SMART INSTRUMENTATION 13.1 (SI) IMPORT UTILITY OVERVIEW

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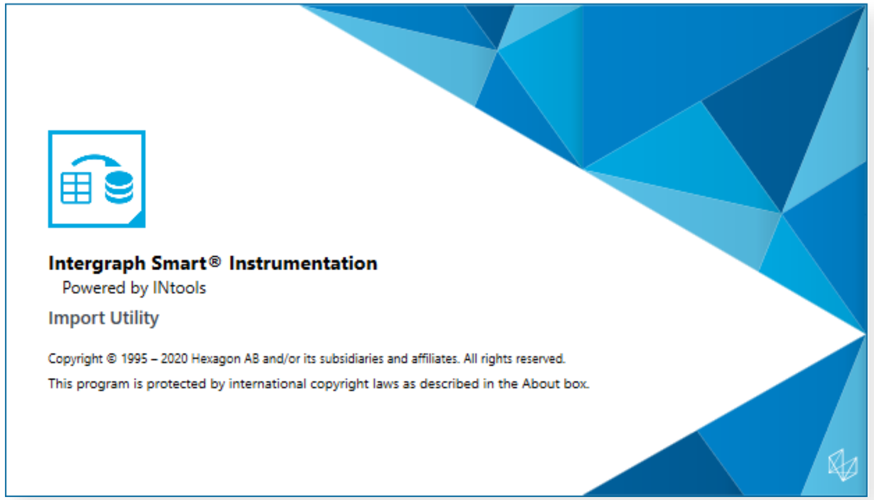
AGENDA

- What is the Import Module?
- Key Features
- Typical Use Cases
- Best Practices
  - Import Procedure
- Challenges & Considerations
- Optimizations from Nezar
- Tips & Tricks
- Comparison



WHAT IS THE IMPORT MODULE?

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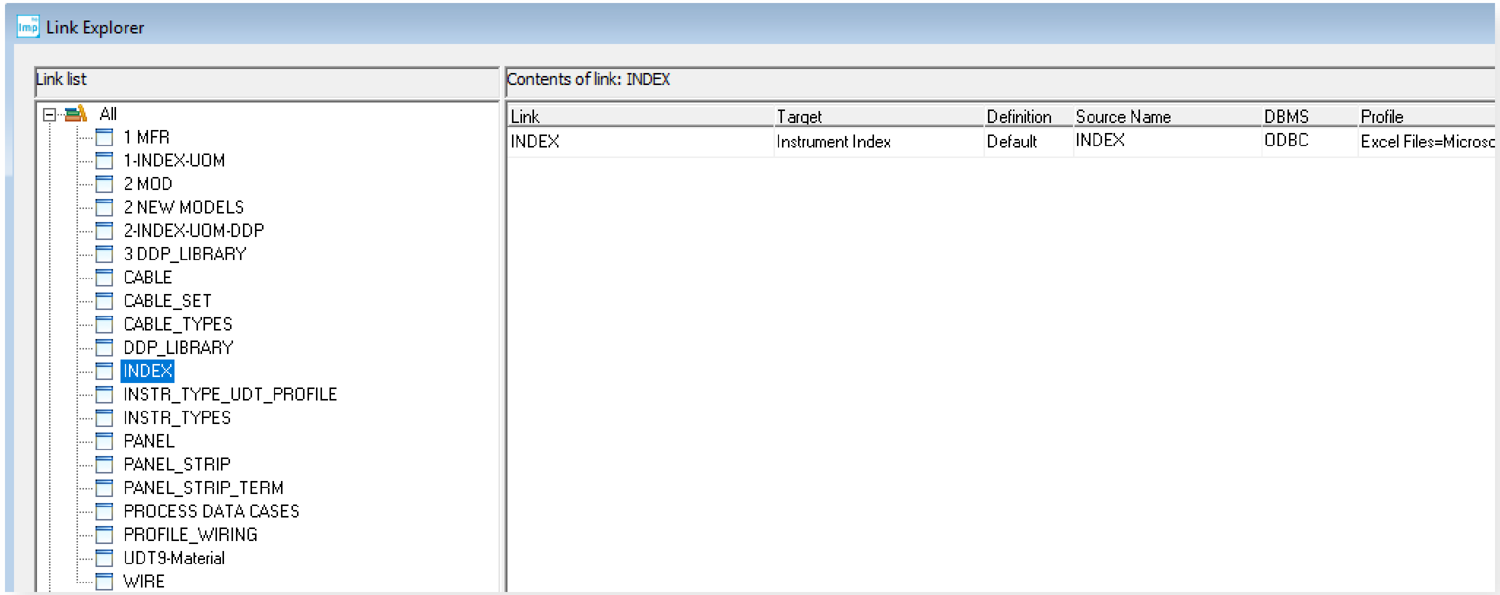
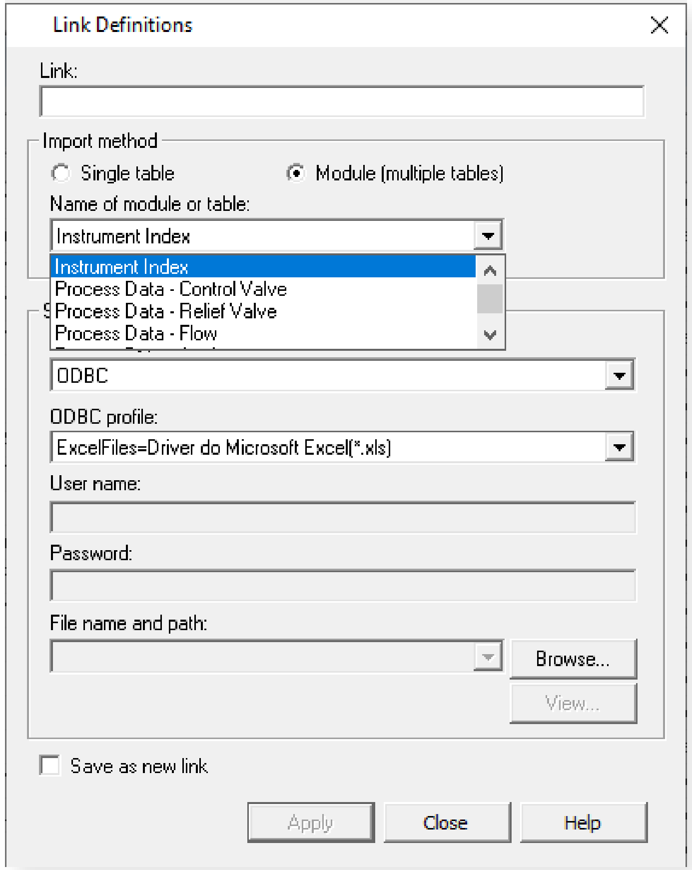
- Separate utility to import into tables or modules of Smart Instrumentation
- Purpose: Bulk load large volumes of instrumentation data
- Can be used to migrate from Excel, CSV, or legacy systems
- Ensures data consistency and reduces manual entry errors



❖ Some knowledge of SI database structure and concepts such as naming conventions is needed.

KEY FEATURES

- Supports import of:
  - Instruments, process data, wiring, I/O assignments, and more
- Data validation before importing
  - Test Import
- Module (Multiple tables)
  - Index, Process Data, Specs
- Insert New items
  - Update existing items
  - Or even Move or Delete (Single Table import)
- Logging and detailed import reports



TYPICAL USE CASES

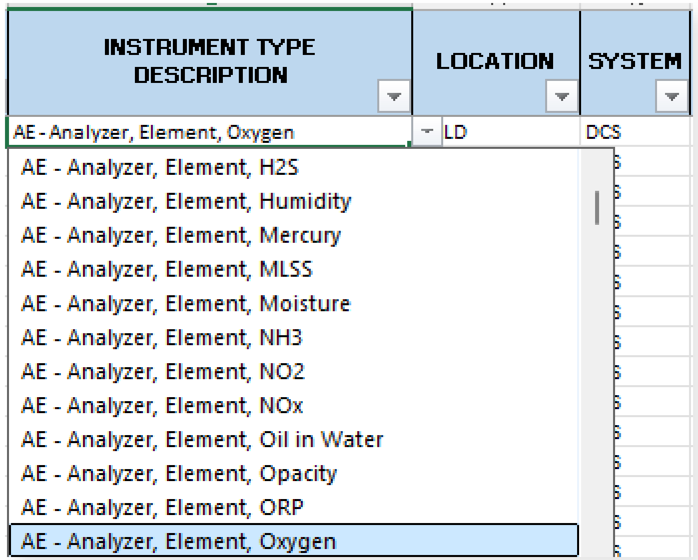
- Initial population of new SPI projects
- Migrating data from Legacy systems
- Updating instrument data from engineering contractors
  - Indexes from Mechanical Packages
- Data from other disciplines
  - Process

LOOP_NO	TAG_NO	SERVICE_DESCRIPTION	PF	IT	IT_DESC	LOCATION	SYSTEM	IO_TYPE	STATUS
03-P-10111	03-PIT -10111	FLG FRM DM BLR H710 TO DM BLR H710 & H720 BLWR	Pressure	PIT	Pressure, Ind Trans, Diaphragm Seal	FIELD	SIS	AI	NEW
03-P-10111	03-PI -10111	FLG FRM DM BLR H710 TO DM BLR H710 & H720 BLWR	Pressure	PI	Pressure Indicator - Soft	PCS	DCS	SOFT	SOFT
03-P-10111	03-PAL -10111	FLG FRM DM BLR H710 TO DM BLR H710 & H720 BLWR	General	PAL	Pressure, Alarm, Low	PCS	DCS	SOFT	SOFT
03-P-10111	03-PALL -10111	FLG FRM DM BLR H710 TO DM BLR H710 & H720 BLWR	Pressure	PALL	Pressure, Alarm, Low Low	PCS	DCS	SOFT	SOFT
03-P-10111	03-PSLL -10111	FLG FRM DM BLR H710 TO DM BLR H710 & H720 BLWR	Pressure	PSLL	Pressure, Switch, Low Low, Soft	PCS	SIS	SOFT	SOFT

DATA PREPARATION & WORKFLOW

1. Best to start with a good Excel template aligned with the SI database
   - Can use Excel Data Validation Lists to align Instrument Types, System, I/O Type etc.
2. Fill in required fields (e.g., tag number, P&ID, Service, Loop…)
3. Validate data (mandatory fields, formats)
   - e.g. Instruments require Process Function, Instrument Type Name and Description
   - Use Excel functions to ensure Tags and Loops match the SI naming conventions
4. Use Import Utility to test / load data
5. Check import logs & correct errors if needed

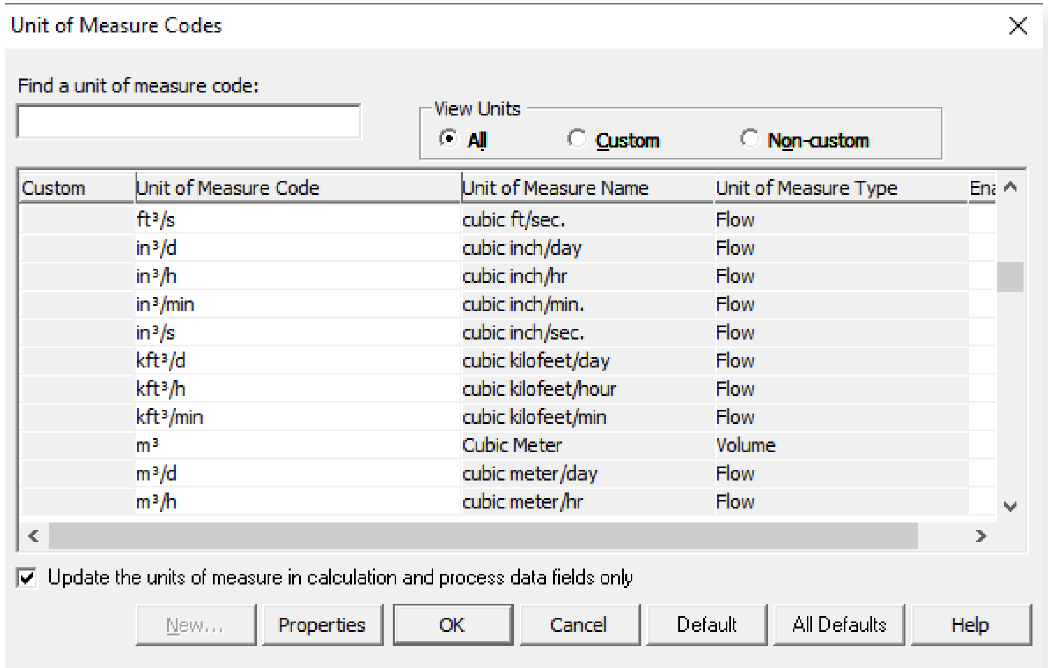
Excel Validation List



❖ Remove special characters and spaces from Excel source file. Special characters will cause a crash, and spaces will cause import slowness.

BEST PRACTICES

- Backup SI before Importing
- Use Excel as the source file
- Validate data offline before importing
  - Cleanup all data that needs to align with SI
    - Tag / Loop Naming convention
    - Status, Location, System, I/O Type…
    - Data consistency
      - Mfr., Model, Equipment, Line…
    - UOMs
      - Process / Calculation module won't recognize the units.
      - Flow and Pressure Unit Flags are separate fields
        - (Don't import kPa-g) into 1 field



IMPORT PROCEDURE

(check log file after each step to confirm results are as expected)

- Test import 1 tag
  - Saves time testing
- Actual Import 1 tag first
  - If something is wrong this 1 tag can easily deleted
- Test import all tags
- Actual import of all tags

```
***
Target table: COMPONENT_SYS_IO_TYPE
Started:      16:58:46
Source data sorted by the fields: index.plant_name,index.area_name,i

Import stopped.                 16:58
Statistics:
*****************************************
* Number of rows in the Source: 1.     *
* Inserted rows:                0.     *
* Updated rows:                 1.     *
* Deleted rows:                 0.     *
* Rejected rows:                0.     *
*****************************************

***
Target table: COMPONENT_LOCATION
Started:      16:58:47
Source data sorted by the fields: index.plant_name,index.area_name,i

Import stopped.                 16:58
Statistics:
*****************************************
* Number of rows in the Source: 1.     *
* Inserted rows:                0.     *
* Updated rows:                 1.     *
* Deleted rows:                 0.     *
* Rejected rows:                0.     *
*****************************************

***
Target table: COMPONENT
Started:      16:58:48
Source data sorted by the fields:
index.plant_name,index.area_name,index.unit_num,index.loop,index.pro

Import stopped.                 16:58
Statistics:
*****************************************
* Number of rows in the Source: 1.     *
* Inserted rows:                1.     *
* Updated rows:                 0.     *
* Deleted rows:                 0.     *
* Rejected rows:                0.     *
*****************************************
```

CHALLENGES & CONSIDERATIONS

Quality of source data affects results

Numeric data, but Excel cell is “Text”

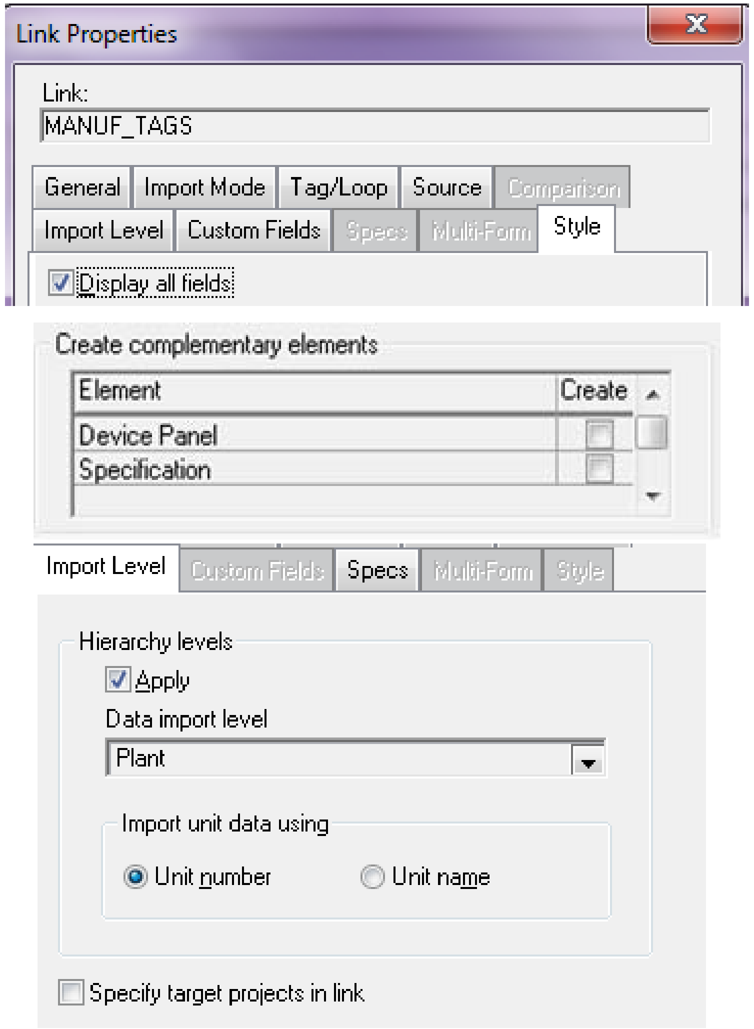
From Nezar

If the same name range is used twice for 2 different excel files(non-unique name range), the first Excel file is linked to the SPI import utility successfully; however, the SPI import utility will map the first file again even if you pointed to the second file.

* Edit the Link and connect to the correct file a 2nd time resolves this.

OPTIMIZATIONS FROM NEZAR

- Display all fields
- Don’t create complementary elements
- Apply Hierarchy Levels for multi unit imports
- Def_Flg: Wiring Flag (‘N’ for Project, ‘Y’ for Reference)
- Process Data Cases:
  - MS-SQL
    - update process_condition set case_name = ‘XXX’ where case_id = 0
    - Set Case Name to ‘XXX’
    - update process_condition set case_name = ‘*’ where case_id = 0
  - Oracle ‘’ for no cases
- SPI Import Link Table Definitions (Contact Hexagon)
- SPI Import System Source Codes (e.g. UOMs) – Not Recommended



OPTIMIZATIONS FROM NEZAR

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Recommended as minimum data

- Tag Number, Instrument Type, Instrument Type Desc., Process Function, and Tag Category ID.
- If importing to multiple units, then include the Plant Name, Area Name, and Unit Name or Unit No.
- If the Tag Number has a loop, then include the Loop Name and the Loop Measure Variable.
- If the Tag Category ID is not included, all tags will be imported as **Conventional Tags**.
- Always recommended to match between the tag instrument type and its table.
    - Ex: Tag: 101-FE-1000; therefore, instrument type in source file is FE.
- Loop - Apply Service, Equip, P&ID columns with ‘Y’ and ‘N’. (Or hardcode ‘N’ in the mapping)

Wiring and I/O imports

- Has number of requirements (refer to Nezar’s presentation)
- Panels (Strip, Terminal) (+ Rack, Slot, Apparatus, Channel)
- Cable (Sets, Wires)

OPTIMIZATIONS FROM NEZAR

- Older version recommendations

Source Name	Target Name	Type	Length
'N'	MERGE RELEASE FLG	char	1

  - Map Loop Measure Variable

SPI Field	Table Name	Value	Issue of not set
Loop Sheet Type Flag	Loop	1	Loop revision comparison will not work
Type Gen	Loop	Z	Loops will not show in the domain explorer (loop folder)

- Test in SI 13.1 HF37 without setting these

TAG	MERGE_RELEASE_FLG	LOOP_NAME	LOOP_PROC_NAME	MERGE_RELEASE_FLG	LOOP_SHEET_TYPE_FLG	TYPE_GEN	DWG_NAME	MERGE_RELEASE_FLG
10-FV -9998-LW	N	10-F-9998	F	N	1	Z	PID-124	N

TIPS & TRICKS

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String Operators in Import Links

When defining the import mapping, you can use various string operators in the **Source Name** field of the **Import Link** window. The following string operators are available:

Operator	Description	Example
'...'	Single quotes. You must enclose any fixed string in single quotes if you do not want to link the source data directly.	**'101-FT-100'** — Imports a specific tag number.
(n,n)	Sub-string operator. This operator allows you to transfer a sub-string of a source field value by adding in parentheses the string parameters: the starting character and the string length.	**cab_name (3,2)** — Indicates that you want to transfer two characters from the **cab_name** field, starting from the third character.
&	Ampersand character. This character allows you to trim any leading or trailing spaces in the imported value. You must add the & character before the field value in the link.	**&tag_name (5,5)** — In this example, the source field (tag_name) is a string representing an entire tag name such as 101-FT -100 (where the instrument type segment can be up to 5 characters long and includes trailing spaces). This example includes a sub-string of 5 characters in length starting from the 5th character, which in this case is 'FT ' (with 3 trailing spaces). The '&' character preceding the string ensures that these trailing spaces are trimmed, so that the imported string will be 'FT'.
#	Pound character. The # character, preceded and followed by a **+** character **(...+#+...)** indicates the end of the current line so that the imported value following #+ appears on the next line.	**spec_note1+#+spec_note2** — Imports two spec note from a predefined source fields and displays the second note on a new line.

TIP You can use any combination of the string operators in an import link.

TIPS & TRICKS

- From Hexagon Documentation:
  - I have not had an issue with crashing on more than 400 tags
  - Test result was same amount of time with or without disable=y

❖ IMPORTANT If you intend to import a large number of records (more than 400 records) in one import session, you must create a new section in the Intools.ini file called [Rules] and add the following parameter: **disable** = **y**.

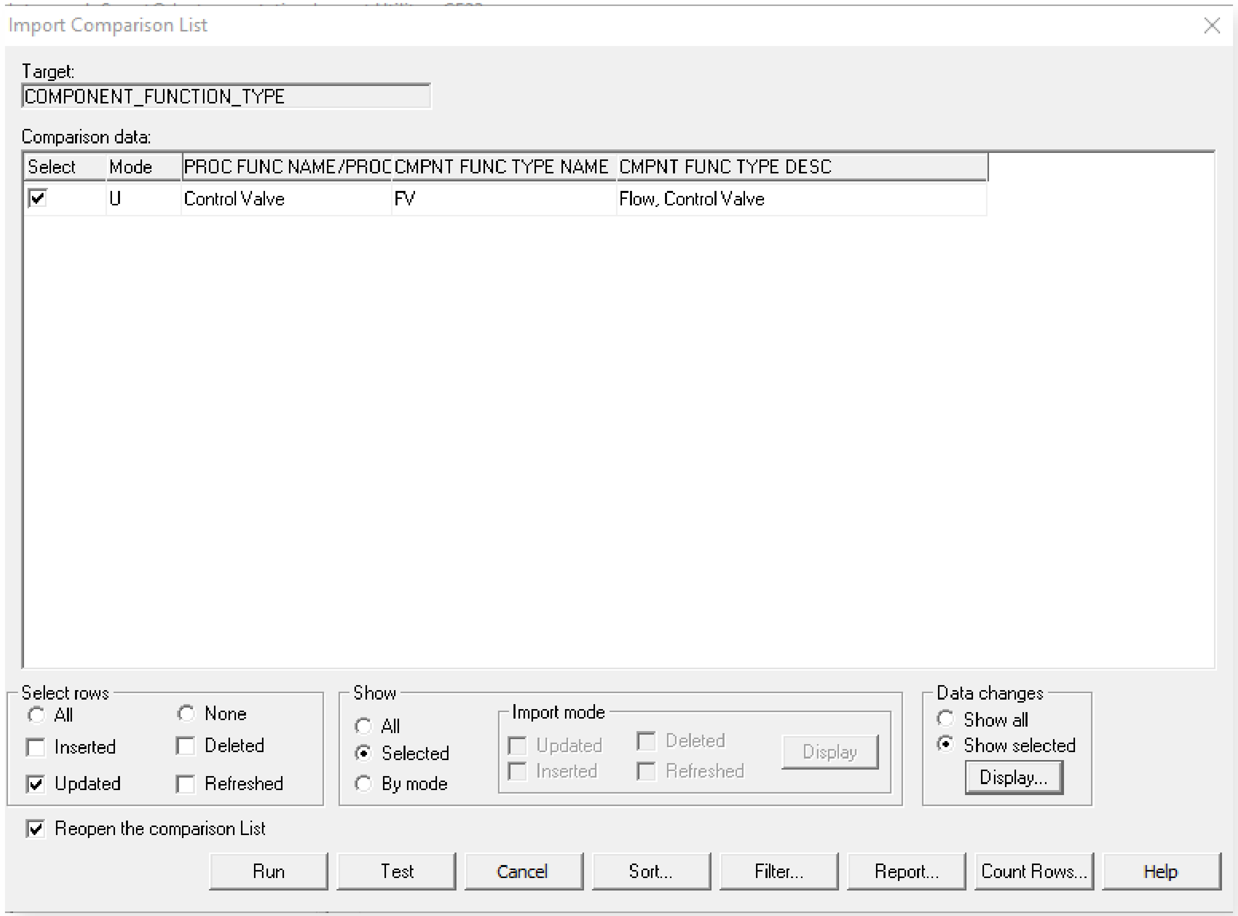
On the **General** tab, clear the **Ignore duplicated source rows** check box.

★ IMPORTANT You must clear this check box if your Excel file has source fields containing more than 256 characters. If this check box is selected, the software only imports the first 256 characters from such fields. This is a limitation of Excel drivers.

- UDT values import to Default Instrument Type value on first import
  - Import UDT values a 2nd time to import value from source file

COMPARISON

- The comparison option can only be used with table imports.
  - helpful when comparing supporting tables such as the instrument types table. It will list inserted, updated, deleted, and refreshed (no change).
- SPI Import Tag/Loop Definition
  - Always Define the naming convention in the link. This means loop and tags will be cleaned in the source file.
- Nezar’s recommendation is to check the validate tag and loop segment. If unchecked, the import will not validate consistency Between tag instrument type and the table, and Loop measured variable and the table.
  - I Don’t normally check this option. If I need to review the instrument types I use a vlookup in Excel. Loop MV gets populated automatically based on Loop MV in the Loop name.



REFERENCES

- **“SI Data Imports LTUF August 2023” & “OPTIMIZING THE SMARTPLANT INSTRUMENTATION V2009 IMPORT MODULE”**
  - **By Nezar Faitouri**
  - LTUF Archive Imports
- Hexagon SI 13.1 Documentation
  - Import Utility • Intergraph Smart Instrumentation Help • Reader • Documentation

THANK YOU