



*Setting the Standard for Automation™*

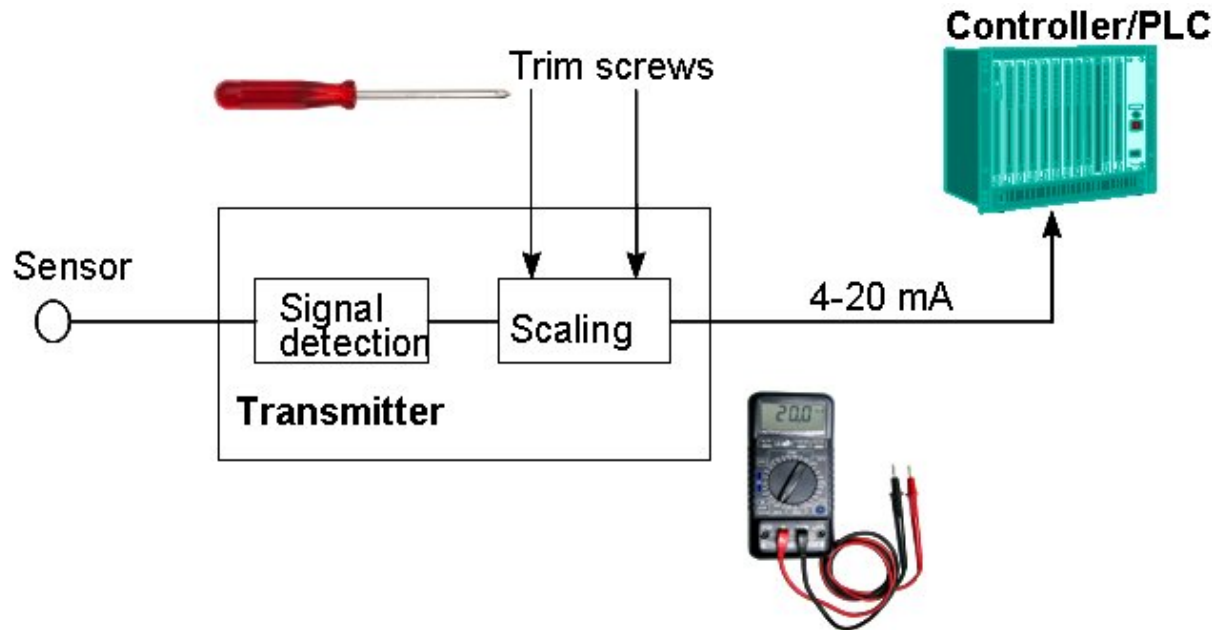
# EDDL-IEC 61804 and ISA104 — Standards Advancing Interoperability of Control Systems Devices

Standards  
Certification  
Education & Training  
Publishing  
Conferences & Exhibits

- Jonas Berge –SP104, Education Team Lead

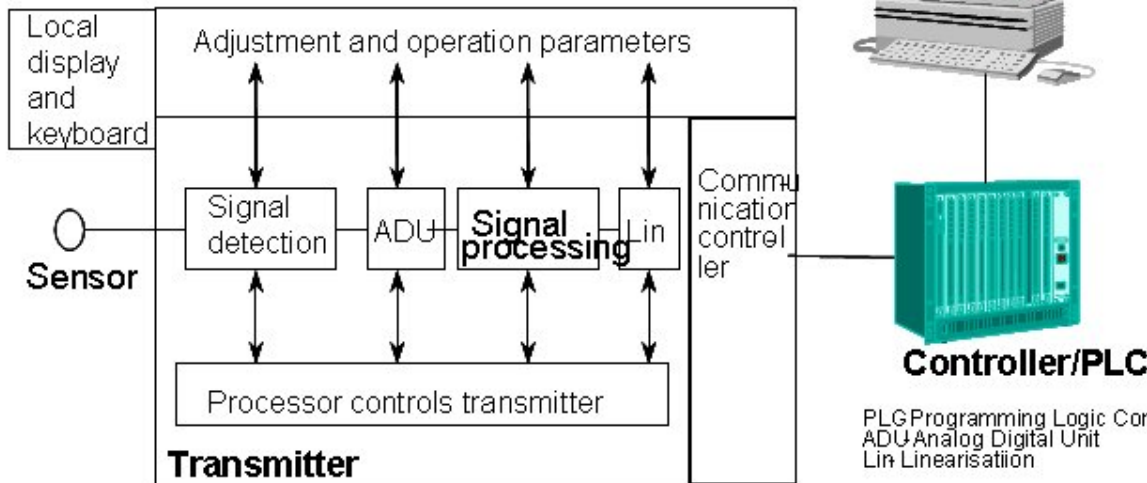
- **History of Development**
- How EDDL Technology Works
- Benefits of Approach
- Recent EDDL Advancements – Examples

# Structure of simple analog field devices



- Local calibration only
- Universal tools i.e. screw driver, meter.
- No remote diagnostic

# Structure of digital field devices



- Calibration and diagnostic parameters through communications link
- Different protocols are utilized and device implementation varies with manufacturer
- Diagnostic information is available to support on-line operation.

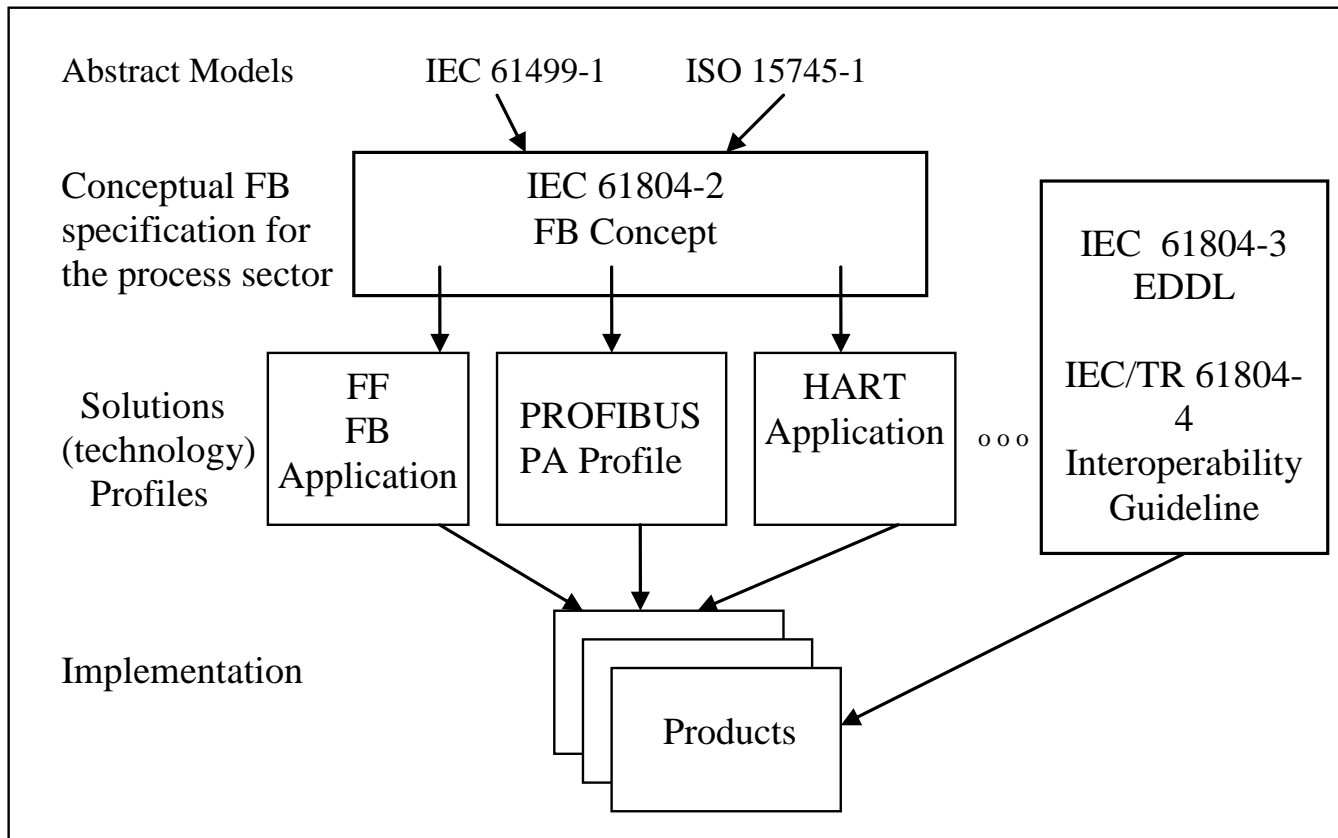
# What is EDDL?



## International Standard for Interoperability

- Electronic Device Description Language
- EDDL is an international standard
  - Standardized by IEC (IEC 61804-3)
  - **Adopted by ISA/ANSI (ISA 61804)**
- EDDL is endorsed by four major foundations and their members
  - Fieldbus Foundation
  - HART Communication Foundation
  - Profibus Nutzerorganisation e.V (PNO)
  - The OPC Foundation

# IEC61804 Standard for Electronic Device Description



- Complies with IEC61499
- Profile are defined for Fieldbus Foundation, Profibus, and HART

- ✓ 3.1 Investment Safety
- ✓ 3.2 Version Conflicts
- ✓ 4.1 Device Integration with Tools
- ✓ 4.2 User Guidance
- ✓ 4.3 Display of Devices
- ✓ 4.4 Standard Profiles
- ✓ 5.1 Device Descriptions
- ✓ 5.2 Licensing of Device Descriptions
- ✓ 5.3 Cross-Platform Compatibility
- ✓ 5.4 Full Support of Device Functionality
- ✓ 5.5 Standardized Data filing
- ✓ 6.0 Certification

A light blue starburst graphic with a black outline, containing the text "EDDL technology meets NE105 requirements".

EDDL technology  
meets NE105  
requirements

- This standard specifies EDDL as a generic language for describing:
  - device parameters and their dependencies;
  - device functions, for example, simulation mode, calibration;
  - graphical representations, for example, menus;
  - interactions with control devices
  - graphical representations
  - persistent data store.
- EDDL is to be used to create Electronic Device Description (EDD). This EDD is used with appropriate tools to support parameter handling, operation, and monitoring of automation systems.
- **ISA 104 is the USA adoption of IEC 61804-3**

# EDDL Cooperation Project



- Founded at the Hannover Fair in April 2004 by Fieldbus Foundation, HCF and PNO and the OPC Foundation to promote and enhance EDDL technology.



OPC Foundation



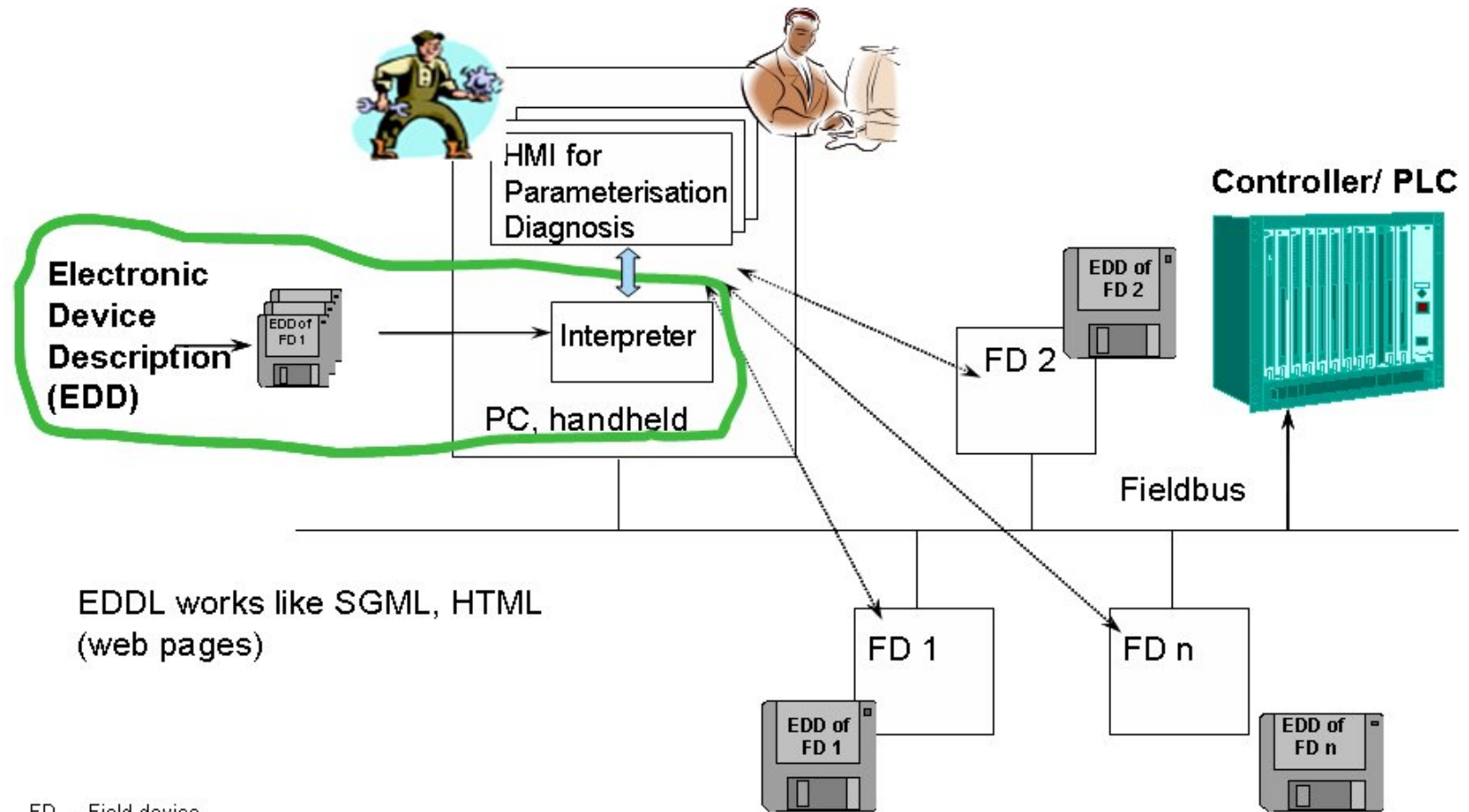
- Agreement to collectively maintain EDDL



- History of Development
- **How EDDL Technology Works**
- Benefits of Approach
- Recent EDDL Advancements – Examples

- The Electronic Device Description Language (EDDL) is a ***text-based language*** that may be used to describe the characteristics of field devices.
- Device suppliers use EDDL to create Electronic Device Description (EDD) files.
- The EDD file provides a standardized form and structure for host systems and handheld communicators to access and display information in field instruments independent of the communication protocol or device operating system.

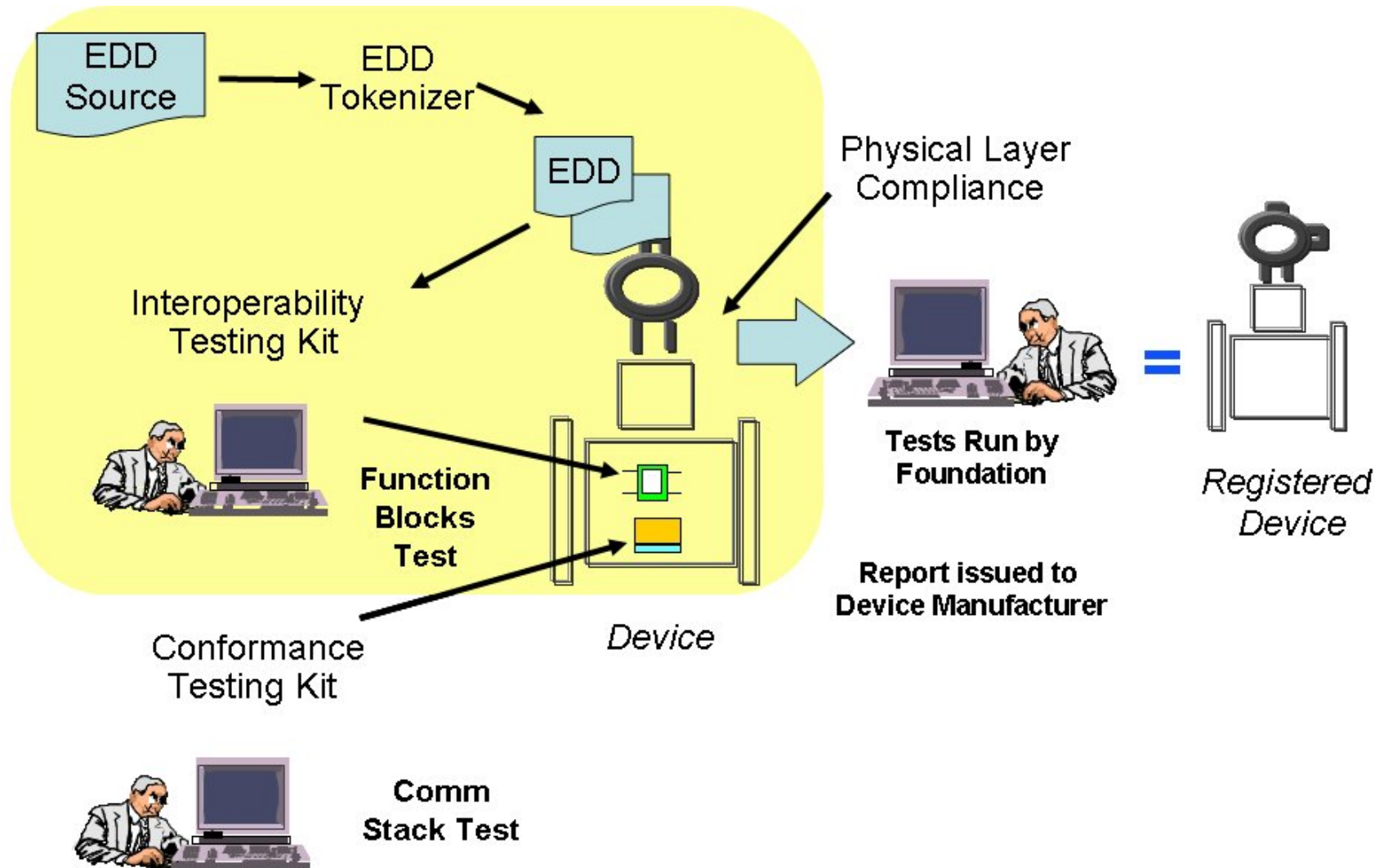
# Interactions with individual field devices



EDDL works like SGML, HTML (web pages)

FD - Field device  
↔ Point-to-Point-Connection

# Example – Device Testing and Registration

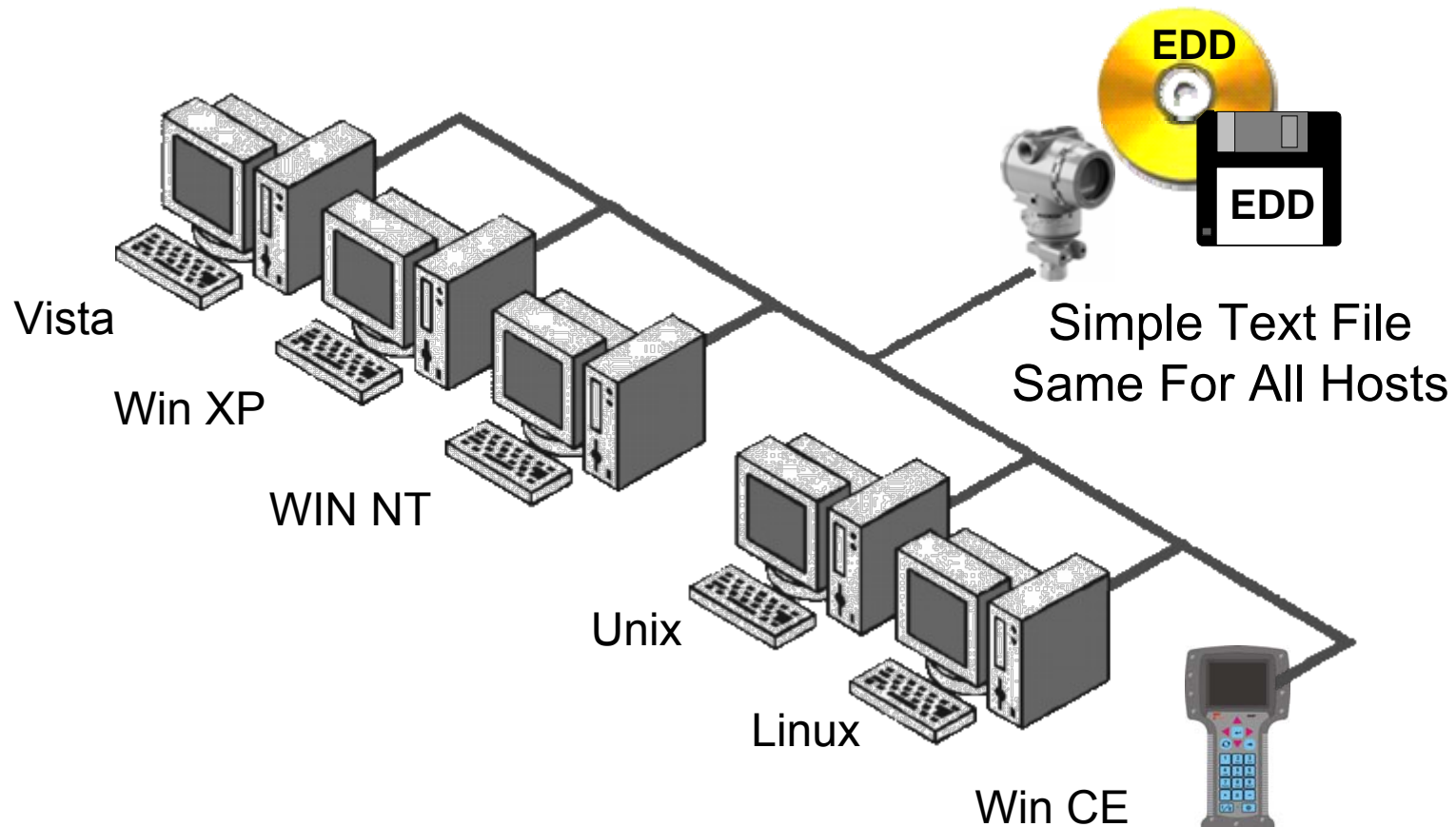


- History of Development
- How EDDL Technology Works
- **Benefits of Approach**
- Recent EDDL Advancements – Examples

- Provides a well-defined structure
- Support the most simple to the very complex field device.
- Since EDD's are text-based, these files are *independent of operating systems and control platforms.*
- The same EDD has common look and feel across applications which reduces the learning curve.
- A field device can be incorporated without affecting the runtime stability of the control system.

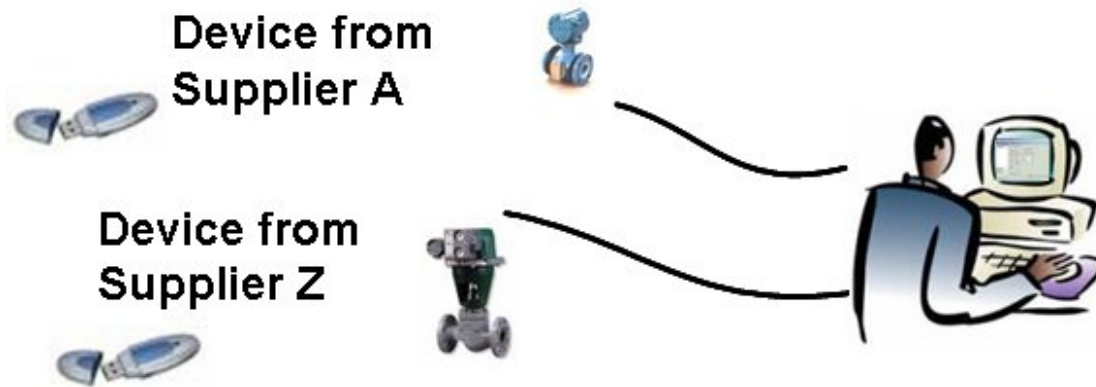
# EDDL: Operating System Independent

- Application on PC or Handheld uses the same EDD
- Fully backward compatible



## EDD's enable :

- Devices from different suppliers to interoperate with a single Host
- The same device to interoperate with different Hosts.



Describes

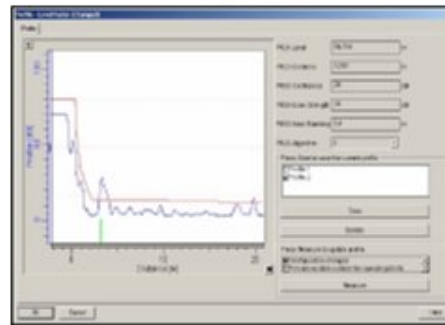
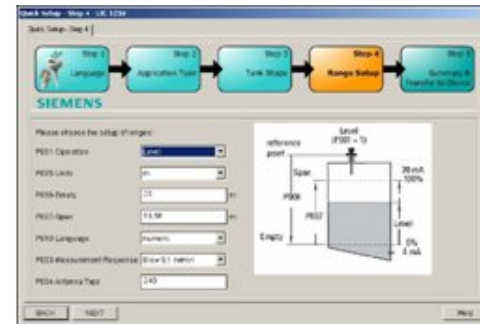
How the device functions per IEC 61804  
Small ASCII files (< 200k)

# EDDL Benefit - Ease to Use

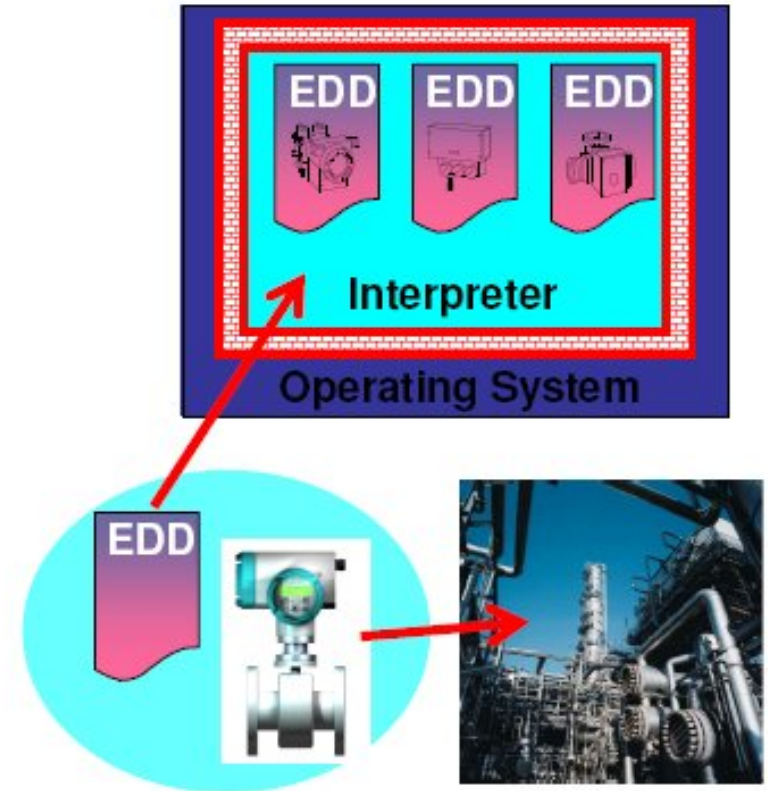


- One tool for all devices
  - Common transparent data base
  - A new device just a new EDD
- Build in state of the art graphics
  - Trends, Bar graphs

Name	Location	Manufacturer	Status
3. 3.000000	...	...	...
4. 4.000000	...	...	...
5. 5.000000	...	...	...
6. 6.000000	...	...	...
7. 7.000000	...	...	...
8. 8.000000	...	...	...
9. 9.000000	...	...	...
10. 10.000000	...	...	...
11. 11.000000	...	...	...
12. 12.000000	...	...	...
13. 13.000000	...	...	...
14. 14.000000	...	...	...
15. 15.000000	...	...	...
16. 16.000000	...	...	...
17. 17.000000	...	...	...
18. 18.000000	...	...	...
19. 19.000000	...	...	...
20. 20.000000	...	...	...
21. 21.000000	...	...	...
22. 22.000000	...	...	...
23. 23.000000	...	...	...
24. 24.000000	...	...	...
25. 25.000000	...	...	...



- There is no executable code with EDDs which may have an effect to the stability of the operating system
- EDDs are interpreted and therefore encapsulated
  - No impact of one EDD to others
  - Easy update and device additions during operation



# Benefits for End users and Vendors - Summary



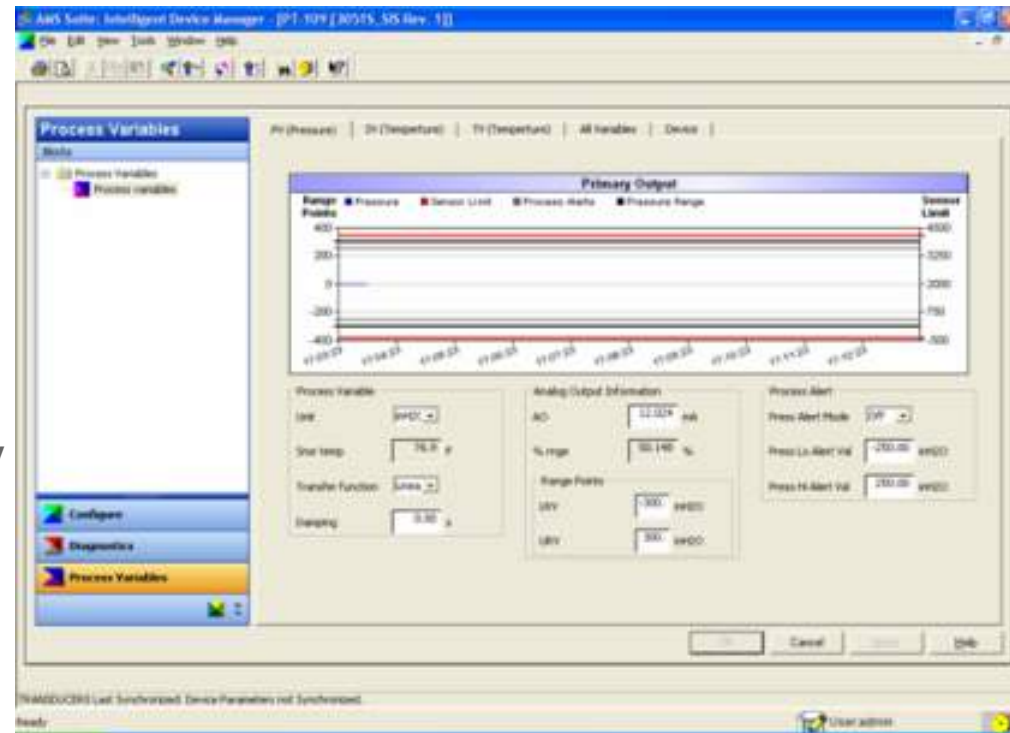
<p><input checked="" type="checkbox"/> <b>Interoperability</b></p> <ul style="list-style-type: none"><li>Independent of operating system</li><li>Work with All Platforms/Version</li><li>All communication protocol</li></ul>	<p><input checked="" type="checkbox"/> <b>Full Featured</b></p> <ul style="list-style-type: none"><li>Describes Complete UI</li><li>Automate procedures</li><li>Supports diagnostic</li></ul>
<p><input checked="" type="checkbox"/> <b>Ease of Use</b></p> <ul style="list-style-type: none"><li>Unified user interface</li><li>One tool for all devices</li><li>State of the art graphics</li></ul>	<p><input checked="" type="checkbox"/> <b>Minimizes Risk</b></p> <ul style="list-style-type: none"><li>No additional cost</li><li>Special skill not needed</li><li>Quick to install</li></ul>
<p><input checked="" type="checkbox"/> <b>Quick Installation</b></p> <ul style="list-style-type: none"><li>No influence on the runtime stability</li><li>Easy update and device addition during operation</li></ul>	<p><input checked="" type="checkbox"/> <b>Scalable</b></p> <ul style="list-style-type: none"><li>From handheld to MES</li><li>From simplex to complex devices</li></ul>

- History of Development
- How EDDL Technology Works
- Benefits of Approach
- **Recent EDDL Advancements – Examples**
- Updating Systems And Communicators
- Demonstration.

# Key Features of Enhancements



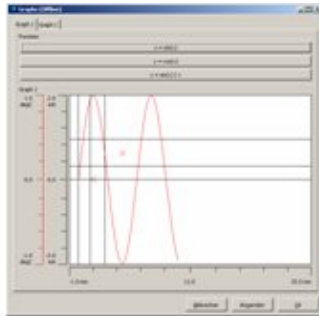
- **Enhanced User Interface**
  - Parameter organization
  - Images
  - Complex data
- **Graphing System**
  - Support for Charts and Graphs
- **Persistent Data Store**
  - Archive and retrieve data
  - Aids diagnostics executed by devices



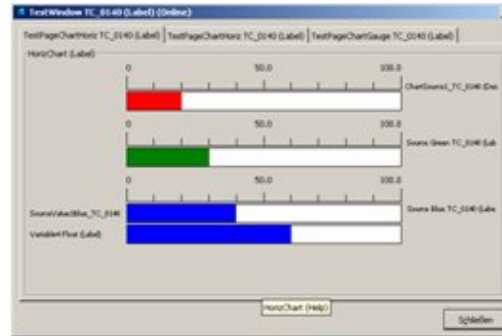
**Extended Interoperability incorporated into  
IEC 61804-3 and ISA 104**

# EDDL may be used to Create Wide Range of Graphical User Interfaces

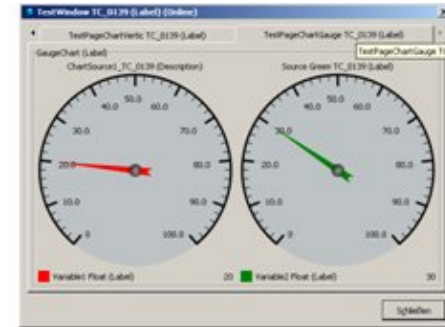
## Histogram



## Bargraph



## Double Axis



## Table

Vector1 TC0206 (Desc)	Vector2 TC0206 (Desc)	Vector3 TC0206 (Desc)	Vect
Car	20001.99	1	654
House	250000.98	2	653
Ship	400000.97	3	653
Motorbike	5000.96	4	653
Bike	1000.95	5	653

## Grid

Type	Distance	Amplitude
False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000
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False Echo	1.000	1.000
False Echo	1.000	1.000
False Echo	1.000	1.000

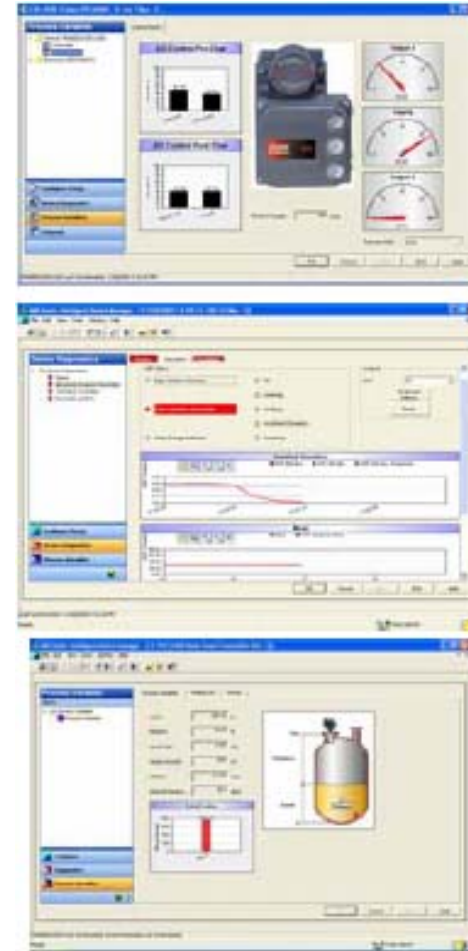
GRID GridFoundEcho

LABEL "All detected echos are displayed below";  
VECTORS

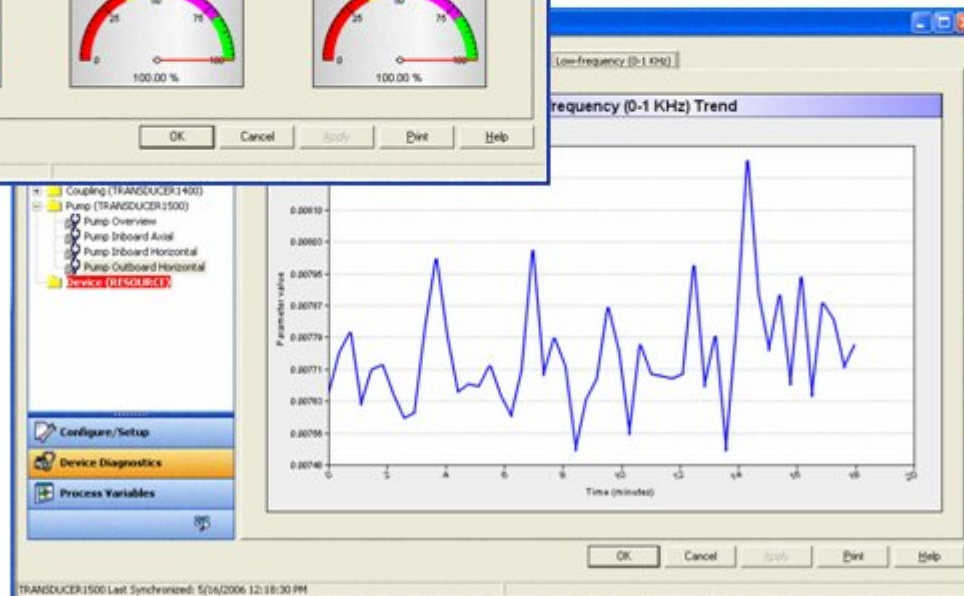
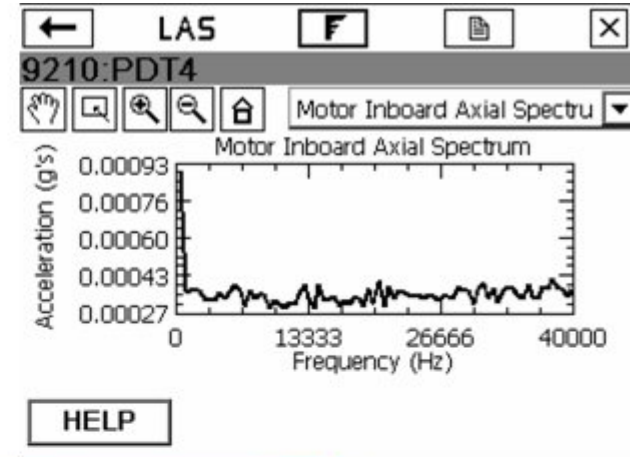
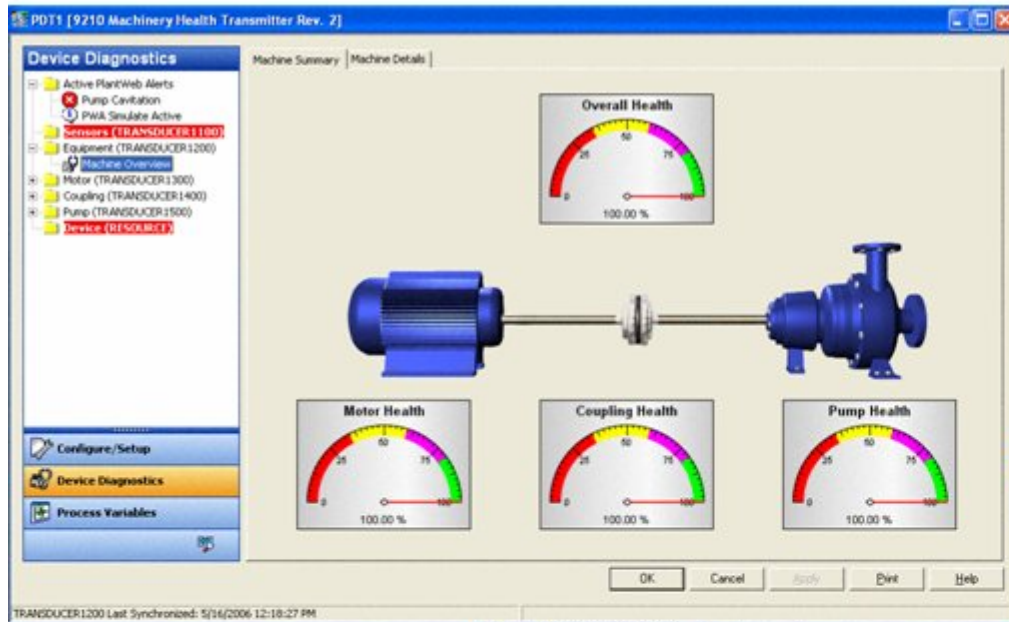
```
{
  {"Type", arrPeakType },
  {"Distance", arrPeakDistance },
  {"Amplitude", arrPeakAmplitude }
}
```

HELP "Grid TC\_0206 (Help)";

- According to functionality
  - Parameters, Status indicators
  - Menus logically, Human readable labels and
- Engineering units
  - Unused factory parameters are hidden.
- Help and Descriptions
  - Parameters, Multiple choice options
- Charts
  - Strip chart historical trend
  - Vertical or horizontal bar-graphs
  - Needle gauge.
- Images
  - Photos, Illustrations → tank geometries.
- Grids
  - Large data sets table
  - Tank strapping tables
  - List of false echoes for radar level transmitters



# Example – Host 1 and Handheld



# Example – Host 2 Online - View



- EDD-based Views
- Central common View (same look and feel for all Devices)
- Contents are defined in the Device description (EDD).

The screenshot displays the SIMATIC Manager interface for a MICROMASTER 440 device. The main window shows the 'Parameter' tab for the device, with fields for TAG, Tag location, Installation date, Description, Signature, Manufacturer, and Order number. A 'Display - LIC 2790 [Online]' window is overlaid, showing a pressure value of 0.10389 mbar on a scale from 0 to 1000 mbar. Below this, a 'Antriebskonfiguration - MicroMaster 440 [Online]' window shows the device's configuration, including a diagram of the motor and its electrical connections. A 'Diagnostik' window is also visible, showing a graph of the output frequency at -2.490 Hz.

Parameter	Value
TAG	MICROMASTER 440
Tag location	PCS 7 MES
Installation date	16.06.2005
Description	Wir sind die Besten
Signature	
Manufacturer	SIEMENS AG
Order number (IMI FR)	6ES7001-1EX00-0AA0

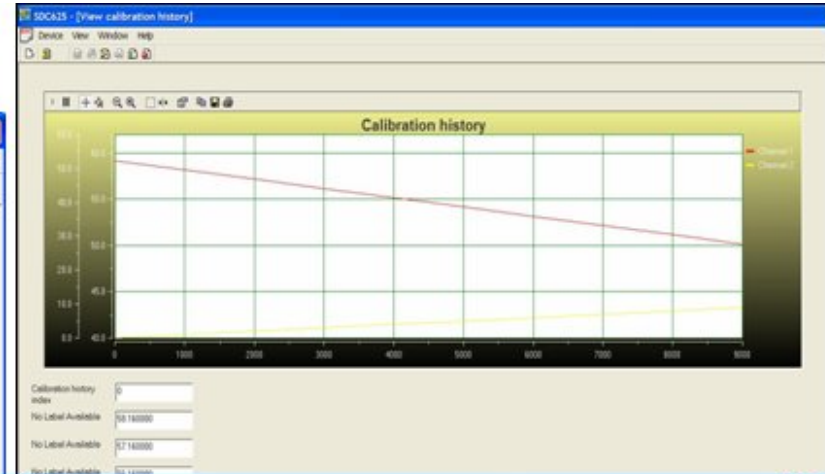
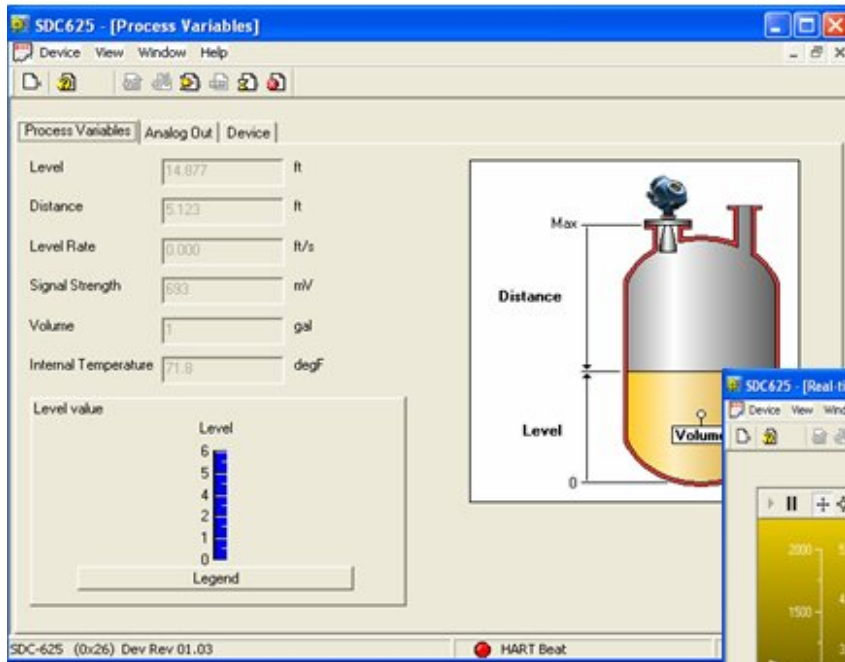
Parameter	Value
Output Value	0.10389 mbar

Parameter	Value
Output	0 mbar
	500 mbar
	1000 mbar

Parameter	Value
Status (Output)	Good

Parameter	Value
Output Frequency	-2.490 Hz

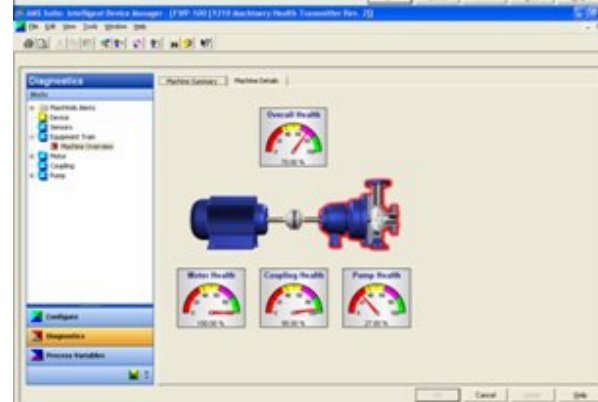
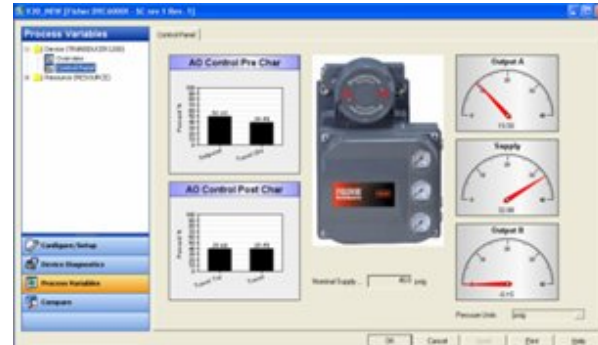
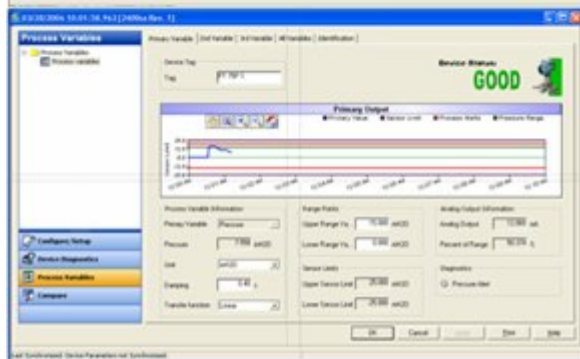
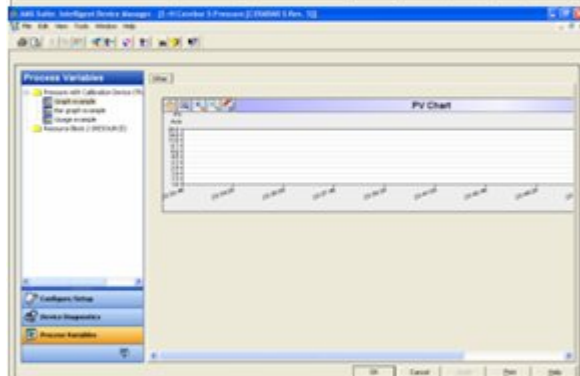
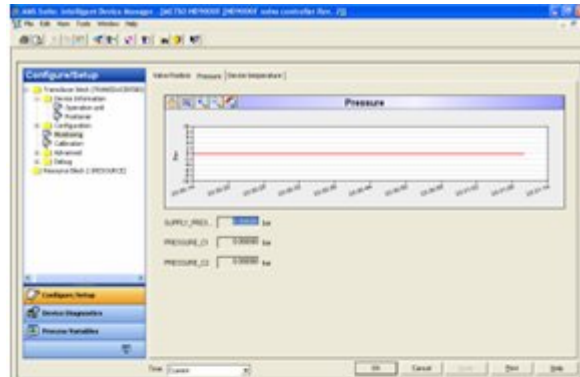
# Host 3 – Example Interface Display



# Presentation of Device Information

- The *look and feel* of the User Interface is determined by the Host System
  - All devices on a given Host system will have the same look and feel.
  - Necessary for efficient utilization by operator and maintenance personnel.
  - The same field device will have a different look and feel on each Host system.
- The *detailed information* of the Device is still determined by the Device Manufacturer in the EDD

# EDDL - Consistent Look & Feel for a given Host



# Example: Radar Level EDD on different Hosts

4



The look and feel of the *User Interface* is determined by the Host System

The detailed information of the *Device* is determined by the EDD

Host	Host 1	Host 2	Host 3	Handheld
Process Variables Trending				
Geometry				
Echo Tuning				

- EDDL is The International standard for Device Description Language
- Robust
- Secure
- Externally accessible information
- Single universal solution
- Investment protection
- Consistent display of devices
- No version conflicts
- Cross-platform compatibility
- Easy integration and removal
- No licensing
- Full support of device functionality
- Certification

# Finding More Information



1. "Fieldbuses for Process Control - Engineering, Operation and Maintenance", Jonas Berge, ISBN 1-55617- 760-7, <http://www.isa.org/fieldbuses>
2. IEC 61804-3, Edition 1.0 (2006-09), Function blocks (FB) for process control - Part 3: Electronic Device Description Language (EDDL)
3. NAMUR Recommendation, Version: 24.08.2004, NE 105, Specifications for Integrating Fieldbus Devices in Engineering Tools for Field Devices
4. SP104 EDDL web site – <http://www.eddl.org/>
5. IEC61804 Web site <http://www.iec.ch/cgi-bin/procgi.pl/www/iecwww.p?wwwlang=e&wwwprog=dirwg.p&progdb=db1&ctnum=519>
6. SP104 Committee web site <http://www.isa.org/MSTemplate.cfm?MicrositeID=1170&CommitteeID=6927>
7. Fieldbus Foundation <http://www.fieldbus.org/index.html>
8. HART Communications Foundation <http://www.hartcomm2.org/>
9. Profibus Nutzerorganisation e.V (PNO) <http://www.profibus.com/>