command line arguments

Although designed as a Windows compliant program with a standard user interface, i.e. a windows dialog, the Control Center may be additionally started from the command line with a number of command line arguments, for automated system startup.

The control center application may be started using the following syntax:

```
xlcenter.exe [-user {User name}] -pswd {Password} [-exec {Application}] [-open {Application}] [-wait {Delay}]```

with:

- `-user {User name}` the User name to login at start-up
- `-pswd {Password}` the password corresponding with `{User name}`
- `-exec {Application}` application to launch in runtime mode; the name of the shortcut or the whole path of the application
- `-open {Application}` application to launch in design mode; the name of the shortcut or the whole path of the application
- `-wait {Delay}` wait for {Delay} seconds before the application is actually launched

### 3.6 System settings

In order to eXlerate run properly, it requires certain Windows system settings and Microsoft Excel settings to be set correctly. These settings are checked by eXlerate when an application is launched. If a misconfigured setting is found, it is logged in the Control Center. Whenever possible, eXlerate tries to fix these settings. If the severity of the misconfigured settings is treated as an Error, a warning message similar to the following is shown:

![Example of misconfigured settings message](image)

Figure 3.11 Example of misconfigured settings message

You can abort application launch by clicking ‘Cancel’, let eXlerate try to fix the settings by clicking ‘Yes’ or continue with current settings by clicking ‘No’. The fixes are carried out by the `xlSettings` tool, that requires administrative credentials to run. If the settings are fixed, the fixed settings are shown and the application is launched, but if eXlerate was not able to fix the settings then another message is shown:

![Message with errors during settings fixing](image)

Figure 3.12 Message with errors during settings fixing

Pressing ‘No’ will abort the execution. If ‘Yes’ is pressed, then the application is launched.

The eXlerate Control Center differentiates the severity between settings. Settings that cause applications to malfunction are considered as an error. Other settings that might influence the behavior but don’t result in malfunction are considered as a warning.

The following settings are checked and considered an error:

- **Windows Regional Settings**
Identification tag: Locale Message logged: Your current regional settings may cause erratic application behavior. Should be 'English (United States)' or 'English (United Kingdom)' Note: this setting must be manually fixed under Microsoft Windows Region settings in Control Panel.

- Access to Visual Basic in Microsoft Excel

Identification tag: AccessVBOM Message logged: Trust access to Visual Basic Project is disabled, but should be enabled

- Macros usage inside Microsoft Excel

Identification tag: VBAWarnings Message logged: 'All Macros' is disabled, but should be enabled

- Microsoft Office EULA

Identification tag: AcceptAllEulas Message logged: Accept the Microsoft Office License Agreement

- Microsoft Office default file type

Identification tag: ShownFileFmtPrompt Message logged: Resolve default file types settings Note: this setting requires administrative privileges to be fixed.

The following settings are checked and considered a warning:

- Multitouch support

Identification tag: MultiTouchEnabled Message logged: Your monitor is currently configured for multitouch what is not supported by eXlerate Note: this setting requires administrative privileges to be fixed.

- Macros security level inside Microsoft Excel

Identification tag: MacroSecurityLevel Message logged: Macro security level is 'High', but should be 'Low'

- Trust level of add-ins inside Microsoft Excel

Identification tag: DontTrustInstalledFiles Message logged: Trust all installed add-ins and templates is disabled, but should be enabled

- Microsoft Excel autorecover configuration

Identification tag: AutoRecoverEnabled Message logged: Auto recover is enabled, but should be disabled

- Microsoft Excel background error checking

Identification tag: BackgroundChecking Message logged: Background error checking is enabled, but should be disabled

The xlSettings tool can also be used directly from command line with the following syntax:

xlSettings.exe sid excel\_internal\_version settings\_list

with: - sid User's security identifier of a Windows user on whose account eXlerate runs. If zero then current user is used.

- excel\_internal\_version Should be replaced by:
  - 14 for Microsoft Excel 2010
  - 15 for Microsoft Excel 2013
  - 16 for Microsoft Excel 2016 / 2016 / 365

- settings A series of identification tags separated by spaces

Example of use:

xlSettings.exe 0 16 AccessVBOM VBAWarnings
4 eXLerate Application controle

A Spirit\textsuperscript{IT} eXLerate application is just one single configuration file that includes:
- Communication settings - Tag definitions - Tag values - User Calculations - Displays - Animation definitions - Reports templates

When in runtime mode, with the communication is active, the tag values and the animations on displays are continuous updated inside the application. Other data, like reports, trend data, alarm and events, is stored in separate files and databases.

4.1 Application operating modes

Spirit\textsuperscript{IT} eXLerate has four different operating modes.

**Runtime** mode is for normal daily operation of a control system. The communication is running, values and animations are continuously updated and the configuration sheets (displays, report layout, communication settings, etc.) cannot be altered.

**Design** mode is for engineering an application. You can modify all sheets and communication is not active. You can switch from Design mode to Preview mode and Verify mode.

**Preview** mode is for an application engineer to check how the application will look in runtime. It has the same look and feel as runtime mode, except that is not active. When in Preview mode, the user may press <Esc> to return to Design mode.

**Verify** mode is for enhanced debugging of an application. It allows for checking communications, calculations, animations with data communications running and without the configuration sheets being protected against modifications. When in Runtime mode, the user may press <Esc> to go to Verify mode, provided a development license is available and the user security level is sufficient.

In summary:

- **Design**
  - Application engineering
  - No communication Sheets not protected

- **Preview**
  - Previewing application
  - No communication Sheets protected

- **Verify**
  - Application debug
  - Communication active Sheets NOT protected

- **Runtime**
  - Normal operation (live)
  - Communication active
  - Sheets are protected

4.2 Running an application

From the Control Center, you may start an application in RunTime or Design mode. In order to start an application, select it with your mouse in the application short-cut bar. and click on the ‘Design’ or ‘Runtime’ button to launch an application in design-mode, or runtime-mode.

When an eXLerate application is started, eXLerate takes the following actions:

1. Creating a copy of the original eXLerate application file. The copy is created for security reasons, that the original file remains uncorrupted on a unintended system shutdown. This copy is stored in the Windows temporary directory, e.g. ‘%Temp%\eXlerate’. The actual directory depends on Windows setup.

2. The copy of the applic file is opened: the corresponding executable is started as a separate Windows process, with the file name of this copy as its argument.

3. A special startup sequence creates the typical eXLerate environment on top of the standard Microsoft Excel environment. Note that the icon of an eXLerate project is colored red rather than the standard green icon. During this startup sequence, various event messages are logged in the event logger, which is displayed as an active window by the Control Center. These messages may be used to closely monitor the entire application startup process, especially during the application development process.

4. When the application is started up normally, the Control Center itself is minimized and disappears as an icon into the system tray. The user may re-store the Control Center to full screen by clicking on the eXLerate icon.

5. When the application has not started properly, monitor the messages as logged to the event logger carefully for unusual messages, or minimize the Control Center manually and check the application. A possible reason can be the usage of additional controls or components, or an improper eXLerate installation process.

When an application is started by pressing the Design or Runtime button while an application is already running, it is activated in the specified mode, and not re-spawned. This prevents running of multiple project instances of the same project, which would cause unpredictable results.

A running application may be closed, either from the application itself, or via the Control Center (Right-click an application shortcut, then select the ‘Terminate Application’ menu option).

When the application is terminated, eXLerate checks if the security level allows for such action. If sufficient, the following warning message is displayed:
If however the application that is to be closed, is not saved yet, the following message pops up instead:

Figure 4.2 Exiting an unsaved application
You may save your project first prior to exiting Excel, or decide after all that the changes need not to be saved.

Finally, the shutdown process may be monitored by the user.

The progress bar of the Control Center indicates the duration of the shutdown process, which may vary based on application size and processor speed.

Typically, the shutdown process should be completed within a few seconds.

4.3 The SpiritIT eXLerate ribbon

When an application is started in Design mode, the development ribbon is available. The ribbon shows a special ‘eXLerate’ item and the items normal available in Excel.

In the eXLerate ribbon there are various sections, which will be described shortly in this section.

File section
The file-section contains the ‘Save’ button, prominently visible for quick access.

Save (Ctrl+S)
When developing an application, regular save your changes. Use the Save button at the top or the Ctrl+S shortcut.

When the application is saved, first a backup of the old application file is created in the archive directory (e.g. “C:\XLRX\Archive”). Then the changes are saved to the application file.
simulations, as configured in the ‘xComms’ sheet, the animations and all internal intervals configured. The workbook is automatically calculated every second.

**Stop (Ctrl+O)**

This button switches from Verify mode to Design mode. It will stop real-time data communications, automatic recalculations, etc.

**Preview mode (Ctrl+N)**

This button switches from Design mode to Preview mode. Preview mode is used to preview display pages, without real-time updates running. It is used during display development to preview the created display pages. To go back to Design mode, press the <Esc>-key.

**Runtime mode (Ctrl+N)**

This button switches from Verify mode to Runtime mode. When communications are active, this will switch to the operational mode. When having made changes to the application prior to starting Runtime mode, it consumes additional resources of the system. In that case it is recommended not to leave the application in runtime mode, but to save, close and restart the application directly in Runtime mode. To go back to Verify mode, press the <Esc>-key.

**Cell properties section**

The Cell Properties section contains the ability to edit names and styles as well as a variety of often used commands for formatting text and backgrounds.

<table>
<thead>
<tr>
<th>Name:</th>
<th>Style: Normal</th>
</tr>
</thead>
</table>

**Names**

Names are a vital part of eXLerate. By using names for cells, ranges and objects, an application can be simplified. Instead of referring to a cell-address (e.g. “B78”) it is possible to refer to name (e.g. “Run1_Pressure”), which makes formulas and references far easier to understand.

Names can be created automatically by eXLerate wizards (see below), and manually by the Name Manager.

The current name of the cell, range or object is displayed in this section. If no name exists, then the ‘Name’ box is empty. You can create a new name by , typing the new name in the ‘Name’ box, and remove a name by clicking the ‘remove’ cross next to the ‘Name’ box.

Clicking on the icon will show the Names Manager with an overview of all configured cell and range names.

**Styles**

With styles you can create names for specific number formats so you can easily apply the format to cells showing certain values. The styles section shows the style that for the selected cell. To choose a different cell for the selection, choose a different style from the combo-box or create a new style. For example you can create a style ‘Pressure’ with a format of ‘0.00’, then you select the cell and apply the ‘Pressure’ style from this ‘Style’ drop-down.

**Lock cell**

The concept of locking and unlocking cells in eXLerate is an important one. In general the following rule applies: When a cell is locked, it cannot be modified when the application is in Runtime mode. This is important when designing a User Interface Display and you want users to only edit certain cells. Only those unlocked cells will be editable. This also applies to the ‘xTagDB’ sheet, so make sure that changeable cells are not locked.

**Insert section**

The Insert section contains the most common options for inserting and selecting objects.

| Picture | Chart |

**Select objects**

This option toggles the select objects state. When selected, this option makes it easier to select multiple objects such as shapes or controls using a dragging motion. When not selected (default), it selects multiple cells when holding the left mouse button and using a dragging motion.

**Design mode**

This Excel option should not be confused with the eXLerate Design-option. This option toggles the Excel Design Mode, which makes it possible to select Active-X controls such as the eXLerate Trend Chart control. Only when this option is selected is it possible to move, size, rename or delete Active-X controls.

**Picture**

The Picture button inserts a new picture into the application. These pictures are then embedded in the application file.

**Chart**

The Chart button inserts a new standard Excel Chart into the application.

**Controls**
The Controls option allows you to insert eXLerate specific controls such as trend charts, alarm summary and generic list views.

After inserting a control, the Excel Design mode is selected in which you can move and size the control. Click the Design mode button to enter or exit this mode.

Insert

The Insert option allows you to insert standard Excel controls such as buttons and check-boxes.

We advise to only use the Form controls and no ActiveX controls.

Apart from the standard Excel Form controls, shapes may also be used as buttons.

Shapes

The Shapes option allows you to insert a large variety of standard shapes. Apart from all standard shapes, shapes can be easily grouped together to form new shapes.

Wizards section

A eXLerate wizards are an important functionality of developing an application. Run the appropriate wizard when you have made changes to the different configuration sections.

Tag & Object wizard (Ctrl+W)

The Tag & Object wizard is the main wizard during application generation. Run this wizard when you have made changes to any of the ‘xTagDB’, ‘xComms’, ‘xTables’ sheets. It automatically creates and updates cell names for tag objects, communication settings, alarm list, intervals and periods for calculations.

Calculation wizard

Calculation sheets are structured and formatted worksheet for custom calculations in your application. When adding calculations to a calculation sheet, run the Calculation wizard. The calculation wizard creates the cell names for calculations.

Color wizard

Animations use colors from a predefined palette defined in the Color table on the ‘xTables’ worksheet. The table contains 64 colors, of which the first 8 are fixed and the others can be configured by the user by specifying the RGB values (values 0-255). The Color wizard applies these RGB values to the palette after which they become active and can be used for animating shapes in runtime.

Button wizard

The button wizard creates the buttons with the caption and associated VBA macros, corresponding to the definitions in the Button table located in the ‘xTables’ worksheet. Using the Button wizard, creation of menu navigation functionality in your application is highly automated.

Language Wizard

The language wizard creates the ‘xLanguage’ worksheet for your application. This language worksheet can be used to extend the application with multiple languages.

Development section

The Development section gives access to the Visual Basic (VBA) programming environment and a range of tools. Visual Basic is also accessible through the keyboard short (ALT+F11).
Figure 4.9 Development section

Shape property tool

The Shape property tool is a tool showing the properties for shapes, especially for shapes that are to be animated with live data. Using this tool, existing shape properties may be copied into the Animation table. In addition, a cross reference shows the usage of a shape over various worksheets.

Name definition tool

The Name definition tool is a pop-up dialog showing all currently defined (object) names in the application. It has similar functionality as the Excel built-in Names tool.

Color palette tool

The Color Palette Tools gives an overview of the currently defined color palette, and their index numbers, which are required for animations.

Alarm tree tool

This tool shows the currently configured alarm directory tree. In eXLerate, an alarm for a tag in the tag database may be grouped in a directory-oriented tree structure. With this tool, the currently configured alarm tree is displayed.

Generate report

The ‘Generate report’ option may be used to generate a predefined report. Reports are generated using a report template file and the data in the application. Reports may be also automatically generated, for example on predefined intervals, or on a special event.

Browse OPC servers

This option displays the OPC server browser.

Communications options

This option shows the diagnostic and logging options for the communication protocols. The protocols themselves are configured on the ‘xComms’ worksheet.

Show Control Center

This option shows the Control Center application.

Mark unprotected cells

Because worksheet cells may be protected during runtime mode, and it is not evident to see which cells are protected and which aren’t, this tool clearly marks all unprotected cells in the current worksheet with a light pattern.

Unmark unprotected cells

This option un-marks the cells that were marked with the previous command.

Remove external links

Sometimes a workbook contains external links to another workbook, for example because of the fact that cells-values or worksheet functions were copied from another workbook. Using this option, such external links are removed, and all external link references are reverted to the current application workbook. To check if there are external links in the first place, see the ‘Edit’, ‘Links’ menu in the standard Excel menu. When the ‘Links’ menu option is grey, no external links exist in the current application. This option should be used with caution.

Reset historical values

The automatically calculated values, for example hourly averages may be reset to 0 using this option, for example to test the application, and remove all existing counters and historical values.

Recalculate application

When this option is chosen, all open workbooks are recalculated. The system flag: ‘xAutoRecalc’, which is used to force recalculate expressions in Excel on a system restart is updated as well. In addition, shape animations are updated.

Import sheets

This option allows you to easily import sheets into your application. The tool automatically removes any external links and provides the ability to replace content while importing.

Advanced replace

Advanced Replace allows you to find & replace content not only on the sheet, but also in names, and objects. Special ‘prefix’ and ‘postfix’ options allow you to replace only the content that you are interested in.

Goto section

The Goto section contains several navigation options for quickly navigating the application. The ‘xTagDB’ and ‘xComms’ options represent worksheets. When pressed, these worksheets are selected.

Figure 4.10 Goto section

⇒ Name Goto name (Ctrl+Q)

This option searches for the definition of the referred name in the current cell. For example, when the current cell contains: ‘=xTR1TA.Value’, this option jumps to the cell bearing the name ‘xTR1TA.Value’.

⇒ Goto last position (Ctrl+Shift+Q)

This command returns to the last cell that the editor was located at before the ‘Goto name’ option was activated.

Help section

The final section in the eXLerate ribbon is the Help section. It provides access to the documentation, license manager and the about-screen.
5  eXLerate installation checklist

BIOS Settings
[ ] Resume operation after a power failure
[ ] Disable boot from CD / USB devices / network
[ ] Boot order set to boot from hard drive first

System info
Processor ________
Clock-speed ________
RAM ________
Computer name: ________________

Hard disk drives:
[ ] C:\ ________ GB
[ ] D:\ ________ GB
[ ] E:\ ________ GB

Printers
Name ________________ Make ________________ Model ________________
Name ________________ Make ________________ Model ________________
Name ________________ Make ________________ Model ________________
Name ________________ Make ________________ Model ________________

Software versions
Operating System (run 'WinVer.exe'):
[ ] Windows 10  Version ________ Build ________
[ ] Server 2019 Version ________ Build ________
[ ] Server 2016 Version ________ Build ________

Microsoft Office / Excel (see ‘Account’):
[ ] Office 365  Version ________ Build ________
[ ] Office 2019 Version ________ Build ________
[ ] Office 2016 Version ________ Build ________

Required software packages
[ ] Microsoft .NET Framework 2.0  Version ________
[ ] Microsoft .NET Framework 4.7.2  Version ________
[ ] Microsoft Visual C++ Redistributable 2019  Version ________

Spirit IT eXLerate
[ ] eXLerate 2016  Version ________ Build ________
[ ] End-user ________
[ ] Company ________
[ ] System ________
[ ] Machine ID ________
[ ] Licence number ________
[ ] Authorization key ________
[ ] Sentinel HASP  Version ________
[ ] Flow-X GUI  Version ________

Optional software packages
[ ] Anti-virus ________________ Version ________
[ ] TeamViewer ________________ Version ________
[ ] PDF reader ________________ Version ________
[ ] OPC Server ________________ Version ________
[ ] Port server ________________ Version ________

Windows software applications:
[ ] Games removed
[ ] Sounds removed
[ ] Search removed
### Network settings

#### Adapters

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DHCP</td>
<td>Static IP address</td>
<td>Subnet mask</td>
</tr>
<tr>
<td>2</td>
<td>DHCP</td>
<td>Static IP address</td>
<td>Subnet mask</td>
</tr>
<tr>
<td>3</td>
<td>DHCP</td>
<td>Static IP address</td>
<td>Subnet mask</td>
</tr>
<tr>
<td>4</td>
<td>DHCP</td>
<td>Static IP address</td>
<td>Subnet mask</td>
</tr>
</tbody>
</table>

#### Firewall ports

- [ ] xlNet ______ (default 9666)
- [ ] Terminal services (xlNet + ID)
- [ ] Flow-X Client ______ (default 818)
- [ ] Modbus TCP ______
- [ ] HASP Driver 1947
- [ ] Web Server 8080 – 9000

### Windows user accounts

<table>
<thead>
<tr>
<th>Username</th>
<th>Password</th>
<th>Member of group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Kiosk mode

- [ ] Automatic logon user 
- [ ] Set User password never expires
- [ ] Disable Lock computer
- [ ] Disable Logoff (from Windows)
- [ ] Disable Change a password
- [ ] Disable Start Task Manager
- [ ] Disable Switch user
- [ ] Enable Writing debugging information.
- [ ] Disable Autorun from CD's and USB sticks
- [ ] Disable Multitouch
- [ ] Power options Never put the computer to sleep (processor and hard disk)
- [ ] Power options Never turn off the display
- [ ] Enable Adjust date and time
- [ ] Disable Automatically adjust clock for Daylight Saving Time
- [ ] Time synchronization with Time Server [ ] No / [ ] Yes ______
- [ ] Action Center settings Turn messages off
- [ ] User Account Control set to *Never notify me*

### Windows Server options

- [ ] Enable 'Do not start server manager automatically at logon'.
- [ ] Disable 'Display shutdown event tracker'
- [ ] Disable 'Display Error Notification'
- [ ] Enable 'Disable Windows Error Reporting'

### Appearance and Personalization

- [ ] Display resolution 1920x1080 / Other ______
- [ ] Magnification settings: Smaller (100%)
- [ ] Disable Windows screen saver
- [ ] Set Windows background
- [ ] Action Center settings Disable notifications.
- [ ] Easy of access Disable Turn on Sticky Keys
- [ ] Easy of access Disable Turn on Filter Keys
- [ ] Regional and Language (In principle select US or UK)
  - [ ] Decimal symbol set to point ","
  - [ ] List separator set to comma ","
eXLerate users

User name _______________ Password _______________ Level _______________
User name _______________ Password _______________ Level _______________
User name _______________ Password _______________ Level _______________
User name _______________ Password _______________ Level _______________

Control Center options

[ ] System name _______________
[ ] Report printer _______________
[ ] Event printer _______________
[ ] Log events _______________
[ ] Install eXLerate as program shell
[ ] Start shortcut __________
[ ] Automatic logon user __________

Application shortcut

[ ] Application path _______________
[ ] Report path _______________
[ ] Trending path _______________
[ ] System database
  [ ] Embedded database path _______________
  [ ] External database _______________
[ ] Enable watchdog

Application

[ ] Check communication ports
[ ] Deselect in xIConnect log events for all protocols and queries
[ ] Check that in VBA all active references are valid
[ ] Compile VBA project
[ ] Run the eXLerate Diagnostic tool and archive these files
6 Revisions

Revision A
Date February 2012
- Added ‘Import Sheets’ and ‘Advanced Replace’.

Revision B
Date December 2016
- Update to eXlerate 2016.
- Update to ABB lay-out.
- New document code: OI/eXL2016-EN.

Revision C
Date September 2018
- New document code: IM/eXL-EN.
- Reintroduce revisions chapter.
- Provisional support for Microsoft Excel 2019 added.
- Windows 8 removed from software requirements.

Revision D
Date April 2019
- Support for Microsoft Excel 2019 added.
- Added references to Function Reference manual.
- Added ‘Required settings’ documentation.
- Added information for system administrators for operation system settings for kiosk mode.

Revision E
Date April 2020
- Split document content with this document containing only Installation instructions
- Update and extended the Software requirements.
- Installing eXlerate chapter updated.