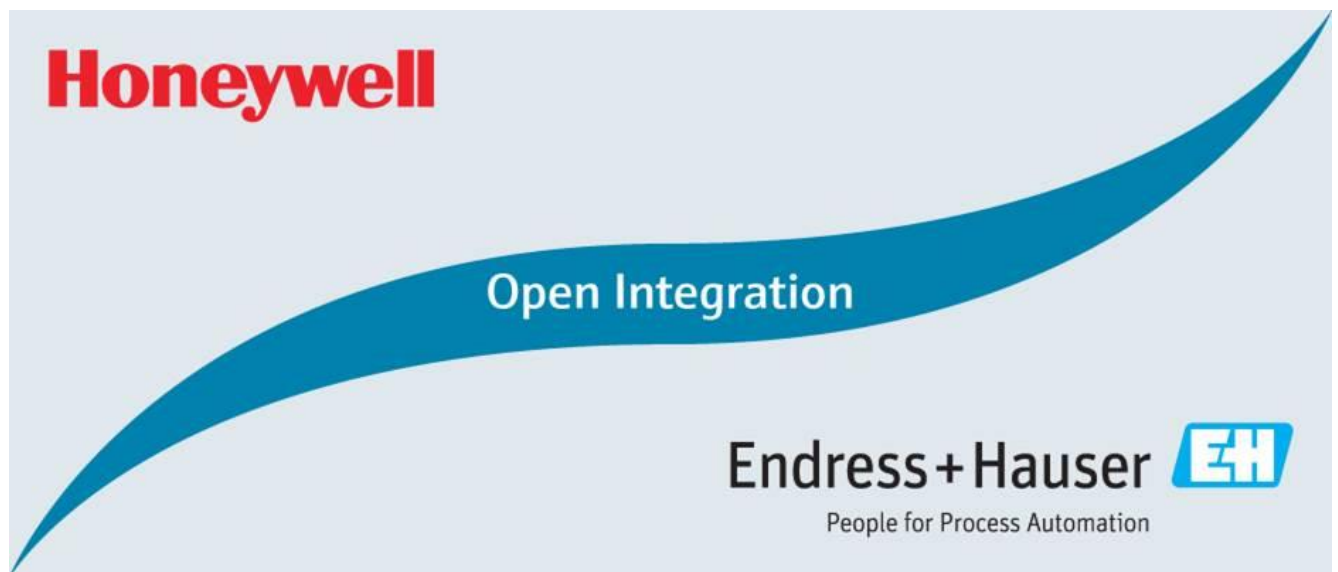


## Integration Test Summary HON04

Honeywell Experion®PKS and PROFINET over Ethernet-APL  
for Chemical Industry



Supported by:

 **PEPPERL+FUCHS**

 **PHOENIX  
CONTACT**

 **bürkert**  
FLUID CONTROL SYSTEMS

**FESTO**



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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 HON04. All content of this document is jointly developed, reviewed and approved by Honeywell 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	2024-09	Initial version

### 1.3 Related Documents

Please refer to related documents as listed below:

Document	Description
SD02920S/04/EN/01.24	Reference Topology HON04
SD02921S/04/EN/01.24	Integration Tutorial HON04
SD02923S/04/EN/01.24	List of Tested Devices and Versions HON04

## 2 Preface

Open Integration focuses on complementary system tests to verify integration and interoperability using practical test conditions. This is done by testing the system versus a reference test network with a relevant variety of components and field devices for defined target applications, and asking questions like this:

Is the system prepared to handle a necessary variety of compliant device implementations?

How does it deal with multiple device revisions and device replacements?

Does it apply reasonable bus settings to share access with other masters?

How can field devices be accessed for configuration or asset health monitoring?

Is this path stable and performing? ...

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 Reference Test Network

Open Integration verifies systems versus a reference test network: Figure 1 shows the principle as applied for PROFINET and PROFINET over Ethernet-APL:

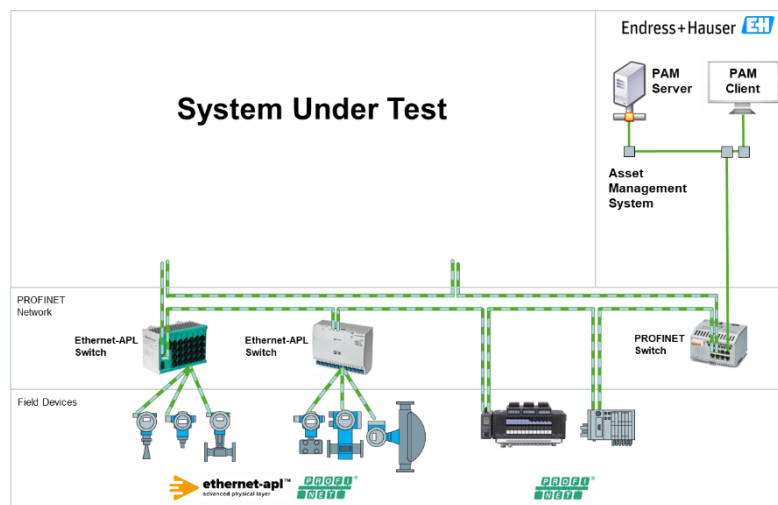


Figure 1: Open Integration Reference Test Network for PROFINET and PROFINET over Ethernet-APL

### 3.2 Integration Test Scenarios

Open Integration verifies supported means for integration into the system and interoperability with other tools. Figure 2 shows the main test scenarios as considered:

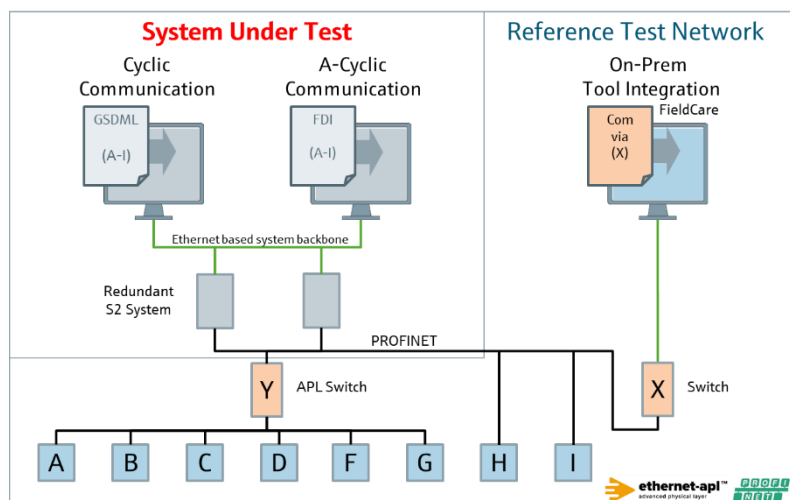


Figure 2: Open Integration Test Scenarios

### 3.2.1 Basic Integration

This scenario deals with integration of network components and field devices for commissioning of the field network and cyclic communication of process values. As a result, process values with status information are available for further processing within the control strategy of the system. Test cases related to this scenario are mandatory.

### 3.2.2 Advanced Integration

This scenario deals with device type specific integration of field devices by means of FDI. As a result, the system is enabled to access additional information from field devices, e.g. for an integrated asset management solution. Test cases related to this scenario are mandatory, if the system under test supports such means.

### 3.2.3 Specific Integration

This scenario considers proprietary means for integration which may be supported by a specific system, e.g. to simplify commissioning or to provide preconfigured elements for visualization. This is optional and not supported by standard test cases. If relevant, a specific set of additional test cases may be defined.

### 3.2.4 Routed Tool Integration

Vice versa, this scenario deals with integration of system components under test as access path for plant asset management software provided by Endress+Hauser. Test cases related to this scenario are mandatory, if the system under test supports such means.

### 3.2.5 Bypassed Tool Integration

This scenario focuses on interoperability to access field devices independently from routing support provided by the system under test. Test cases related to this scenario are optional. Test results may serve to complement a missing routing support, or as performance reference for routing support provided by a system under test.

## 4 Relevant Test Scenarios

Honeywell Experion®PKS requires GSDML drivers for Basic Integration of PROFINET network components and field devices. This shall be tested in a S2 redundant topology.

Advanced Integration shall be evaluated by means of FDI packages in Honeywell FDM Plant Asset Management tool.

Bypassed Tool Integration shall also be considered with Endress+Hauser FieldCare Plant Asset Management tool.

Routed Tool Integration and Specific Integration are not considered in this evaluation.

## 5 Summary of Test Results

### 5.1 Basic Integration

Control Builder uses the tool "PROFINET Device Configuration" to setup the PROFINET network. It was possible to setup the network. Some usability issues are mentioned below.

#### 5.1.1 Drivers for PROFINET

- GSDML files are not included per default in the device Library.
- All required vendor specific GSDML files have been successfully imported.
- All required PROFINET PA 4.02 Profile GSDML files devices have been successfully imported.
- Installed GSDML files are grouped by vendor names and sorted by occurrence order. Sorting by device type would make it sometimes easier to find the right ones.

#### 5.1.2 Field Network Configuration

##### Media Redundancy (MRP)

- The primary Honeywell Ethernet Interface Module (EIM) has been successfully configured as MRP ring manager. The secondary EIM module does not need to be configured separately to function as a backup for the primary EIM.
- All Ethernet-APL switches and further participants in the MRP ring have been successfully configured as ring clients.

##### Station Name and IP Settings

- Station Name and IP settings of all network components must be manually configured in the Control Builder "PROFINET Device Configuration" tool.

##### Ethernet-APL Field Switches

- Both Pepperl+Fuchs and Phoenix Contact Ethernet-APL switches have been successfully configured and integrated as network components in the Honeywell System.
- All necessary configurations can be done in Experion. In addition, all Ethernet-APL switches provide embedded web servers for configuration and diagnostics.
- Temperature, pressure, level and vortex flow devices are automatically line powered by the Ethernet-APL switches. Coriolis and electromagnetic flow meters still need an external power supply. The required line powering is automatically managed by the Ethernet-APL switches without any need for configuration.



## PROFINET Switch for PAM

- An additional Phoenix Contact Industrial Ethernet switch has been successfully integrated as a network component in the MRP ring. It serves as an access point to the Plant Asset Management tools for device configuration.
- All necessary configurations can be done in Experion. In addition, the switch provides an embedded web server for configuration and diagnostics.

## 5.2 Field Devices Integration

- All PROFINET field devices have been successfully integrated in the network by using the Control Builder "PROFINET Device Configuration" tool. Cyclic communication has been successfully established with all field devices.
- Station Name and IP settings of all field devices must be configured in the offline project. This works as intended, the alternative workflow to create an offline project from a scanned network is not supported.
- Devices can be integrated by using either Vendor Specific or PA Profile GSDML files. Vendor Specific GSDML must be used if Honeywell FDM shall be used for device configuration. Honeywell will fix this in the upcoming release.
- "Sort by IP Address" feature in the "Configure Devices" section currently sorts the IP addresses as strings. Honeywell will improve the sorting method in an upcoming release.
- The GSDML parameter "MinDeviceInterval" was not considered by the system. According to Honeywell, this has now been fixed in the final version of R520.2 FP3.
- The Watch Dog Time factor was not always correctly calculated and stored. According to Honeywell, this has now been fixed in the final version of R520.2 FP3.
- The "Station Discovery and Configuration" menu allows the user to scan all connected PROFINET devices and to modify their Station Name and IP address if necessary.
- The discovery tool does not support automated IP assigning based on Station Names uploaded from the device. Station Name and IP settings must be configured both online and offline.
- The discovery tool supports forcing the device display blinking feature to identify a certain device in the field but only for about 3 seconds. While this works according to specification, usability could be improved by forcing multiple times until a device is found in a larger project.

## 5.3 System Scalability Tests

The system has been successfully tested with a complete /24 subnet and 240 field devices.

### 5.3.1 Media Redundancy (MRP)

- The Honeywell EIM module configured as a ring manager, has successfully handled the MRP network tests.

### 5.3.2 System Redundancy (S2)

- System Redundancy S2 has been successfully tested. The switchover between primary EIM and backup EIM takes about 300ms for a network with 240 field devices.
- The tested version of Bürkert valve island did not yet support S2 Redundancy. Meanwhile, a newer version is now released with this feature.

### 5.3.3 Dynamic Reconfiguration

- "Station Scan Time" and "Watch Dog Factor" parameters for all devices need to be adjusted. Please refer to Honeywell documentation for more details.
- Dynamic reconfiguration allows the parameters of a running device to be changed.
- The dynamic reconfiguration feature does not yet work as expected for changing the device module configuration. This will be further analyzed by development teams from Honeywell and E+H. Process values of a reconfigured device are available after the EIM synchronization.

## 5.4 Advanced Integration

- All available FDI Packages have been successfully imported in FDM Package Library.
- All Field devices integrated in Control Builder appear in the FDM Network view, but only devices which have been integrated with vendor specific GSDML files can be operated in FDM.
- The current FDM version does not yet support the UIPs of a FDI package.

## 5.5 Bypassed Tool Integration

### 5.5.1 Integrated Web server

- All tested Ethernet-APL devices and switches provide an embedded web server, which can be used to configure and check individual field devices. Prerequisite to this is that the network topology allows access with a web browser running on a web client station.
- The embedded web server of E+H devices must be enabled to use it.

## 5.5.2 Plant Asset Management (FieldCare)

- All Ethernet-APL field devices have been successfully connected in FieldCare by using the PROFINET Communication DTM and iDTM for FDI packages.
- Not all PROFINET FDI packages are included in the tested iDTM FDI library and had to be installed separately. Single FDI package can be downloaded from E+H Software Portal and installed by using the PROFINET FDI package manager tool.
- The Create Network function of FieldCare is working as expected. The complete network has been successfully scanned.

## 6 Open Integration Result

Reference Topology HON04	Recommended	Not Recommended	Not Applicable
<b>Basic Integration</b>	X		
<b>Advanced Integration</b> (PAM with FDM for PROFINET APL device configuration)	X <sub>1</sub>		
<b>Specific Integration</b>			X
<b>Routed Tool Integration</b>			X
<b>Bypassed Tool Integration</b> (PAM with FieldCare for PROFINET APL device configuration)	X		

X<sub>1</sub>: Field devices configured in EPKS with PA Profile GSDML drivers cannot be operated in FDM. To be fixed by Honeywell.

[www.endress.com/open-integration](http://www.endress.com/open-integration)

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