

Integration Test Summary SYT01

Softing smartLink and HART over PROFIBUS for
Siemens ET200M and ET200SP

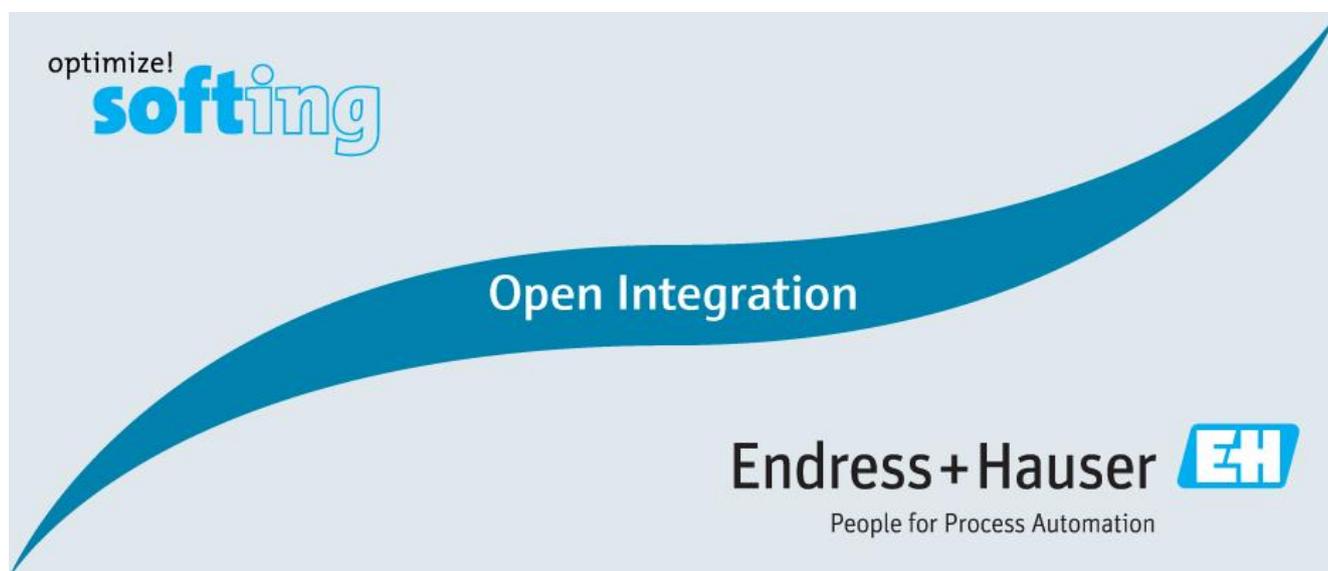


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1 Document Information

1.1 Purpose and Scope

This document provides a brief summary of Open Integration tests for Reference Topology SYT01. All content of this document is jointly developed, reviewed and approved by Softing and Endress+Hauser as a common deliverable of Open Integration.

1.2 Document History

This is version 1.00.00 of this document. Version history:

Version	Released	Description
1.00.00	2022-06	Initial version

1.3 Related Documents

Please refer to related documents as listed below:

Document	Description
SD02925S/04/EN/01.22	Reference Topology SYT01
SD02926S/04/EN/01.22	Integration Tutorial SYT01
SD02928S/04/EN/01.22	List of Tested Devices and Versions SYT01

2 Preface

Open Integration focuses on complementary system tests to verify integration and interoperability using practical test conditions. This is done by testing either a "system under test" versus a reference test network with a relevant variety of components and field devices for defined target applications, or by testing a "bypass under test" versus a typical control system setup which shall be extended by asset management or IoT applications via a bypass connection.

Open Integration does not test field devices, field network components or systems as such. All parts of a reference topology under test are released and have passed mandatory integration and interoperability tests as defined by technology foundations upfront.

3 General Introduction

This chapter provides a short introduction to Open Integration testing in general:

3.1 Control System Topology

This Reference Topology extends a given control system with bypass connectivity for asset management and IoT applications. The control system topology is considered as given and the 2nd channel bypass is under test. Figure 1 shows the principle as applied for SYT01:

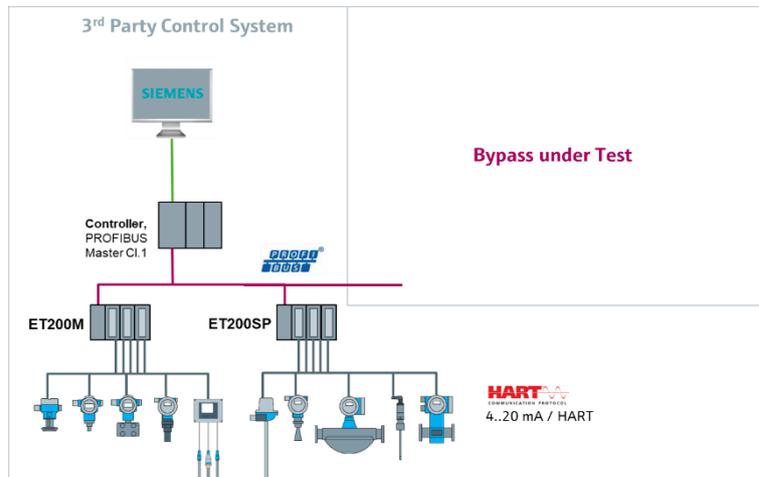


Figure 1: Open Integration Bypass Setup for HART over PROFIBUS

3.2 Integration Test Scenarios

Open Integration verifies bypass connectivity and means for integration into on-premises tools and cloud-based applications. Figure 2 shows the main test scenarios as considered for HART over PROFIBUS:

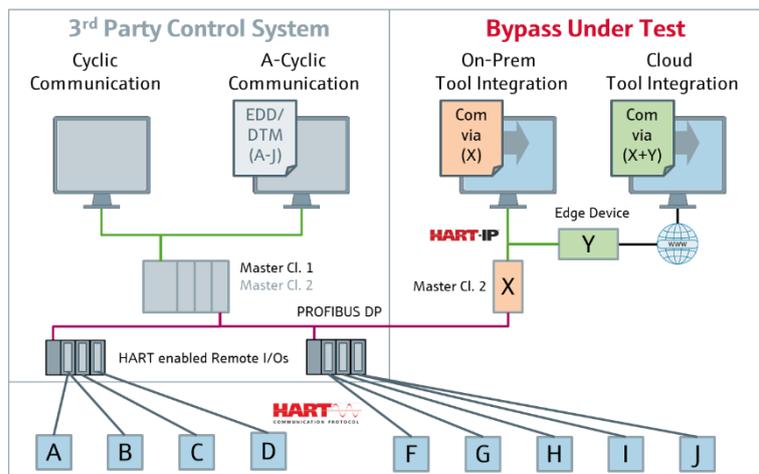


Figure 2: Open Integration Bypass Test Scenarios for HART over PROFIBUS

3.2.1 Basic Setup

The basic setup considers all aspects of setting up the 2nd channel connectivity which allows to connect to field devices in parallel to the given control system. As a result, bypass communication is established, and field devices can be reached by software tools for plant asset management and/or forward data to IoT applications. Test cases related to this scenario are mandatory and have to be adapted to control system specific requirements.

3.2.2 Bypassed Tool Integration

This scenario focuses on field device integration into software tools which may be installed on-premises or running in a cloud. The overall communication path via the bypass under test and the interoperability with the given control system has to be tested. Test cases related to this scenario are mandatory and have to be adapted to tool specific requirements.

4 Relevant Test Scenarios for SYT01

A mandatory prerequisite for the test scenarios is a successful PROFIBUS DP cyclic communication between the Siemens PROFIBUS master and the ET200M/ET200SP Remote I/Os.

On top of this, a basic setup is required to integrate the Softing smartLink HW-DP as secondary PROFIBUS DP master which shall serve as bypass connection for FieldCare and Netilion. All necessary steps shall be documented and the interoperability with the given Siemens PROFIBUS DP master must be tested.

Based on this, bypassed tool integration shall be tested with FieldCare as on-premises tool for device configuration management as well as Netilion as cloud-based application. The second comprises the setup and tests with the Endress+Hauser FieldEdge SGC500.

5 Summary of Test Results

5.1 Basic Setup

5.1.1 smartLink HW-DP IP address and licensing

- The IP address of the smartLink HW-DP has been successfully configured with the Softing tool "Search and Configure". This tool can be found and downloaded from Softings product webpage.
- Specific smartLink licenses are required to connect the HART field devices over the PROFIBUS DP network. These licenses can be installed via the smartLink web server. Please contact your local Softing support for further details.

5.1.2 PROFIBUS DP Network

- A Siemens S7-300 PLC acts as PROFIBUS Master Cl.1 device which communicates with ET200M and ET200SP Remote I/Os. These devices support a variety of Baud rates as listed below. However, the Softing smartLink HW-DP supports only a subset of possible Baud rates:

PROFIBUS Network		Baud rates (Baud)										
		9.6k	19.2k	31.25k	45.45k	93.75k	187.5k	500k	1.5M	3M	6M	12M
DP Master	S7-300	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
DP Slave	ET200SP	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
DP Slave	ET200M	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
DP Slave	smartLink	✗	✗	✗	✗	✗	✓	✓	✓	✗	✗	✓

- Consequently, the smartLink HW-DP gateway can only be used as a bypass to a specific control system, if the control system works with one out of the four supported baud rates. The Baud rate can be selected in the smartLink webserver.
- Tests have been successfully executed with 187.5 kBaud, 500 kBaud, 1.5 MBaud and 12 MBaud.
- PROFIBUS bus parameters Slot Time (Tsl), min and max Station Delays (Tsdr), Target Rotation Time (Ttr) and Setup Time (Tset) run with defaults and cannot be modified. These parameters may have to be checked and adjusted on the PROFIBUS DP Master Cl. 1 side.
- Using the smartLink gateway as a Master class 2 requires at first the configuration of the gateway PROFIBUS Segment DP1, which includes Baud rate, Highest Station Address, Max Retry limit and Station Address. Please refer to the Integration Tutorial for further details.
- Once the PROFIBUS Segment is configured, it is recommended to save and also export the configuration. The export may be helpful after a reboot of the smartLink HW-DP gateway, because

the configuration is not lost, but stored settings will not be displayed in the configuration webpage anymore.

- Finally, the HART IP server for the Segment DP1 must be enabled. After activation, the Web server Diagnosis Live List displays the connected HART Analog Input modules of the PROFIBUS network with connected HART field devices. This step may require some time depending on the number of modules and field devices.
- Clicking on the "Refresh" button may be useful to update the web server page. However, pay attention not to click too many times on the Refresh button. This could lead to some Refresh issues.
- Each HART field device is identified with some standard HART information like Long Tag, HART Long Address, Manufacturer, Device type, Device Revision and HART revision.

5.2 Bypassed Tool Integration

5.2.1 FieldCare Device Configuration Management

Prerequisites

- The smartLink HW-DP PROFIBUS settings must be configured adequately and HART IP server must be activated via its embedded web server.
- It is not recommended to run the SGC500 FieldEdge in parallel. This may lead to communication errors.

FieldCare Project

- Softing CommDTM smartLink DTM 1.00 has been successfully installed and added to FieldCare DTM catalogue.
- All HART field devices connected to the PROFIBUS ET200M and ET200SP Remote I/Os have been successfully scanned and added in the project by using the FieldCare function "Create Network".
- It is recommended to configure the number of connected nodes in the smartLink CommDTM to reduce the scanning time. Please refer to the integration tutorial for further details.
- All Endress+Hauser HART devices could be connected and operated.
- The smartLink CommDTM forwards a flat list of "logical channels" for all connected HART devices to the FieldCare network view. These displayed channels do not correspond to the physical

connection of the HART devices to certain Remote I/O units, modules or channels. The “physical channel assignment” is only visible in the CommDTM menu itself.

5.2.2 Netilion Digital Services

Prerequisites

- The smartLink HW-DP PROFIBUS settings must be configured adequately and HART IP server must be activated via its embedded web server.
- It is not recommended to run FieldCare Device Configuration Management in parallel. This may lead to communication errors.

FieldEdge SGC500

- A Netilion account is mandatory for having access to the digital Services as well as a subscription plan. Please contact your local Endress+Hauser Sales Center for further information.
- The FieldEdge SGC500 has been successfully commissioned. Please follow the instructions in the Integration Tutorial.
- After commissioning, the FieldEdge SGC500 has automatically connected to Netilion and could be found in the Netilion account. All further settings could be done in the Netilion web pages.

smartLink HW-DP

- In current version, there is no dedicated Field Gateway Type implemented for the Softing smartLink HW-DP. However, the Field Gateway Type “SFG250” may be used and is working as well for the Softing smartLink HW-DP configuration. This issue has been reported to development, a dedicated Field Gateway Type may be added in future.
- Once configured in Netilion, the smartLink HW-DP gateway has been successfully scanned and appeared in the object list. The generated tag is not very user friendly but allows to identify the smartLink HW-DP gateway based on its MAC address.
- A corresponding Asset for the smartLink HW-DP tag has been successfully created in Netilion.

Netilion Health

- All Endress+Hauser HART field devices appear in the "All Objects" list with their configured HART tag. However, there is a general issue regarding the tags definition:
 - If the tag has already been created offline and linked to an asset (for example in a pre-engineering workflow), a new online tag will be created automatically and also linked to the same asset. Deleting this duplicated tag will just work temporarily. About 20 minutes later, the online tag will be created automatically again.
 - The duplicated online tag can be used in Netilion but should not be renamed. Otherwise, another duplicated online tag will be created about 20 minutes later.

This issue has been reported to the Endress+Hauser development team and may be fixed in future.

- Field Devices status are sorted according to their Namur status in the "Overview" part. Clicking on one of the Namur status categories displays the list of tags with its status. The update time for the Namur Status "OK" takes more time than the other Namur status (about 10sec). This point has been reported to the Endress+Hauser development team and may be fixed in future.
- Additional status data are contained in the Asset itself. Clicking on the tag and then on the associated Asset displays the Asset Details. The user can now see the Health Conditions details as well as the status History.
- There is a problem with disconnected devices. The status of a field device (or smartLink HW DP gateway) that has since been disconnected is still displayed as online with the same Namur status as it was last connected. This may be confusing for users who expect a live status view.

Netilion Value

- Netilion displays successfully the Endress+Hauser field devices values via their tags, either in a dashboard or in List View format. Additional information like Namur status, Process value, units and Last update time are displayed as well.
- Selecting the tag will display the tag details like Latest Values, History, or associated Assets.
- The corresponding Asset gives more details for the History (contains PV, SV, TV and QV).

6 Open Integration Result

Reference Topology SYT01	Recommended	Not Recommended	Not Applicable
Basic Setup (smartLink HW-DP as HART over PROFIBUS DP bypass solution for 187.5 kBaud, 500 kBaud, 1.5 MBaud or 12 MBaud)	X		
Basic Setup (smartLink HW-DP as HART over PROFIBUS DP bypass solution for other Baud rates than listed above)			X
Bypassed Tool Integration (FieldCare Device Configuration Management via smartLink HW-DP)	X		
Bypassed Tool Integration (Netilion Health and Value Services via smartLink HW-DP and SGC500)	X		
Bypassed Tool Integration (Concurrent use of FieldCare and Netilion Services via smartLink HW-DP)		X ^{*)}	

*) At the time of testing, a concurrent access version was under development but not yet available. If this feature becomes important for your application in future, please ask Softing about the current status of this development and consider project-specific retesting.

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