



AUCOTEC
Create Synergy – Connect Processes

Engineering Base

Ex-i Calculation Wizard

September 2017

AUCOTEC AG

Oldenburger Allee 24
D-30659 Hannover
Phone: +49 (0)511 61 03-0
Fax: +49 (0)511 61 40 74

www.aucotec.com

AUCOTEC, INC.

17177 North Laurel Park Drive,
Suite 437
Livonia, MI 48152
Phone: +1 630 485 5600
Fax: +1 248 655 7800

Copyright: All rights, especially the right of reproduction and distribution as well as translation, are reserved. No part of this book may be reproduced, stored in retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording, or otherwise, without prior permission from **AUCOTEC AG**.

Exclusion of liability: Texts and software have been prepared with the greatest of care. The publishers as well as the authors cannot assume any legal or other liability of any nature for potential faulty statements and their consequences, which shall apply also for the software potentially included.

Trademarks Engineering Base® is a registered trade mark of the AUCOTEC AG, Germany. Microsoft Office Visio®, Microsoft SQL Server and Windows® are registered trademarks of Microsoft Corporation, USA.

Contents

1	About the Ex-I Calculation Wizard	1
1.1	Functionality.....	1
2	Terminology.....	3
3	Prerequisites.....	4
3.1	Structure of the PCE Tags	4
3.2	Attributes of the PCE Tags	4
3.3	Object Types Relevant for the Calculation	7
3.3.1	Object Types with Optional Ex-i Data	8
3.4	Attributes for Active Devices, Passive Devices and Cables.....	8
3.4.1	Active Devices (e.g. Modulator, Change Over Contact, PLC Output).....	9
3.4.2	Passive Devices (e.g. Sensor, Motor, Valve)	9
3.4.3	Cables.....	9
3.5	Requirements for an Intrinsic Safe Circuit	10
4	User Interface.....	11
4.1	Running the Calculation.....	11
4.2	Calculation Procedure.....	13
4.3	Messages about the Course of the Calculation	14
5	Resulting Data.....	15
5.1	Creation of a Calculation Sheet.....	15
5.1.1	Storage Location of the Calculation Sheet	15
5.1.2	Storage Location of the XLS Template	15
5.1.3	Setup of the Calculation Sheet.....	16
5.1.4	Configuration of the Template	16
5.1.4.1	Configuration Elements.....	17

1 About the Ex-I Calculation Wizard

Frequently there are areas in production plants, in which highly inflammable or explosive materials or mixtures of materials are present. On the other hand process data has to be measured and the media flows have to be moved and controlled in these areas. The sensors and actuators used in this area are often electrically driven. In the process, the supply of energy is required to operate these components.

The supplied amount of energy must not exceed a certain value so that no ignition or explosion of the mixtures of the material can take place. The circuits must be intrinsically safe so that neither in the normal operation nor in case of an error an ignitable spark can be produced during opening or closing the circuit or in case of short circuits to ground.

Apart from spark ignition, the heat ignition caused by hot surfaces must also be avoided. For this purpose, it is necessary to ensure for the normal operation and in case of errors, that for the maximum currents, voltages and power of the intrinsic-safe circuit no impermissibly high surface temperatures occur at equipment, components and cables which are located in the potentially explosive area.

To comply with these criteria, not only the individual equipment included in the intrinsic safe circuit but the complete interconnection and the interaction of the entire equipment involved including the connection cables have to be considered. The standards DIN EN 60079-14 require a verification of intrinsic safety for intrinsic safe circuits; it makes sense that this verification is created already in the planning and projecting phase and that it includes the selection of appropriate equipment and the check of the selected interconnections.

The measuring and control circuits for the hazardous areas are included in the Engineering Base projects. Using the **Ex-i Calculation Wizard** the intrinsic safety of functions in the hazardous areas can be calculated and the required documentations can be created automatically.



The license **Ex-i Calculation** (1155) is required for the use of the wizard which is contained in the business solution **Instrumentation Basic Engineering**.

1.1 Functionality

The wizards offers the following range of functions:

- The calculation of the intrinsic safety of all functions present in the project is performed on the basis of the associated article master data and the data of the project considering up to 5 measuring circuits.
- For each of the calculations, a calculation sheet, i.e. a document in the form of a report, is created in which the result of the calculation and the given source data are listed.
- The characteristic values of the active and passive devices and the cable lengths are considered during the calculation of the functions.
- The **EC-type Examination Certificate** in the form of the ATEX certificate number is provided for all relevant tag elements of the function.
- If the conditions for the intrinsic safety of a function are not met the user directly gets a message. These messages are listed in the Engineering Base project and have to be processed by the user. A report with the message that the intrinsic safety is not fulfilled is created.

The following boundary conditions have to be met for the use of the wizard:

- The created reports are not actively linked to the objects in the project. If the data of the objects is changed, new calculations have to be performed and therefore new reports have to be created.
- Technical data of the devices and functions cannot be modified via the wizard in the project. Changes in the master data have to be performed via the assistant **Update From Catalog Wizard** also in the projects.
- The basic electrical and logically correct layout of the measuring and control circuits is not checked by the wizard.
- The documentation created by the wizard is a collection and preparation of information present in the project. The calculations of the wizard are not certified. Without the check performed by the user, the documentations of the intrinsic safety do not have a proof character.
- The wizard does not recognize if device parameters have been changed after the calculation. The user has to start the calculation process anew.

2 Terminology

The following terms are used in this document:

PCE Tag/Main Function

The PCE tag comprises all components required for the implementation of a measuring or control task. PCE tags are represented by function objects in Engineering Base. The information relevant for the intrinsic safety is collected here. Among other things, these are the attributes **Proof of intrinsic safety**, **Calculation status 1 ...**, **Calculation status 5** and the **Calculation date**.

Measuring Circuit

Group of devices below a main function.

PCE Tag Element

The components of the PCE tags required for the measuring or control tasks are called PCE tag elements which could be sensors or actors but also connection components, such as cables or terminals.

Source/Active, Feeding Item

Device that supplies the circuit.

Target/Passive, Consuming Item

Device that consumes electricity.

3 Prerequisites

In order that the intrinsic safety can be calculated, appropriate data must be available in the Engineering Base projects. For this purpose, some attributes have to be added **in the type definitions** for the Ex-i relevant object types. The attributes for technical data are "Attributes with Units" of the type „Number" with 2 decimal places. Further information about changing the type definitions can be taken from the online help and the document **Users_Manual.pdf**.

3.1 Structure of the PCE Tags

After starting the calculation of the intrinsic safety of the PCE tags, all **functions** below the starting point are determined, for which the Ex-i attribute **Proof of Intrinsic Safety** is set. Via the alphanumeric wiring the devices and cables associated below are determined. They can be assigned to a maximum of 5 measuring circuits. In this context, a measuring circuit consist of an active device which supplies the circuits, any number of passive, electricity consuming devices and cables. The active devices are identified via a positive value of the Ex-i attribute **Max. Output Power Po**. The content of the attribute **Measuring Circuit** determine the allocation of the objects to a measuring circuit.

3.2 Attributes of the PCE Tags

All object types relevant for the intrinsic safety are functions, among others **measurement tags, load tags** and **actuator tags**. In **Engineering Base** they need some additional attributes which enable the calculation of the intrinsic safety. The results of the calculations in turn are returned to attribute of the PCE tags.

Name (Attribute ID)	Type / Internal Decimal Places	Value, Set by User or Wiz- ard	Use
Proof of intrinsic safety (25742)	Boolean	1=calculation required Default=0 (User)	Specifies if a calculation is required for this PCE tag.
Ex-i protection (27879)	Text	Protection acc. to RL 94/9/EG or protection acc. to EN 50 014 (User)	Specifies the type of protection.
Ex calculation status 1 (27893) 2 (27904) 3 (27915) 4 (27926) 5 (27937)	Boolean	1=Calculation successful (Wizard)	Result per measuring circuit, specifies if the calculation was successful or not.

Ex date of calculation (25744)	Date	Default=empty (Wizard)	Result, specifies the calculation was performed. If no calculation was performed at all, the value is empty.
Sum external capacitance C_o 1 (27897) 2 (27908) 3 (27919) 4 (27930) 5 (27941)	Number/2	Default=empty (Wizard)	Result per measuring circuit, specifies the sum of the external capacitances of the active components.
Sum external inductance L_o 1 (27898) 2 (27909) 3 (27920) 4 (27931) 5 (27942)	Number/2	Default=empty (Wizard)	Result per measuring circuit, specifies the sum of the external inductances of the active components.
Maximum output voltage U_o 1 (27894) 2 (27905) 3 (27916) 4 (27927) 5 (27938)	Number/2	Default=empty (User)	Specifies the maximum output voltage of the active components per measuring circuit.
Maximum output current I_o 1 (27895) 2 (27906) 3 (27917) 4 (27928) 5 (27939)	Number/2	Default=empty (User)	Specifies the maximum output current of the active components per measuring circuit.
Max. output power P_o 1 (27896) 2 (27907) 3 (27918) 4 (27929) 5 (27940)	Number/2	Default=empty (User)	Specifies the output power of the active components per measuring circuit.

Sum internal capacitance C_i 1 (27902) 2 (27913) 3 (27924) 4 (27935) 5 (27946)	Number/2	Default=empty (Wizard)	Result per measuring circuit, specifies the sum of the internal capacitances of the passive components.
Sum internal inductance L_i 1 (27903) 2 (27914) 3 (27925) 4 (27936) 5 (27947)	Number/2	Default=empty (Wizard)	Result per measuring circuit, specifies the sum of the internal inductances of the passive components.
Max. input voltage U_i 1 (27899) 2 (27910) 3 (27921) 4 (27932) 5 (27943)	Number/2	Default=empty (User)	Specifies the smallest value of the input voltage of the connected passive components per measuring circuit.
Max. input current I_i 1 (27900) 2 (27911) 3 (27922) 4 (27933) 5 (27944)	Number/2	Default=empty (User)	Specifies the smallest value of the input currents of the connected passive elements per measuring circuit.
Max. input power P_i 1 (27901) 2 (27912) 3 (27923) 4 (27934) 5 (27945)	Number/2	Default=empty (User)	Specifies the smallest value of the input power per measuring circuit.

3.3 Object Types Relevant for the Calculation

Only special devices are used in intrinsic safe circuit. These device types correspond to the following object types in Engineering Base:

Device Type	Object Type in EB	Use
Transducer	Sensor, transducer	Target Conversion of the physical values into an electrical signal
Measuring device	Measuring device, scale	Target Display of measuring values
Measuring feeder	Sensor, transmitter	Target Conversion of the physical values into electrical values
Power supply unit	Modulator, changer	Source Power supply of devices in intrinsic safe areas
Supply isolation amplifier	Modulator, changer	Source Signal separation between intrinsic safe and non-safe area, power supply of devices in intrinsic safe area
Measuring line	Multicore cable	Cable Electrical connection between measuring feeders and the power supply units
Over-voltage devices	Suppressor	Target Discharge of over-voltages caused by external factors (lightning, electromagnetic shockwaves)
Actor	Electrically driven mechanical device	Target Moving mechanical components
Display unit	Signaling device	Target Optical display of conditions
Command device	Control switch	Target Enter commands
Input	Input	Source Channel of an Ex-i isolator with several channels
Output	Output	Source Channel of an Ex-i isolator with several channels

3.3.1 Object Types with Optional Ex-i Data

When tracking the cabling encounters devices of specific device types these device can be skipped and they do not stop the tracking process even if the Ex-i data is missing in these devices. The following table includes these Engineering Base device types. In this process the tracking process is not generally stopped at switches, especially not at the switch types listed below. The property "Separate Potential/Substance" is still not considered during tracking the cabling.

Engineering Base Object Type
Terminal block
Terminal segment
Terminal
Fuse
Connector
Unspecified contact
Resistor, Potentiometer
Net-separator
Male connector terminal
Female connector terminal
Cable lug
Jumper
End clamp
End cover
Connector assembly
Relay, contactors, timer
Disconnect switch
Control switch
Circuit breaker
Change over contact

3.4 Attributes for Active Devices, Passive Devices and Cables

To perform a calculation, the required technical data of the individual object types must be available.

The properties required for the calculation of the intrinsic safety are summarized in the **Modify** dialog of the objects in the **Ex-i** tab. The properties listed below are required for the calculation. The values have to be entered by the user with the specified unit and 2 decimal places because they are interpreted that way during the calculation.

Each device incorporated in the intrinsic safe circuit must have a type approval certificate. With regard to the explosion protection, the devices are subdivided into four categories. For that, the following attributes are available:

Name (Attribute ID)	type	Selection
EC-type Examination Certificate (24356)	Text	
Category (25760)	Text	II 1, II ½, II 2, II 3, G, D
Protection type mark (25761)	Text	ia, ib
Explosion protection class (25762)	Text	IIA, IIB, IIC
Temperature class (19507)	Text	T1, T2, T3, T4, T5, T6

3.4.1 Active Devices (e.g. Modulator, Change Over Contact, PLC Output)

During the calculation, active devices are recognized from the fact that the following attributes are used:

Name (Attribute ID)	type
Max. external capacitance C_o (27884)	Number/2
Max. external inductance L_o (27883)	Number/2
Max. output voltage U_o (27881)	Number/2
Max. output current I_o (27882)	Number/2
Max. output power P_o (27880)	Number/2

3.4.2 Passive Devices (e.g. Sensor, Motor, Valve)

During the calculation, passive devices are recognized from the fact that the following attributes are used:

Name (Attribute ID)	type
Max. internal capacitance C_i (27889)	Number/2
Max. internal inductance L_i (27888)	Number/2
Max. input voltage U_i (27886)	Number/2
Max. input current I_i (27887)	Number/2
Max. input power P_i (27885)	Number/2

3.4.3 Cables

The following properties are required to determine the permissible length of the cables:

Name (Attribute ID)	type
Specific capacitance C_c (27890)	Number/2
Specific inductance L_c (27891)	Number/2
Cable length L [km] (25765)	Number/2

For the calculation of the maximum cable length, the cable length data can be missing at one cable. The maximum cable length of this cable is then determined using the difference to the total value. If the length information is missing at more than one cable, the calculation is aborted.

The length information can be stored in attributes which are evaluated with the following priority:

Designator	Attribute ID	Priority
Cable length L [km]	25765	1
Cable length	10008	2
Connection cable length (m)	24298	3
Length	10193	4

3.5 Requirements for an Intrinsic Safe Circuit

A measuring circuit must fulfill two requirements:

1. The internal power consumption ($P_{i\ min}$) of each passive device of the measuring circuit must be higher than the power (P_o) supplied by the active device to the measuring circuit.

Voltage	$U_o \leq U_{i\ min}$
Current	$I_o \leq I_{i\ min}$
Power	$P_o \leq P_{i\ min}$

2. The total inductive load ($L_{i\ total}$) and the total capacitive load ($C_{i\ total}$) of all passive devices and the cables which connect them must be lower than the loads of the active device (L_o, C_o).



If the value for the cable length is not available it will be determined using the inductive and the capacitive load. The cable length is then specified by the lower of the calculated length value $((L_o - L_i) / L_c)$ and $(C_o - C_i) / C_c$.

4 User Interface

The intrinsic safety can be calculated for the entire project, individual plant sections or for a single PCE tag. In doing so, a recursive search for functions is performed, starting at the start object or the start objects that have the value "True" in their attribute **Proof of intrinsic safety**.

4.1 Running the Calculation

To start the wizard

1. In the **Engineering Base Explorer**, select a **project** or objects included in the project.
2. In the shortcut menu, click **Select Assistant**, select the wizard **Ex-i Calculation Wizard** and then click **Run**.

The wizard is started and the dialog **Ex-i Calculation Wizard** is opened.

In this dialog you can make the settings for the reports created during the calculation. After checking the option **Save Setup** the current entries for **Cc**, **Lc**, **Title** and **Comment** are already preset when the wizard is started again.

Dialog Element	Use
<input type="checkbox"/> Ignore wiring and set the cable values for calculation	After the start of the calculation, all Functions below the start object are determined for which the Ex-i attribute Proof of intrinsic safety is set. By means of the alphanumeric wiring, the devices and cables associated underneath are then determined.

<input checked="" type="checkbox"/> Ignore wiring and set the cable values for calculation	<p>The assistant still searches for Ex-i relevant functions below the start object of the assistant. If such a function is found, the cables and the passive devices are not found by means of the wiring of the active devices, but the devices are determined by means of the association to the function. Thus, all devices associated with the function are examined with regard to the corresponding Ex-i attributes; all devices with corresponding Ex-i attributes found are considered during the calculation.</p> <p>In addition, a total cable length for functions and measuring circuits is calculated via the capacity and inductance values of a standard cable and is then stored at the functions (Max. cable length 1, ..., 5).</p>
Cc	The capacity value (of a standard cable) to be used, when calculating the overall cable length.
Lc	The inductance value (of a standard cable) to be used, when calculating the overall cable length.
Title	The title of the created report. The text is shown in the header of the related document.
Comment	A Comment for the created report. The text is shown in the header of the related document.
Template	<p>The template to be used for the creation of the report.</p> <p>Upon clicking on  select the template using the file selection dialog in the file system. Alternatively, you can use  to open the selection list of the Ex-templates available in the project. These templates are located in the folder Calculation of Intrinsic Safety in the sub-folder Configurations in the Template Folder of the project. Once a template is selected, the button Run is activated.</p> <p>After the selection of a template via the file selection dialog the template will be included in the selection list of the available Ex-templates.</p>

- Click on the **Run** button to start the calculation for the selected objects. By a click on **Cancel** the wizard can be closed.

4.2 Calculation Procedure

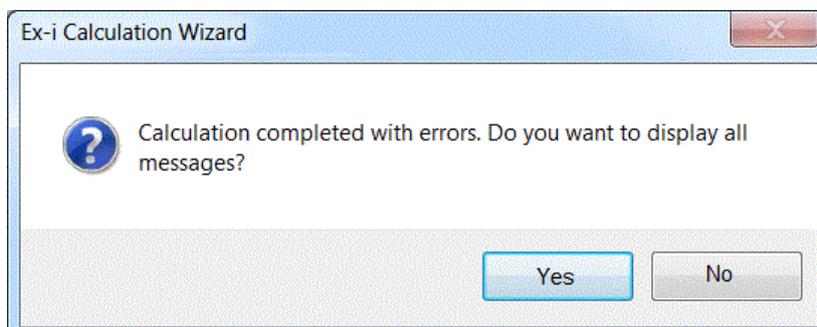
Upon starting the calculation the PCE tags to be checked are determined and the consistency of their related data is checked. Only if all relevant object structures for the calculation are available, the generation of the required projects is started. Since this analysis of the structure and the subsequent calculation can take more or less time, the user is informed about the status by means of a progress dialog.

Specifically, the following checks are performed:

Check/Result	Termination with explanatory error message
Is there another function below a found Ex-i tag which is likewise marked as an Ex-i tag?	Ex-i tag cannot be calculated. It contains another Ex-i tag.
Several active devices identified, but the main function does not contain the required attributes for corresponding measuring circuits.	Ex-i tag cannot be calculated. Circuit contains several active devices.
An active device in the main function does not contain a correct measuring circuit number. This is the case if the number is missing or it is not within the range [1,5].	Ex-i tag cannot be calculated. The measuring circuit numbers are not unique.
At a device, active and passive attributes are filled. Not all obligatory active or obligatory passive attributes are present at a device.	The Ex-i tag cannot be calculated. The device [device/cable name] is not unambiguously specified.
Devices without Ex-i data for which EX-i data are mandatory are connected to an Ex-i cable.	The Ex-i tag cannot be calculated. The function contains devices without Ex-i data

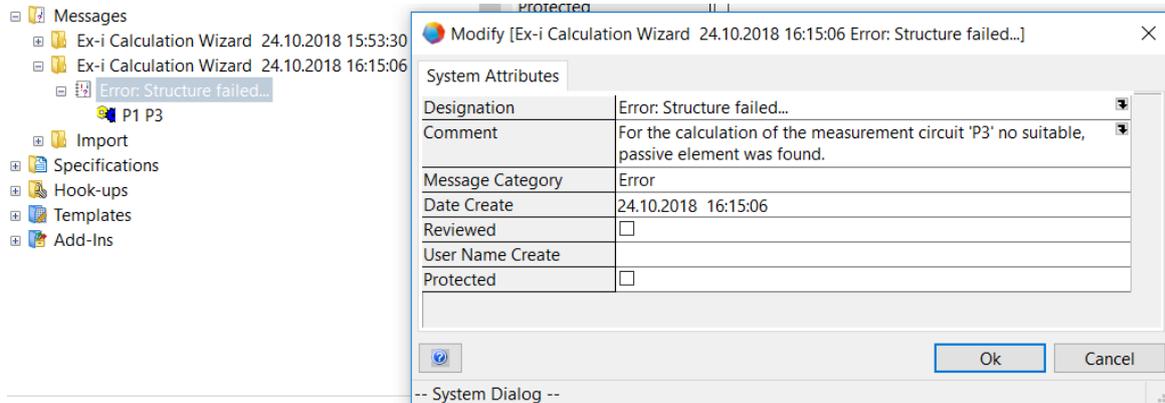
Finally, the calculation is carried out for the successfully tested tags.

If the wizard must be terminated because of the tests, or if it skips a tag during calculation, the user is informed about the corresponding messages in the project folder **Messages**.



4.3 Messages about the Course of the Calculation

For success and failure messages, a folder "**Ex-i-Calculation Wizard** dd.dd.dddd tt:tt:tt" is created in the system folder **Messages** at each start of a calculation; here message objects are stored whose **Comment** contains message texts concerning the course of the calculation (dd.dd.dddd and tt:tt:tt stand for the date and time at the start of the calculation).



5 Resulting Data

After the calculation of a tag, the Ex data is updated, and a calculation sheet is created. Subsequently the calculation is carried out for the next function with specified Ex-i attribute **Proof of intrinsic safety**; this is continued until all tags determined via the start object have been processed.

1. The wizard updates the attributes of the tag listed in chapter [Attributes of the PCE Tags](#). The current date is entered in the attribute **Ex date of calculation**.
2. If the calculation was successful, the attributes **Ex calculation status 1 ... 5** for the existing measuring circuits are set to "TRUE", and a calculation sheet in the form of a report is stored in the document folder **Ex-i Calculation Wizard**.

5.1 Creation of a Calculation Sheet

For each tag, a calculation sheet in the form of a report is issued in the XLS format. For this purpose the XLS template selected in [Start dialog](#) is used. The filename contains the function name of the tag as well as the date and time terms of the calculation date.

Changes of the report layout can be made by adjusting the XLS templates.



Since the generated reports are not associated with the objects in the project, following a change in the data new calculations must be started and thus new reports must be created.

5.1.1 Storage Location of the Calculation Sheet

The reports are stored in the folder **Ex-i Calculation Wizard** under the system folder **Documents** of the project. If this folder does not exist, it is automatically created.

5.1.2 Storage Location of the XLS Template

The XLS templates and the associated configuration file **Report.config** are stored in the folder **Calculation of Intrinsic Safety** of the project. This folder is located in the folder **Configurations** in the system folder **Templates**.

- [-] Messages
- [-] Templates
 - [+] Sheets
 - [+] Worksheets
 - [+] Excel Import Mappings
 - [-] Configurations
 - [-] Calculation of Intrinsic Safety
 - [+] ISV_mixed circuit.xls
 - [+] ISV_simple circuit.xls
 - [+] Report.config
- [+] Add-Ins

If the folder **Calculation of Intrinsic Safety** contains several templates, you must select one of these templates via the template selection in start dialog of the wizard. Alternatively you may also select a template from the file system. If the project contains only one template, then this is the default selection.

5.1.3 Setup of the Calculation Sheet

The header line area of the calculation sheet contains, in addition to the tag, the status, the date of the Ex-i calculation and the **Title** and the **Comment** entered in the start dialog. Underneath, there is a list with the data for the active equipment, the passive equipment and the cables per measuring circuit determined during the calculation.

The positioning and the graphic properties of the elements as well as the assignment of shown attributes to the EXCEL cells of the selected template are taken from the configuration file **Report.config**.

Process Control Room

Check Cable Lengths

Verification of Intrinsic Safety

for intrinsically safe circuits with one source (calculation base acc. to DIN EN 60 079-14)

Function	P1	Measuring circuit	1	Created at	31.05.2016 13:03:30	Status	OK		
Active Equipment									
No.	Manufacturer	Type	Designation	Examination Certificate	Uo	Io	Po	Lo	Co
1	P&F	40182.0101	.0	BVS 12 ATEX E 015 X	27,00 V	87 mA	575,00 mW	4,60 mH	90,00 nF
Passive Equipment									
No.	Manufacturer	Type	Designation	Examination Certificate	Ui	Ii	Pi	Li	Ci
1	KNICK	30112.0008	-L30040_ANZ	ZELM 00 ATEX 0025	60,00 V	150 mA	841,00 mW	0,00 mH	3,00 nF
Cables									
No.	Capacity and Inductivity		Designation	Length [m]	Calculated Length (max.) [m]		Lc [mH]	Cc [nF]	
1	Lc	0,50 mH/Km	-WV128_35	1			0,0005	0,04	
	Cc	40,00 nF/Km							
2	Lc	0,20 mH/Km	-WV128_36	100			0,02	3	
	Cc	30,00 nF/Km							
Function	P1	Measuring circuit	2	Created at	31.05.2016 13:03:30	Status	OK		
Active Equipment									
No.	Manufacturer	Type	Designation	Examination Certificate	Uo	Io	Po	Lo	Co
1	P&F	40181.0101	.0	BVS 12 ATEX E 101 X	27,00 V	90 mA	588,00 mW	4,40 mH	90,00 nF

5.1.4 Configuration of the Template

The assignment of attribute values to be shown to the cells of the report is specified in the configuration file **Report.config**. To carry out changes, the file must be stored in the local file system. For editing this file in the XML format, we recommend the use of a suitable editor. Finally you can again store the changed file with **Insert file** in the folder **Calculation of Intrinsic Safety**.

The XML elements **Field** have 4 XML attributes:

- **Label** defines the EXCEL cell used for the display.
- **EBAttributeId** defines the attribute to be shown.
- **ReportSection** defines the area of the report where an attribute is to be displayed.
- **IsInternal** describes the type of the **AttributeId**:
 - "false" the ID is an Engineering Base attribute ID.
 - "true" the ID is managed by the wizard.

5.1.4.1 Configuration Elements

In particular the wizard manages the following **ReportSections** and internal attributes:

Available ReportSections	Description
Project	Header data
MeasurementCircuit	Calculated results
ActiveDevice	Source data
PassiveDevice	Sink data
Cable	Cable data

ReportSection	Internal AID	Description
Project	1	Report title from the start dialog
Project	2	Report comment from the start dialog
ActiveDevice	1	Tag number
PassiveDevice	1	Tag number
Cable	1	Tag number
Cable	2	Maximum length [m]
Cable	3	Cc [nF]
Cable	4	Lc [mH]
Cable	5	Length [m]
MeasurementCircuit	1	Tag number
MeasurementCircuit	2	Maximum Co
MeasurementCircuit	3	Maximum 0.5*Co
MeasurementCircuit	4	Result of the calculation: Maximum Co
MeasurementCircuit	5	Result of the calculation: Maximum 0.5*Co
MeasurementCircuit	6	Maximum Lo
MeasurementCircuit	7	Maximum 0.5*Lo
MeasurementCircuit	8	Result of the calculation: Maximum Lo
MeasurementCircuit	9	Result of the calculation: Maximum 0.5*Lo
MeasurementCircuit	10	Result of the calculation: Maximum U
MeasurementCircuit	11	Result of the calculation: Maximum I
MeasurementCircuit	12	Result of the calculation: Maximum P

The entries for **Title**, **Comment** and **Template** made in the start dialog are stored in the configuration file and can be assigned to the EXCEL cells "Title" and "Comment" in the ReportSection "Project".

Structure	Values
Title	Process Control Room
Comment	Check cable lengths
ExcelTemplate	ISV_simple circuit.xls
Fields	
Field	
Label	Title
EbAttributeId	1
ReportSection	Project
IsInternal	true
Field	
Label	Comment
EbAttributeId	2
ReportSection	Project
IsInternal	true
Field	
Label	ZB_Pos
EbAttributeId	1
ReportSection	ActiveDevice
IsInternal	true
Field	
Label	ZB_Uo
EbAttributeId	24342
ReportSection	ActiveDevice
IsInternal	false
Field	
Label	ZB_Io
EbAttributeId	24343
ReportSection	ActiveDevice
IsInternal	false