PA-DIM®

HANNOVER MESSE

**Join us at Hannover Messe 2026**
April 20 – 24, 2026

| | |
|---|---|
| **FCG** | Hall 27 booth D37 |
| **ODVA** | Hall 27 booth E11 |
| **OPCF** | Hall 27 booth F60 |
| **NAMUR** | Hall 27 booth J70 |
| **PI** | Hall 27 booth D37 |
| **VDMA** | Hall 27 booth F58 |
| **ZVEI** | Hall 27 booth J70 |

# Process Automation – Device Information Model (PA-DIM)

Version V02 // April 2026

## Technical Status – Demonstrators – Solutions at Hannover Messe 2026


**PA-DIM @ Hannover Messe**
**Germany**
**April 20 – 24, 2026**

# WELCOME

## PA-DIM®

**Frank Fengler, ABB,**
**Chair of PA-DIM working group**

### WELCOME

PA-DIM is a groundbreaking specification that revolutionizes interoperability with standardized device parameters—and it's simpler than you might think. Whether you're a manufacturer, a system integrator, or an end user, PA-DIM empowers you to unlock the full potential of your field devices through a straightforward identification approach.

### PA-DIM MADE SIMPLE: UNDERSTANDING THE CORE IDENTIFIERS

At the heart of PA-DIM lies a practical three-level identification system designed to align with how process automation plants actually operate:

1. **ProductInstanceUri – The Device's Global Identity, also called ID Link or ILString according 61406**
   Every device delivered by a manufacturer comes with a **ProductInstanceUri,** a globally unique identifier defined by the vendor. Think of it as the device's "birth certificate" – a read-only string that uniquely identifies the physical component worldwide. This identifier is often stamped on the device as a QR code, making it easily accessible for scanning and verification

2. **AssetID – Flexible Device Identification**
   The **AssetID** is a user-writable alphanumeric sequence that uniquely identifies a device within your plant. Here's where PA-DIM's simplicity shines: the **ProductInstanceUri can serve as the default value for AssetID.** Since it's already globally unique, plant owners typically have no need to change it. However, if your organization has specific asset management requirements, you retain the flexibility to assign your own AssetID

3. **SignalTag – Identifying Measuring and Control Points**
   In process automation plants, operators don't just work with devices – they work with specific **measuring and control points.** This is where **SignalTag** comes in. A SignalTag is a user-writable alphanumeric sequence that uniquely identifies each signal within your plant, following established practices from standards like ANSI/ISA-5.1 for instrumentation identification. A single device can have multiple signals. For example, a temperature transmitter might provide primary temperature, secondary temperature, and diagnostic signals – each identified by its own SignalTag (e.g., TT-101, TT-102). This approach aligns perfectly with how P&IDs (Piping and Instrumentation Diagrams) are already structured in process plants, where tags like FT (Flow Transmitter), PT (Pressure Transmitter), and LT (Level Transmitter) are standard practice.

### WHY THIS MATTERS FOR PROCESS AUTOMATION

PA-DIM aims to replicate field devices across hosts, cloud platforms, and analytic applications using a common information model. By doing so, it maximizes the value of data from diverse field devices—regardless of their types, brands, or communication protocols.

**The beauty of this approach is its practicality:**

- **Manufacturers** provide the ProductInstanceUri – no additional work required
- **Plant owners** can use it as-is for AssetID, avoiding unnecessary reconfiguration
- **Operators** continue using familiar SignalTags to identify their measuring and control points
- **All parameters** are semantically defined in IEC 61987 CDD with unique IRDIs, ensuring unambiguous machine-to-machine communication

### A COLLABORATIVE INDUSTRY ACHIEVEMENT

PA-DIM didn't emerge overnight; it's the result of years of concerted effort by industry leaders. FieldComm Group, OPC Foundation, and NAMUR started the collaboration – today it's co-owned by FieldComm Group, ISA100 WCI, NAMUR, ODVA, PROFIBUS & PROFINET International, VDMA, and ZVEI.
PA-DIM aligns with existing standards, such as OPC UA device specifications and FDI (Field Device Integration), to ensure seamless interoperability. PI, as the host organization for NOA (NAMUR Open Architecture), works closely together with NAMUR and ZVEI leveraging the expertise of the three associations, and PA-DIM is the current implementation for the NOA Information Model.

### JOIN THE PA-DIM REVOLUTION AT HANNOVER MESSE!

PA-DIM isn't just an acronym; it's a game-changer that makes digital transformation accessible and practical. As we move forward, let's embrace this standardized yet flexible approach to process automation devices. Together, we'll enhance efficiency, reduce integration headaches, and pave the way for a more connected industrial landscape.
Welcome to PA-DIM – where simplicity meets standardization, and data speaks a universal language!

Regards,
**Frank Fengler**
Head of Cyber Security & Connectivity for Measurement & Analytics, ABB, frank.fengler@de.abb.com



# CONTENTS

# Overview of the PA-DIM (Process Automation Device Information Model)

PA-DIM is a collaborative effort between FieldComm Group, ISA100, NAMUR, ODVA, OPC Foundation, PROFIBUS & PROFINET International, VDMA and ZVEI

**This specification is co-owned by the associations:**

It serves as a common language for describing device data, regardless of the protocol, type of device, or manufacturer. Here are the key points about PA-DIM:

**1. PURPOSE AND SCOPE:**

- PA-DIM defines the OPC UA Information Model to represent and access Process Automation Devices.
- It provides a structured hierarchy for standardized data access for devices, ensuring consistency across different devices and protocols.
- The scope of the joint working group is to enhance the OPC UA for Devices (DI) companion specification.

**2. SEMANTIC IDENTIFICATION:**

- One of the primary benefits of PA-DIM is its ability to map protocol-specific parameters to globally standardized terms.
- PA-DIM is a **manufacturer-independent Information Model** that defines a structured hierarchy for data access.
- Devices (assets) have a set of signals (functions), such as process variables, which are based on the **OPC UA for Devices (DI).**
- PA-DIM reuses interfaces like **IVendor and ITagNameplate,** as well as **IDeviceHealth** from the DI model.
- Additionally, PA-DIM introduces the **IAdministration** and **ISignalSet** interfaces, making it reusable by other Information Models.
- All parameters are defined in **IEC 61987 CDD** with a **Semantic ID (IRDI),** ensuring easy reuse across different software tools and protocols.

**3. SIGNAL VARIABLES AND TYPES:**

- The **SignalVariableType** is an extension of **OPC UA Part 8: Data Access** and describes both analog and discrete variables, including their simulation.
- This variable can be used at any object, even from other Information Models.
- The **PA-DIM SignalType Object** builds upon the SignalVariableType and adds specific methods like **ZeroPointAdjustment** or **AutoAdjustPositioner.**

**4. SIMPLIFIED DATA ACCESS:**

- PA-DIM provides a **manufacturer-independent, sorted,** and **structured hierarchy** for accessing device data.
- Prioritized mapping ensures consistency across different devices and protocols.





# Modelling Principles and Specification Criteria

The following criteria describe best practices and formal requirements for designing OPC UA information models and Companion Specifications based on PA-DIM, ensuring semantic consistency, interoperability, and specification conformance and may serve as a foundational enabler for NAMUR Open Architecture (NOA) when embedded into an appropriate system and security concept.

**1. USE EXISTING PARAMETERS/TYPES FROM PA-DIM:**

- Leverage the existing parameter types defined in the PA-DIM model.
- These standardized parameters ensure consistency and interoperability across different devices and protocols.

**2. PROVIDE NEW PARAMETERS WITH DEFINITIONS IN IEC CDD (IRDI):**

- Introduce new parameters specific to your use case or device type.
- Define these parameters in the IEC CDD (International Electrotechnical Commission Common Data Dictionary) using unique IRDIs (International Registration Data Identifiers).

**3. PA-DIM INTERFACES:**

- Utilize the following PA-DIM interfaces:
  - **VendorNameplate Interface:** Provides consistent vendor-related information.
  - **TagNameplate Interface:** Focuses on tag-related details for identification.
  - **DeviceHealth Interface:** Includes diagnostic information for device health monitoring.
  - **AdministrationType Interface:** Handles administrative aspects of the device.
  - **SignalSet Interface:** Defines the set of signals (process variables) associated with the device.

**4. PROFILES, FACETS & CONFORMANCE UNITS:**

- Ensure that your implementation adheres to granular conformance units and facets as specified on profiles.opcfoundation.org.
- These conformance units and facets define the specific features and capabilities supported by your device.

**5. GENERAL COMPANION SPECIFICATION TOPICS:**

- Fulfill important topics outlined in the general Companion Specification.
- These topics may cover security, communication protocols, and interoperability guidelines.

**6. OPC UA COMPANION SPECIFICATIONS TEMPLATE:**

- Use the latest version of the OPC UA Companion Specifications Template.
- Follow template's guidelines for structuring and documenting your device information model.

**7. FULFILL UA MODELING BEST PRACTICES:**

- Adhere to OPC UA modeling best practices.
- Ensure consistency, clarity, and semantic correctness in your model.

By following these criteria, a PA-DIM-conformant and interoperable OPC UA information model can be achieved, providing a solid foundation for integration into NOA-aligned architectures.

## Conformance & Certification

The organizations are working together to establish a conformance and certification process.

PA-DIM in OPC UA can be validated with the OPC Foundation CTT tool already.

# USE CASES

## NOA (PA-DIM®) Use Cases

**Device Health/ Remote Diagnostics** NOA

Monitoring of the device health, including status, possible cause and further details.

**Device Lifecycle/ Storage** NOA

Storing of NOA device parameters, including their history.

**Dimensioning design check** NOA

Monitoring devices over time for their operating range and verify, if their dimensioning is appropriate (e.g. not over dimensioned).

**Unique Identification** NOA

Identifying a device, including Manufacturer, Model, Serial Number, Hardware and Software Revision, Product Code and AssetID (Tag for Device).

**Automated as Built** NOA

Verifying that the installed devices and their configurations match with the engineered devices and configurations.

**Multivariable Read** NOA

Reading the process variables from multivariable devices.

## PA-DIM® Process Instruments

### OVERVIEW:

- **PA-DIM® 1.0** focuses on process instrumentation devices, including pressure (P), differential pressure (DP), temperature (T), flow (F), level (L), and valve postioner.
- The primary goal is to standardize a basic set of device information for various purposes.

### KEY FEATURES:

- **Identification:** PA-DIM® provides consistent methods for identifying devices across different protocols.
- **Diagnosis:** It includes diagnostic information for preventive maintenance.
- **Process Variables:** Standardized access to process variables.
- **Core Parameters:** Basic parameters relevant to process instrumentation.
- **NAMUR Open Architecture Requirements:** PA-DIM aligns with NAMUR recommendations for open architecture.

### PARAMETER STANDARDIZATION:

- PA-DIM defines approximately 50 standardized parameters relevant to process instrumentation devices.

### TIMELINE:

- **Started in 2017:**
  The collaborative effort began.
- **Release in 2020:**
  The first version of PA-DIM was officially released.



# MILESTONES

## PA-DIM® Process Analysers

### HIGH-LEVEL GOALS:

- **Process Analyser:** Focuses on collecting standardized “vital” data for preventive maintenance.
- **Secure Data Transmission:** Ensures secure data transmission using a standardized communication system.

### USE CASES AND REQUIREMENTS:

- **NAMUR/ZVEI AK Process Analyser:**
  - **Part of PA-DIM 1.01**
    **(● green bullets in Figure 1):**
    TOC (Total Organic Carbon), CGA (Common Gas Analyser), and pH measurements.
  - **Part of PA-DIM 1.02**
    **(● blue bullets in Figure 1):**
    PGC (Process Gas Chromatographs), gas detectors, and spectrometers
  - **Next Phase**
    **(● orange bullets in Figure 1):**
    Expands to include Titrator, Optical photometer Ultrasonic Analyser, Refractometer.
- **GeneralDeviceConditionSet**
  including service performance parameters e.g., ResidualLife, OperationDuration, PowerOnDuration, OperationCycleCounter

### PARAMETER STANDARDIZATION:

- PA-DIM™ 1.01 introduces approximately **80 additional parameter** specifically for process analysers.
- PA-DIM™ 1.02 introduces approximately **50 additional parameter** specifically for process analysers.

### TIMELINE:

- **PA-DIM™ 1.01**
  started in 2020
  release in 2023
- **PA-DIM™ 1.02**
  started in 2023
  release in 2026

### CHARACTERISATION OF PROCESS ANALYSER

The area of process analysers is divided into a range of sub-areas.
The names of the sub-areas are shown in Figure 1.
All definitions of parameter are within https://cdd.iec.ch

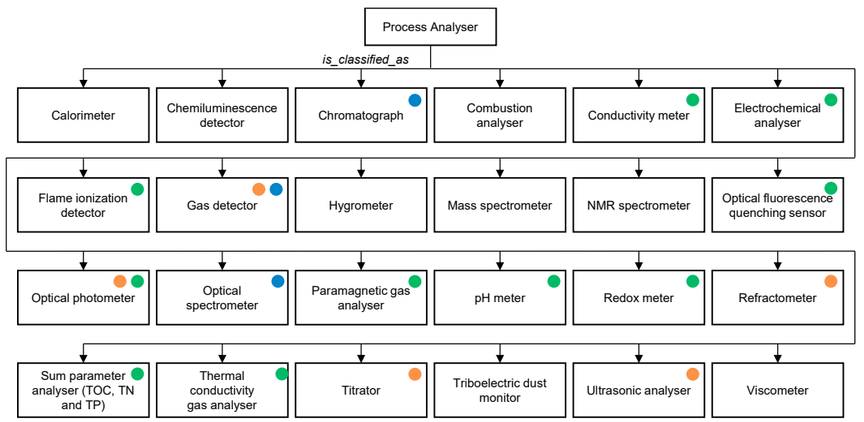
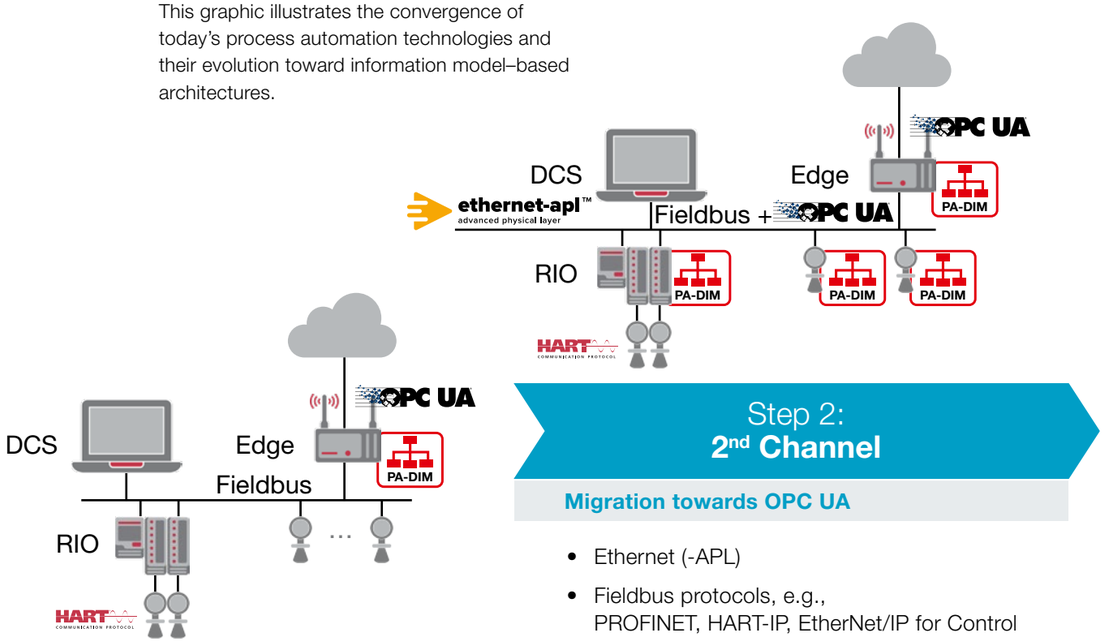



Figure 1 – Characterization of process analyser IEC 61987-41 ED1; green bullets phase 1, blue bullets next phase

# PA-DIM® supports Convergence towards IIOT enabled Automation

This graphic illustrates the convergence of today's process automation technologies and their evolution toward information model–based architectures.




## Step 1: Traditional Fieldbus

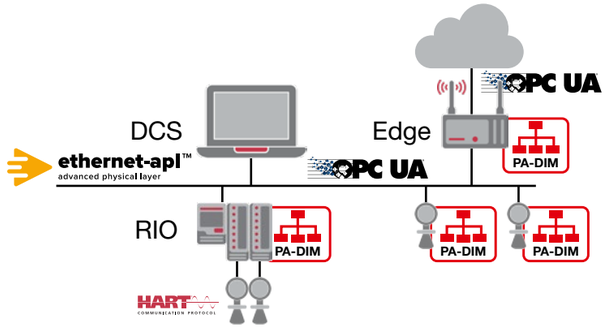
**Brownfield/Greenfield**

- Fieldbus protocols, e.g., PROFIBUS
- OPC UA and PA-DIM on Edge
- Mapping from existing fieldbuses to PA-DIM

## Step 2: 2nd Channel

**Migration towards OPC UA**

- Ethernet (-APL)
- Fieldbus protocols, e.g., PROFINET, HART-IP, EtherNet/IP for Control
- OPC UA and PA-DIM as "2nd channel" for M+O on device level




## Step 3: Native OPC UA → FUTURE

**Seamless information flow**

- Ethernet (-APL)
- OPC UA as single protocol for Control and M+O
- PA-DIM on device level

The table defines the mandatory PA-DIM parameters for NAMUR Open Architecture (NOA) use cases. Each parameter is uniquely identified by IRDIs from the IEC CDD, enabling mapping to other protocols. It covers device identification (manufacturer, model, serial number), versioning (hardware/software revisions), unique identifiers (e.g., Instance URI, Asset ID), and diagnostics. This standardized structure ensures consistent lifecycle tracking and supports interoperability across systems and manufacturers.

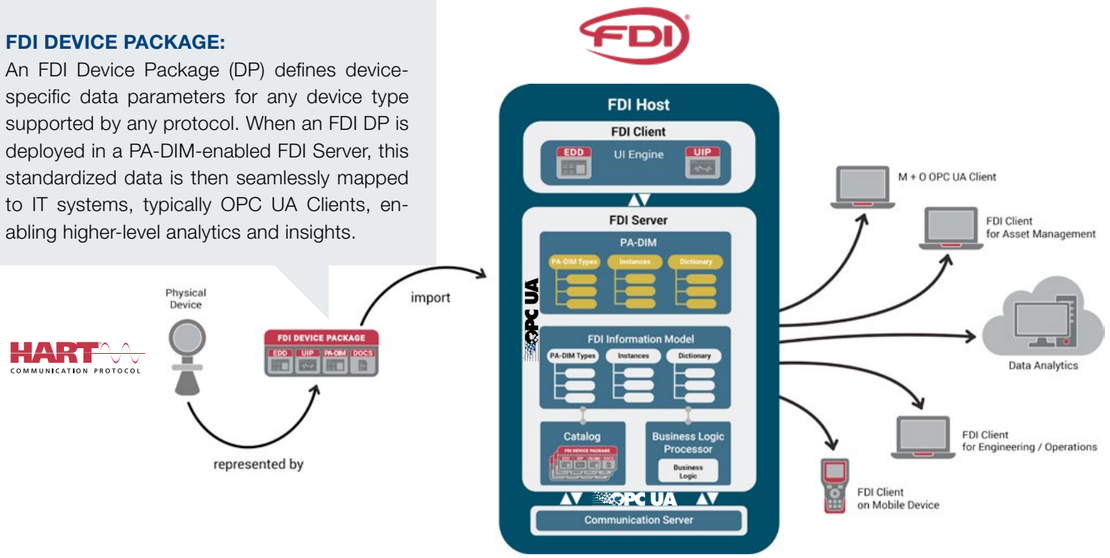
| CDD IRDI | CDD Short name | CDD Definition | Unique Identification | Automated as built | Device Health | Life Cycle | Dimensioning | Multi Variable | Condition Monitoring |
|---|---|---|---|---|---|---|---|---|---|
| 0112/2///61360_7#CBA031 | Manufac-turer | designation of the entity, company or organization responsible for the manufacturing of the product | • | • | – | • | • | – | – |
| 0112/2///61360_7#CBA032 | Manufac-turer URI | fully qualified domain name of the manufacturer of a product using a uniform resource identifier (URI) | • | • | – | • | • | – | – |
| 0112/2///61360_7#CBA039 | Model | third level of a product description hierarchy as defined by the manufacturer, being the article or product designation under which the article or product is marketed | • | • | – | • | • | – | – |
| 0112/2///61360_7#CBA050 | Serial number | unique combination of numbers and letters used to identify the instance of a device or entity once it has been manufactured | • | • | – | • | • | – | – |
| 0112/2///61360_7#CBA046 | Software revision | version of the software used by the product | • | • | – | • | • | – | – |
| 0112/2///61360_7#CBA047 | Hardware revision | version of the hardware of the product | • | • | – | • | • | – | – |
| 0112/2///61360_7#CBA040 | Code | combination of numbers and letters used to identify the type of product (product type) | • | • | – | • | • | – | – |
| 0112/2///61987#ABN972 | Diagnostic status | properties characterizing device diagnostic function states | – | – | • | – | – | – | – |
| 0112/2///61360_7#CBA055 | instance URI | unique global identification of the product (physical instance) using a uniform resource identifier (URI) | • | • | – | • | • | – | – |
| 0112/2///61987#ABA038 | Asset ID | customer defined alphanumeric character sequence uniquely identifying a device | – | • | • | • | – | • | – |
| 0112/2///61987#ABN603 | Rev. Counter | value of the counter totalizing the storing of the parameter set of a device | – | – | – | • | – | – | – |
| 0112/2///61987#ABB271 | Tag | alphanumeric character sequence uniquely identifying a measuring or control point | – | • | – | • | • | • | – |
| 0112/2///61987#ABN634 | Value | parameter indicating the input or output value of a device using the units of measure of the process variable | – | – | – | – | – | – | • |
| 0112/2///61987#ABA968 | Unit | short name of the standardized engineering unit associated with a variable, display, scale, graduation or any other means of indicating a value | – | • | – | • | • | • | – |

## PA-DIM® HART mapping by FieldComm Group

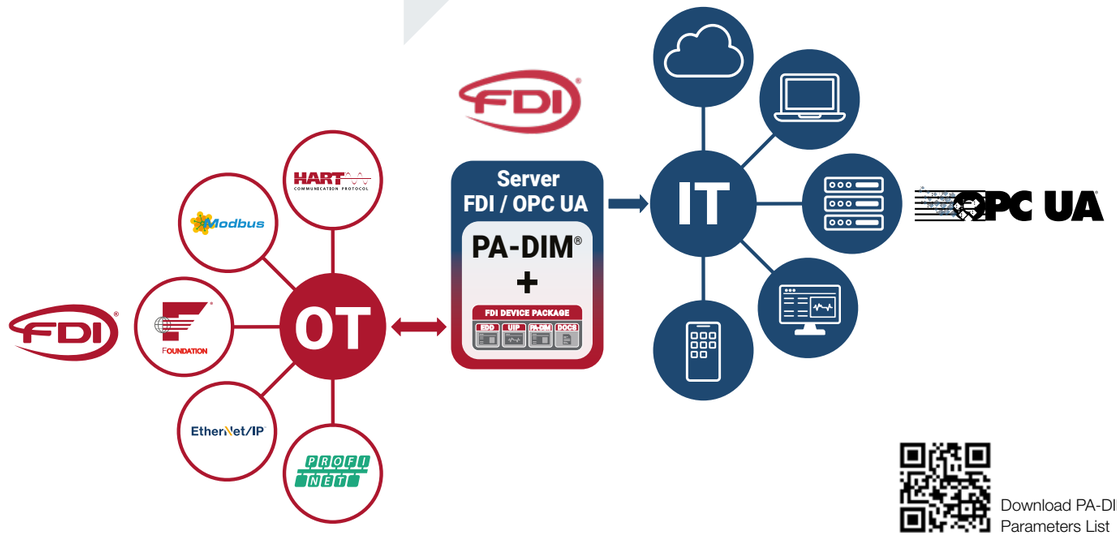
HART remains the most widely deployed protocol in the industry today, with more than 50 million devices installed and operating worldwide. For brownfield environments, the NOA 2nd channel architecture, combined with PA-DIM data mapping for HART, provides a powerful pathway to unlock contextualize device information so it can be easily delivered to enterprise systems in support of modern digital transformation initiatives. Combining PA-DIM with FDI provides a protocol-independent, future-proof foundation for secure integration, with standardized, semantically rich, read-only access to device data for confident monitoring and optimization.

**WHAT IS FDI?**
Field Device Integration (FDI) is a device to host (DCS, PLC, IAMS, engineering application) integration standard providing a unified environment for intelligent device and lifecycle management. PA-DIM is deployed within the FDI Server hosting environment. Together, they harmonize data, enabling critical information to reach OT and IT applications.

**FDI DEVICE PACKAGE:**
An FDI Device Package (DP) defines device-specific data parameters for any device type supported by any protocol. When an FDI DP is deployed in a PA-DIM-enabled FDI Server, this standardized data is then seamlessly mapped to IT systems, typically OPC UA Clients, enabling higher-level analytics and insights.




**FDI + PA-DIM: WHERE INDUSTRIAL IT/OT DATA BECOMES INTELLIGENCE**
PA-DIM and FDI are not limited to HART-based technologies. Because both are protocol-agnostic, they enable seamless integration of any protocol-enabled devices, allowing data to flow effortlessly to OPC UA clients, IT applications, or custom dashboards, supporting a wide range of NOA use cases.




Download PA-DIM Parameters List

| Category | Name | Modelling Rule | CDD IRDI | HART Parameters |
|---|---|---|---|---|
| PADIMType | Manufacturer | M | 0112/2///61360_7#CBA031 | manufacturer_id |
| PADIMType | ManufacturerUri | M | 0112/2///61360_7#CBA032 | locManufacturerUri |
| PADIMType | Model | M | 0112/2///61360_7#CBA039 | device_type |
| PADIMType | SerialNumber | M | 0112/2///61360_7#CBA050 | locSerialNumber |
| PADIMType | SoftwareRevision | M | 0112/2///61360_7#CBA046 | locSoftwareRevision |
| PADIMType | HardwareRevision | M | 0112/2///61360_7#CBA047 | locHardwareRevision |
| PADIMType | ProductCode | M | 0112/2///61360_7#CBA040 | locProductCode |
| PADIMType | DeviceHealth | M | 0112/2///61987#ABN972 | methGetDeviceHealth |
| PADIMType | ProductInstanceUri | M | 0112/2///61360_7#CBA055 | methProductInstanceUri |
| PADIMType | AssetId | M | 0112/2///61987#ABA038 | Use Product Instance URI |
| PADIMType | RevisionCounter | M | 0112/2///61987#ABN603 | config_change_counter |
| AnalogSignalType | SignalTag | M | 0112/2///61987#ABB271 | Tag Name for Primary Measurement |
| AnalogSignalType | AnalogSignal | M | 0112/2///61987#ABN634 | DIGITAL_VALUE |
| AnalogSignalType | EngineeringUnits | M | 0112/2///61987#ABA968 | DIGITAL_UNITS |

# PA-DIM® EtherNet/IP mapping by ODVA

**VISIT ODVA AT HANNOVER MESSE IN HALL 27, STAND E11 TO LEARN ABOUT PA-DIM® IN PROCESS AUTOMATION**

ODVA is collaborating with major standards development and end user organizations serving the process automation industry regarding the Process Automation Device Information Model (PA-DIM) specification. ODVA is pleased to support PA-DIM to enable greater information standardization within process automation, which will allow for more seamless data analysis and prognostics. End users of EtherNet/IP networks can leverage full PA-DIM support to transfer data from all defined process device profiles, i.e., flow, level, temperature, and pressure, from the field to the cloud, improving data standardization across networks. All EtherNet/IP process devices are conformance tested to ensure full PA-DIM support.

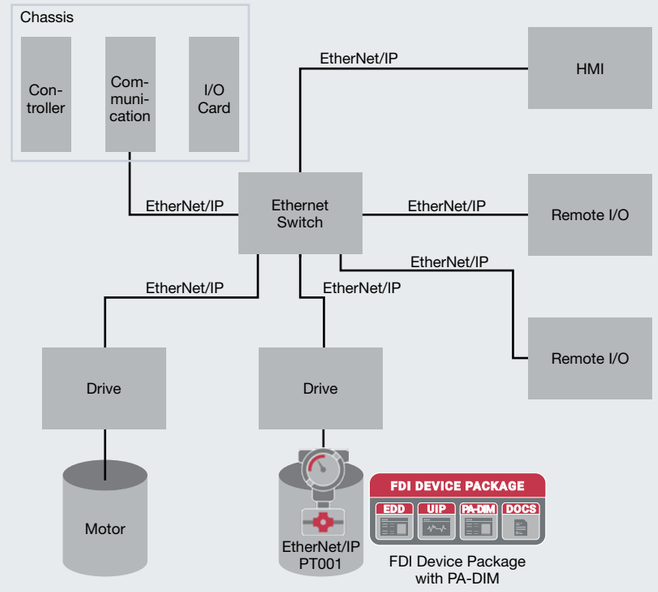
The data mapping to PA-DIM from the Common Industrial Protocol (CIP), which provides a common, object-oriented data organization and messaging structure for EtherNet/IP, is straightforward thanks to the flexibility of CIP. Additionally, PA-DIM over EtherNet/IP runs transparently along with the CIP Security network extension. CIP Security enables device identity management, secure communication protocols, and vulnerability mitigation, which can support EU Cyber Resiliency Act compliance.

PA-DIM is a specification that allows for protocol agnostic communication of common process automation instrument parameters, including semantic IDs as defined by IEC 61987, using OPC UA information modeling techniques. Eliminating automation protocol dependencies simplifies the integration of IT and OT systems. Including semantic device information enables unambiguous machine to-machine (M2M) communication. Fieldbus-specific implementations are converted into the address space of the PA-DIM Information Model. Products using PA-DIM can easily support the NAMUR Open Architecture (NOA) use cases including automated as built, unique identification, device dimensioning, multivariable possibility check, read multivariable process values, device life cycle backup, health monitoring, and diagnosis.

**To learn more, visit** www.odva.org/pa-dim.
**For further information,** representatives from ODVA are available for inquiries in Hall 27, Stand E11.

**Visit ODVA online at odva.org**

| Category | Name | Modelling Rule | CDD IRDI | Mapping | | | |
|---|---|---|---|---|---|---|---|
| | | | | EtherNet/IP Object | Instance | Attribute ID | Attribute Name |
| PADIMType | Manufacturer | M | 0112/2///61360_7#CBA031 | Identity | 1 | 31 | Vendor Name |
| PADIMType | ManufacturerUri | M | 0112/2///61360_7#CBA032 | Identity | 1 | 32 | Vendor URI |
| PADIMType | Model | M | 0112/2///61360_7#CBA039 | Identity | 1 | 7 | Product Name |
| PADIMType | SerialNumber | M | 0112/2///61360_7#CBA050 | Identity | 1 | 6 | Serial Number |
| PADIMType | SoftwareRevision | M | 0112/2///61360_7#CBA046 | Identity | 1 | 4 | Revision |
| PADIMType | HardwareRevision | M | 0112/2///61360_7#CBA047 | Identity | 1 | 37 | Hardware Revision |
| PADIMType | ProductCode | M | 0112/2///61360_7#CBA040 | Identity | 1 | 21 | Catalog Number |
| PADIMType | DeviceHealth | M | 0112/2///61987#ABN972 | Process Device Diagnostics | 0 | 9 | Global Status |
| PADIMType | ProductInstanceUri | M | 0112/2///61360_7#CBA055 | Identity | 1 | 32 and 6 | Vendor URI and Serial Number |
| PADIMType | AssetId | M | 0112/2///61987#ABA038 | Identity | 1 | 15 | Assigned_Name |
| PADIMType | RevisionCounter | M | 0112/2///61987#ABN603 | Identity | 1 | 33 | Configuration Counter |
| AnalogSignalType | SignalTag | M | 0112/2///61987#ABB271 | Process Measurement Value | 1 | 2 | Name |
| AnalogSignalType | AnalogSignal | M | 0112/2///61987#ABN634 | Process Measurement Value | 1 | 4 | Value |
| AnalogSignalType | EngineeringUnits | M | 0112/2///61987#ABA968 | Process Measurement Value | 1 | 3 | Value Engineering Units |



# PROFINET TO PA-DIM

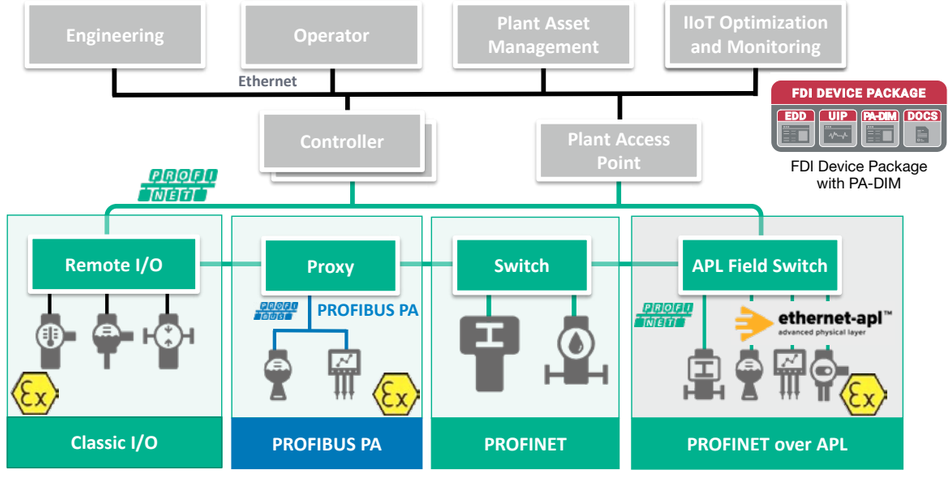
## PA-DIM® PROFIBUS/PROFINET mapping by PI

PROFINET offers a powerful and flexible platform enabling companies to make their production processes more efficient, secure and sustainable. PROFINET integrates seamlessly into existing networks while offering end-to-end communication from the field level to the control level. It supports real-time communication, highly available systems and robust data security, making it the ideal solution for modern industrial applications. Our goal at PI is to drive the continuous development of PROFINET to meet the growing demands of digital transformation and support vertical integration by PA-DIM.

The PA profile, an application profile for PROFINET and PROFIBUS devices used in process automation, provides the link from the PA-DIM server to field instruments, such as temperature, pressure, level and flow sensors or valves and positioners. Thanks to PROFINET over APL, those can be even installed in hazardous areas. The PA-Profile comes with a generic and vendor independent device driver (FDI package), which provides the mapping between PROFINET and PA-DIM without a single manual copy and translate functions required.

PA-DIM and FDI complement PROFINET over APL with its PA-Profile and PROFIsafe, providing a complete Ethernet-APL solution that securely transports digital data from the field level to the cloud, with defined semantics. This enables the analysis of information for operational optimization, diagnostics, asset management, valuable data-driven insights and other use cases.

PROFINET and PA-DIM are shaping the future of industrial communication – for networked, intelligent and sustainable production.




PROFINET – Platform for Advanced Process Automation

**Interested in learning more about PA-DIM as an important part of PI's PROFINET over APL solution?**
Please contact representatives from the PI organization at our **HMI booth D37 in hall 27,** visit our website at www.profibus.com/pa-dim, or read our PA white paper "PROFINET – The Solution Platform for Process Automation".

**For further information, representatives from PI/PNO are available for inquiries.**

**CONTACT:**
PROFIBUS Nutzerorganisation e.V.
info@profinet.com
https://www.profinet.com/

| Category | Name | Modelling Rule | CDD IRDI | Mapping<br>PROFINET + PA-Profile |
|---|---|---|---|---|
| PADIMType | Manufacturer | M | 0112/2///61360_7#CBA031 | PB – DEVICE_Man_ID |
| PADIMType | ManufacturerUri | M | 0112/2///61360_7#CBA032 | PB – DEVICE_Man_ID |
| PADIMType | Model | M | 0112/2///61360_7#CBA039 | PB – DeviceType |
| PADIMType | SerialNumber | M | 0112/2///61360_7#CBA050 | PB – IM_Serial_Number |
| PADIMType | SoftwareRevision | M | 0112/2///61360_7#CBA046 | PB – SOFTWARE_REVISION |
| PADIMType | HardwareRevision | M | 0112/2///61360_7#CBA047 | PB – HARDWARE_REVISION |
| PADIMType | ProductCode | M | 0112/2///61360_7#CBA040 | PB – OrderID |
| PADIMType | DeviceHealth | M | 0112/2///61987#ABN972 | PB – NE107_STATUS |
| PADIMType | ProductInstanceUri | M | 0112/2///61360_7#CBA055 | I&M – 7 |
| PADIMType | AssetId | M | 0112/2///61987#ABA038 | PB – IM_Tag_Location |
| PADIMType | RevisionCounter | M | 0112/2///61987#ABN603 | PB – IM_Revision_Counter |
| AnalogSignalType | SignalTag | M | 0112/2///61987#ABB271 | AI – IM_Tag_Function |
| AnalogSignalType | AnalogSignal | M | 0112/2///61987#ABN634 | AI – <Process value> |
| AnalogSignalType | EngineeringUnits | M | 0112/2///61987#ABA968 | AI – <Process value>_UNITS |

# PA-DIM® OPC UA mapping by OPCF

### OPC UA MAPPING – ENABLING SEMANTIC INTEROPERABILITY WITH PA-DIM

OPC UA plays a central role in enabling the full potential of PA-DIM by providing the standardized communication and information modelling framework required for seamless interoperability across industrial systems. While PA-DIM defines what information should be represented, OPC UA defines how this information is structured, accessed, and exchanged in a secure way.

PA-DIM establishes a common, vendor-independent semantic for process automation – scaling from field devices to control systems and up to IT and cloud applications. This shared information model is a key industry milestone, enabling consistent understanding of data across all levels.

OPC UA brings this semantic to life by providing the standardized framework to transport, secure and expose it. When using legacy protocols (e.g. HART, EtherNet/IP, PROFINET), OPC UA is acting as the bridge between OT and IT, OPC UA connects devices, systems, and applications into upper layers—enabling seamless, end-to-end data flow from sensor to cloud.

### TWO INTEGRATION PATHS – BRIDGING TODAY AND TOMORROW

The combination of PA-DIM and OPC UA enables a continuous and standardized information flow across all automation layers. In practice, two complementary integration paths exist, reflecting both today's installed base and future architectures.

### 1 INTEGRATION VIA FDI FOR EXISTING FIELDBUS SYSTEMS

Established fieldbus technologies such as EtherNet/IP, PROFINET, and HART remain widely deployed in process automation. Their device data is mapped to the standardized PA-DIM information model and, using FDI, exposed via OPC UA.

This enables existing brownfield installations to integrate seamlessly into modern, information model-based architectures – without changes to the underlying fieldbus communication.

### 2 NATIVE OPC UA DEVICES WITH EMBEDDED PA-DIM

In parallel, a new generation of field devices is emerging that supports OPC UA natively. These devices implement the PA-DIM information model directly within the asset. As a result, they can expose semantically structured, standardized data without the need for protocol mapping or gateways. This reduces system complexity, eliminates transformation layers, and enables direct, end-to-end interoperability from the field to higher-level systems.




### SEMANTIC DATA AS THE KEY TO INTEROPERABILITY

A key advantage of OPC UA is its support for semantic information models. PA-DIM leverages this capability by defining standardized device parameters based on IEC 61987 with unique semantic identifiers (IRDIs). This ensures that data is not only exchanged, but also consistently understood across systems.

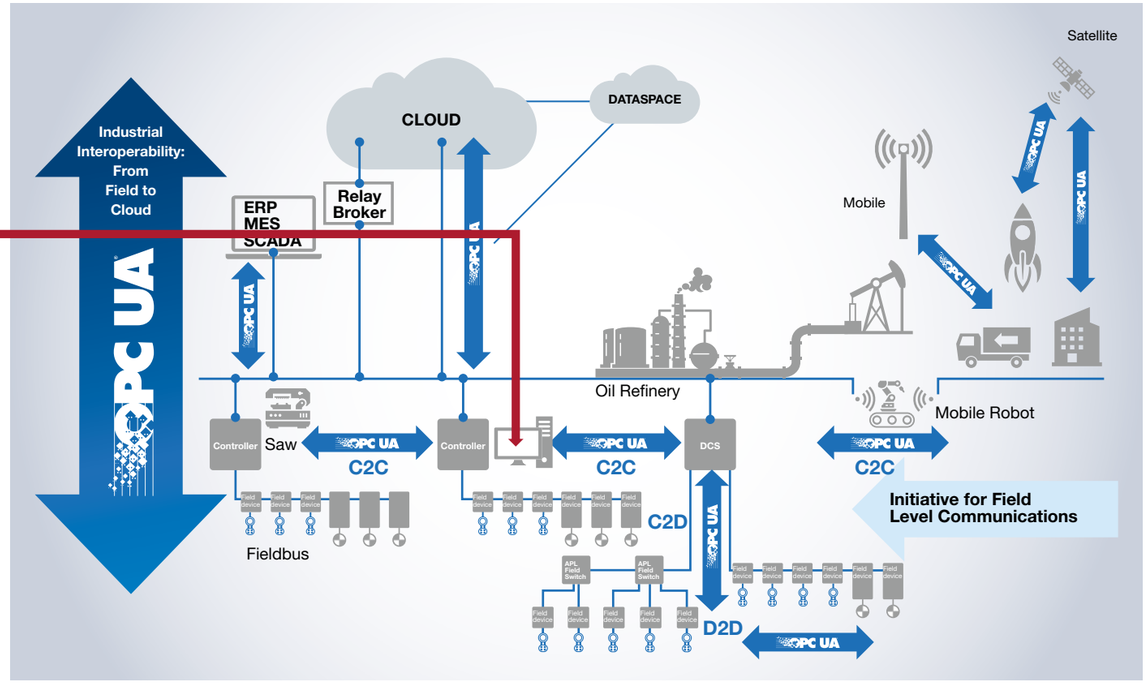
PA-DIM and OPC UA enable self-describing, semantically consistent data across systems. This allows not only machine-to-machine communication, but also seamless integration from OT to IT– without vendor-specific dependencies. It also creates the foundation for advanced analytics and AI by providing structured, context-rich data.

### FUTURE-PROOF ARCHITECTURE

Together, PA-DIM and OPC UA establish a future-proof architecture supporting both brownfield integration and native OPC UA devices. PA-DIM can be added as an information layer or embedded directly into next-generation field assets – enabling scalable, AI-ready data flows from field to cloud.

### CONCLUSION

OPC UA is the enabler that brings PA-DIM to life. Together, they provide a standardized, semantic, and scalable approach to industrial interoperability – bridging legacy systems and future-ready devices, and enabling the next generation of data-driven process automation.



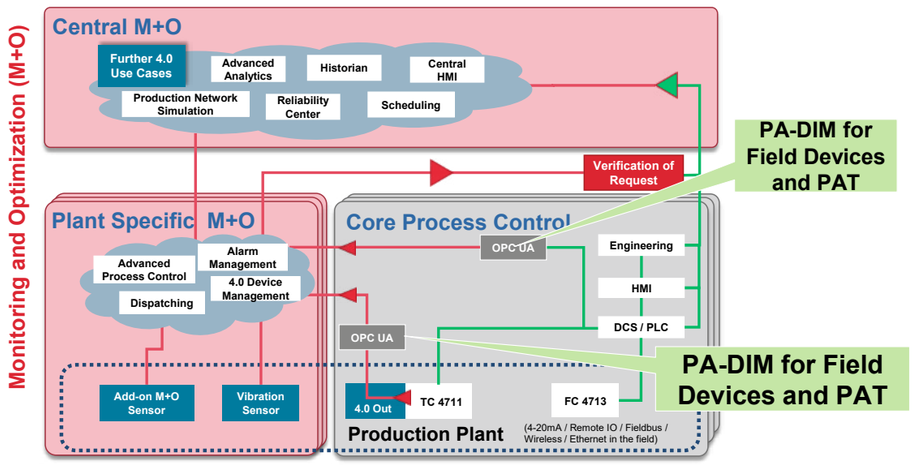

OPC UA Use Cases

# PA-DIM® NAMUR/ZVEI

The NAMUR Open Architecture (NOA), set in motion by NAMUR, PROFIBUS & PROFINET International and ZVEI, provides a robust and future-ready framework for secure data extraction from the OT domain and controlled, verified feedback of information—while safeguarding the safety, availability, and integrity of core process control systems. Its modular building blocks seamlessly bridge OT, edge, and cloud environments, leveraging existing IT infrastructures for scalable and secure data exchange. NOA enables a wide range of use cases—from engineering and diagnostics to optimization and advanced analytics—by combining its architectural principles with standardized OPC UA Companion Specifications and rich semantic models. Depending on the asset class, this includes PA-DIM for field devices and PAT process analysers defined by the FieldComm Group, as well as OPC UA for Machinery specified by VDMA. Built on OPC UA and compatible with traditional field technologies (4–20 mA HART, PROFINET, wireless), NOA ensures vendor-independent interoperability and long-term scalability through collaboratively defined industry standards.

**KEY BENEFITS ARE**

- Secure. Interoperable. Scalable. Future-ready.
- Open, vendor-independent semantics
- Enabling predictive and data-driven operations




NAMUR open architecture – Scope of the information model

# PA-DIM® VDMA

**INTEROPERABILITY ACROSS DOMAINS: PA-DIM AND OPC UA FOR MACHINERY**

PA-DIM and OPC UA for Machinery originate from different industrial domains, yet both pursue the same objective: providing interoperable, vendor-independent information models within their respective domains. PA-DIM was developed for the process industries where it provides a representation of device and process information. OPC UA for Machinery focuses on the needs of the mechanical engineering sector, addressing the diversity of machines and equipment typically found in discrete manufacturing and parts of process industry.

With the publication of the OPC UA Companion Specification “OPC 40001 2 Process Values”, OPC UA for Machinery has taken a major step toward a unified way of representing process values across the machine-building world. This specification selectively references individual PA-DIM concepts to strive for the alignment of fundamental process value semantics such as temperature, pressure, or flowrate. Importantly, OPC UA for Machinery does not replicate PA-DIM as a whole; rather, it adopts only essential core elements and extends them to suit the significantly broader and more heterogeneous requirements of machinery applications. This avoids redundant modelling work while ensuring that both standards remain true to their respective industrial contexts.

**RELEVANCE FOR MACHINERY BUILDERS**

For machinery builders, this semantic alignment is highly relevant. Many machine-level processes rely on classical process values that have long been standardized in the process industries. In example cleaning systems depend on reliable temperature measurements; filtration, extraction, and ventilation systems monitor pressure differentials; coating equipment manages precise and repeatable flow rates; and machine tools frequently track coolant pressure or lubricant temperature. Through harmonization, identical measurements can now be interpreted consistently across diverse production environments – regardless of whether the component is installed in a chemical plant or in a discrete manufacturing line.

This alignment also contributes to greater coherence within the broader OPC UA ecosystem. A growing number of OPC UA Companion Specifications in the machinery domain are built on OPC UA for Machinery as their foundational layer. The specifications referencing the Machinery Process Values part, automatically benefit from the harmonized semantics originally established in PA-DIM. This ensures long-term consistency not only within single machines, but also across factories, multi-vendor installations, and cross-industry data architectures. Those interested in exploring this evolution from a machine builder’s perspective may find additional insights in the OPC UA FX podcast episode on machine construction and interoperability.

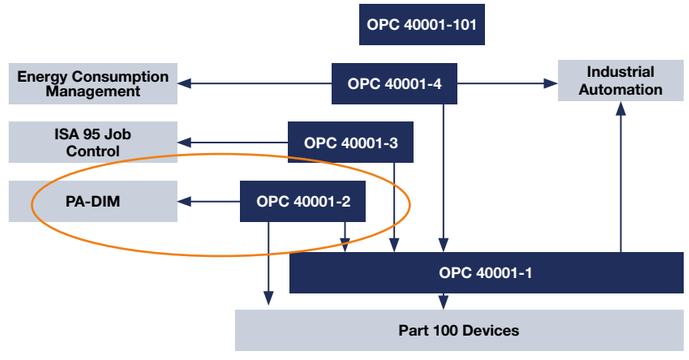
**OPC 40001-1**
OPC UA for Machinery – Part 1: Basic Building Blocks

**OPC 40001-2**
OPC UA for Machinery – Part 2: Process Values

**OPC 40001-3**
OPC UA for Machinery – Part 3: Job Management

**OPC 40001-4**
OPC UA for Machinery – Part 4: Energy Management

**OPC 40001-101**
OPC UA for Machinery – Part 101: Result Transfer




Harmonization of the different OPC UA for Machinery parts.

# PA-DIM®

## The PA-DIM specification is co-owned by the associations:

### ABOUT PA-DIM AND THE PA-DIM OWNERS ALLIANCE

The Process Automation Device Information Model Standard (PA-DIM) is a specification that defines protocol agnostic communication of common process automation parameters, including semantic IDs as defined by IEC 61987, using OPC UA information modeling techniques. Eliminating protocol dependencies simplifies the integration of IT and OT systems, while enabling a semantic device information approach for unambiguous machine-to-machine (M2M) communication. Seamless communication is achieved through data-mapping of fieldbus-specific instrument parameters using the address space defined in PA-DIM specification.

PA-DIM Owners Alliance encompass standards development and end user organizations that share a common interest in collaboratively developing specifications and technology to accelerate the digital transformation of the process automation industry. Each participating organization is a co-owner of the PA-DIM specification, which is managed by the PA-DIM Working Group that is hosted by the FieldComm Group. Current PA-DIM Owners are FieldComm Group, ISA 100 WCI, NAMUR, ODVA, OPC Foundation, PROFIBUS and PROFINET International, VDMA, and ZVEI.

## Information / Download

The PA-DIM specification is co-owned by multiple associations. All of them agreed on the same content and published the specification under their own IPR with different names.

### THE CONTENTS OF THESE SPECIFICATIONS IS IDENTICAL:

- FCG TS10098: 2023-10-27 (1.01.0)
- ODVA PUB00351: 2023-10-27 (1.01.0)
- OPC 30081: 2023-10-27 (1.01.0)
- PNO PI: 50.002: 2023-10-27 (1.01.0)

### FIND MORE INFORMATION ANDDOWNLOAD THE SPECIFICATION HERE:

www.fieldcommgroup.org/pa-dim
www.odva.org/pa-dim
www.opcfoundation.org/pa-dim
www.profibus.com/pa-dim