Underused Smart Instrumentation Modules

If you don't use it – you can lose it!

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John Dressel, Fluor
Control Systems Fellow

Underused Smart Instrumentation Modules

- Underused Smart Instrumentation Modules and Interfaces
  - Dimensional Data for Piping Module
  - Vendor Interfaces
  - SAP interface
  - Process Module
  - Calculation Module
  - Calibration Module
  - Hookup Module
  - Maintenance Module
  - Telecom Module
  - Import Module

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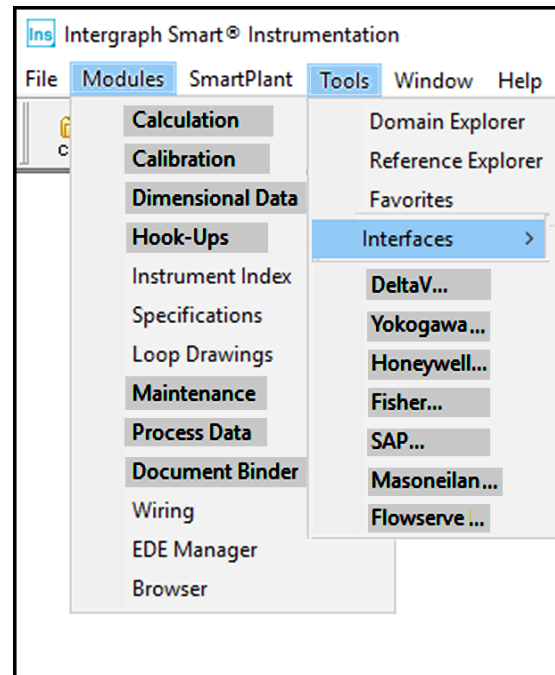
Dimensional Data for Piping Module

- Domain Administrator imports the DDP Library Data with DDP Groups that match groups in Smart 3D

- Designers add Groups and Piping End Connection and Piping Classes to the inline tags

- After sizing the Vendor Dimensional Data is imported and added to the DDP datasheet

- The DDP data is Published to SmartPlant Foundation (SPF) for S3D to Retrieve into the 3D Model with Tag Numbers

- The Piping Designer selects the Valve Tag and places the Fully Dimensioned Valve into the Model

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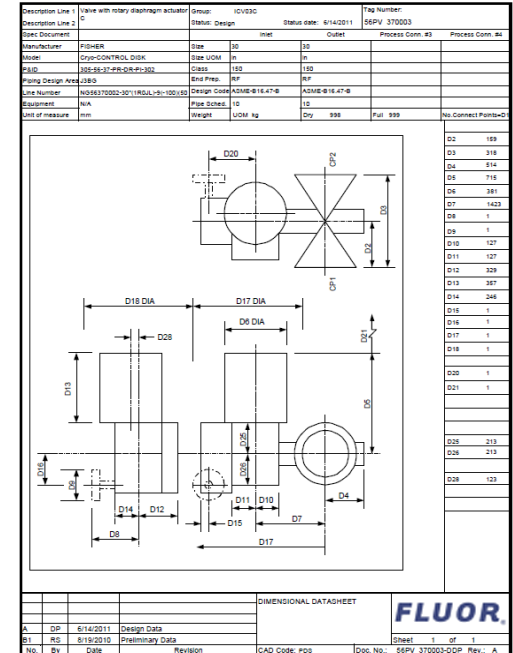
Dimensional Data for Piping Module

- DDP data workflow allows early placement of inline devices in the 3D Model

- Most Valve and some Flowmeter Vendors have interfaces with the DDP Module
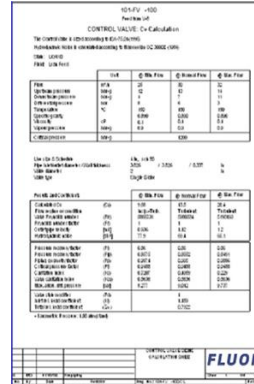
Process Conditions   →   **Specification Sheet**   →   **Sizing Calculations**   →   **DDP Datasheet**   →   **Piping 3D Model**

Dimensional Data for Piping Module

- Vendors can provide a simple CSV file that can be loaded into Smart Instrumentation

OD	OE	OF	OH	OI	OP	OQ	OR	OS	OT	OU	OV	OW	OX	OY	OZ	PA	PB	PC	PD	PE	PF	PG	PH	PI	PJ	PK	PL	PM	PN	PO	PP	PQ	PR	PS	PT
TagNumber	Item	Rev	Type	Model	Weight	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18	D19	D20	D21	D22	D23	D24	D25	D26	D27	D28	D29	D30
101-PCV-1001	1	A	VGlobeSRACT001	E 2 IN 667 SZ 45 300 RF	167	0	11	5.3	6.5	3.1	30	16	0	0	0	6.3	13	9.6	9.2	5.2	6.9	18	0	10	0	0	0	0	0	5	0	0	0	0
101-PCV-1002	4	A	VGlobeSRACT001	E 3 IN 667 SZ 40 300 RF	215	0	13	6.3	7.5	3.8	23	13	0	0	0	6.3	10	9.2	9.2	5.2	6.9	16	0	10	0	0	0	0	0	5	0	0	0	0
101-PCV-1003	5	A	VRotarySRACT001	8580 6 IN 2052 SZ 3 300 SGL FLG	384	0	2.2	1	3.6	3.6	7.3	7.3	4.4	10	15	2.5	23	20	0	0	0	6.3	9.2	5.2	20	0	5	5	15	5	0	0	0	0
101-PCV-1004	8	A	VGlobeSRACT001	E 3 IN 667 SZ 40 300 RF	215	0	13	6.3	7.5	3.8	23	13	0	0	0	6.3	10	9.2	9.2	5.2	6.9	16	0	10	0	0	0	0	0	5	0	0	0	0
101-PCV-1005	9	A	VRotarySRACT001	8580 8 IN 2052 SZ 3 150 SGL FLG	420	0	2.4	1.1	3.6	3.6	7.3	7.3	4.4	10	17	2.5	23	20	0	0	0	6.3	9.2	5.2	20	0	5	5	15	5	0	0	0	0

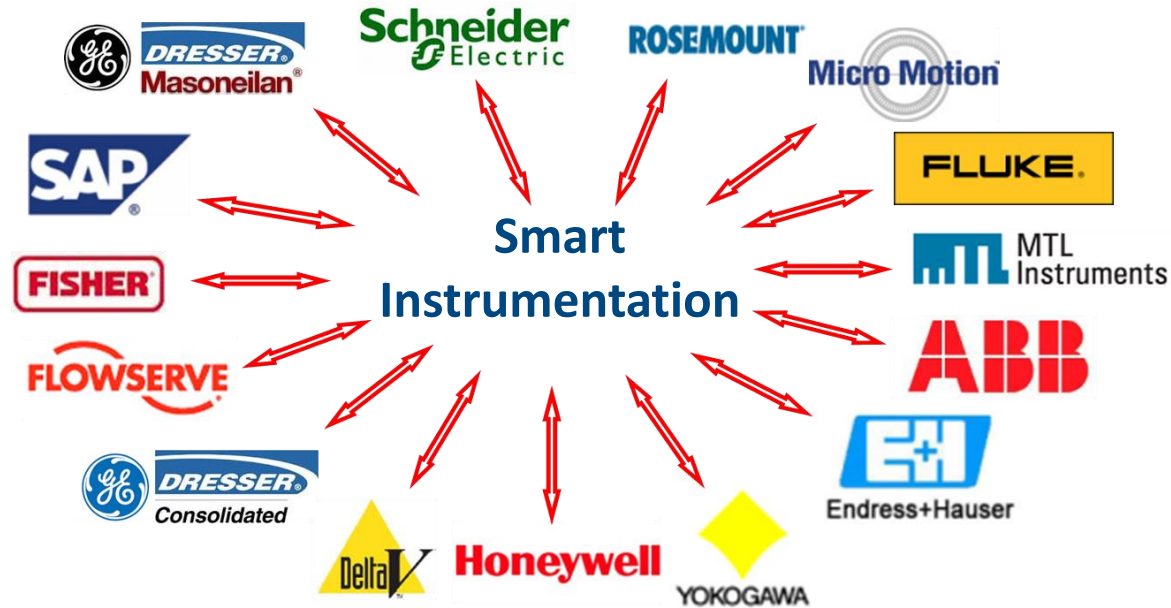Tags   Standard DDP 3D Groups   Up to 30 dimensions per DDP Group
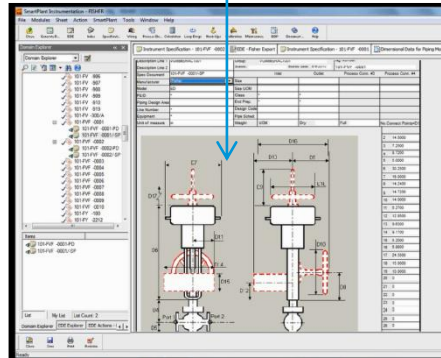
Most Valve Vendors have interfaces for providing DDP data and many Instrument vendors are developing Data Centric DDP Interfaces
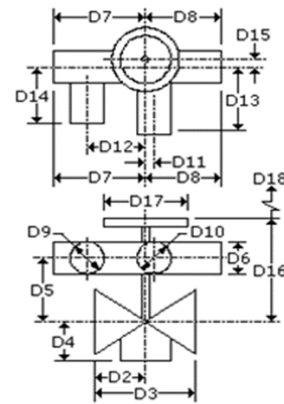
Smart Instrumentation Vendor Interfaces

- Smart Instrumentation has more Vendor interfaces than any other Process Controls Engineering Automation tool


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Smart Instrumentation Vendor Interfaces

- Some Vendor Interfaces with Smart Instrumentation are underutilized and may soon be discontinued

- Types of Vendor Interfaces:

  - Control Valve Interface (Vendor Data for Control Valves, Regulators, Relief valves)

  - Instrument Interface (Vendor Data for Flowmeters, Pressure, Level, and Temperature Devices)

  - DCS Interface (Vendor Data for I/O Card terminal configuration and model numbers)

  - DDP Interface (Vendor Data for inlet/outlet Sizes, Lengths, Rotations and Weights of Inline Devices)

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Smart Instrumentation SAP Interface

- Smart Instrumentation (SI) can export data that includes tags, loops, services, manufacturers, models, fluids, and material data to SAP PM for Asset and Maintenance Management

- The SAPSyn utility is configured from the SAP Export Wizard

- The SI Tag and the SAP FLOC (Functional Location) are synchronized in a predefined EDE SAP View

- The SAP Export Wizard selects the export data from the predefined EDE SAP Views

- The SAPSyn can run it as required by a scheduler to synchronize data to SAP at predetermined times

SAP PM Maintenance Management

FLOC

FLOC

Hexagon PPM ALIM Products

SI TAG

Data & Docs

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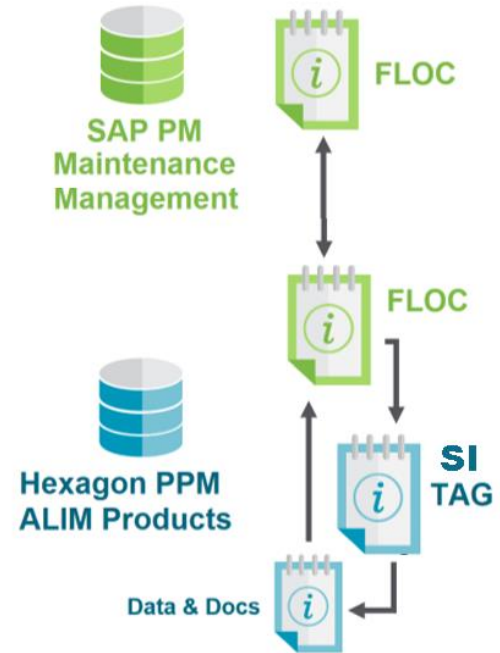
Smart Instrumentation Process Modules

- Process Date can be defined for multiple Process Cases

- Fluid properties lookup tables from internal database of chemical compounds or API 2540

- Process Data may be entered by Tag or Line Number

- Changing Unit of Measure will convert the process variable

- Process data may be Copied between instrument Tags

- Enter Additional Properties, Design and Base conditions

- Tag Alarm / Trip Settings are defined in the Process Module

- Process Workflow between Instruments and Process

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Smart Instrumentation Process Modules

- Value Added by Process Engineers entering data directly into SmartPlant Instrumentation

  - Timely Access to Process Data by Control Systems and ownership of Process Data by Process

  - Data Centric Control of Process Data without the need to manually reload process data from spreadsheets

  - Real Time Process Data Becomes a deliverable to Control Systems via the Instrument Spec Sheets

  - Process Engineering can Generate Process Datasheets with Revision management

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Smart Instrumentation Calculation Module

- The Calculation Module is a subset of the Process Module

- Before running a calculation, the Process Data needs to be complete with the fluid and fluid state

- The calculation will alert of missing data to complete the calculation

- Perform a Batch Calculation on multiple tags

- Calculate Multiple Process Cases for sizing

- Create a Hybrid Case so different Cases can be combined in a single calculation

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Smart Instrumentation Calculation Module

- Generates Calculation Reports with Revisions

- Instrument Calculation Basis:

  - **Control Valve Sizing**
    - ISA S75.01 (1995)
    - IEC 60534-2-1 (1998)

  - **Relief Valve Sizing**
    - API RP 520, (2000)

  - **Flow Meter Sizing**
    - ISO / Miller

  - **Thermowell Wake Frequency**
    - ASME PTC 19.3TW (2010)(2016)

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Smart Instrumentation Calibration Module

- Provides traceable and auditable Calibration history

- "As found - As left" calibration is recorded in the database

- Customizable calibration forms for settings and results

- Multiple profiles available for instruments

- Test equipment can be indexed for tracking and calibration

- Calibration certificate (snapshot of the calibration results)

- Errors per each calibration point are explicitly recorded in the Smart Instrumentation database

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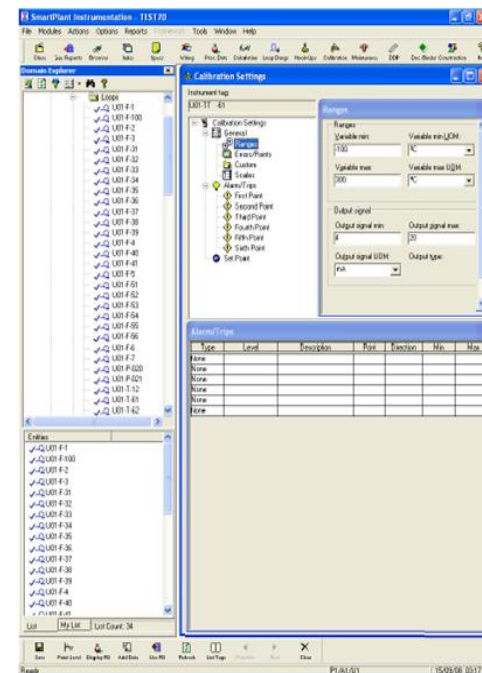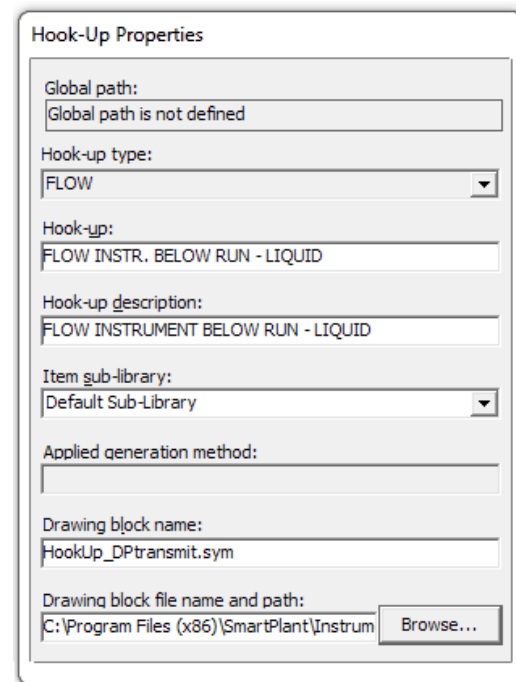
Smart Instrumentation Calibration Module

- The calibration module Interfaces with FLUKE Calibrators

- A Fluke Interface Wizard performs the following activities:

  - Download calibration settings to the calibrator

  - Upload the Calibration results to the database

  - Flush the calibrator memory for new download

Fluke Interface Wizard

Select Activity
Select the activity you want to perform.

- Download settings to calibrator
  - Clear tasks before download
- Upload results to SmartPlant Instrumentation
  - Clear results after upload
- Flush calibrator memory

< Back | Next > | Cancel

Field Transmitter → calibration documentation ← **Fluke Calibrator** ← settings, results → **SI Database**
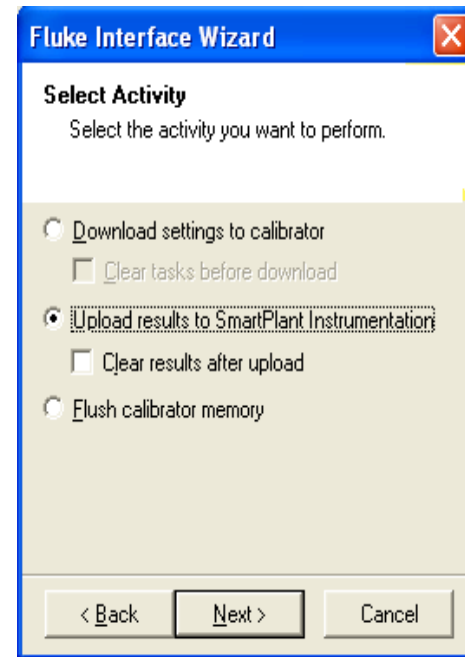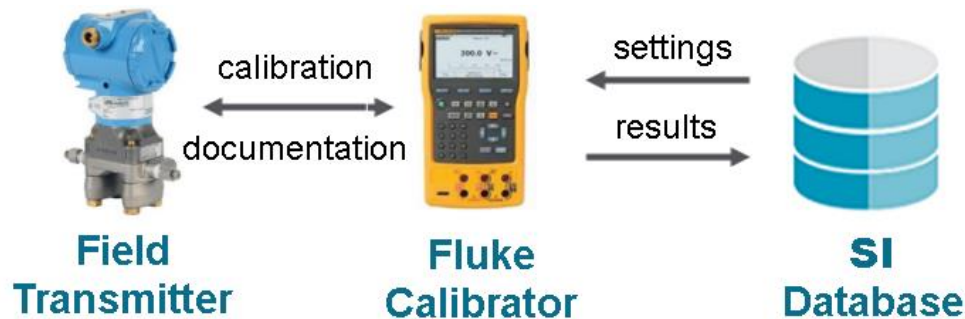
Smart Instrumentation Hookup Module

- Hook-up Libraries and Sub-Libraries are located in the Reference Explorer

- Default hook-ups can be assigned to Instrument types

- Crete Bill of Material and Library Items Reports

- The Hook-Up Properties defines the following:

  - Configure Paths for Existing Drawings and Blocks

  - The Hook-Up Type, Name and Description

  - Drawing block Names and Paths if the Hook-Up Drawings are being generated by Smart Instrumentation

Hook-Up Properties

Global path:
Global path is not defined

Hook-up type:
FLOW

Hook-up:
FLOW INSTR. BELOW RUN - LIQUID

Hook-up description:
FLOW INSTRUMENT BELOW RUN - LIQUID

Item sub-library:
Default Sub-Library

Applied generation method:

Drawing block name:
HookUp_DPtransmit.sym

Drawing block file name and path:
C:\Program Files (x86)\SmartPlant\Instrum   Browse...

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Smart Instrumentation Hookup Module

- Hook-up Details may be Automatically or Manually associated to Tags Numbers

- Multiple Details may be assigned to each Tag Number

- Commodity Catalog may be Default or Custom and can be modified by user

- Can generate AutoCAD, MicroStation or Enhanced Hook-up Detail Drawing

- Material List and Tag Numbers show on each Generated Hook-up Detail

- Bill of Materials generated for export to Material Managers

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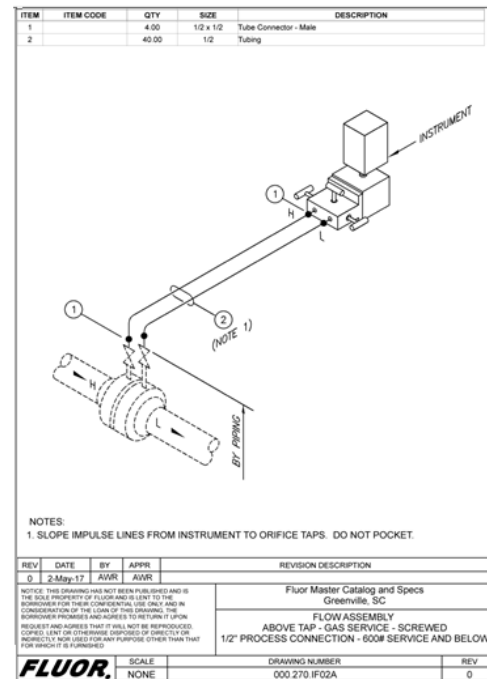
Smart Instrumentation Maintenance Module

- Define Preventive Maintenance Activities

- Schedule Preventive Maintenance Events

- Extend Existing Preventive Maintenance Scheduling

- Enter Preventive Maintenance Details:

  - PM code

  - Priority

  - Created by

  - Creation Date

  - Last preventive maintenance

  - Interval and Frequency

Smart Instrumentation Maintenance Module

- Generate Maintenance Repair forms

- Generate Maintenance Work requests

- Generate Maintenance Reports:

  - Scheduled Preventive Maintenance Report

  - Summary of Failure Reason Report

  - Summary of Repair Action Report

  - Summary of Outcome Report

  - Repair Details Report

- Create Maintenance Event Records – Domain Explorer

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Smart Instrumentation Telecom Module

- The Telecom module is becoming more important as Instrument systems become more computerized and relying on networking communications

- Typical Telecom Equipment :

  - Field equipment (intercoms, telephones)

  - Public announcement (speakers and amplifiers)

  - Wiring (coax, fiber optic and network cables)

  - Network equipment (hubs, switches and routers)

  - Security equipment (cameras and access monitors)

  - HMI Equipment (monitors. consoles and handsets)

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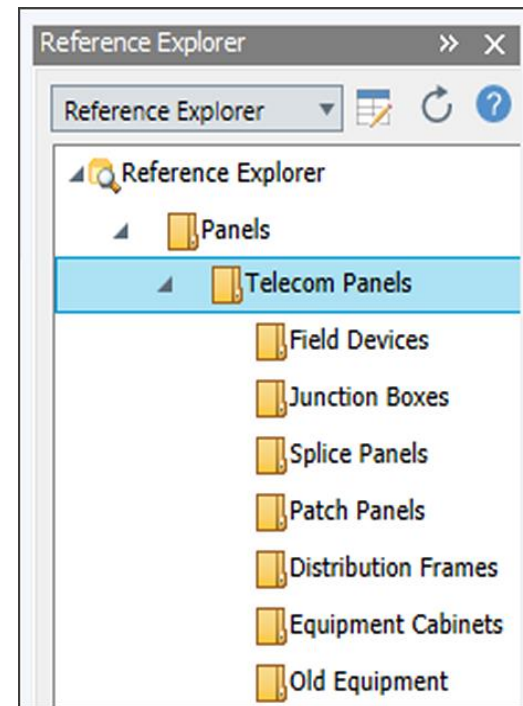
Smart Instrumentation Telecom Module

- Typical Telecom Activities:

  - Define Telecon Naming Conventions

  - Create Reference Telecom Equipment

  - Define Telecom Device types and Profiles

  - Create Define Telecom Device Spec forms

  - Build Telecom Instrument Index

  - Define Telecom Cable types

  - Do Interconnection Wiring

  - Generate Telecom Reports

Telecom Device Types ×

Find a device type:

Device Type	Description	CS Tag Alias
ANT	ANTENNA	ANT
CAM	CAMERA	CAM
CAM 2	CÁMARA IP PT EXTERIOR	CAM 2
CAM CL	CAMARA IP PTZ EXTERIOR	CVE
CAM DM	CAMARA IP PTZ INTERIOR	CDIPI
FL	FLASH LIGHT	FL
HO	HOODS,ACOUSTIC	HO
IN	IN-CIRCUIT T.V.	IN
INT	INTERCOM/SPEAKER	INT
JB	JB/MR	JB

OK   Profile...   New

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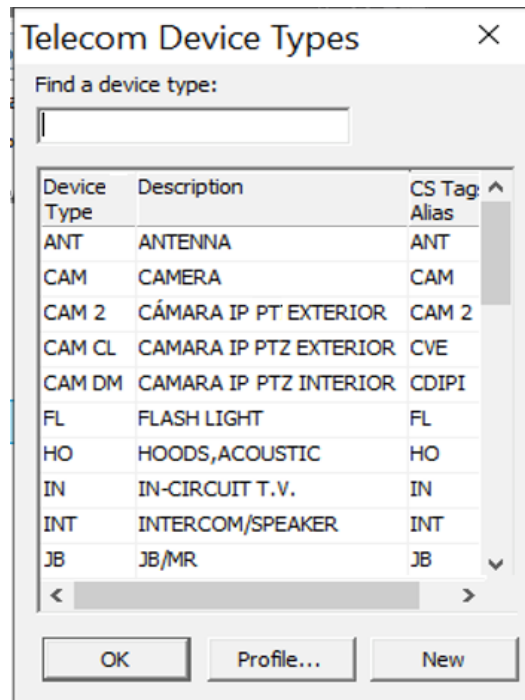
Smart Instrumentation Import Module

- Activities for Importing Data into Smart Instrumentation:

  - Define an Import Source File or Database

  - Create a Link Group - If data is from several sources

  - Create an Import Link to the target table or module

  - Define Import Link Properties

  - Map Source and Target Fields

  - Use Comparison Options

  - Import Data into Smart Instrumentation

Link Definitions

Link:
DDPTAGIMPORTCOMPONENT1

Import method
- Single table   Module (multiple tables)

Name of module or table:
COMPONENT

Source
Database type:
ODBC

ODBC profile:
Excel Files=Microsoft Excel Driver (*.xls)

User name:

Password:

File name and path:
U:\Reliance\SPI\DTA DDP Export Files\DDPTAGI   Browse...

View...

Save as new link

Apply   Close   Help

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Smart Instrumentation Import Module

- Recommend exporting data from Smart Instrumentation then modify externally and Import back in for **Existing Tags**

- Minimum data for importing **New Tags** from Excel:

    - 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.

	A	B	C	D
1	TAG_NUMBER	INSTR_TYPE	INSTRUMENT_TYPE_DESC	PROCESS_FUNC
3	310-FT-0286	FT	Flow, Transmitter, Diff Pressure	1
4	310-FT-0287	FT	Flow, Transmitter, Diff Pressure	1
5	310-FT-1036	FT	Flow, Transmitter, Magnetic	1
6	310-FE-1083	FE	Flow, Element, Orifice Plate	1
7	310-FT-1083	FT	Flow, Transmitter, Diff Pressure	1
8	310-FE-1084	FE	Flow, Element, Orifice Plate	1
9	310-FT-1084	FT	Flow, Transmitter, Diff Pressure	1
10	310-FT-2036	FT	Flow, Transmitter, Magnetic	1
11	310-FE-2083	FE	Flow, Element, Orifice Plate	1
12	310-FT-2083	FT	Flow, Transmitter, Diff Pressure	1
13	310-FE-2084	FE	Flow, Element, Orifice Plate	1
14	310-FT-2084	FT	Flow, Transmitter, Diff Pressure	1
15	310-FE-3084	FE	Flow, Element, Orifice Plate	1
16	310-FT-3084	FT	Flow, Transmitter, Diff Pressure	1
17	310-FI-9002	FI	Flow, Rotameter	1
18	310-FO-9027	FO	Flow, Orifice, Restriction	1
19	310-FO-9028	FO	Flow, Orifice, Restriction	1
20	310-FO-9101	FO	Flow, Orifice, Restriction	1
21	310-FO-9103	FO	Flow, Orifice, Restriction	1
22	310-FI-9135	FI	Flow, Rotameter	1
23	310-FI-9136	FI	Flow, Rotameter	1
24	310-FO-9201	FO	Flow, Orifice, Restriction	1
25	310-FO-9203	FO	Flow, Orifice, Restriction	1
26	310-FI-9235	FI	Flow, Rotameter	1
27	310-FI-9236	FI	Flow, Rotameter	1
28	310-XV-0042A	XV	On/Off Valve	6
29	310-XY-0042A	XY	Solenoid Valve	6
30	310-XZSC-0042A	XZSC	Position Switch, Close	0
31	310-XZSO-0042A	XZSO	Position Switch, Open	0
32	310-XV-0042B	XV	On/Off Valve	6
33	310-XY-0042B	XY	Solenoid Valve	6
34	310-XZSC-0042B	XZSC	Position Switch, Close	0

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Smart Instrumentation Training

"Use it or lose it"

~ Jimmy Connors

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