D7560E Embedded Intelligence – Service Description (SD)

ricbli-7

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PowerMeasurement_SD – Service Description

1. Overview

The **PowerMeasurement_SD** defines a microservice that provides electrical power measurements from the ore feeder or conveyor motor subsystem within the AI control and optimization system. This service offers standardized and secure access to live power data, supporting monitoring, optimization, and predictive control in an industrial environment.

1.1 Significant Prior Art

This service builds on existing Arrowhead compliant measurement services and standard industrial communication models. Its structure and communication model follow the Eclipse Arrowhead framework conventions for service interoperability and data exchange.

1.2 How This Service Is Meant to Be Used

The service is intended to be used by supervisory or AI optimization systems to retrieve real time or aggregated power readings from connected field devices. Typical consumers include:

- AI-based control optimizers that adjust process parameters.
- Data acquisition systems for energy usage monitoring.
- Local control loops verifying power levels for motor safety.

1.3 Important Delimitations and Dependencies

The PowerMeasurement_SD assumes:

- A valid Arrowhead service registry and authorization core system are available.
- Communication occurs within a trusted local cloud.
- Token-based security (Arrowhead Token / JSON Web Token) is implemented by both provider and consumer.

Dependencies include the **PowerMeasurement_IDD** interface definition and the associated **PowerSensor_SysD** subsystem.

2. Service Interface

This section describes the interface operations provided by the **PowerMeasurement** service. Each operation defines its purpose and the abstract data types it exchanges.

2.1 operation GetPowerMeasurement() : PowerMeasurement IDD

The `GetPowerMeasurement` operation provides the latest electrical power measurement from the PowerSensor subsystem.

Purpose: To supply real-time voltage, current, and calculated power data to authorized consumer systems for monitoring, optimization, and control.

Input: None

Output: `PowerMeasurement IDD` — the current power measurement data structure.

Error handling: If a request cannot be processed, the service may return standard Arrowhead error codes such as:

- **400 Bad Request** – Invalid or missing request parameters.
- **401 Unauthorized** – Authentication or token validation failed.
- **500 Internal Server Error** – Sensor or communication failure.

3. Information Model

The following data structure defines the content of the PowerMeasurement_IDD returned by the service.

3.1 struct PowerMeasurement_IDD

Field	Type	Description
timestamp	DateTime	Time when the measurement was taken.
voltage	Float	Measured voltage in volts.
current	Float	Measured current in amperes.
power	Float	Calculated electrical power in watts.
unit	String	Measurement unit, e.g., “W”.
sensorId	String	Identifier of the PowerSensor providing data.

3.2 Primitives

Type	Description
DateTime	Pinpoints a specific moment in time.
Float	Numeric representation for real-valued measurements.
String	Textual identifier or unit name.

4. Revision History

Version	Date	Author	Description
1.0	2025-10-15	ricbli-7	Initial PowerMeasurement_SD created for AI-driven ore feeder and conveyor system.