

D7560E Embedded Intelligence – Interface Design Description (IDD)

ricbli-7

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PowerMeasurement_IDD – Interface Design Description

1. Overview

This section describes the **PowerMeasurement_IDD** interface, which provides access to electrical power measurement data from the **PowerSensor_SysD** subsystem. It defines the protocol, encoding, and security mechanisms used to communicate with the power measurement service in the AI ore handling control and optimization system.

This IDD implements the interface for the **PowerMeasurement_SD** service description, enabling higher level control and optimization systems to retrieve secure and structured power readings from for example the conveyor motor.

Profile Type	Type / Standard	Version / Example
Transfer Protocol	HTTP	1.1
Data Encryption	TLS	1.3
Encoding	JSON	RFC 8259
Compression	N/A	–
Semantics	SensML	RFC 8428
Ontology	N/A	–
Security	TOKEN	JWT (Arrowhead Token)

Explanation: This communication profile ensures secure, interoperable, and machine readable data exchange between subsystems. Communication occurs over HTTP 1.1 with end-to-end encryption using TLS 1.3. Data is encoded in JSON following the SensML format for consistent measurement representation. Token based authentication Arrowhead Token is employed, where each system obtains an authorization token from a trusted service before accessing the PowerMeasurement interface.

2. Service Operations

The PowerMeasurement provides methods to obtain live power data. All operations use secure HTTP and respond with 200 OK upon success.

Possible error codes:

- 400 Bad Request – malformed request
- 401 Unauthorized – invalid or expired token
- 500 Internal Server Error – communication failure

2.1 GET /powermonitor/measurement

Operation: GetPowerMeasurement()

Input: None

Output: PowerMeasurement_IDD

Description: Returns the current electrical power measurement data from the connected motor or feeder sensor.

Example Request:

```
GET /powermonitor/measurement HTTP/1.1
Host: 192.168.0.110
Accept: application/json
Authorization: Bearer <ArrowheadToken>
```

Example Response:

```
{
  "timestamp": "2025-10-15 12:00:00",
  "voltage": 380.0,
  "current": 5.2,
  "power": 1976.0,
  "unit": "W",
  "sensorId": "TP-2"
}
```

3. Data Model

The data model specifies the structure of the messages exchanged with the service. The individual data elements such as timestamp, voltage, current, power, unit, and sensorId are defined as attributes within the **PowerMeasurement_IDD**.

These attributes represent the key measurement parameters that are transmitted as part of the service response. Since the Interface Design Description (IDD) describes the data structure rather than the service behavior, these values are modeled as attributes instead of operations.

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.

4. Security and Implementation Details

Parameter	Value
Port	0
Protocol	HTTP
Encoding	JSON
Security	TOKEN
Compression	NONE
Certificate Level	ApplicationSystem
Token	ArrowheadToken
Crypto Algorithm	RSA
Datamodel	NONE

This configuration ensures encrypted communication and authenticated data exchange using Arrowhead-compliant **token based security**. Each subsystem must request and present a valid token when accessing the PowerMeasurement service, ensuring secure orchestration across the distributed network.

5. Revision History

Version	Date	Author	Description
1.0	2025-10-15	ricbli-7	Initial version of PowerMeasurement_IDD (TOKEN-based security)