# Index of Change

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| Version | Description of Change | Name | Date |
| 1.0 | Initial | Prabhat Gaikwad | 2023-06-11 |
| 2.0 | ValP #5 and #6 added | Hikmad Abishov | 2023-06-25 |
| 3.0 | ValP #7, #8 and #9 added | Vinit Devchandani | 2023-07-15 |
| 4.0 | ValP #10 and #11 added | Sagar Patil | 2023-07-16 |

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# Subject

Test item: XY Pen Plotter, Doc: # XYPP\_14\_004-Dossier

**Report refers to Technical Specification doc: XYPP\_14\_007-User\_Req.xlsx**

A pen plotter is a type of computer-controlled device that uses pens or markers to create precise and accurate drawings on paper. This project aims to develop a functional pen plotter using specific components and technologies that showcases the integration of hardware, software, and mechanical components to achieve a specific task.

This document outlines the validation test protocols for the operation of the pen plotter.

The validation test protocols outlined in this document will serve as a comprehensive framework for evaluating the pen plotter's operation, performance, and reliability.

By conducting these tests, we aim to validate the functionality of the device and identify any areas that require improvement or optimization.

The results obtained from these tests will guide further refinements to ensure that the pen plotter meets the desired standards and provides users with a reliable and precise drawing tool.

# Validation Protocol

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| --- | --- | --- | --- | --- |
| **Validation Protocol** | | | | |
| **ValP #** | **ref. to UR #** | **Validation procedure (description of routine)** | **ref. # (i.e.  validation  protocol, customer test, etc..)** | **Validation**  **criterion, target value** |
| ValP1 | UR1, UR2, UR3, UR4 | Set-up pen plotter at the university's lab, start pen plotter by student, draw  Nikolaus Haus. | XYPP\_14\_007-User\_Req | Plotter must draw Nikolaus Haus in one run. |
| ValP2 | UR5 | Put the pen plotter into a box of 56x39x42 cm provided by Uni Lab. | XYPP\_14\_007-User\_Req | Fits perfectly |
| ValP3 | UR7 | Place the pen plotter assembly on a measuring scale with an accuracy of ± 1gm | XYPP\_14\_007-User\_Req | Total weight <= 3.5kg |
| ValP4 | UR9 | Continuous drawing up to 30 min at a time. | XYPP\_14\_007-User\_Req | 30 min. |
| ValP5 | UR10 | Compare the calculated mean value with expected results or specifications to ensure the accuracy of the timing measurements. | XYPP\_14\_007-User\_Req | Average error <=  ±0.25mm |
| ValP6 | UR11 | Start the pen plotter and take noise level measurement by sound level meter. | XYPP\_14\_007-User\_Req | Average noise measure <=60 dBA |
| **ValP #** | **ref. to UR #** | **Validation procedure (description of routine)** | **ref. # (i.e.  validation  protocol, customer test, etc..)** | **Validation**  **criterion, target value** |
| ValP7 | UR27 | Verify switch functionality by testing 10 times, ensuring successful halting of plotter movement upon contact with levers, preventing overtravel and ensuring accurate and safe plotting. | XYPP\_14\_007-User\_Req | All the switches work properly. |
| ValP8 | UR41 | Maximum pen diameter of 15mm | XYPP\_14\_007-User\_Req | Pen diameter <=15mm |
| ValP9 | UR45 | Maximum thickness of drawing media = 3cm. | XYPP\_14\_007-User\_Req | Maximum thickness of drawing media >= 5mm. |
| ValP10 | UR50 | Perform a series of tests including starting, calibrating (5 times), testing emergency stop, establishing starting point, aligning X and Y axis, moving to a specific point, and checking for any errors. | XYPP\_14\_007-User\_Req | All the functions are working properly. |
| ValP11 | UR52 | Verify the display by confirming real-time distance lag updates, accurate emergency stop status representation, and clear visibility for effective monitoring. | XYPP\_14\_007-User\_Req | Display shows the detailed status on OLED/LCD Display. |

# Validation Test Report

|  |  |  |  |
| --- | --- | --- | --- |
| **Validation Report** | | | |
| **ValR #** | **ref. to ValP #** | **Criteria (passed/failed)** | **ref. # (i.e. test report, etc..)** |
| ValR1 | ValP1 | Passed | XYPP\_14\_007-User\_Req |
| ValR2 | ValP2 | Passed | XYPP\_14\_007-User\_Req |
| ValR3 | ValP3 | Passed | XYPP\_14\_007-User\_Req |
| ValR4 | ValP4 | Passed | XYPP\_14\_007-User\_Req |
| ValR5 | ValP5 | Passed | XYPP\_14\_007-User\_Req |
| ValR6 | ValP6 | Passed | XYPP\_14\_007-User\_Req |
| ValR7 | ValP7 | Passed | XYPP\_14\_007-User\_Req |
| ValR8 | ValP9 | Passed | XYPP\_14\_007-User\_Req |
| ValR9 | ValP10 | Passed | XYPP\_14\_007-User\_Req |
| **ValR #** | **ref. to ValP #** | **Criteria (passed/failed)** | **ref. # (i.e. test report, etc..)** |
| ValR10 | ValP11 | Passed | XYPP\_14\_007-User\_Req |
| ValR11 | ValP12 | Passed | XYPP\_14\_007-User\_Req |

# Validation Test

The given protocols in Section 2 (Validation protocol) have been tested successfully.

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