# Test Case Design Document

## 1. Module Overview

This module is responsible for processing raw data from sensors, including data cleaning, outlier detection, and database storage. The testing objective is to ensure that the module can correctly handle data in normal, boundary, and abnormal situations, while maintaining data accuracy and integrity.

## 2. Module Breakdown

- Module A: Data Cleaning Module  
- Module B: Outlier Detection Module  
- Module C: Database Storage Module

## 3. Test Case Design

### Module A: Data Cleaning Module

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case ID | Test Item | Input Example | Expected Output | Description |
| A-01 | Normal Data Cleaning | {"timestamp":12345678, "angle":30.5} | Same as input (no change) | Verify correct retention of valid data |
| A-02 | Missing Field Handling | {"timestamp":12345678} | Throw exception / return failure flag | Check detection of missing fields |
| A-03 | Type Error Handling | {"timestamp":12345678, "angle":"30.5"} | Convert to float or discard | Test handling of numeric strings |
| A-04 | Empty Data Handling | {} | Return error flag | Check if empty input is blocked |

### Module B: Outlier Detection Module

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case ID | Test Item | Input Example | Expected Output | Description |
| B-01 | Normal Value Detection | {"angle": 45} | Marked as normal | Verify if valid data passes |
| B-02 | Negative Value Detection | {"angle": -30} | Marked as abnormal / discarded | Check if negative angles are filtered |

### Module C: Database Storage Module

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Case ID | Test Item | Input Example | Expected Output | Description |
| C-01 | Normal Data Storage | {"timestamp":12345678, "angle":30.5} | Data successfully stored in the database | Verify correct storage operation |
| C-02 | Duplicate Data Handling | Input the same data twice | Ignore duplicate / update existing record | Clarify system storage strategy |
| C-03 | Bulk Data Insertion | Insert 1000 records at once | All successfully stored / report failed records | Verify batch operation performance and error localization |

## 4. Testing Environment Requirements

- Python/Java data processing scripts  
- Simulated sensor data input module  
- MySQL test database