

Terugkoppeling van PROFINET APL in de praktijk



Ethernet APL - de fysieke laag voor 2-draads Ethernet

Jaap Westeneng



Industrial Ethernet

26 maart 2024 | De Basiliek, Veenendaal



Endress+Hauser 
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Terugkoppeling van PROFINET APL in de praktijk

Ethernet APL - de fysieke laag voor 2-draads Ethernet

Wereldwijd wordt tot op de dag van vandaag **analoge signaalstandaarden** toegepast in de proces- en fabrieksautomatisering. Om echter invulling te kunnen geven aan **nieuwe functionele behoeften en inzichten** zal de noodzaak van **digitale signaalverwerking** steeds meer toenemen.

Hiervoor is **Ethernet APL** als nieuwe **fysieke laag voor 2-draads Ethernet** zeker van toegevoegde waarde, **maar is deze technologie al voldoende volwassen?**

Aan de hand van praktische voorbeelden zal Jaap Westeneng – Digital Solutions Consultant bij Endress+Hauser – u een terugkoppeling geven van **PROFINET APL toepassingen** met betrekking **beschikbare hardware en software** en **aanbevelingen voor systeem integratie** en **onderhoud en beheer**.



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Ethernet-APL in een notendop

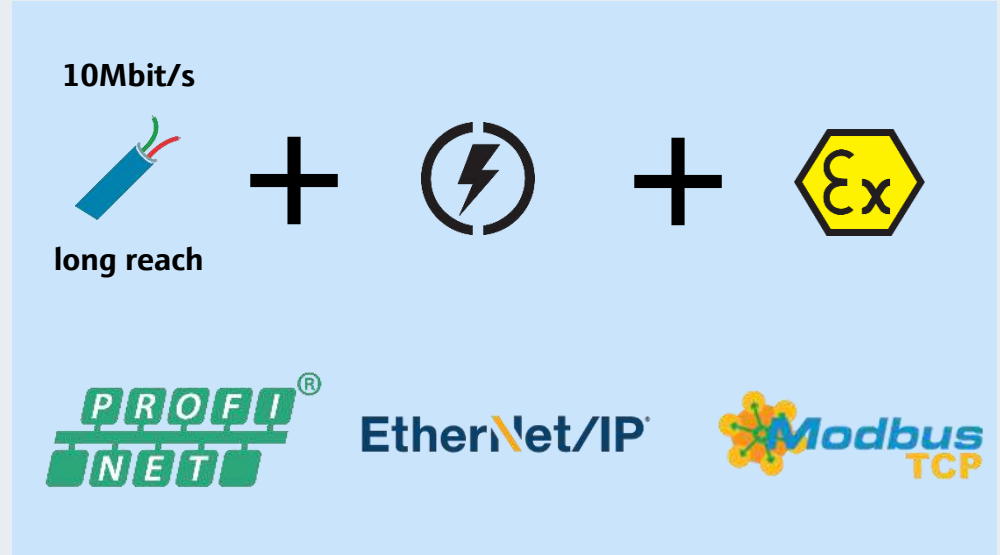
Organisatie Ethernet-APL

- Samenwerking van **standaardorganisaties** en **industriële partners**
- Alle specificaties en richtlijnen afgerond
- Lancering technologie in **2021**



Belangrijkste kenmerken van Ethernet-APL

- Voeding en data via **2-draads kabel**
- Ethernet snelheid van **10Mbit/s full-duplex**
- Geschikt voor Ex omgevingen
- Open voor elk **industriële Ethernet-protocol**



<https://www.ethernet-apl.org/>

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BASF Ludwigshafen (2019)

Ethernet-APL evaluatie project



Field Level with sensors and actuators



Control Level with ABB, Emerson, Honeywell and Siemens DCS



BASF Ludwigshafen (2019)

Conclusions

- Ethernet-APL could be successfully tested in a first practical application
- The following advantages could be identified:
 - Simple and flexible installation
 - Simple integration
 - Stable and fast Ethernet communication
 - Plug&Play device exchange
 - Parallel data export



NAMUR AK 2.6 - Evaluation



Eenvoudige installatie en integratie, **stabiele snelle Ethernet-communicatie** met ondersteuning voor **Plug & Play** apparaat **uitwisseling**

Het doel is eenvoudig, **flexibel** en **leveranciersonafhankelijk** gebruik van alle **apparaat functionaliteit!**

Snelle inbedrijfstelling door gebruik van standaard apparaatparameters (NE131)

Probleemloze integratie en configuratie van apparaten (NE 105)

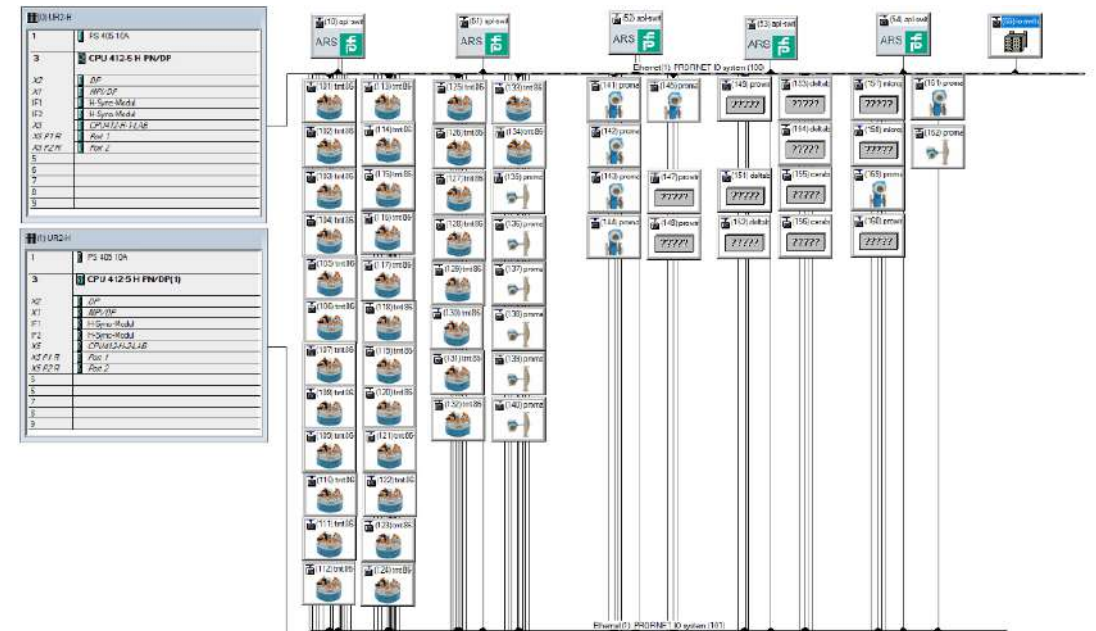
- APL is an enabler for NOA applications

The target is simple, flexible and vendor-independent use of all device functionality!



Integratie test met PROFINET APL (juli 2022)

Test case	Test result
Integration of > 60 PROFINET APL devices in different DCS and PAM systems	Successful (PROFINET and FDI Packages)
Observation of netload with fastest device cycle times	< 7% → no issues
Simulation of cable break between APL field switches	Successful, no issues with Media Redundancy Protocol (MRP)
Simulation of controller failure	Successful, no issues with system redundancy (S2)
Device replacement	Successful, automatic reconfiguration of new device (PA Profile 4)



University of Applied Sciences Keulen (januari 2023)

- Evaluatie van PROFINET APL
- PLT Labor (Prof. Dr.-Ing. Große)

Untersuchung von Ethernet/APL in prozesstechnischen Produktionsanlagen
 Aien Mahendrarajah, B. Sc., Prof. Dr.-Ing. Norbert Große

Technology Arts Sciences TH Köln

Einleitung

Das PLT-Labor untersucht die Anforderungen und die Einsatzmöglichkeiten von Ethernet-basierten Feldbusstrukturen in prozesstechnischen Produktionsanlagen im Auftrag der Kooperationspartner Bayer, Cummins, Linxess und Covestro. Dabei ist Ethernet/APL die notwendige Voraussetzung, um Ethernet mit hoher Schutzart im prozesstechnischen Umfeld einzusetzen.

In Kooperation mit:

Untersuchungspunkte

Alle möglichen Topologien werden untersucht, um eine sinnvolle Gesamtstruktur zu erstellen. Die Themen Explosionsschutz, Funktionale Sicherheit und Cyber-Security werden betrachtet. Des Weiteren werden die Diagnosemöglichkeiten, sowie die Feldintegration und die Gerätekonfiguration untersucht. Es werden alle wichtigen Anforderungen der Industrie an Feldbusse untersucht. Die Möglichkeit des Protokollersatzes von Profinet, Prosafe, HART SP und OPC UA wird bearbeitet. Um die Daten sicher aus der Pyramide zu erhalten, wird das Thema NAMUR Open Architecture (NOA) betrachtet. Zuletzt werden Konzepte erstellt zur Integration der bisherigen Feldbusysteme (Profibus PA und Foundation Fieldbus) und HART.

Projektstruktur

Das Projekt ist in zwei Phasen aufgeteilt. In der ersten Phase soll ein Lastheft erstellt werden und in der zweiten Phase soll eine Multiszenario-Aufgabe werden. In diesem Lastheft der ersten Phase werden die Anforderungen an einen Ethernet-basierten Feldbus in prozesstechnischen Produktionsanlagen erstellt und ausgearbeitet. Die Anforderungen werden in Sub-Teams diskutiert, um eine erste Struktur für eine Multiszenario-Aufgabe zu erstellen. Dazu wurden folgenden Sub-Teams gebildet:

- Engineering
- Explosionsschutz
- Predictive Maintenance
- Safety and Security

Die Kooperationspartner haben jeweils Anspornpunkte für jedes Sub-Team festgelegt, welche die Anforderungen und Einsatzmöglichkeiten prüfen. Diese werden anschließend mit den Herstellern besprochen und geteilt. Der aktuelle Stand der Arbeit, die strategischen Entscheidungen und die weiteren Vorgehen werden regelmäßig in einem Steering Committee besprochen.

In der zweiten Phase soll dann im PLT-Labor eine Feldbus-Multiszenario-Aufgabe gelöst werden. Die Ergebnisse sollen als Machbarkeitsstudie für künftige Projekte dienen.

APL-Testaufbau

In der folgenden Abbildung ist der APL-Testaufbau im PLT-Labor dargestellt. Zunächst sind die APL-Feldbusgeräte an einem managed-Switch angeschlossen. Der Profinet-Controller ist in einem Mehr-Ring und der SIMATIC-Server in einer starren Linientopologie angeschlossen. Der Backbone im Netzwerk ist Profinet. Die Profinet über APL Feldgeräte von Samsun (Positioner) und Endress+Hauser (Gardis Messdruck/Messwasser) sind an den APL-Feldbus angeschlossen.

Migration

Die bestehenden Anlagen können nicht komplett bis zur Feldebene neu aufgestellt werden. Daher müssen geeignete Migrationskonzepte erstellt werden. Die bisherigen Feldbusstrukturen und HART sind bereits in der Laboranlage von dem PLT-Labor im Einsatz. Daher soll die Laboranlage mit einem APL-Strang erweitert werden, um die Migrationskonzepte anzunehmen.

PLT-LABOR
 Laboratory of Process Control Engineering
 Prof. Dr.-Ing. Norbert Große
 Institute of Automation Engineering
 www.automatisierungstechnik-koeln.de/plt

IOTECH
 Institute of Industrial Automation
 Dr. Gert, Campus University of Applied Sciences
 Cologne, Campus 2, Schürweg, Germany
 April 2023



www.automatisierungstechnik-koeln.de/plt



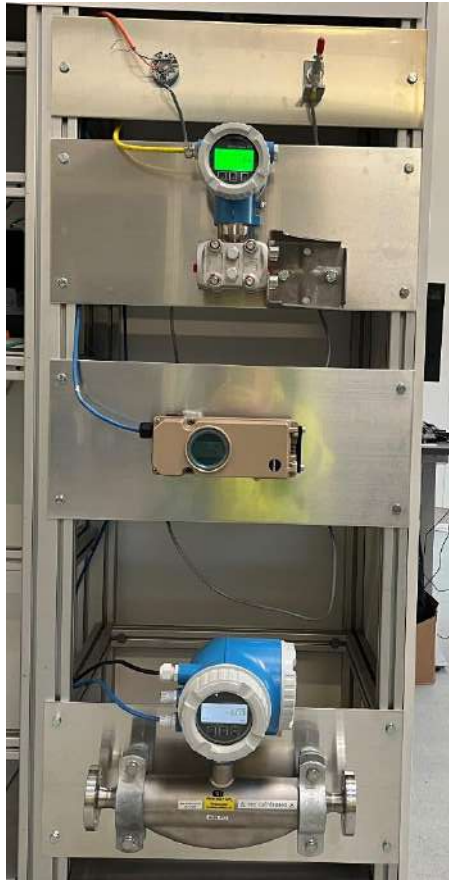
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Bayer, Actemium en Invite Leverkusen (februari 2023) INDUSTRIËLE AUTOMATISERING

- PROFINET APL test



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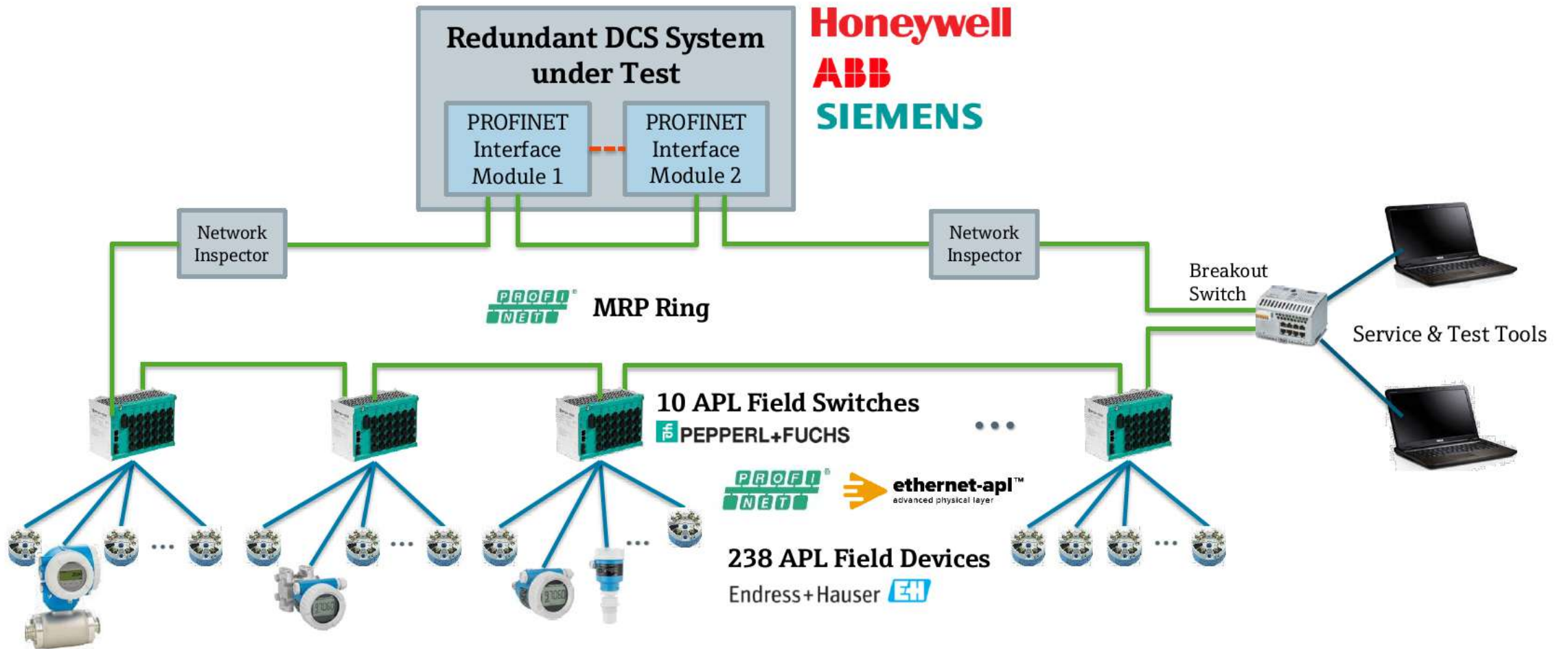
Belasting test met PROFINET APL (maart 2023)

- **ABB, Honeywell** en **Siemens** besturingsysteem
- **10** Pepperl+Fuchs **24 ports APL switches**
- **238** Endress+Hauser **PROFINET APL instrumenten**

- Maximale netwerkcapaciteit, schaalbaarheid en fouttolerantie werden met succes geverifieerd.
- Klanteisen zijn gehaald of zelfs overtroffen.





Belasting test met PROFINET APL (maart 2023)

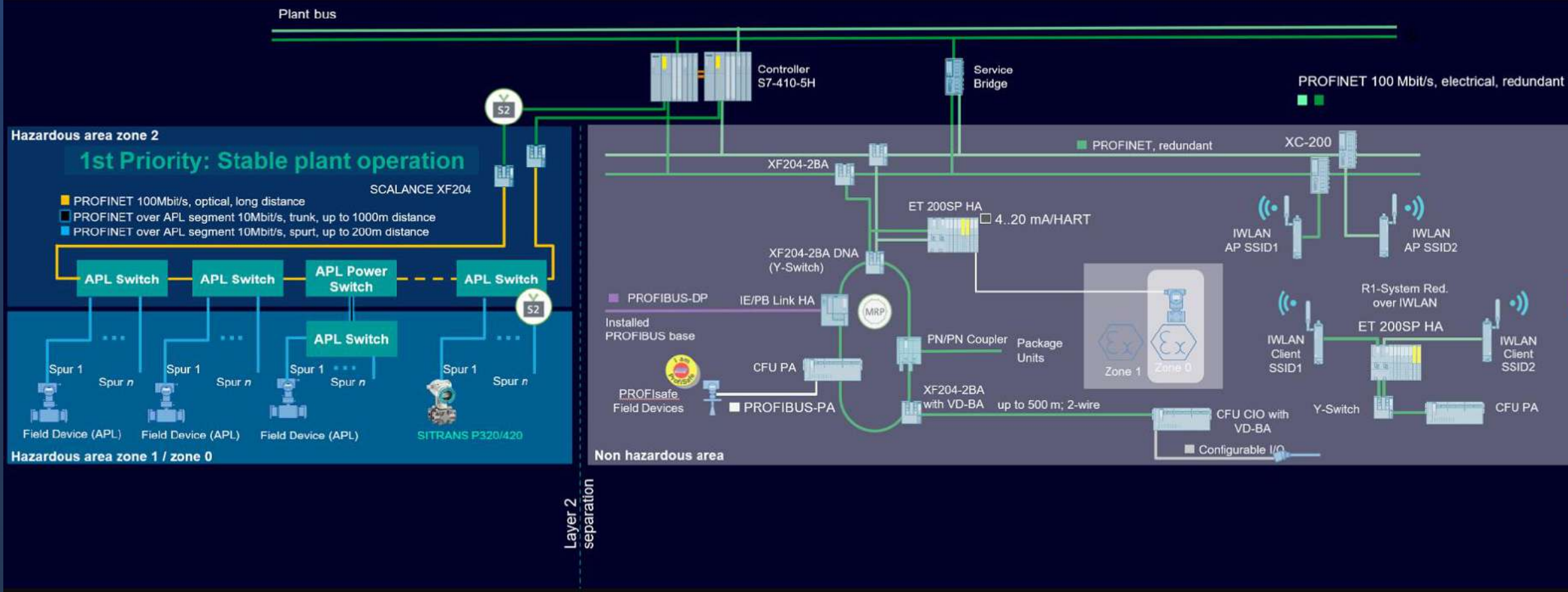


Geteste besturings- en beheersystemen

- Ondersteuning van PROFINET APL

Vendor	Controller	Additional HW	Engineering Software	Asset Management
Endress+Hauser 	-	-	-	FieldCare, DeviceCare, Field Xpert
SIEMENS	S7-400-5H	-	PCS 7 (≥ V9.1 SP2)	PDM
	S7-1500	-	TIA (≥ V18)	
Honeywell	UOC C300	-	EPKS (≥ R520.2 RFP2)	FDM (≥ 520.1)
ABB	AC 800M	<ul style="list-style-type: none"> ▪ BC 820 (Sync Module) ▪ CI 871 (PN Card) 	Control Builder (≥ V6.2)	FIM
	PK Controller		Delta V (≥ V15.FP1)	AMS (≥ V15.LTS)





Siemens PCS7 V9.1 SP2 UC04 (februari 2024)

5.1.13 Using PROFINET over APL (Advanced Physical Layer)

PROFINET over APL is a new technology to bring two-wire Ethernet with 10 Mbit/s into explosion area via intrinsic safety.

At system release time, only APL prototypes were available. Therefore, the quantity structure that needs to be configured is **limited to 25 field devices per PROFINET interface of a S7-410 5H controller**

For more information, refer to Using PROFINET over APL. (<https://support.industry.siemens.com/cs/ww/en/view/109812677>)

Note

- Product management approval is required to use in productive environment with PROFINET certified APL devices only.

As of **SIMATIC PCS 7 V9.1 SP2 UC04**, the **maximum number of allowed PROFINET over APL devices** has been increased up to **256 per interface**.

SIEMENS

SIMATIC

PCS 7 Process Control System
PCS 7 Readme V9.1 SP2 UC04
(Online)

Readme

Cybersecurity information	1
Industrial Security	2
Overview	3
Notes on installation	4
Notes on usage	5
Software components in SIMATIC PCS 7 V9.1 SP2 UC04	6
Change history SIMATIC PCS 7 Readme (Online)	7

Version: 2024-02 (Online)

PCS 7 V9.1 SP2 UC04
ACS1837316-0F

[PCS 7 Readme V9.1 SP2 UC04 \(Online\) \(siemens.com\)](#)

[PROFINET over APL \(Advanced Physical Layer\) Support in PCS 7 V9.1 SP2 - ID: 109812677 - Industry Support Siemens](#)

[SIMATIC PCS 7 V9.1 SP2 Software Updates - ID: 109812242 - Industry Support Siemens](#)



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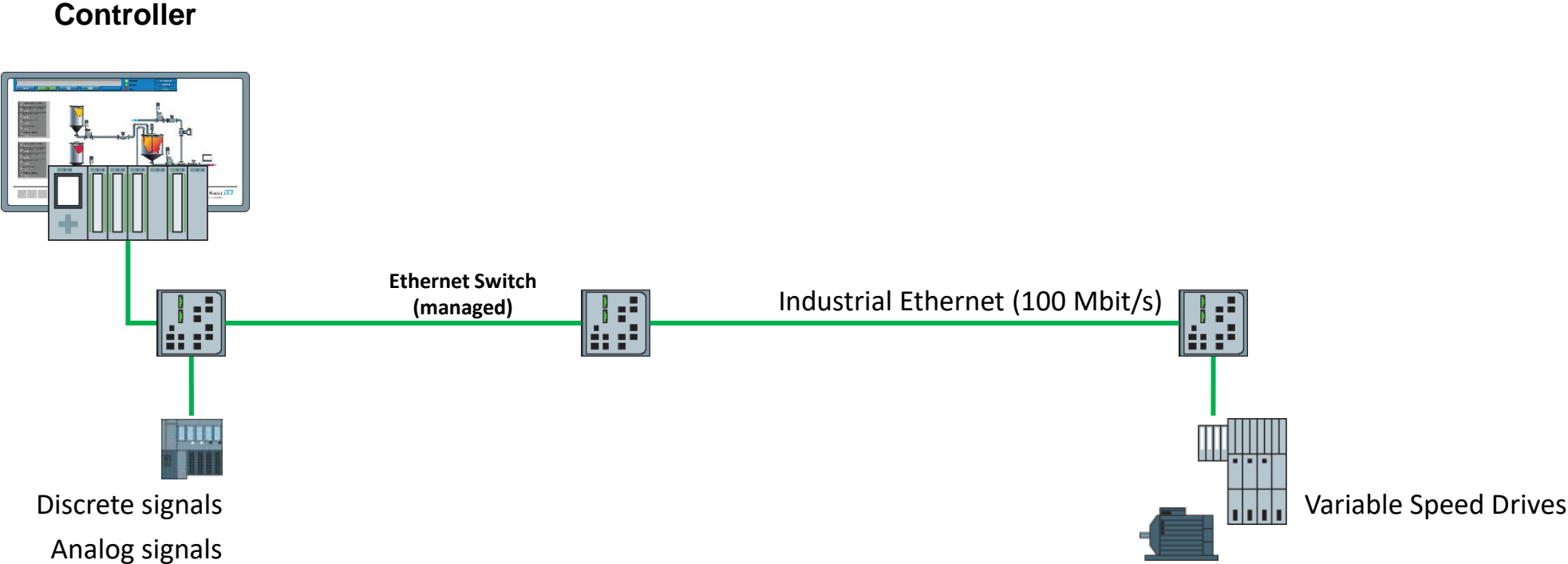


Endress+Hauser

People for Process Automation

Opbouw Industrial Ethernet

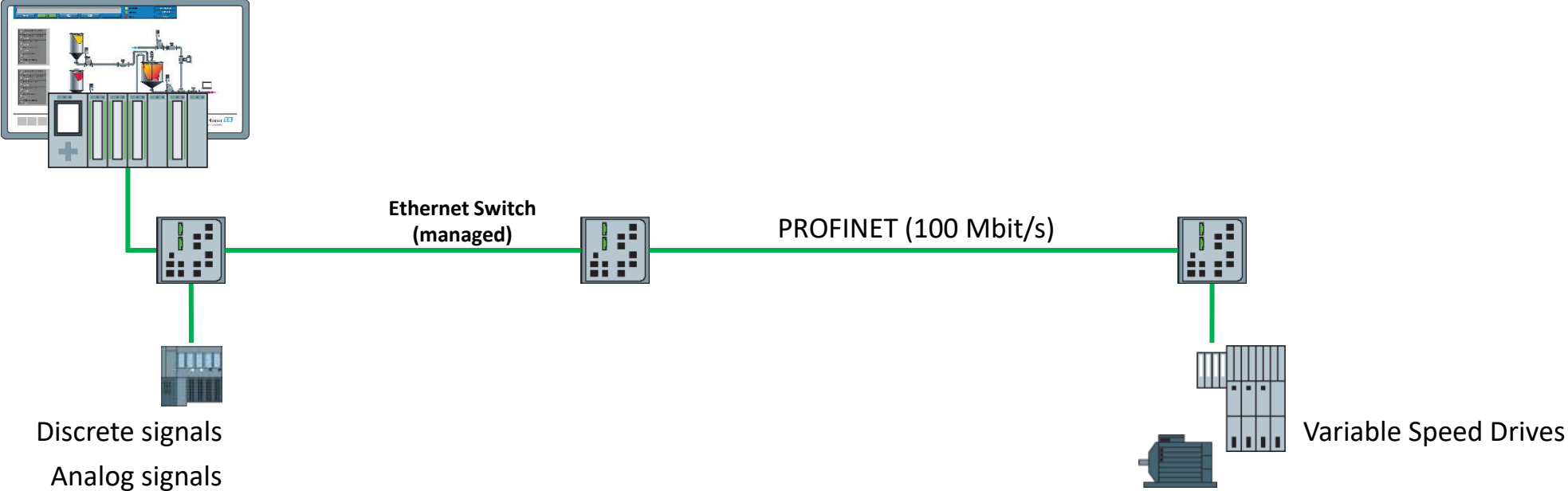
Engineering



Opbouw PROFINET

Engineering

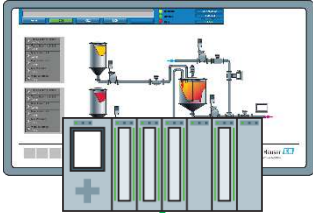
PROFINET Controller



Opbouw PROFINET met HART

Engineering

PROFINET Controller



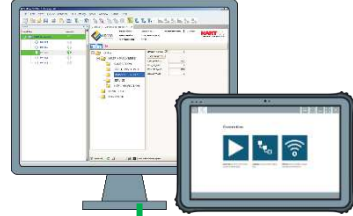
Discrete signals
(Smart) Analog signals



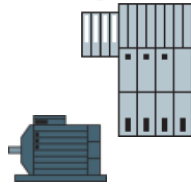
Ethernet Switch (managed)



PROFINET (100 Mbit/s)



PROFINET Supervisor (FDI/FDT)



Variable Speed Drives



Opbouw PROFINET met PROFINET APL

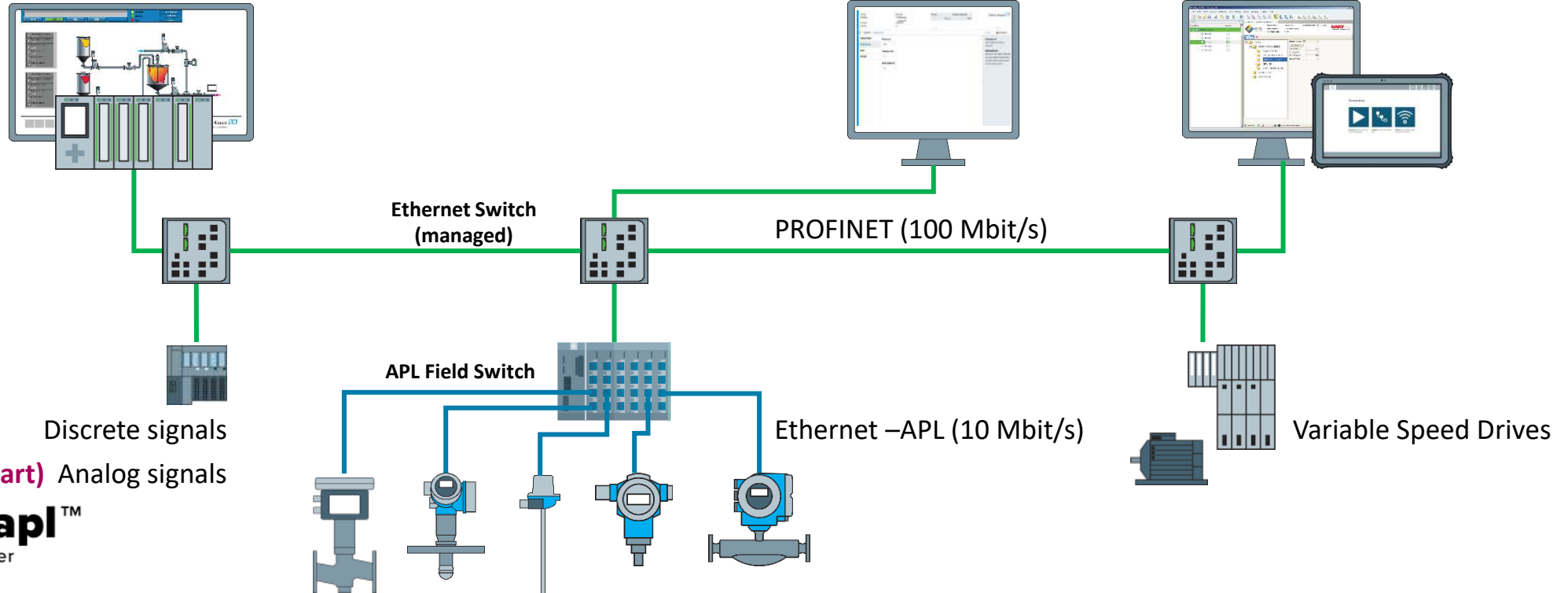
Engineering

Asset Management

PROFINET Controller

Web client
(IP adres)

PROFINET Supervisor
(FDI/FDT)



HART
COMMUNICATION PROTOCOL

PROFINET

(Smart) Analog signals

ethernet-apl
advanced physical layer

Smart Digital signals

Industrial Ethernet

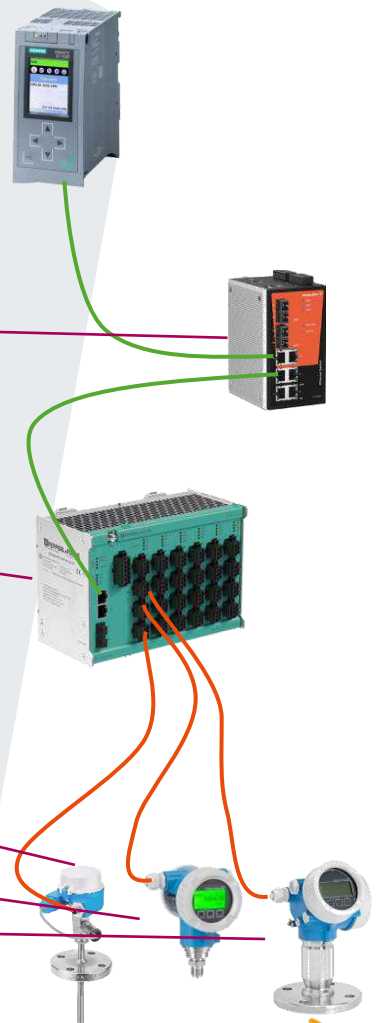
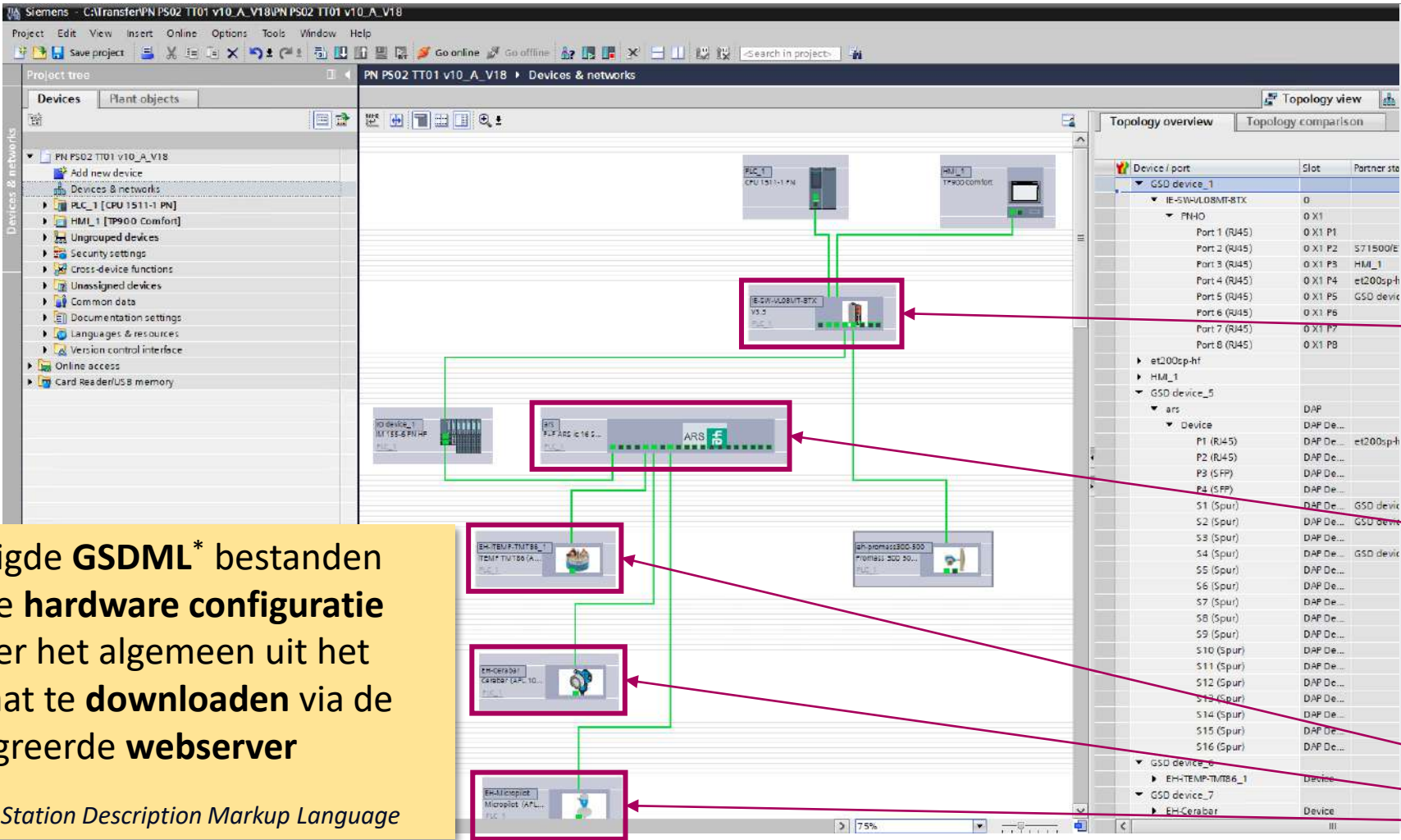
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Endress+Hauser
People for Process Automation



Engineering (GSDML)

Siemens TIA Portal V18 met APL Field Switch



Benodigde **GSDML*** bestanden voor de **hardware configuratie** zijn over het algemeen uit het apparaat te **downloaden** via de geïntegreerde **webserver**

* General Station Description Markup Language



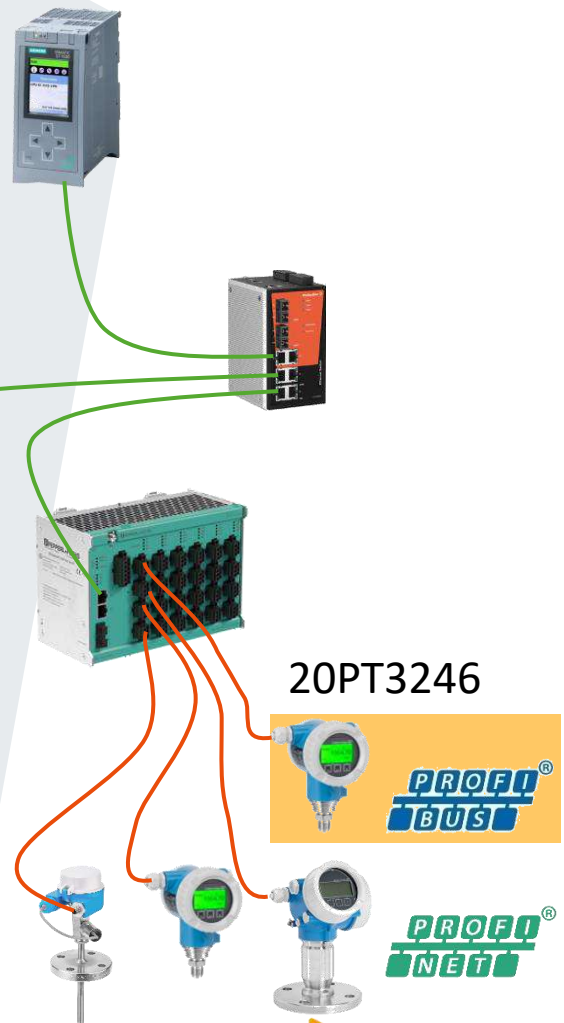
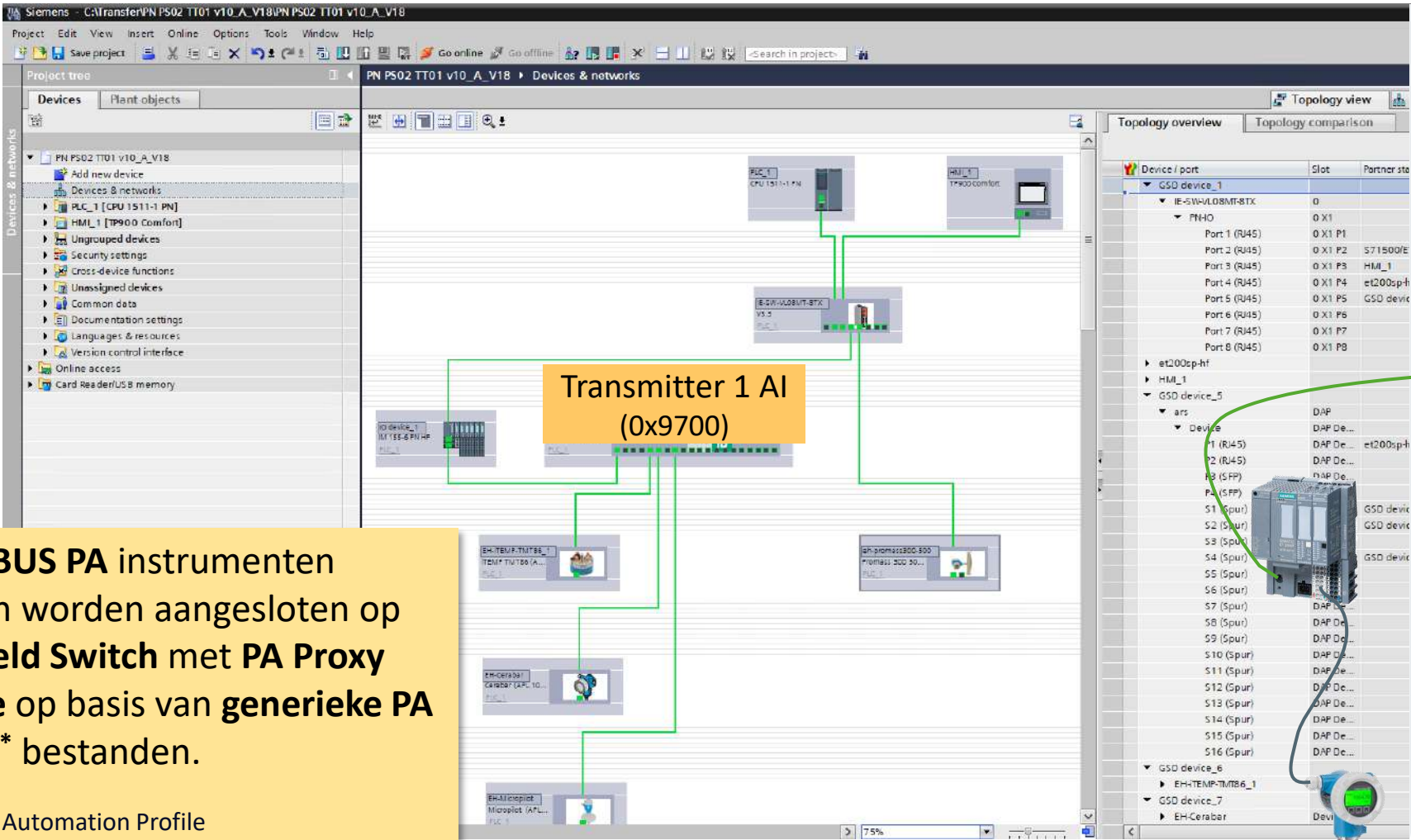
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Engineering (Profile PA GSD)

APL Field Switch met PA Proxy voor PROFIBUS PA



PROFIBUS PA instrumenten kunnen worden aangesloten op **APL Field Switch** met **PA Proxy** functie op basis van generieke **PA Profiel*** bestanden.

* Process Automation Profile



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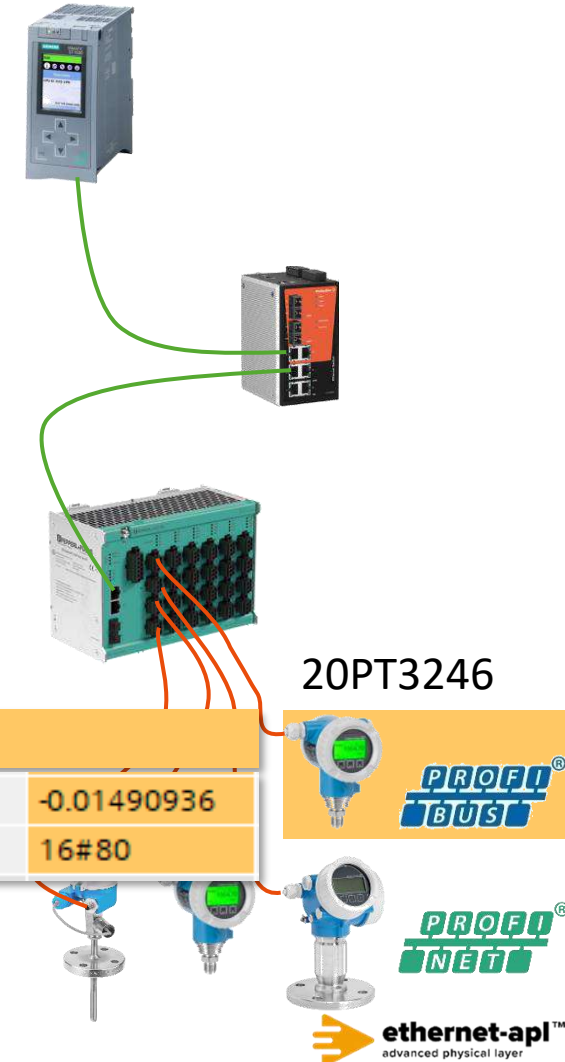


Engineering (Profile PA GSD)

APL Field Switch met PA Proxy voor PROFIBUS PA

PN PS02 TT01 v10_A_V18 ▶ Ungrouped devices ▶ ars [P+F ARS ic 16 Spurs PA RJ45 SFP]

Module	Rack	Slot	I address
ars	0	DAP	
Device	0	DAP Device	
S1 (Spur)	0	S1 (Spur)	
S2 (Spur)	0	S2 (Spur)	
S3 (Spur)	0	S3 (Spur)	
Transmitter 1 AI (0x9700)_1	0	S3 (Spur) Device	
Transmitter 1 AI (0x9700)	0	S3 (Spur) Slot 1	86...90
OUT (AI)	0	S4 (Spur)	
S4 (Spur)	0	S4 (Spur)	
S5 (Spur)	0	S5 (Spur)	
S6 (Spur)	0	S6 (Spur)	
S7 (Spur)	0	S7 (Spur)	
S8 (Spur)	0	S8 (Spur)	
S9 (Spur)	0	S9 (Spur)	
S10 (Spur)	0	S10 (Spur)	
S11 (Spur)	0	S11 (Spur)	
S12 (Spur)	0	S12 (Spur)	
S13 (Spur)	0	S13 (Spur)	
S14 (Spur)	0	S14 (Spur)	



PROFIBUS PA instrumenten kunnen worden aangesloten op **APL Field Switch** met **PA Proxy** functie op basis van **generieke PA Profiel*** bestanden.

* Process Automation Profile

Watch and force tables

"20PT3246"	%ID86	Floating-point number	-0.01490936
"20PT3246_Status"	%IB90	Hex	16#80



Asset Management (Webserver APL Field Switch)

APL Field Switch met PA Proxy voor PROFIBUS PA

PEPPERL+FUCHS

Product name: ARS11-B2-IC16-1
Tag: pf22xx0008-0-10-tt01-dap154-ars11

Dashboard

Diagnostics

- Overview
- Details
- Network
 - Port summary
 - Connected devices
 - Network load
 - Statistics
 - FDB (MAC) table
- Device
- Event log
- Data history
- Snapshots
- Physical layer

Configuration

Expert

Downloads

Help

OVERVIEW SECURITY

Device information Network information Connected devices

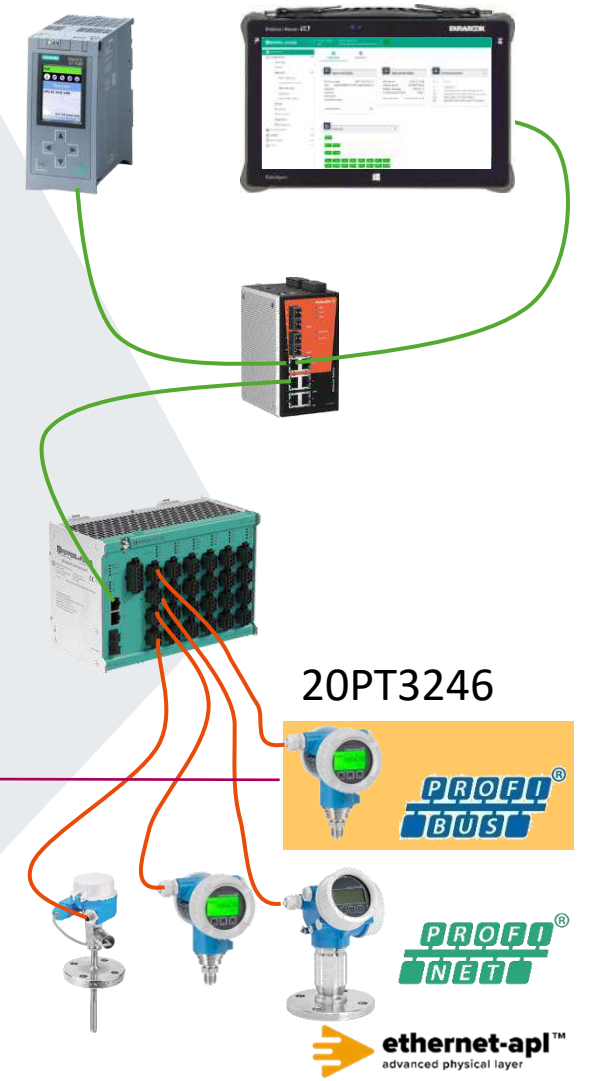
Product name: ARS11-B2-IC16-1 IP address: 10.85.23.154

Spur ports - 10 Mbit/s

Port	Device	Voltage [V]	Current [mA]	SNR [dB]
S1	eh22tt0102-0-10-tt01-dap162-tmt86	13.7	27	32.0
S2	eh22pt0102-0-10-tt01-dap167-pmc71b	13.7	31	32.2
S4	eh22tt0102-0-10-tt01-dap171-fmr62b	13.7	30	32.0

Spur ports - PROFIBUS

Port	Device	Voltage [V]	Current [mA]	Signal level [mV]	Jitter [µs]
S3	20PT3246-0-10-TT01-PMC71	13.9	13	1624	1.0
S12	PROFIBUS PA - Liquiline M CM42	13.8	21	1693	0.9
S13	20PT3025-0-10-TT01-PMC731	14.0	10	1590	1.8
S14	20PT3252-0-10-TT01-PMC71	13.9	13	1628	0.9
S16	20PT3055-0-10-TT01-PMC71	14.0	11	1529	1.2



Asset Management (Webserver APL Field Switch)

APL Field Switch met PA Proxy voor PROFIBUS PA

PEPPERL+FUCHS

Product name: ARS11-B2-1C16-1
Tag: pf22xx0008-0-10-tt01-dap154-ars11

Dashboard

Diagnostics

- Overview
- Details
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- Physical layer

Configuration

Expert

Downloads

Help

Port	Device	IP
P1	et200sp-hf	10.85.23.55
S1	eh22tt0102-0-10-tt01-dap162-tmt86	10.85.23.162
S2	eh22pt0102-0-10-tt01-dap167-pmc71b	10.85.23.167
S3	20PT3246-0-10-TT01-PMC71	46

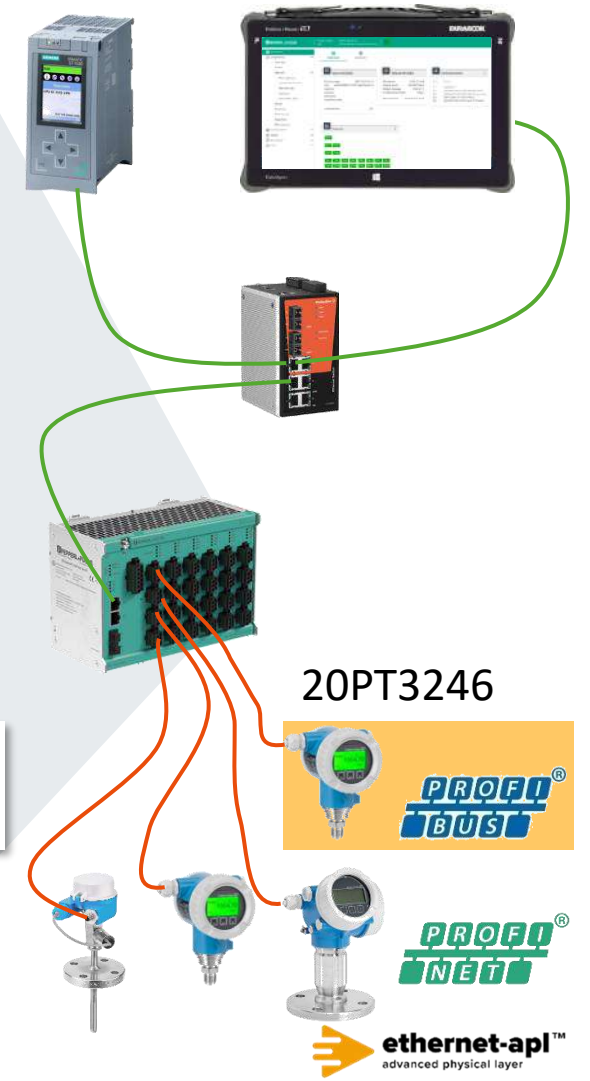
LLDP

- Device: Cerabar PMC71B-16FT3/0 V901 3A01197 100 V 1 0 0
- Management address: 10.85.23.167

PROFIBUS

- Device
 - Manufacturer: Endress+Hauser
 - Order ID: PMC71-ANA1F1GAANA
 - Serial number: S30DB10109C
 - Hardware revision: 02.00.00
 - Software revision: 04.01.00
- Address: 46
- Supported Idents
 - 0x1541 (Manufactur
 - 0x1501 (Manufactur
 - 0x9700 (PA Profile:
- Current Ident
 - 0x9700 (PA Profile:
- Ident number selector: Adaption mode (127)
- PROFIBUS PA Profile revision: 3.02
- Device state: Device in DataExchange
- Diagnostics state: No problems detected

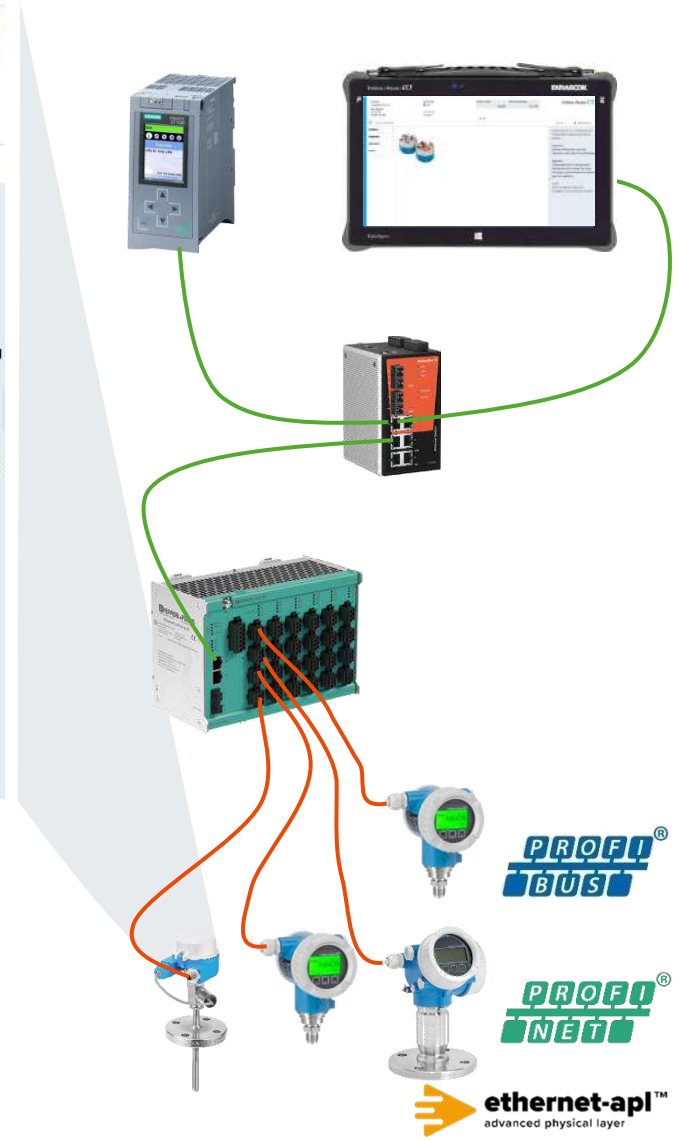
Current Ident
■ 0x9700 (PA Profile: Transmitter 1 AI)



Asset Management (Webserver temperatuur transmitter)

PROFINET APL instrument

The screenshot displays the web interface for an Endress+Hauser iTEMP TMT86 instrument. At the top, it shows the device tag 'eh22tt0102-0-10-tt01-dap162' and device name 'iTEMP TMT86'. The status signal is 'OK'. Key data points include 'Sensor 1 value' at 24.01 °C and 'Device temperature' at 25.20 °C. The interface includes a navigation menu with 'Guidance', 'Diagnostics', 'Application', and 'System' sections. A central image shows the physical instrument. On the right, there is a 'Maintenance' dropdown menu with options for 'en' and 'Maintenance'. Below this, there are four main functional areas: 'Main functions for use', 'Diagnostics', 'Application', and 'System', each with a brief description of its purpose.



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Asset Management (FDT/DTM)

APL Field Switch met PA Proxy voor PROFIBUS PA

The screenshot shows the FDT/DTM software interface. On the left, a network tree lists various communication protocols and devices. The 'PROFINET CommDTM' folder is expanded, showing a list of devices. The device '20PT3246-0-10-TT01-PMC71' is highlighted in red. On the right, the 'Online Parameterize' window for this device is open, showing the 'Instrument health' status as 'OK' and a list of available views: MEASURING MODE, QUICK SETUP, MANUFACTURER VIEW, and PROFILE VIEW.

Network Tag	C...	Chan...	Ad...	Device type (DTM)
10.85.23.118 - isNet Lite				isNet Lite
10.85.23.119 - CDI Communication TCP/IP				CDI Communication TCP/IP
10.85.23.127 - RSG45 HART Communication		0		RSG45 HART Communication
10.85.23.131 - CDI Communication TCP/IP				CDI Communication TCP/IP
10.85.23.132 - CDI Communication TCP/IP				CDI Communication TCP/IP
FactoryTalk Linx CommDTM				FactoryTalk Linx CommDTM
HART IP Communication				HART IP Communication
PROFINET CommDTM				PROFINET CommDTM
unknown		PNIO	un...	Placeholder FieldDevice
pf22xx0009-0-00-ps01-dap133-ars12		PNIO	pf2...	ARS11-*IC16*
turck tben		PNIO	tur...	Placeholder FieldDevice
pf22xx0008-0-10-tt01-dap154-ars11		PNIO	pf2...	ARS11-*IC16*
20PT3246-0-10-TT01-PMC71		Spur03	46	Cerabar S / PMx 7x / PA / FW 4.01
eh22pt0103-0-00-ps01-dap168-pmc71b		PNIO	eh...	Cerabar 5xB/7xB
eh22pt0102-0-10-tt01-dap167-pmc71b		PNIO	eh...	Cerabar 5xB/7xB
eh22tt0101-0-00-ps01-dap156-pmd75b		PNIO	eh...	Deltabar 5xB/7xB
eh22tt0101-0-00-ps01-dap155-tmt86		PNIO	eh...	ITEMP / TMT86 / PNA / FW 01.00.
eh22tt0102-0-10-tt01-dap162-tmt86		PNIO	eh...	ITEMP / TMT86 / PNA / FW 01.00.
eh22tt0102-0-10-tt01-dap171-fmr62b		PNIO	eh...	Micropilot 5xB/6xB
eh22tt0101-0-00-ps01-dap169-fmr62b		PNIO	eh...	Micropilot 5xB/6xB
eh22tt0101-0-10-fp01-dap131-5p1b25		PNIO	eh...	Placeholder FieldDevice



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Engineering Guideline Ethernet - APL

PROFINET, APL

Description:

This document shall support users in using the Ethernet advanced physical layer (Ethernet-APL) network technology. Ethernet-APL uses a two wire Ethernet to provide communication and power to devices. Defined strictly as a physical layer, Ethernet-APL supports any Ethernet-based protocol including those with real-time requirements. ODVA Inc, OPC Foundation and PROFIBUS and PROFINET International (PI) cooperate in the development of the APL technology as well as in the design of the APL standard.

Details:

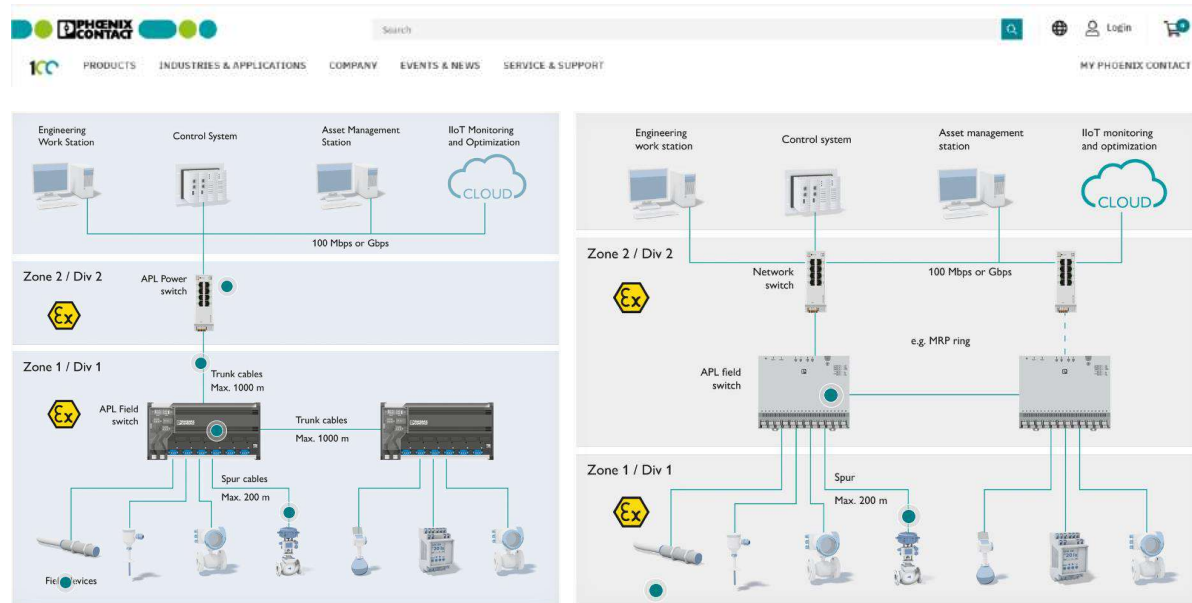
Version: 1.14

Order No.: 8.122 / 8.121

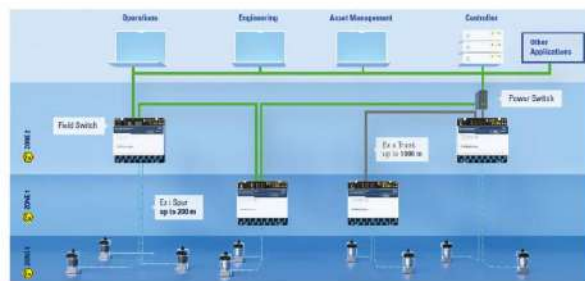
Language: English / German



Ethernet APL connectiviteit componenten



STAHl PRODUCTS SYSTEMS INDUSTRIES SERVICES AND SEMINARS SUPPORT



PEPPERL+FUCHS Your automation, our passion.

Ethernet-APL, Databits, Highlights, Videos, Integrate Safety, Integration with PROFINET PA, Enclosure Solutions, More Information

The Ethernet Advanced Physical Layer
The key to successful digitalization in the field of process industries

The Cost-effective Solution: GR Enclosures



The GR enclosure series consists of carbon-loaded, glass-fiber reinforced polyester with stainless steel cover screws. The enclosure series provides an anti-static, UV stabilized and corrosion resistant solution. Many attributes **simplify installation and handling** such as dedicated pry points for opening, a foamed gasket for IP66, and special protection for the sealing edge. With an expanded operating temperature range down to -40 °C, the GR enclosure series can serve as a **cost-effective** choice for many installations that would otherwise require stainless steel enclosures.

Great Variety with the SR Series



Designed for use in hazardous areas and harsh environments, the SR series offers different sizes and dimensions for a **variety of different Ethernet-APL applications**. Any accessories, such as flange plates, hinges, mounting brackets or lid security can be integrated according to **customer specifications**. The SR enclosures are manufactured from brushed AISI 316L stainless steel and all fittings are manufactured from A4 grade stainless steel as standard to provide **excellent finish and corrosion resistance**.

BECKHOFF from Automation Technology

Identif. Production Branches Support

Industries > Process industry > Ethernet-APL

Ethernet-APL: New communication standard

- How does Ethernet-APL work?
- Advantages of Ethernet-APL for the process industry

Implementing Ethernet-APL with Beckhoff

The vision of the Ethernet-APL concept is to implement the entire communication in process technology plants – from the field level to higher-level control systems – on an Ethernet basis. Now Ethernet-APL compatible field devices are also required to ensure easy plant design. Since the technology is still relatively new and involves a high level of development work, the market does not yet offer a broad range of devices. The added value of a transmission rate of 10 mbps is also limited for simple digital services.

This is why Beckhoff has made the decision to integrate Ethernet-APL technology into their modular terminal block portfolio. The compact ET-16222 can be mounted in the control cabinet in combination with other EtherCAT terminals. Two Ethernet-APL field devices can be connected via the ET-16222 terminal. As with all EtherCAT terminals in the ET series, the ET-16222 enables direct connection of terminal safety field devices up to zone 2.

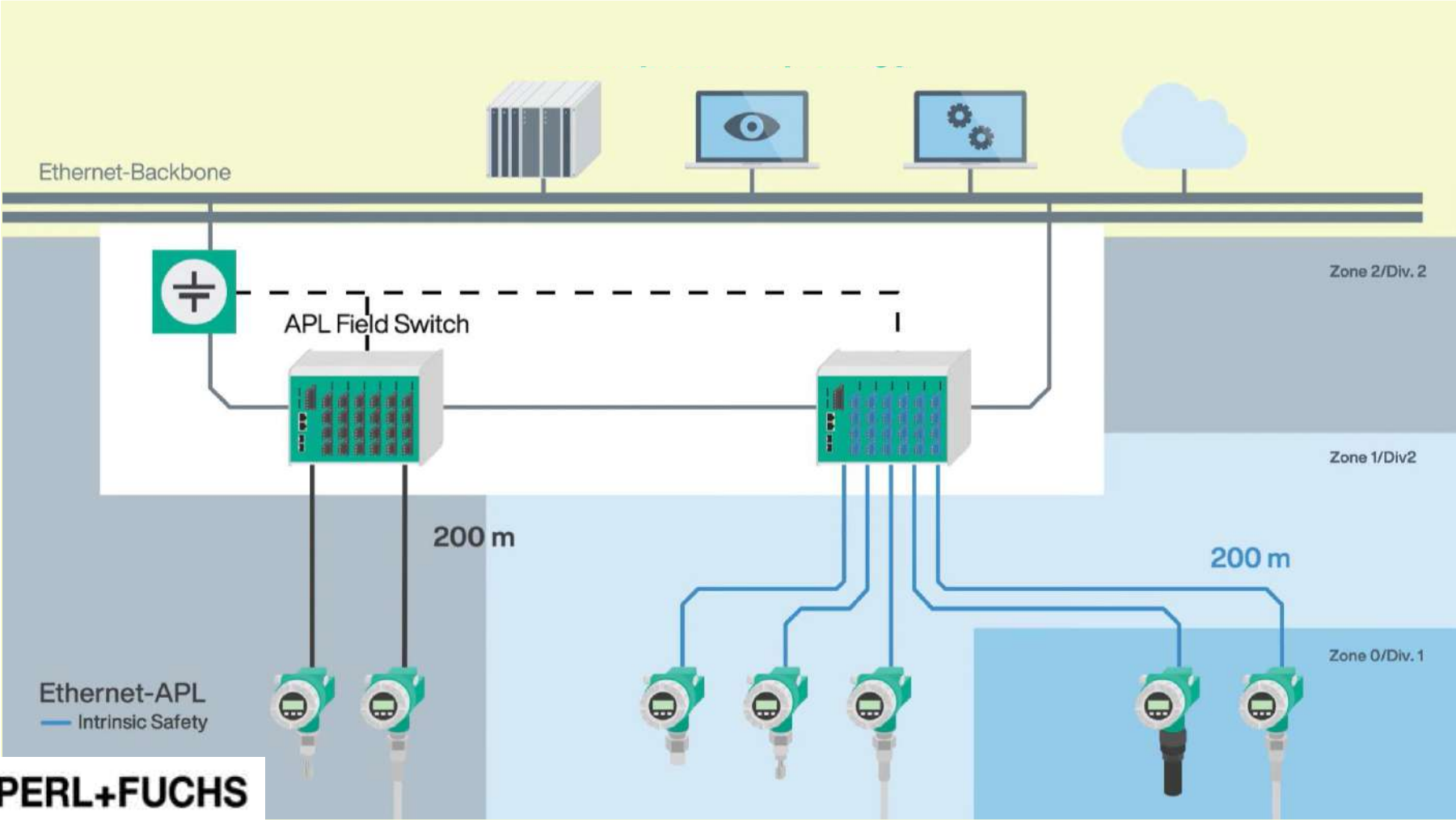
Contact us



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APL ster topologie (max 200 m, Zone 2)



Beschikbaar

APL Field Switch

- 100BASE-TX (2x RJ45) of – FX (2x SFP) Ethernet
- **Afzonderlijke** voeding
- Standaard en intrinsieke veilige met **8/16/24 spurs** (Ex ia, 2-WISE, FISCO)
- Installatie in veilige omgeving en in Zone 2
- **PROFINET PA Proxy** (optioneel) met **DTM**

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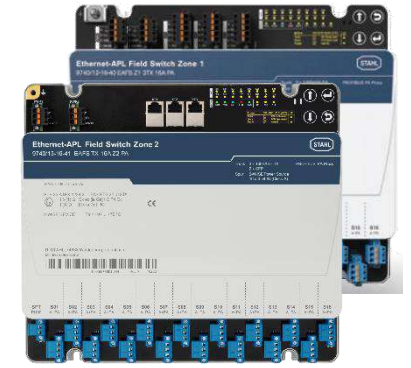
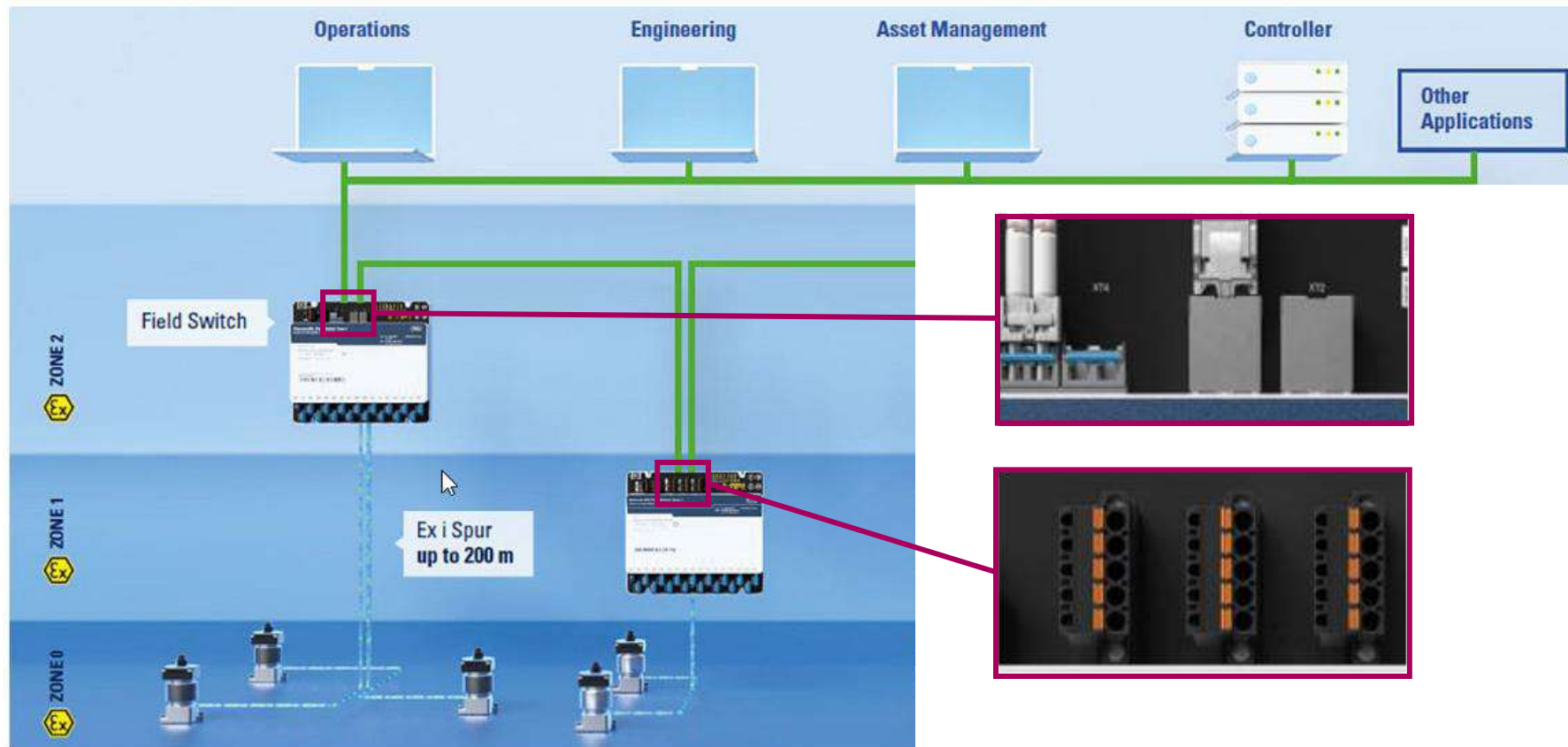


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APL ster topologie (max 200 m, Zone 2 en Zone 1)



Op aanvraag

APL Field Switch

- 100BASE-TX (2x RJ45) of (3 x Exe) of -FX (2x SFP) Ethernet
- Afzonderlijke voeding
- 16 spurs intrinsieke veilig (Ex ia, 2-WISE, FISCO)
- Installatie in veilige omgeving, Zone 2 en Zone 1
- PROFINET PA Proxy (optioneel)

STAHL

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Asset Management (Webserver)

Ethernet APL Field Switch met PA Proxy voor PROFIBUS PA

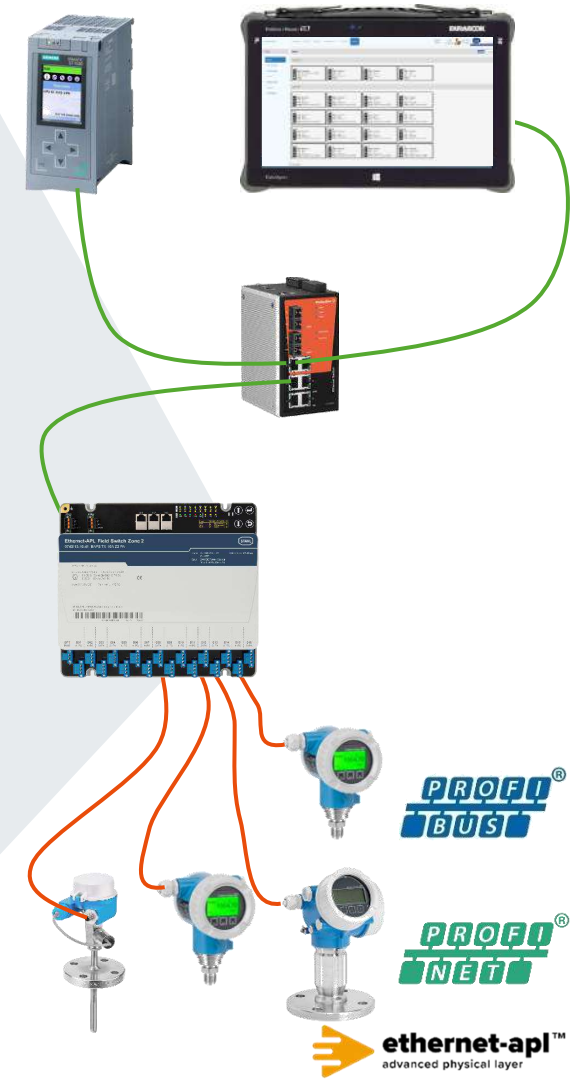
The screenshot shows the 'Health' page of the Field Switch web interface. It displays the status of 16 ports, categorized into Trunk and Spur ports. Each port card shows its state (Connected or No device), link status (up or down), SNR, and power consumption.

Port	State	Link	SNR	Power
Trunk 1	Connected	up (100 Mbit/s Full duplex)	47.5 dB	-
Trunk 2	No device	down	-	-
Trunk 3	No device	down	-	-
Trunk 4	No device	down	-	-
Spur 1	No device	down	-	13.846 V * 0 mA = 0.000 W
Spur 2	No device	down	-	13.862 V * 0 mA = 0.000 W
Spur 3	No device	down	-	13.889 V * 0 mA = 0.000 W
Spur 4	No device	down	-	13.700 V * 0 mA = 0.000 W
Spur 5	No device	down	-	13.992 V * 0 mA = 0.000 W
Spur 6	No device	down	-	13.732 V * 0 mA = 0.000 W
Spur 7	No device	down	-	13.872 V * 0 mA = 0.000 W
Spur 8	No device	down	-	13.876 V * 0 mA = 0.000 W
Spur 9	No device	down	-	13.813 V * 0 mA = 0.000 W
Spur 10	No device	down	-	13.577 V * 0 mA = 0.000 W
Spur 11	No device	down	-	13.813 V * 0 mA = 0.000 W
Spur 12	No device	down	-	13.824 V * 0 mA = 0.000 W
Spur 13	No device	down	-	13.564 V * 0 mA = 0.000 W
Spur 14	No device	down	-	13.639 V * 0 mA = 0.000 W
Spur 15	No device	down	-	13.661 V * 0 mA = 0.000 W
Spur 16	Connected	up (10 Mbit/s)	37.22 dB	12.038 V * 30 mA = 0.361 W



Spur 16

State: Connected
 Link: up (10 Mbit/s)
 SNR: 37.22 dB
 Power: 12.038 V * 30 mA = 0.361 W

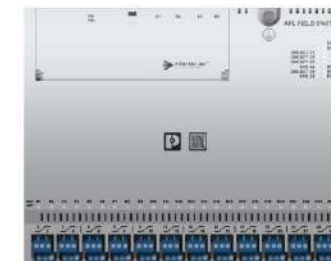
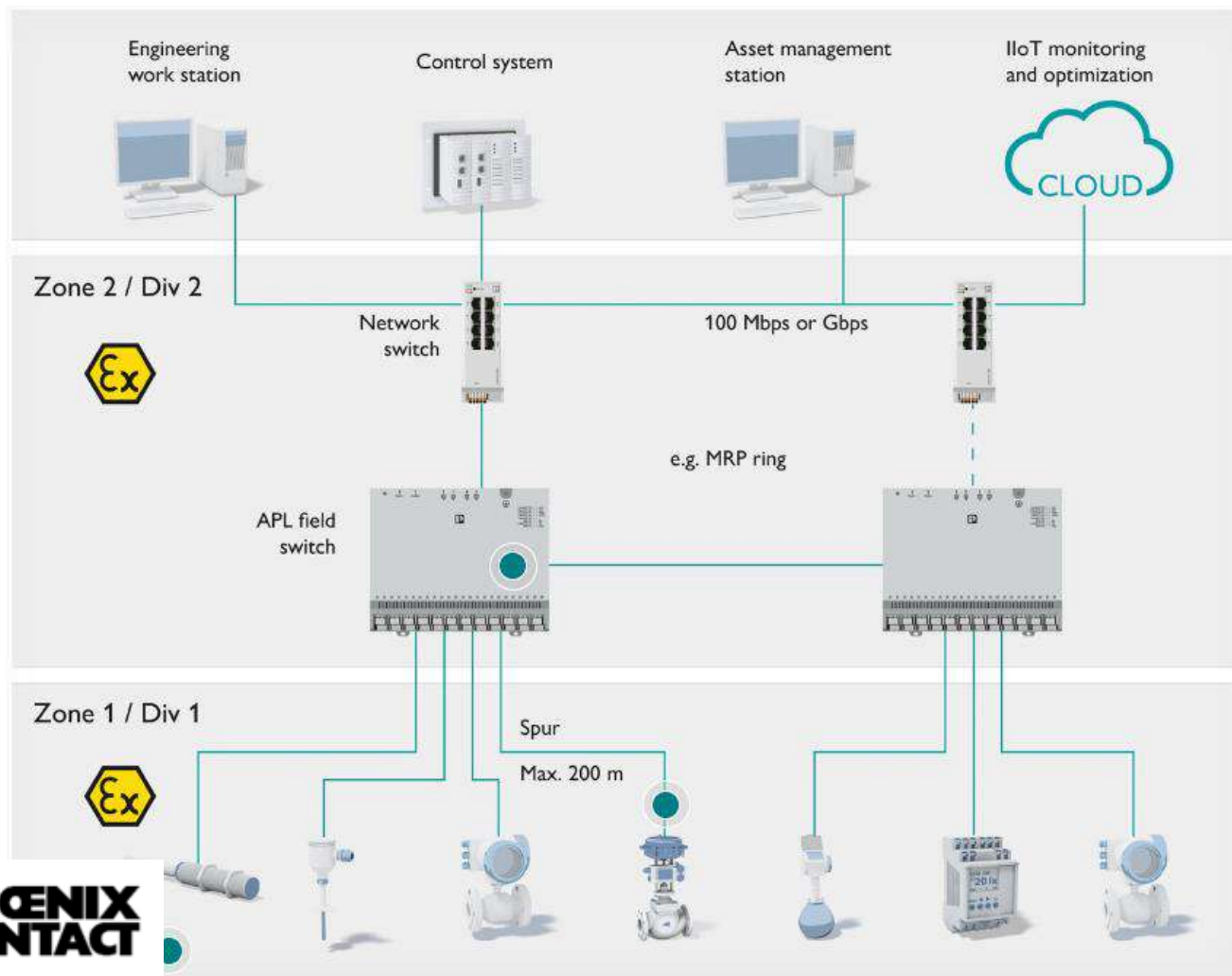


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APL ster topologie (max 200 m, Zone 2)

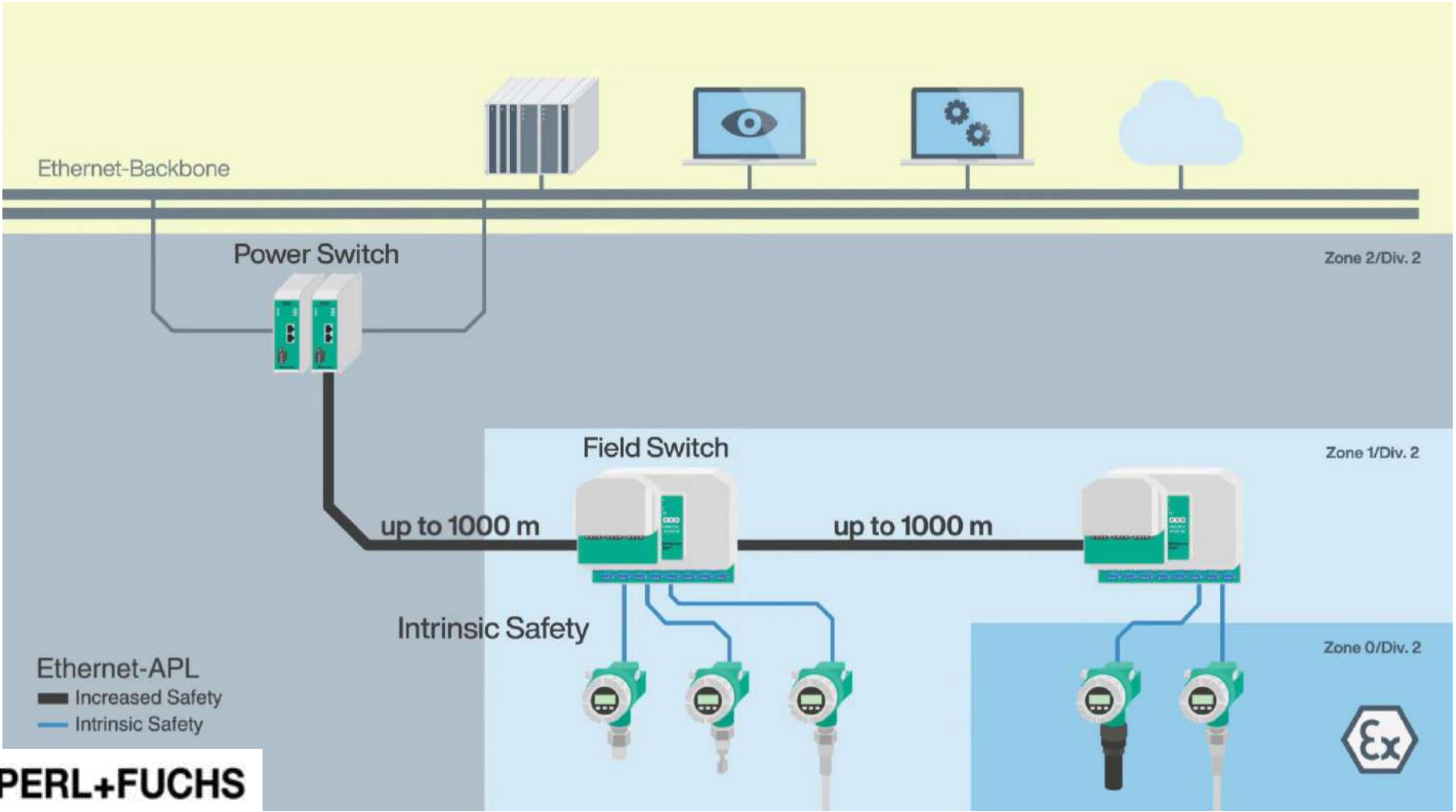


Op aanvraag

APL Field Switch

- 100BASE-TX (2x RJ45) of -FX (2x SFP) Ethernet
- **Afzonderlijke voeding**
- Standaard en intrinsieke veilige met **24 spurs** (Ex ia, 2-WISE, FISCO)
- Installatie in veilige omgeving en Zone 2
- **PROFINET PA Proxy**

APL stam en ster topologie (Max. 1000 m, Zone 1)



- APL Power Switch**
- 100BASE-TX of -FX Ethernet
 - **Afzonderlijke voeding**
 - **Trunk** niet-intrinsieke veilig
 - Installatie in veilige omgeving



- APL Field Switch**
- **Voeding via power switch**
 - **Spurs** intrinsieke veilig (Ex ia, 2-WISE, FISCO)
 - **Installatie typisch in Zone 1**

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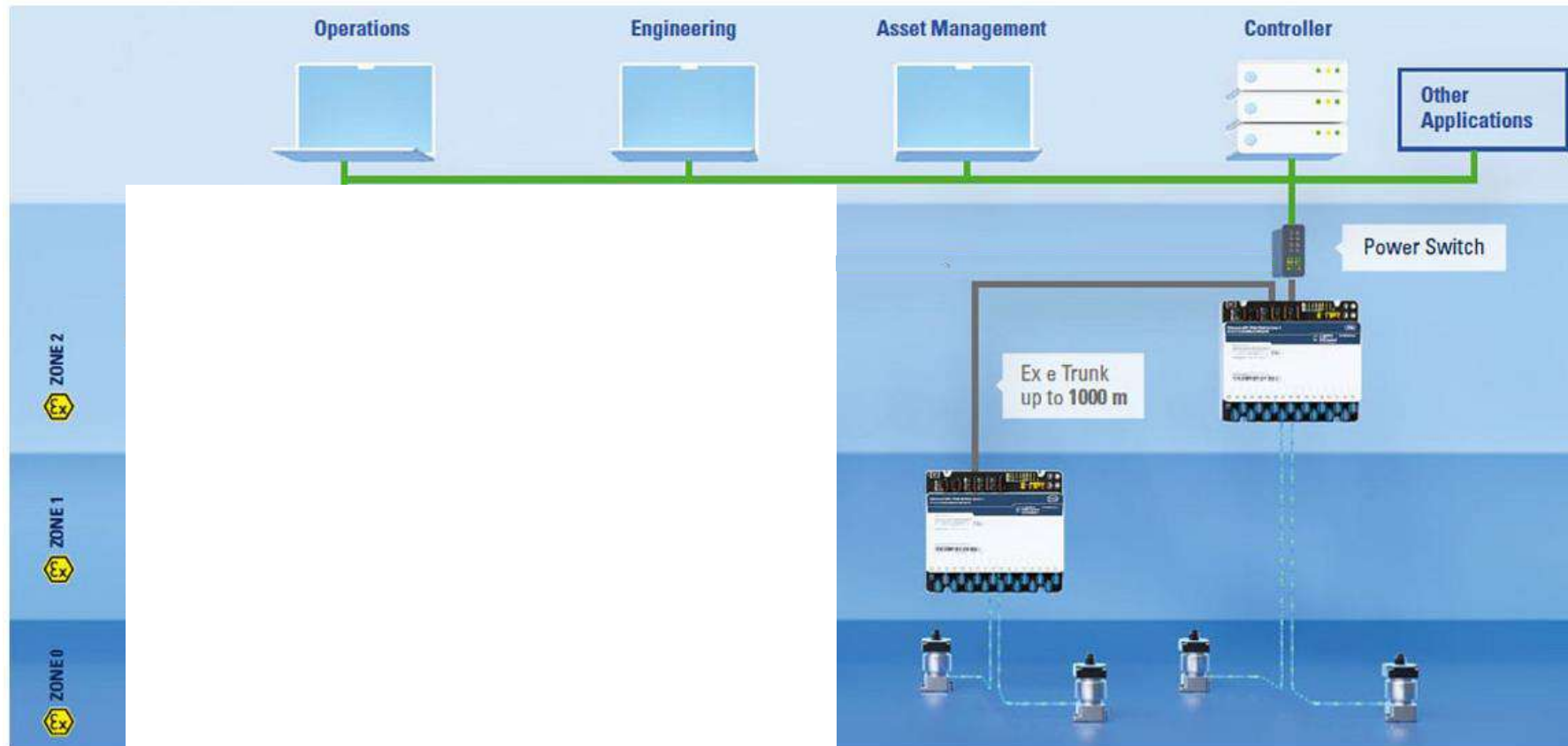
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APL stam en ster topologie (max 1000 m, Zone 1)



Op aanvraag

APL Field Switch

- 100BASE-TX (3 x Exe) Ethernet
- Voeding via power switch (trunk)
- 16 spurs intrinsieke veilig (Ex ia, 2-WISE, FISCO)
- Installatie in veilige omgeving, Zone 2 en Zone 1
- PROFINET PA Proxy (optioneel)



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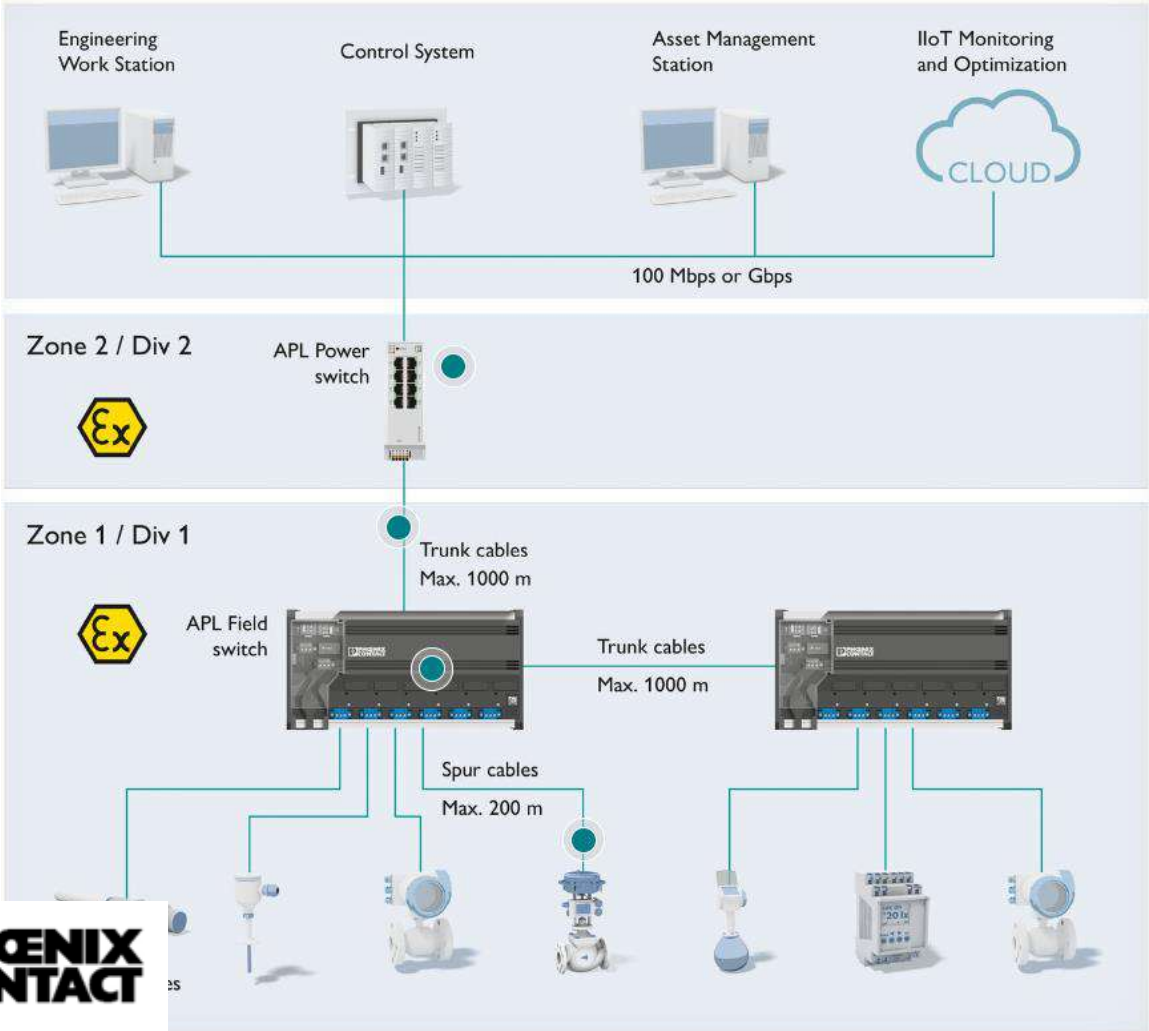
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APL stam en ster topologie (max 1000 m, Zone 1)



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PROFINET APL gecertificeerde instrumenten

The screenshot shows the website interface with a search bar at the top. The main content area displays a list of certified instruments, with the first item, 'PROMAG 300/500 PROFINET', highlighted with a red box. The list includes details such as the product name, description, company (Endress+Hauser), and product types. The left sidebar contains filters for 'Active selection', 'Technology and Profiles' (with 'PA Devices' selected), 'Product Types', and 'Vendor' (set to Endress+Hauser).

Product Name	Description	Company	Product Types
PROMAG 300/500 PROFINET	Electromagnetic flowmeter	Endress+Hauser	Flow
PROMASS 300/500 PROFINET	Coriolis flowmeter	Endress+Hauser	Flow
ITEMP® TMT86	Temperature head transmitter	Endress+Hauser	Temperature
ITEMP® TMT84	Temperature head transmitter (Form B)	Endress+Hauser	Temperature
PROMASS 300/500 PA	Coriolis flowmeter	Endress+Hauser	Flow
PROMAG 300/500 PA	Electromagnetic flowmeter	Endress+Hauser	Flow
PROMAG 300/500 DP	Electromagnetic flowmeter	Endress+Hauser	Flow



Promag 300/500 PROFINET

Classification:

Product name: Promag 300/500 PROFINET

Shortdescription: Electromagnetic flowmeter

Product types: Flow

Technology & Profiles: PROFINET, PA Devices

Certification number: PROFINET Z11922 | Z60005 | Z60006 | PROFINET Z13735

Product Finder - www.profibus.com



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Ethernet APL Status Update



- HOME
- APPLICATION STORIES
- TECH TIPS
- TRAINING / EVENTS
- PRODUCT NEWS
- PI NEWS
- MEMBER NEWS
- REGIONAL NEWS

Ethernet APL Status Update: Q1 2024

March 5, 2024 - PI NEWS - 2 mins read

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State of the Art

Ethernet-APL is done. The specs are written, organizations. To recap: Ethernet-APL is an e for intrinsically safe environments. This is de (2-Wire Intrinsically Safe Ethernet).

Now is the time for products to appear on t transmitters, and flow transmitters are available from Endress+Hauser (E+H). In 2024, 16 new products are expected to be released from: ABB, E+H, Honeywell, Krohne, Samson, Siemens, and Vega. In 2025 another 16 new products are scheduled for release. And those are just the ones from the founding members of the Ethernet APL Group. There are other companies developing Ethernet-APL products as well.

In 2024 worden 16 nieuwe producten verwacht van **ABB, Endress+Hauser, Honeywell, Krohne, Samson, Siemens en Vega**. In 2025 staan er nog eens 16 nieuwe producten op de planning.

- Upcoming IO-Link and PROFINET One-Day Events in USA
- omlox Continues its Ascent and Opens First Test Lab
- Upcoming Certified Engineer Courses



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APL in de praktijk

Cargill Bioindustrial, Gouda





Start-up parameters
(NAMUR NE131)

PROFINET
PA Profile 4.0

‘Door het vroegtijdig testen met Ethernet APL hebben wij de noodzakelijke kennis en ervaring opgedaan en in het bijzonder vertrouwen gekregen in het toepassen van deze nieuwe technologie op onze nieuwe installaties’

‘Door de juiste keuzes te maken in de engineering fase kunnen we PROFINET APL instrumenten eenvoudig uitwisselen zonder enige PLC aanpassing of instrument configuratie’

Robin Deelen
Cargill Bioindustrial, Gouda




Via een geïntegreerde webserver kunnen PROFINET APL instrumenten eenvoudig worden geconfigureerd.

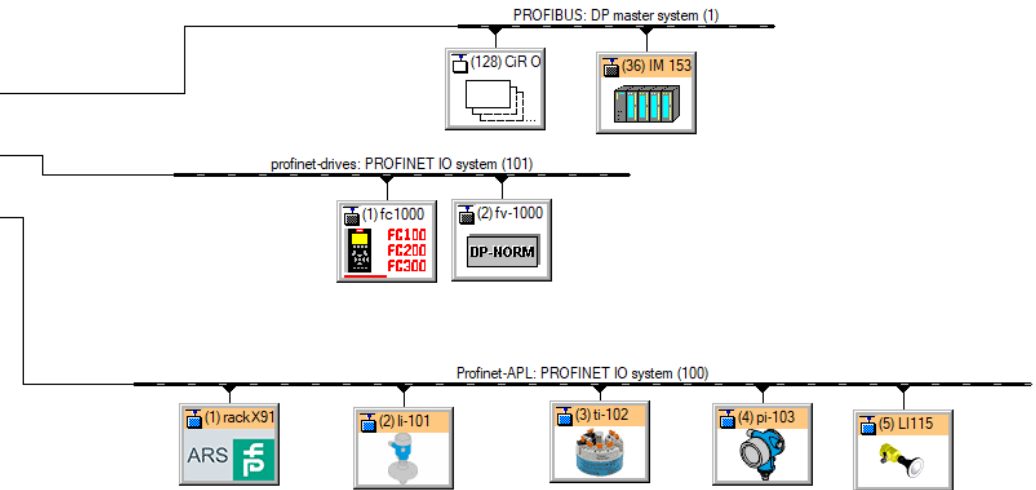
Als er (nog) geen webserver is voorzien dan kan het instrument worden geconfigureerd met een FDI Package (EDD, UIP, Docs) in een FDI host (b.v. FieldCare, PACTware)



Siemens PCS7 V9.1 SP2 UC04



(0) UR2	PS 407 10A
3	CPU 410-5H
Y1	DP
F1	
F2	
V5	PN-IO-X5
V5 P1 R	Port 1
V5 P2 R	Port 2
V8	PN-IO-X8
V8 P1 R	Port 1
V8 P2 R	Port 2
5	CP 443-1
Y1	AS55
Y1 P1 R	Port 1
Y1 P2 R	Port 2



- In Siemens PCS7 V9.1 SP2 UC04 is het **NIET** mogelijk om standaard PROFINET apparaten (100 Mbit/s) te combineren met PROFINET APL instrumenten (10 Mbit/s).
- Discrete signalen (DI/DO) kunnen worden aangesloten op standaard PROFINET remote IO of op PROFINET APL multiple input/output (MIO) modules.





APL in de praktijk
SARPI Veolia Netherlands, Almelo

Automatisering nieuw tanken park



- **Polariteit onafhankelijk**, bij 4-20mA moet je altijd een paar draden omdraaien.
- **Niet méér bekabeling** in vergelijking met conventionele analoge aansluitingen.
- **Instrument parameters** centraal opgeslagen in je project als je geen profielen toepast.
- **Geen barriers meer nodig**, componenten en sensoren goedgekeurd voor toepassing in diverse explosiegevaarlijke zones.
- **Instrumenten kunnen eenvoudig worden gepingd**, snellere diagnose en controle op bereikbaarheid.
- **Directe alarmering** vanuit PROFINET Controller **bij verbreken verbinding**, voor 4-20mA komt hier altijd een stukje storingsanalyse bij kijken.
- **APL switch** biedt optioneel ondersteuning voor **PROFIBUS PA**. In combinatie met **MIO modules** kan letterlijk alles worden ingelezen. (ventieleilanden op APL?)



Terugkoppeling van PROFINET APL in de praktijk



PROFI[®]
NET

PROFI[®]
NET

 **ethernet-apl**[™]
advanced physical layer



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