POLYTECHNIC BANTING SELANGOR

AUTOMATIC VICE

MUHAMMAD AMEER FAHMI BIN BAHARUDDIN

(24DTP22F1049)

MUHAMMAD ADZIM BIN MASTUKI

(24DTP22F1008)

NUR ELZA EMYLIESHA BINTI RAHIM

(24DTP22F1047)

MOHAMAD FAHRUL RIZKY BIN ALPADIL

(24DTP22F1042)

DEPARTMENT OF MECHANICAL ENGINEERING

SESSION 1: 2024/2025

POLYTECHNIC BANTING SELANGOR

AUTOMATIC VICE

MUHAMMAD AMEER FAHMI BIN BAHARUDDIN (24DTP22F1049)

MUHAMMAD ADZIM BIN MASTUKI (24DTP22F1008)

NUR ELZA EMYLIESHA BINTI RAHIM (24DTP22F1047)

MOHAMAD FAHRUL RIZKY BIN ALPADIL (24DTP22F1042)

This report is submitted to The Department Of Mechanical Engineering as part of the requirements for the award of The Diploma In Mechanical Engineering (Manufacturing)

DEPARTMENT OF MECHANICAL ENGINEERING

SESSION 1: 2024/2025

STATEMENT OF AUTHENTICITY AND PROPRIETARY RIGHTS

AUTOMATIC VICE

SESSION 1: 2024/2025

1. We are final-year students of the **Diploma in Mechanical Engineering (Manufacturing) at Polytechnic Banting Selangor,** which is located at **Jalan Sultan Abdul Samad, Persiaran Ilmu, 42700 Banting, Selangor** (From now on referred to as 'The Polytechnic').
2. We acknowledge that the Automatic Vise and the intellectual property in it are the result of our original work/design without taking or copying any intellectual property from other parties.
3. We agree to relinquish ownership of the Automatic Vise intellectual property to 'The Polytechnic' to meet the requirements for awarding the **Diploma in Mechanical Engineering (Manufacturing)** to us.

Done and truly acknowledged by:

1. MUHAMMAD AMEER FAHMI BIN BAHARUDDIN
   (IC NO: 040322-10-1397) ....
2. MUHAMMAD ADZIM BIN MASTUKI
   (IC NO: 040420-10-2449) ....
3. NUR ELZA EMYLIESHA BINTI RAHIM
   (IC NO: 040111-10-1370) ....
4. MOHAMAD FAHRUL RIZKY BIN ALPADIL
   (IC NO: 040509-10-0255) ....

Before me:

ZALAIDA BINTI TALIB ....

(Project Supervisor)

APPRECIATION

Grateful to the Almighty **Allah SWT** and sending blessings upon our esteemed leader, **Prophet Muhammad (peace be upon him)**, we are appreciative that we have successfully concluded the ultimate project impeccably within the prescribed period of 6 months without encountering any significant challenges, as a prerequisite for the conferment of **Diploma in Mechanical Engineering (Manufacturing)** for the **Session 1: 2024/2025** session. We convey our sincere gratitude to all parties involved, both directly and indirectly, particularly to our supervisor, **Ms. Zalaida Binti Talib**, who has imparted guidance, counsel, motivation, and constructive feedback, facilitating our triumphant completion of this **Automatic Vise** project report. Additionally, we wish to extend our appreciation to companions and relatives who have made substantial contributions in terms of perspectives and financial backing in fulfilling this ultimate project assignment.

With this, we reiterate our gratitude to Allah SWT and hereby announce the culmination of this ultimate project. It is our aspiration that this report can serve as a paradigm and manual for pertinent parties in the future.

ABSTRACT

A vice is a mechanical screw apparatus utilized for securing or clamping a workpiece to facilitate the execution of tasks with tools such as saws, planes, drills, mills, screwdrivers, sandpaper, and more. Vices typically consist of a stationary jaw and a parallel movable jaw adjusted by the screw. The vice is essential for drilling wood, metal, and other materials by firmly gripping the workpiece, providing the necessary stability for precise cuts. It is also indispensable for sawing tasks where a consistent manual or automatic force is applied to achieve desired shapes. A pneumatic system can be controlled manually or automatically. The Automatic vice project for metalworking features a swiftly movable clamping jaw and fixed jaw, ensuring precise and unalterable alignment of the vertical clamping surface of the fixed jaw and the horizontal surface of the workpiece fastening plane. Employing an automatically operated pneumatic vice simplifies tasks and conserves energy. Our result goes beyond our expectations in a good way. Future recommendations include Improving the automation control system to reduce response delays during heavy operations.

ABSTRACT IN MALAY

Ragum ialah radas skru mekanikal yang digunakan untuk mengamankan atau mengapit benda kerja untuk memudahkan pelaksanaan tugas dengan alatan seperti gergaji, satah, gerudi, kilang, pemutar skru, kertas pasir dan banyak lagi. Ragum biasanya terdiri daripada rahang pegun dan rahang boleh alih selari yang dilaraskan oleh skru. Ragum adalah penting untuk menggerudi kayu, logam dan bahan lain dengan menggenggam bahan kerja dengan kuat, memberikan kestabilan yang diperlukan untuk pemotongan yang tepat. Ia juga amat diperlukan untuk tugas menggergaji di mana daya manual atau automatik yang konsisten digunakan untuk mencapai bentuk yang diingini. Sistem pneumatik boleh dikawal secara manual atau automatik. Projek ragum automatik untuk kerja logam mempunyai rahang pengapit yang boleh digerakkan dengan pantas dan rahang tetap, memastikan penjajaran yang tepat dan tidak boleh diubah pada permukaan pengapit menegak rahang tetap dan permukaan mendatar satah pengikat bahan kerja. Menggunakan Ragum pneumatik yang dikendalikan secara automatik memudahkan tugas dan menjimatkan tenaga. Keputusan kami menunjukkan di luar jangkaan anda dengan cara yang baik. Cadangan masa depan termasuk Memperbaik sistem kawalan automasi untuk mengurangkan kelewatan tindak balas semasa operasi berat.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF SYMBOLS

Symbol	
%	Per cent
cm	Centimetre
kg	Kilogram
m	Meter
mm	Millimeter
N	Newton
V	Volt

LIST OF ABBREVIATIONS

NO.	Number
CAD	Computer Aided Design
DC	Direct Current
RM	Ringgit Malaysia

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

A vice is a mechanical screw apparatus utilized for securing or clamping a workpiece to facilitate work with tools such as saws, planes, drills, mills, screwdrivers, sandpaper, and more. Vices typically consist of a fixed jaw and a parallel movable jaw adjusted by the screw. By tightly holding the workpiece, a vice enables the drilling of materials like wood or metal with precision and stability, ensuring accurate cuts. Moreover, it aids in sawing tasks by providing a constant force both manually or automatically to achieve desired shapes. The automatic system can be controlled manually or automatically. This automatic vice project for metalworking features a clamping jaw and fixed jaw that are easily and quickly movable, ensuring precise and unchanging vertical and horizontal clamping surfaces, respectively. Employing an automatically operated vice simplifies work processes and conserves energy effectively.

1.2 BACKGROUND OF THE STUDY

In industrial and workshop settings, the need for efficient and reliable clamping solutions is paramount to ensuring the precise execution of various machining and fabrication tasks. Traditional bench vices, while effective, often require manual operation and can pose limitations in terms of clamping force and adjustability.

Recognizing the demand for enhanced clamping capabilities, our project focuses on the development of an automatic vice. A sophisticated clamping device powered by hydraulic pressure. Hydraulic vices offer distinct advantages over their mechanical counterparts, including increased clamping force, smoother operation, and greater precision.

The primary motivation behind this project is to address the shortcomings of conventional bench vices and provide users with a superior clamping solution that optimizes productivity and accuracy in machining, welding, assembly, and other industrial processes.

1.3 PROBLEM STATEMENT

Efficient and accurate gripping mechanisms play a vital role in modern manufacturing processes, yet traditional vices have significant drawbacks, including limitations in speed, accuracy, and versatility. These vices rely on manual operation, which is often labour-intensive and prone to human error, and the manual adjustment of clamping force can lead to uneven gripping that compromises workpiece quality and poses potential safety risks. To address these challenges, there is a growing need for an advanced gripping system that offers accurate, reliable, and fast clamping while ensuring worker safety. Developing an automatic vice system capable of delivering a consistent clamping force with adjustable precision can overcome these limitations, enhance productivity and secure better quality assurance in manufacturing environments.

1.4 PROJECT OBJECTIVES

1. To design the automatic vice to deliver significantly higher clamping forces compared to traditional vices.
2. To develop a semi-automatic vice to help the students and workers.

1.5 SCOPE PROJECT

1. Limitation weight of object: 30-40 kg.
2. Can be used by Polytechnic Banting students and lectures in the Mechanical Workshop.
3. Hold both small and large workpieces.
4. Semi-automatic control for easy operation.
5. Time taken within 24 seconds to achieve full clamping.
6. Clamp force up to 900N.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The automatic vice, designed for clamping in workshops, significantly reduces power consumption and lowers production costs. It minimizes material handling, making the workflow more efficient. By reducing the physical effort required from workers, it helps alleviate fatigue and improve productivity. These features ensure high product quality and operational efficiency.

2.2 DESIGN THAT CURRENTLY AVAILABLE IN THE MARKET

In the current market, automatic vices come in various designs tailored to specific applications and user requirements. Common types include automatic toggle vices, which utilize toggle mechanisms for high clamping forces; automatic swing vices with rotating jaws for easy loading and unloading; pneumatic self-centring vices that automatically adjust workpiece alignment; automatic angle vices for precise angle positioning; automatic multi-jaw vices for simultaneous clamping of multiple workpieces; automatic quick-change vices for rapid setup and changeover; and automatic modular vices with interchangeable components for flexible configurations. These designs leverage automatic actuators to provide efficient clamping force, adjustment capabilities, and versatility in industrial machining processes, catering to a variety of manufacturing needs with varying features, sizes, and capabilities.

2.3 COMPONENTS

The main components of an automatic vice are:

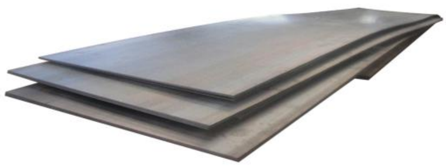
1. The clamping mechanism serves as the core component responsible for securely holding the workpiece in place during machining operations.

2. Jaws, equipped with gripping surfaces or serrations, directly contact the workpiece to enhance grip and stability.

3. A base or mounting plate provides a stable foundation for securely mounting the vice to a workbench or machine table.

4. Guide rails ensure smooth and accurate movement of the clamping mechanism, facilitating precise positioning of the workpiece.

Table 2.1: List Of Components Names and Its Functions

Name	Function	Image
Mild Steel Plate	As A Main Body For Vice	
12V Linear Motor Cylinder	To Extend And Retract The Vice Gripper (Adjustable Jaw)	
DC Motor Speed Controller	To Control The Speed Of Linear Motor	

Wire Cable	To Connect The Electric Circuit	
Battery	To Supply Electrical Power	
Toggle Switch	As The Main Power Switch	
Flat File	To Act As A Vice Gripper	

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This section focuses on the process of making the Automatic Vice. Overall, this flowchart illustrating the manufacturing process is shown in the diagram.

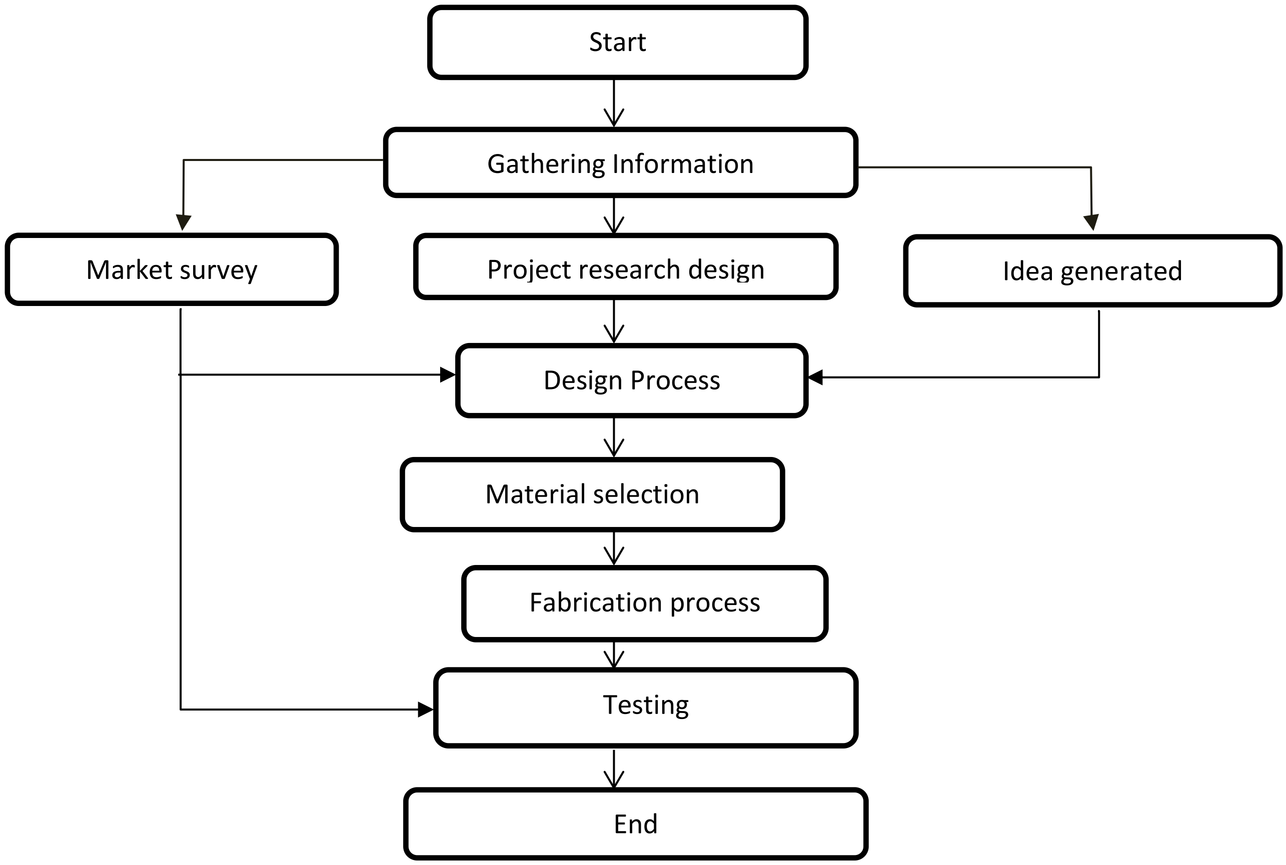


Figure 3.1: Flow Chart Process In Making Automatic Vise

3.2. CONCEPT SELECTION AND DESIGN OF AUTOMATIC VICE

At the initial stage, three proposed designs for the automatic vice have the potential to be developed. Figures 3.2, 3.3, and 3.4 depict isometric drawings of these two designs. Figure 3.2 shows the design of an automatic vice that utilizes a hand pump so it can manually pressurize the automatic system, generating clamping force to secure the workpiece.

3.2.1 Design Proposal 1

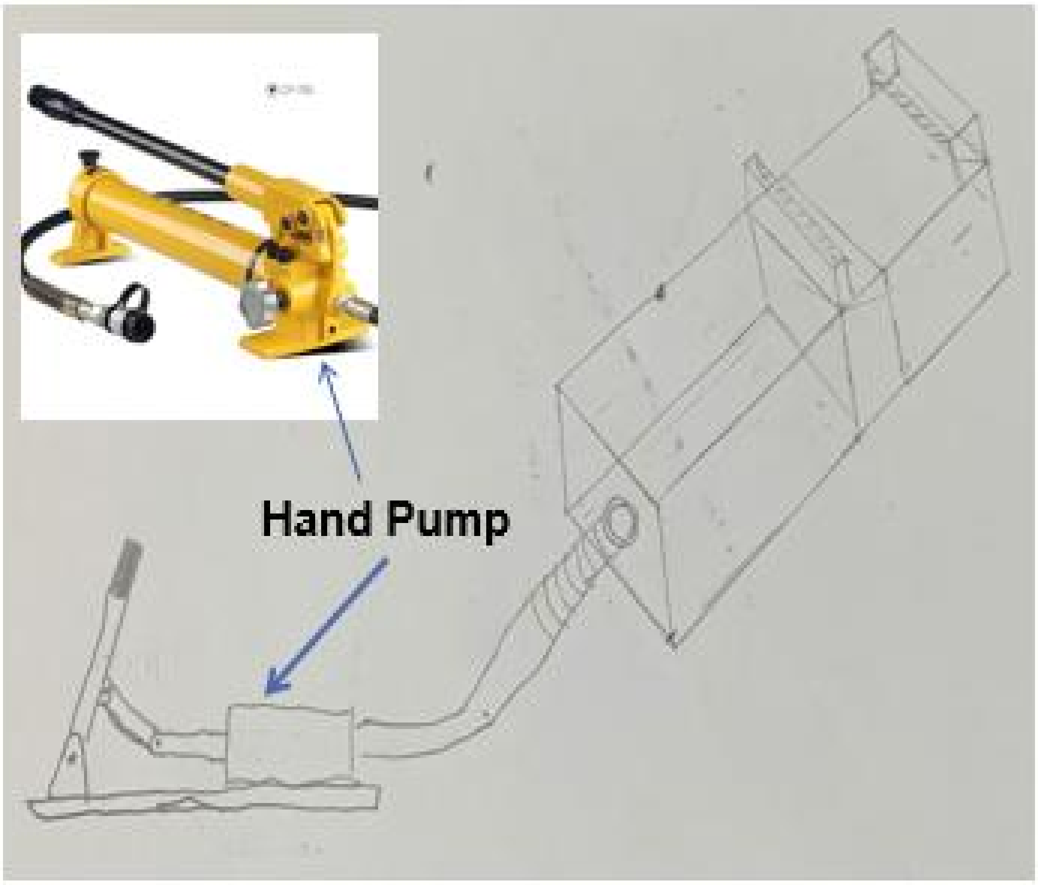
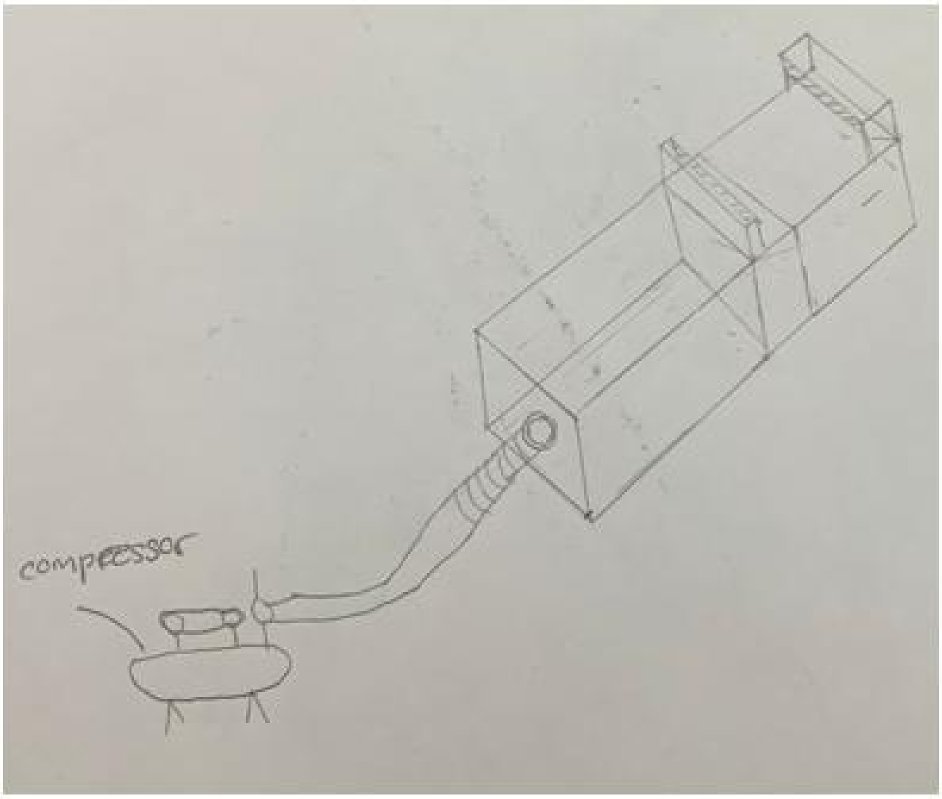


Figure 3.2: Design Proposal 1

3.2.2 Design Proposal 2

Figure 3.3 shows the design of an automatic vice that utilizes a compressor that supplies compressed air to power the automatic system. Generate clamping force to secure the workpiece.



Figure

Figure3.3: Design Proposal 2

3.2.3 Design Proposal 3

Figure 3.4 shows the design of an automatic vice that utilizes a 12V linear motor cylinder inside the vice to drive the clamping mechanism, provide linear motion to generate clamping force and secure the workpiece.

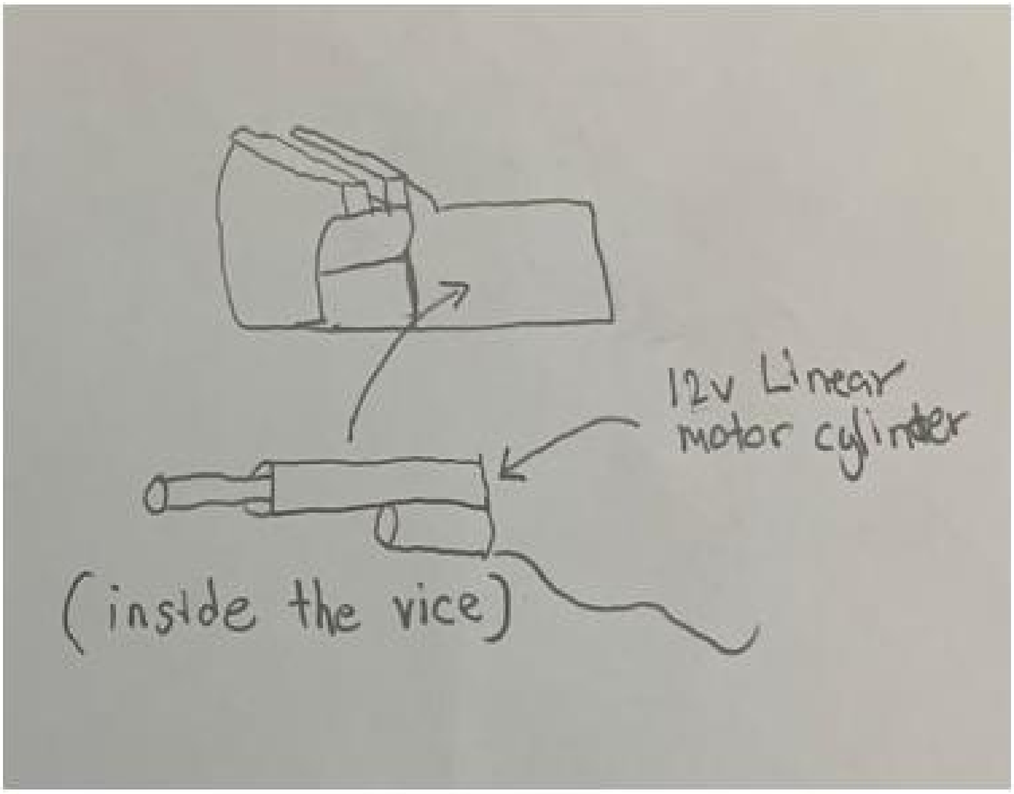


Figure 3.4: Design Proposal 3

3.3 SUMMARY OF ALL DESIGNS

Figures 3.2, 3.3, and 3.4 show our technical drawing for automatic vice, and we have decided to choose design proposal idea number 3.

Table 3.1: Summary Of All Designs

No. (Design Proposal)	Function	Idea 1	Idea 2	Idea 3
1	The design is compact and space-saving	/	X	/
2	The design required less man-power	X	/	/
3	The design offers precise control and easy-to-use	/	X	/

3.4 TECHNICAL DRAWING

CAD simplifies our technical drawings by enabling precise and detailed designs with easy adjustments to dimensions or components.

Figures 3.2, 3.3, and 3.4 show our technical drawing for automatic vice, and we decided to choose design proposal idea number 3.

3.4.1 Complete Drawing

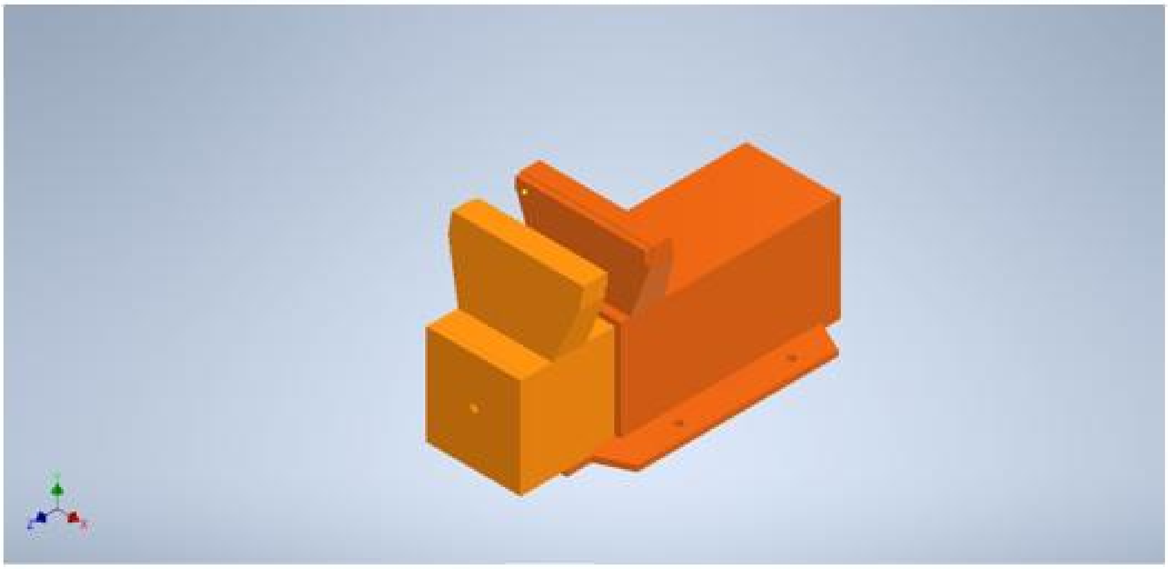


Figure 3.5: Complete Drawing Of The Automatic Vise

This drawing features jaws designed to securely hold workpieces or objects weighing between 30 kg and 40 kg. To prevent it from slipping, a flat file is utilized as a gripper. Inside the vice, a linear motor device cylinder applies a force of 900 N to ensure a firm grip on the objects.

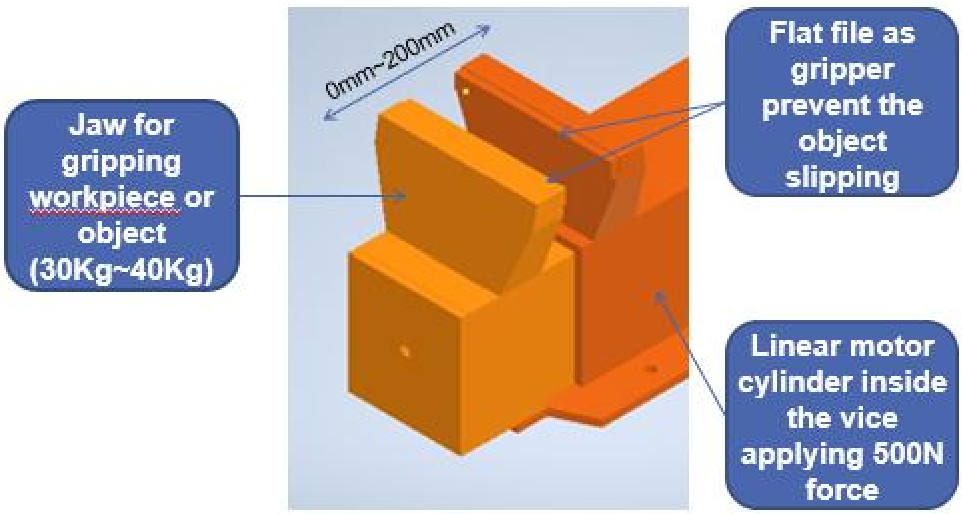


Figure 3.6: Closer Look Of The Drawing Of The Automatic Vise At Gripping Part

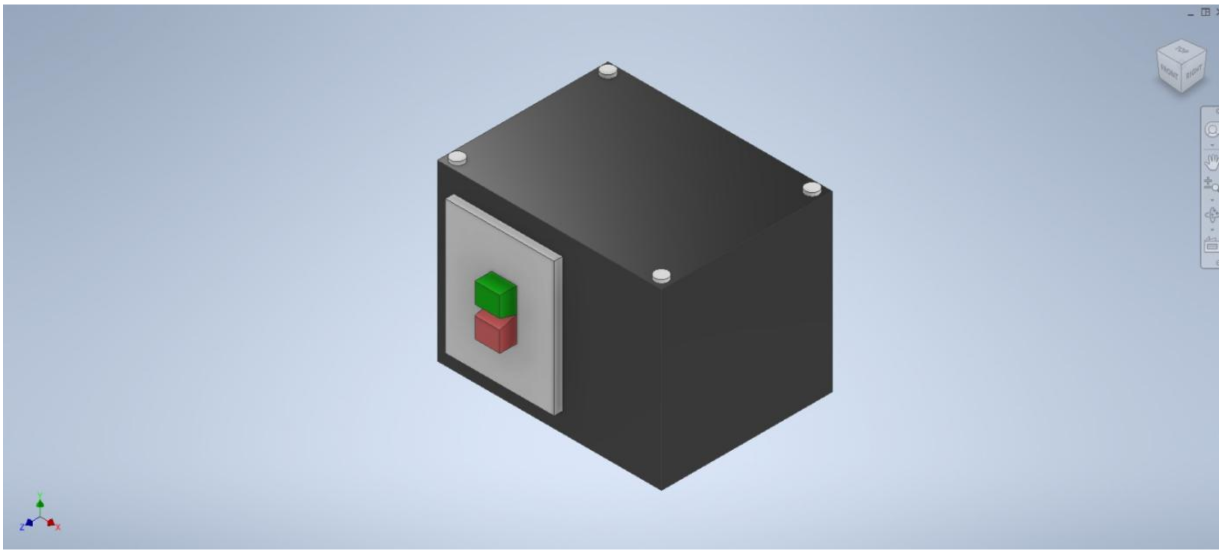


Figure 3.7: Drawing Of The Controller Box To Control Automatic Vise

This other drawing shows buttons for extending and extracting the jaws of the vice. These buttons facilitate the controlled movement of the vice to adjust its grip on the workpieces or objects as needed. Figure 3.8 shows more specific parts.

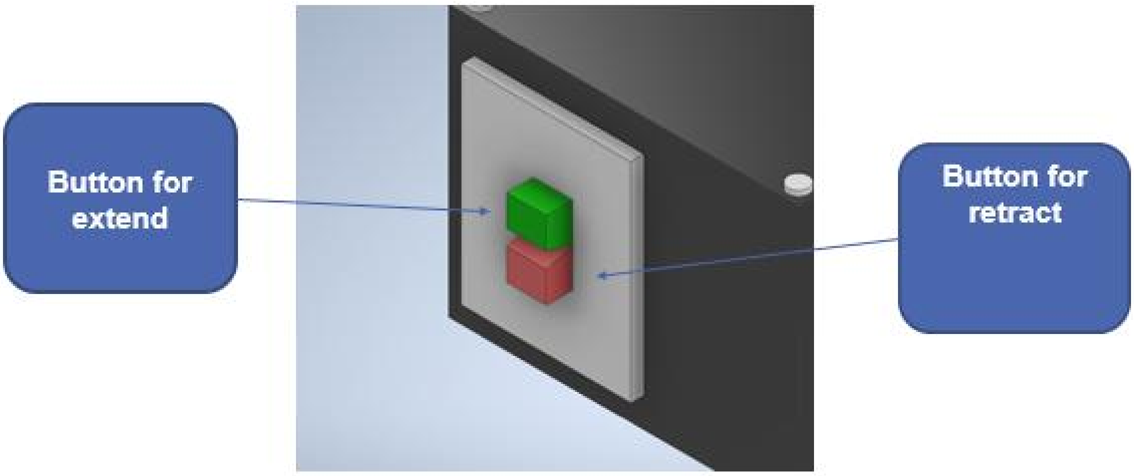


Figure 3.8: Closer Look at Controller Box

3.4.2 Dimension

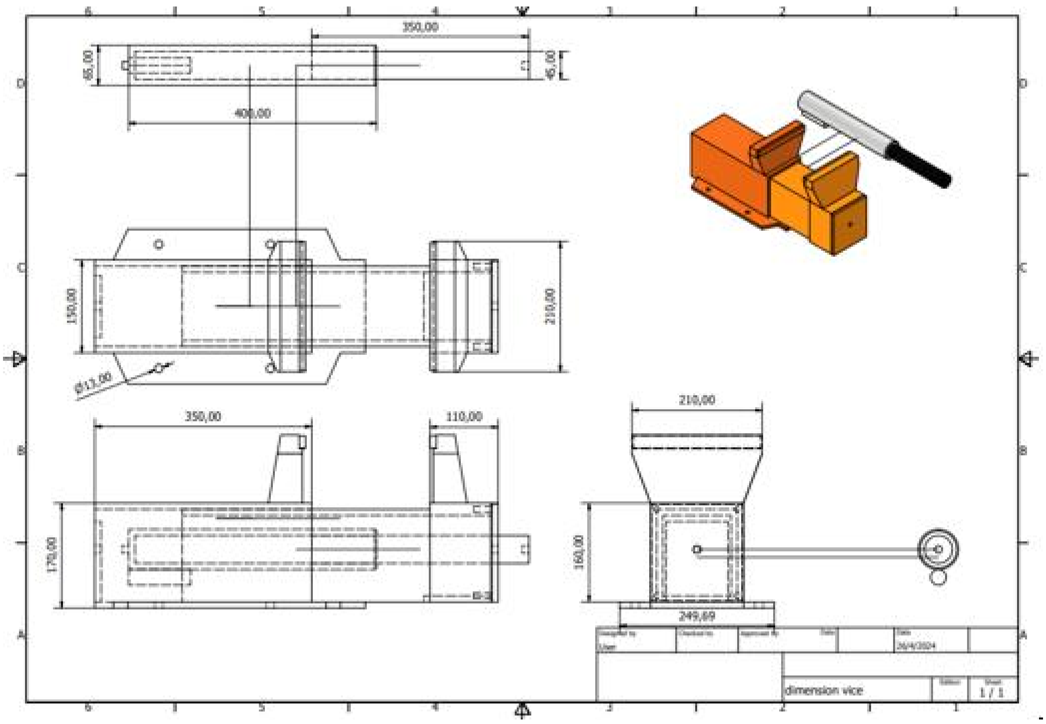


Figure 3.9: Dimension For Automatic Vise

This figure provides detailed dimensions for each part of the automatic vice's gripping mechanism. The view clearly shows the thickness and length of each material. Additionally, this angle helps to understand the overall size and length of the entire project.

3.5 COSTING

The following is the cost for each material used in the automatic vice project.

Table 3.2: Cost To Build Automatic Vise

No.	Material	Quantity	Price (Rm)
1	Mild Steel Plate (20 cm x 20 cm)	5	150
2	12V Linear Motor Cylinder	1	78
3	DC Motor Speed Controller	1	11
4	Wire Cable (1 m)	1	2
5	Battery Motor	1	25
6	Toggle Switch	1	7
7	Flat File (200mm)	2	12
8	Screw	20	30
9	Spring	1	15
	Total	33	330

3.6 GANTT CHART

Figure 3.11 illustrates the Gantt chart for our automatic vice project, showcasing the stages from brainstorming and problem statement identification to literature review, methodology development, report writing, and finally, report submission with presentation. Each phase is crucial for the project's progress and success.

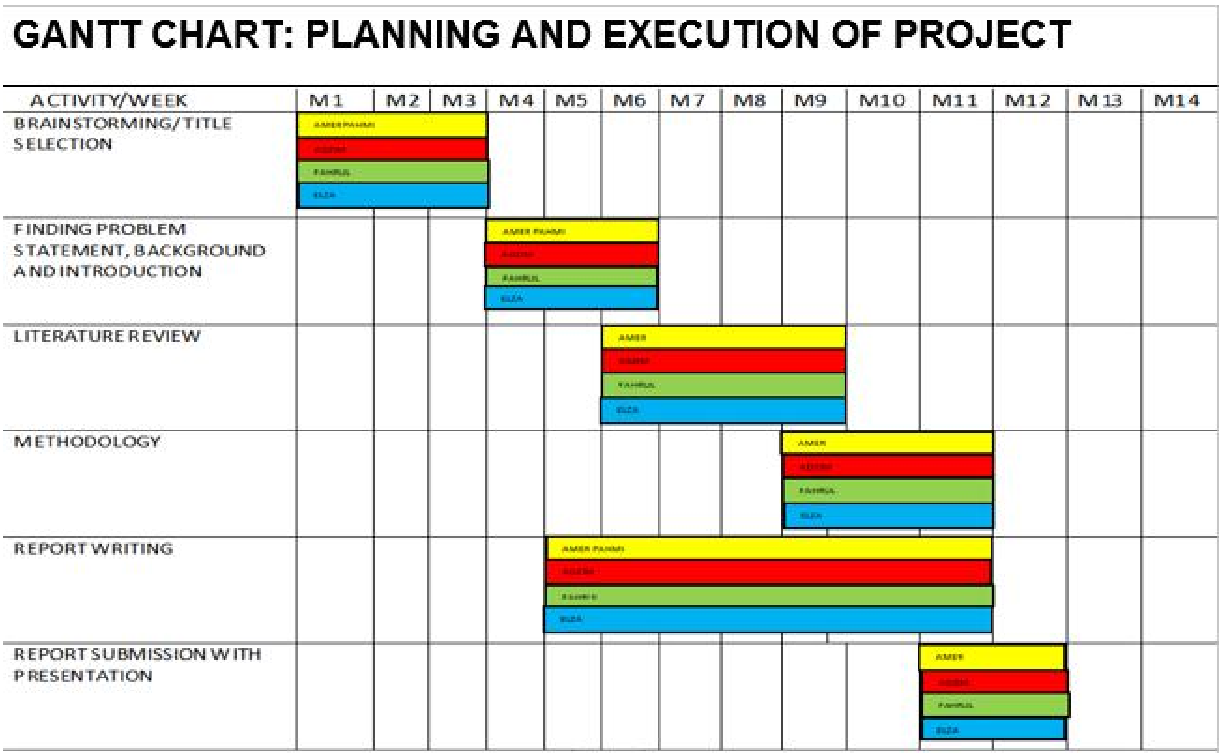


Figure 3.10: Gantt Chart To Build Automatic Vise

CHAPTER 4

DATA AND DISCUSSION

4.1 BUILDING THE PROJECT

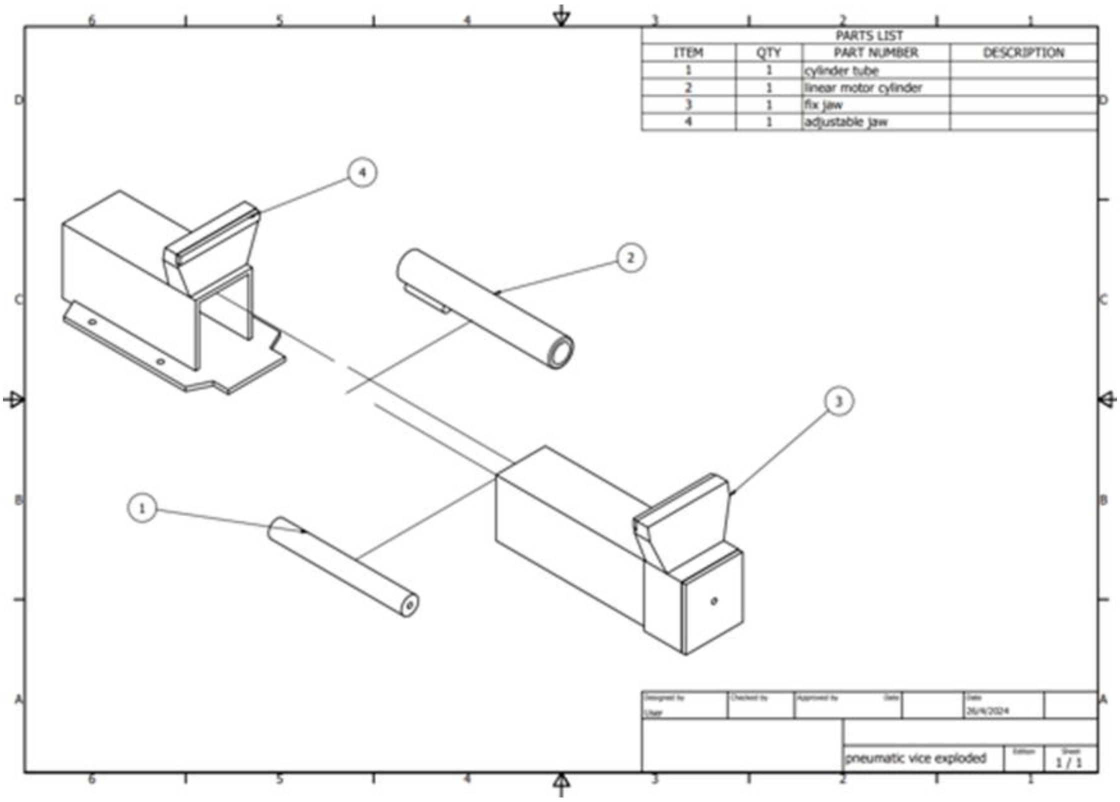


Figure 4.1: Exploded Drawing Of The Automatic Vise And The Bill Of Materials

Figure 4.1 shows the drawing and the bill of materials. Cylinder tube. This is the housing for the linear motor cylinder. Linear motor cylinder. This component generates the linear motion needed to operate the vice. Fixed jaw. The stationary part of the vice and adjustable jaw is the moving part that is adjusted by the linear motor cylinder.

This chapter presents how to develop the prototype. This involved 2 sections, which are the body structure and the automatic system.

4.1.1 Body Structure

1. Cylinder Tube

The cylinder tube is a key component that houses the piston, facilitating the movement of the jaws. It provides the structural support for the vice's clamping mechanism.

2. Linear Motor Cylinder

The linear motor cylinder powers the movement of the vice. This motorized component enables the vice to clamp and release the workpieces efficiently through automation.

3. Fixed Jaw

The fixed jaw remains stationary, providing a stable surface for the workpiece to be clamped against. It ensures the workpiece is securely held in place during operation.

4. Adjustable Jaw

The adjustable jaw moves toward or away from the fixed jaw, controlled by the motorized mechanism. Its movement allows the vice to accommodate workpieces of different sizes.

This body structure is shown visually below:

1. Body Structure

i. Cutting

Figure 4.2: The metal plate for the base structure was measured accurately and cut to the specified size.

ii. Welding

Figure 4.3: Cut Metal Pieces Were Welded Together To Build Foundation Of The Automatic Vice

iii. Grinding

Figure 4.4: The surface Of The Body Structure Was Ground To Smooth Out Any Rough Areas

4.1.2 Central Frame For Housing Automatic System (Linear Motor Cylinder, Fixed Jaw And Adjustable Jaw)

i. Measuring And Cutting

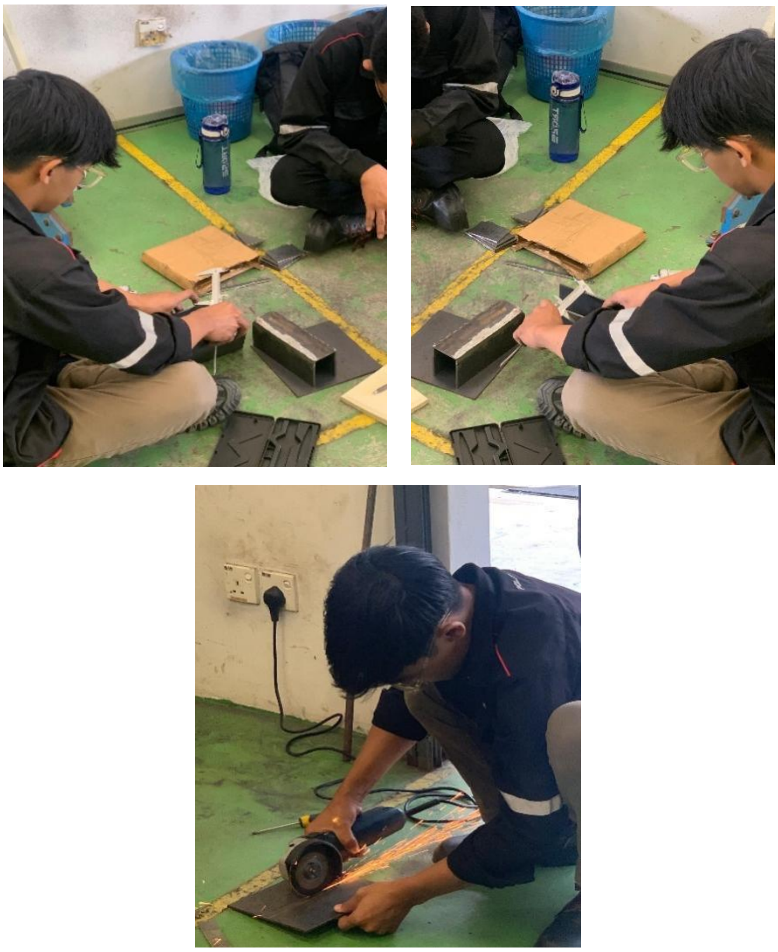


Figure 4.5: Metal Pieces For the Central Frame Were Measured And Cut According To The Design Requirements

ii. Welding

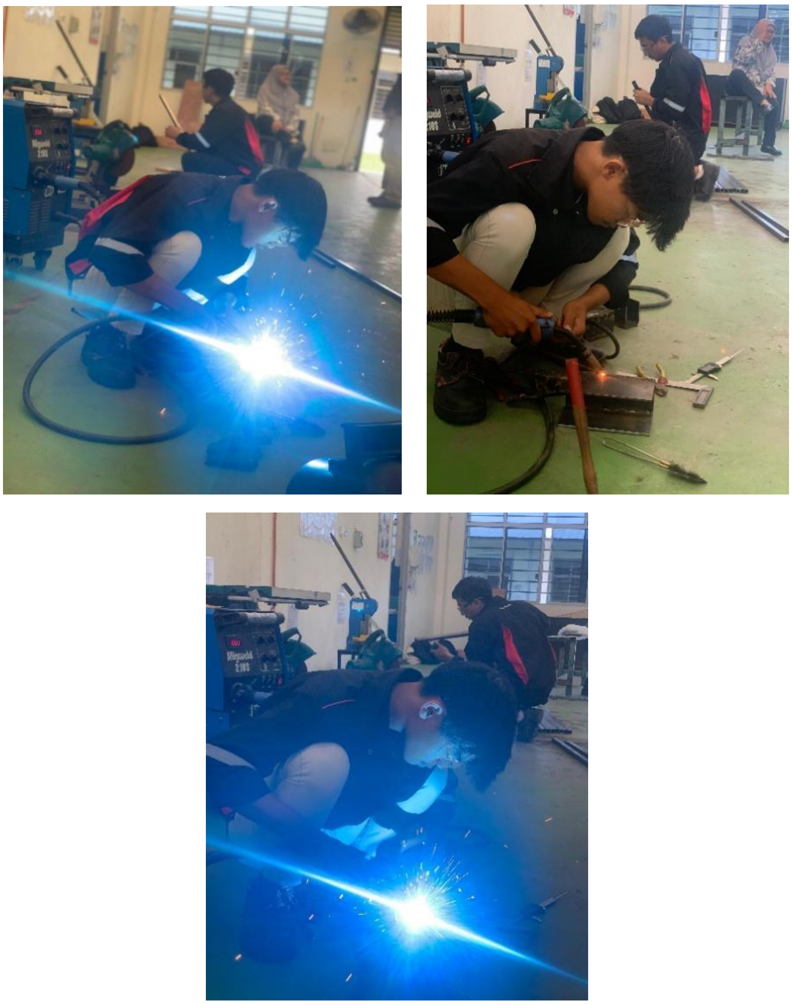


Figure 4.6: Central Frame Components Were Welded Together To Form The Main Body Of The Automatic Vice

iii. Grinding

Figure 4.7: The surface Of The Central Frame Was Ground To Smooth Out Any Rough Areas

4.2 PROJECT FINDINGS

In the Automatic Vice project, several important results were found from testing and observing the system. Each finding highlights how the automatic vice performs and what it is capable of. The key findings are:

4.2.1 Clamping Force Performance

The tests showed that the automatic vice could apply enough force to hold different types of materials securely. Even when handling various loads, the vice stayed stable and maintained a strong grip without damaging the materials. This shows that the system can safely handle heavier tasks.

Table 4.1: Result Of Testing Automatic Vise

Test Parameter	Expected Value	Actual Valve	Results
Maximum clamping force	500 N	900 N	Exceeds expectations
Consistency of force	+/- 5% variation	+/- 3% variation	Passed
Workpiece weight capacity	30-40 kg	30-40 kg	Met expectations

4.2.2 Operational Efficiency

When it comes to efficiency, the automatic vice greatly reduces the time needed to adjust the workpieces compared to using a manual vice. The automation made the process faster and easier, which improved overall productivity in the workshop and manufacturing tasks.

Table 4.2: Comparisons Between Manual Vise And Automatic Vise

Test Parameter	Manual Vice	Automatic Vice	Improvement
Time to clamp workpiece (s)	60	30	50 % faster
Time for adjustment (s)	45	10	78 % faster
Total cycle time (s)	105	40	70 % faster

4.2.3 Durability Of Materials

The automatic vice was made from high-quality materials, especially the steel frame and clamping jaws. After extended use, there were no significant signs of wear or damage, which shows that the system is strong and suitable for long-term industrial use.

Table 4.3: Tolerance Test That Made On Automatic Vise

Test Parameter	Expected Tolerance	Actual Tolerance
Material Wear (Steel Frame)	After 1000 Cycles	No Significant Wear
Jaw Integrity	After Clamping 100 Cycles	No Damage Observed

4.3 MATHEMATICAL CALCULATIONS IN PRODUCT DESIGN

In this section, we will present the mathematical calculations involved in the design of the automatic vice. These calculations ensure that the design meets the necessary specifications for performance, efficiency, and safety.

4.3.1 Clamping Force Calculation

The clamping force is a critical factor in ensuring the vice can securely hold the workpiece. The clamping force (F) can be calculated using the following formula:

F: P X A

F: Clamping force (N)

P: Pressure applied (Pa)

A: Area of the clamping jaw (m2)

For this project:

- Applied pressure, P: Calculated based on the automatic system
- Clamping Area, A: Determined by the dimensions of the jaw surface

Using these values, we obtain a clamping force of approximately **900 N**, exceeding the initial design requirement of 500 N.

4.3.2 Efficiency Improvement Calculation

The vice's automation reduces clamping time from 60 seconds (manual operation) to 24 seconds. The improvement is calculated as follows;

Vice Handle Time Efficiency = 60-24/60 x 100 = 60%

Thus, the automatic vice improves clamping time by **60%**, significantly enhancing operational efficiency.

4.4 COST ANALYSIS

The cost analysis is an essential part of the project to ensure that the design and development of the automatic vice are both cost-effective and within the allocated budget. This section breaks down the costs of materials, components, and other relevant expenses related to the project.

4.4.1 Cost Of Material And Components

Table 4.4.: Cost Of Components And Its Quantity

No	Item	Quantity	Unit Cost (RM)	Total cost (RM)
1	Mild Steel Plate (20 cm x 20 cm)	6	30.50	183.00
2	12V Linear Motor Cylinder	1	78.00	78.00
3	DC Motor Speed Controller	1	11.00	11.00
4	Wire Cable (1 meter)	1	2.00	2.00
5	Battery	1	67.00	25.00
6	Toggle Switch	1	7.00	7.00
7	Flat File (200 mm)	2	22.00	12.00
8	Screw	20	1.50	30.00
9	Spring	1	15.00	15.00
Total Cost			363.00	

4.4.2 Additional Costs

In addition to the material components, several other costs were considered, including labor, testing, and transportation of materials. Below is the breakdown of these additional costs:

Table 4.5: Additional Cost For Automatic Vise

Category	Description	Cost (RM)
Transportation	Delivery of materials	50.00
Total additional cost		50.00

4.4.3 Overall Project Cost

The overall cost of the project is the total of material costs and additional costs as shown below:

Table 4.6: Overall Cost For Automatic Vise

Cost category	Total cost (RM)
Materials and components	363.00
Additional Costs	50.00
Overall Project cost	413.00

4.4.4 Cost Efficiency

The total project cost of RM 413.00 demonstrates that the Automatic Vice was developed within a reasonable budget. The selection of cost-effective materials and efficient labor management helped to keep the expenses controlled while ensuring the quality and durability of the product. Moreover, the projected cost aligns with similar products available on the market, offering a competitive price for its performance and features.

4.5 SAFETY RISKS

The table below summarizes the safety risks identified during the development and use of the Automatic Vice, along with the mitigation measures implemented to reduce these risks:

Table 4.7: List Of Safety Risks, Its Impact and Mitigation Measures

No	Safety Risk	Impact	Mitigation Measures
1.	Electrical Shock	The User May Experience An Electric Shock If The Wiring Is Exposed Or Damaged	-All Electrical Wiring Is Insulated And Housed In Protective Casings A Proper Grounding System Is Installed To Prevent Electrical Leakage -A Fuse Is Installed To Prevent Short Circuit
2	Pinching Or Crushing Risk	The User May Be Injured If Hands Or Other Body Parts Come Into Contact With The Moving Clamping Jaws	-A Safety Guard Is Installed Around The Clamping Jaws To Prevent Accidental Contact -Warning Labels Are Placed To Remind Users To Keep Clear Of Moving Parts
3	Overloading And Structural Failure	The Vice May Fail Or Break If It Is Loaded Beyond Its Designed Capacity	-The Maximum Load Capacity Is Marked On The Vice -Load Sensors Are Installed To Monitor The Clamping Force And Prevent Overloading -Regular Maintenance Checks Are Scheduled

4	Fire Hazard Due To Electrical Components	Electrical Components May Overheat Or Cause a Fire In Case Of Damage Or Malfunction	Fire-resistant materials and high-quality electrical components Components used. -An Automatic Shutoff System Is Installed In Case Of Overheating -Regular Inspections Are Conducted To Detect Any Faults
5	Operator Fatigue And Human Error	The User May Become Fatigued After Extended Use, Increasing The Risks Of Error Or Accidents	The automation of The vice reduces the need for constant manual operation, Helping To Minimize User Fatigue -Training Is Provided To Ensure Proper Usage And Reduce The Chance Of Human Error

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

In conclusion, the Automatic Vice successfully met the design objectives by providing a consistent clamping force that securely holds a variety of workpieces. The automation feature significantly reduced manual effort and improved operational efficiency compared to manual vices. The materials used, particularly the steel frame and jaws, proved to be durable under extensive testing, showing no significant signs of wear. However, a slight delay in the automation system response was observed during high-load operations, which may affect performance. Overall, the safety features implemented, including the protective guard and warning labels, effectively minimized the risks associated with the vice's operation.

5.2 RECOMMENDATIONS

1. Upgrade the motor to increase the clamping force capacity for handling larger workpieces.

2. Improve the automation control system to reduce response delays during heavy operations.

3. Add advanced safety features such as emergency stop sensors for enhanced user protection.

REFERENCES

1. Salman Darzi1, Sufiyan Chaudhry2, Hrishikesh Kolhe3, and Chirag Hiwarkar4 1, 2, 3, 4 Nutan College of Engineering and Research
2. Prof. Rushikesh D. Sonar1, Milind Y. Patil2, Karan B. Bandawane3, Vaibhav A. Bhandare4, Darshan M. Chaudhai5
3. Adityasing Chauhan, Samarth Patil, Ved Yadav, Shashank, Gujar, and Bidve Mangesh (2022) "Pneumatic Bench Vice"
4. M. Rajesh, S. Ganesh Kumar Reddy, P.H. Lokesh, A. Adarsh Raj, P.Pavan Kalyan, and V. Kiran Kumar (2021), "Design and Development of Prototype Model of Pneumatic Bench Vice."
5. Swapnil B. Lande, Tushar S. Shahan, Mitesh M. Deshmukh, Mahesh D. Mange, Durgesh V. Ahire, and Ekanath K. Rathod (2020), "DESIGN OF PNEUMATIC VICE."
6. M. SANJAY KUMAR, S. SIVARAJNANI V. SOUNTHARYAN S. UTHAYAKUMAR G. CHANDRA, SEKAR, M. GEETHA (2022) “FABRICATION OF PNEUMATIC VICE”
7. Parr. Andrew (2003), "Hydraulic & Pneumatics, Butterworth Hermann Ltd.
8. Majumdar S.R. "Pneumatic Systems," Tata McGraw-Hills Company Ltd.

APPENDIX A

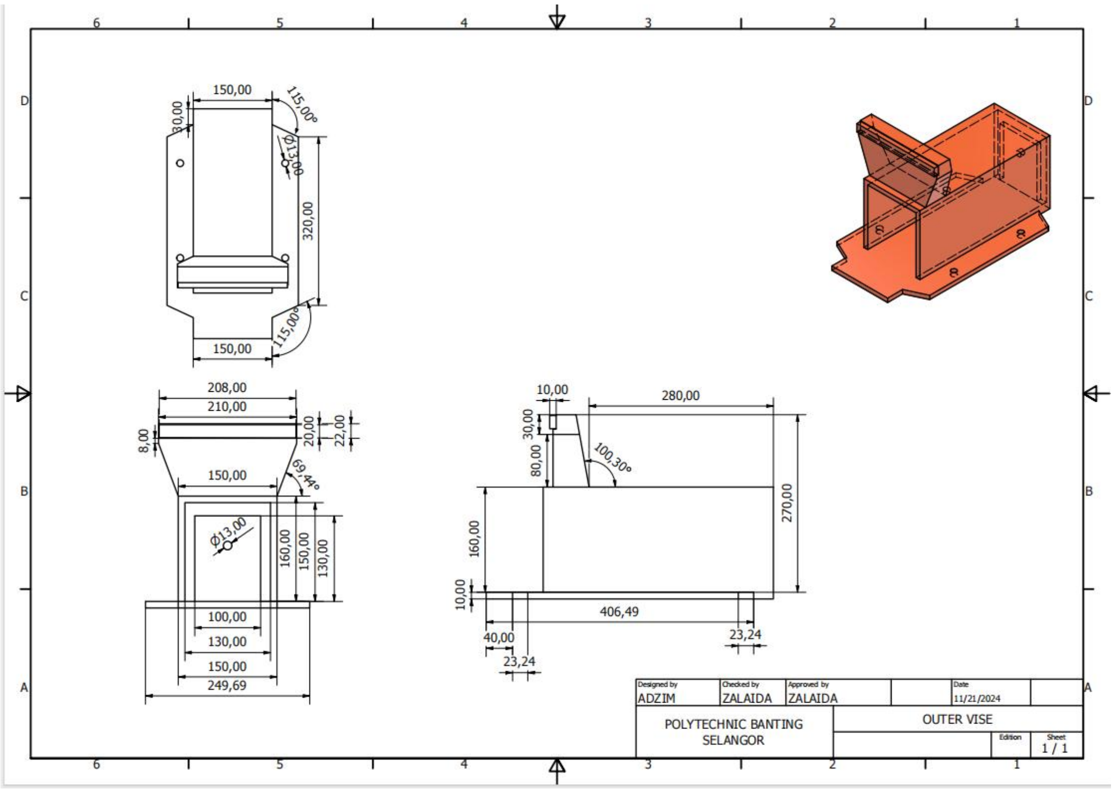
DECLARATION OF REPORT WRITING SEGREGATION

SUB-CHAPTERS	DESCRIPTION
MUHAMMAD AMEER FAHMI BIN BAHARUDDIN (24DTP22F1049)	
1.3	PROBLEM STATEMENT
1.5	SCOPES PROJECT
2.1	INTRODUCTION LITERATURE REVIEW
2.2	DESIGN THAT CURRENTLY AVAILABLE IN THE MARKET
2.3	COMPONENTS
3.2.3	DESIGN PROPOSAL 3
3.3	SUMMARY OF ALL DESIGNS
4.4-4.4.4	COST ANALYSIS
4.7	SAFETY RISKS
MUHAMMAD ADZIM BIN MASTUKI (24DTP22F1008)	
1.4	PROJECT OBJECTIVE
3.1	INTRODUCTION OF METHODOLOGY
3.2	CONCEPT SELECTION AND DESIGN
3.2.1	DESIGN PROPOSAL 1
3.4-3.4.1	TECHNICAL DRAWING
3.6	GANTT CHART
4.2-4.4.2.3	PROJECT FINDINGS
4.3-4.3.2	MATHEMATICAL CALCULATION IN PRODUCT DESIGN

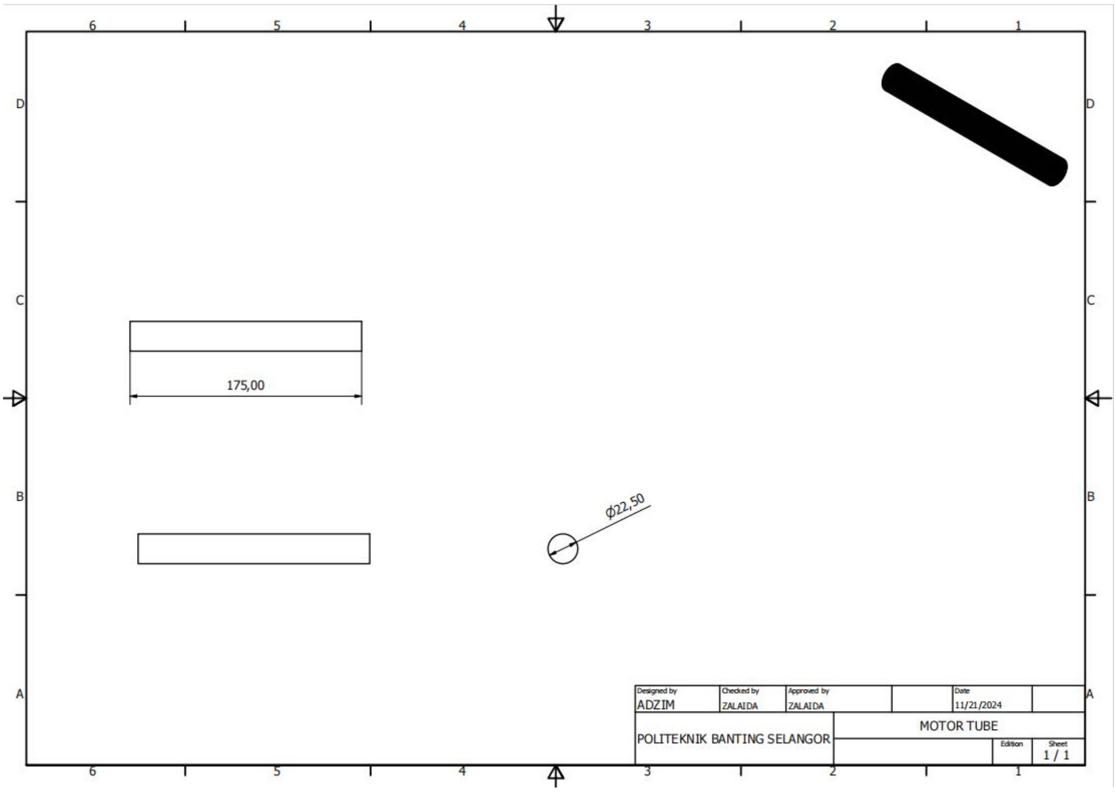
NUR ELZA EMYLIESHA BINTI RAHIM (24DTP22F1047)	
1.1	INTRODUCTION
1.2	BACKGROUND OF STUDY
3.5	COSTING
4.1-4.1.2	BUILDING THE PROJECT
4.3	PRODUCT OVERVIEW
5.1-5.2	CONCLUSION AND RECOMMENDATIONS
	REFERENCE
	RESULT TURNITIN
MOHAMAD FAHRUL RIZKY BIN ALPADIL (24DTP22F1042)	
II	STATEMENT OF Attenuation AND Property RIGHTS
III	APPRECIATION
IV	ABSTRACT
V	ABSTRACT IN MALAY
VI	TABLE OF CONTENTS
VII	LIST OF TABLES
VIII	LIST OF FIGURES
X	LIST OF Symbols
3.2.2	DESIGN PROPOSAL 2
	APPENDIX

ENDORSED BY:	…..…………………… **ZALAIDA BINTI TALIB** **PROJECT SUPERVISOR** **DATE:**
OFFICIAL STAMP:	

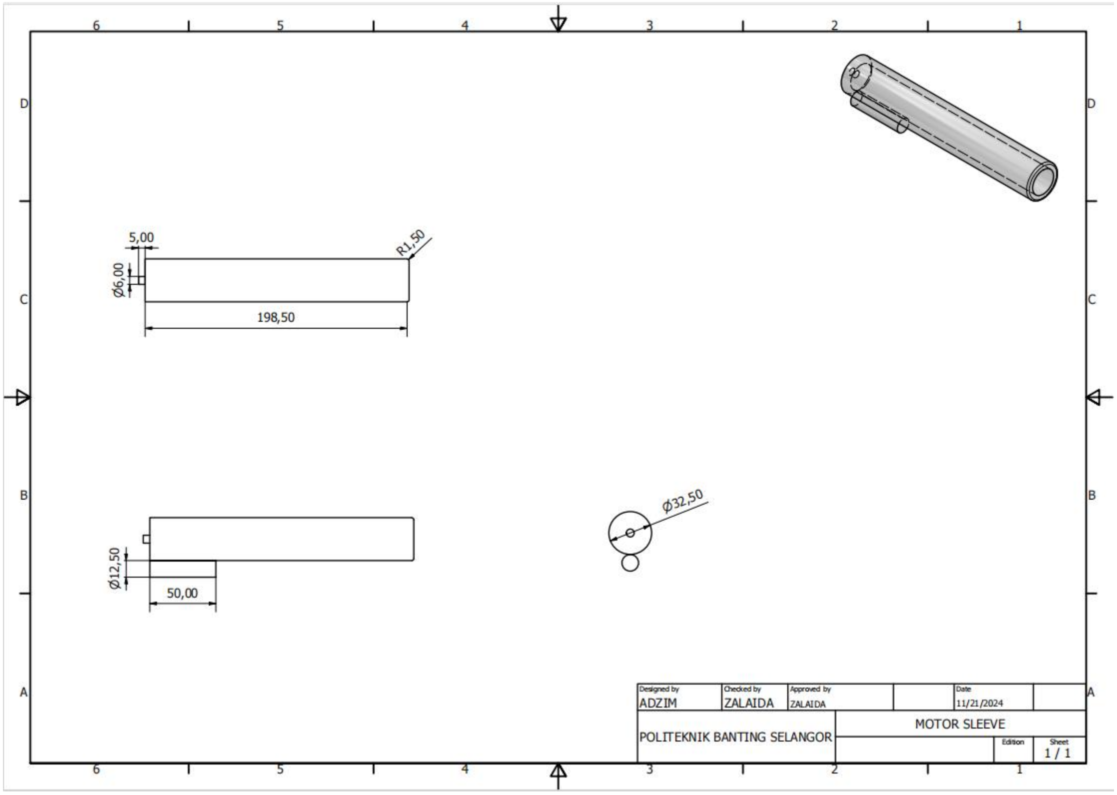
APPENDIX B



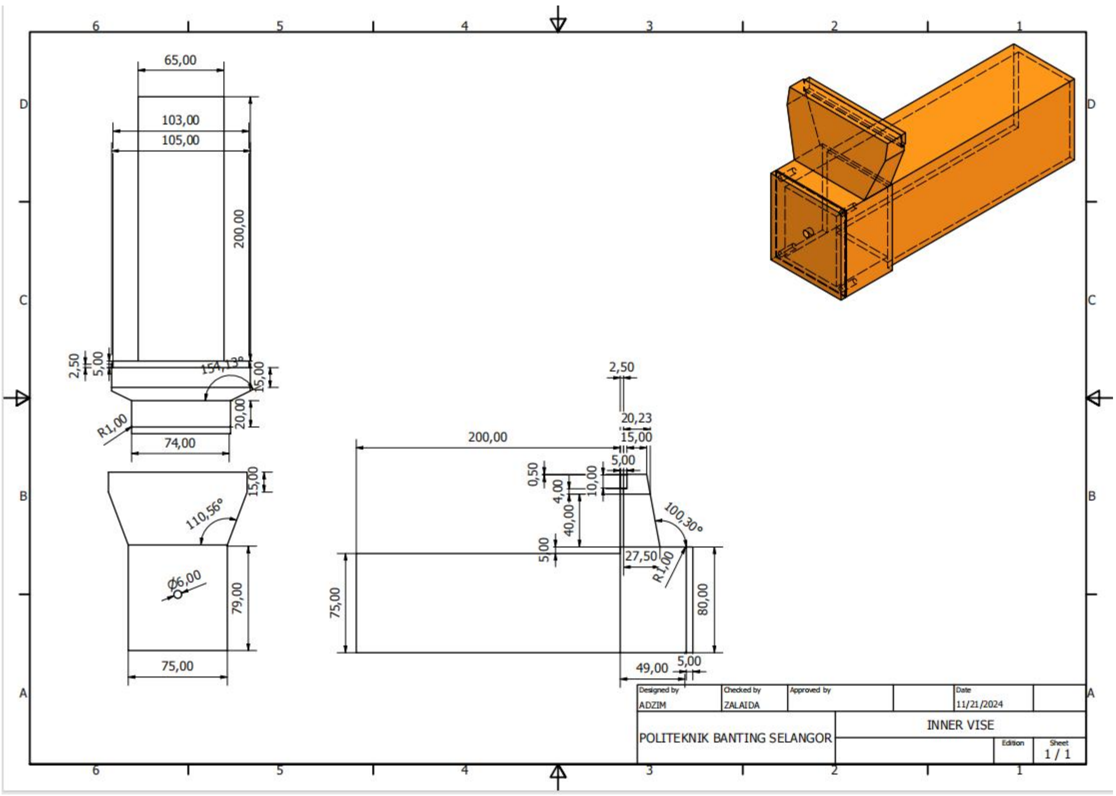
Orthographic And Isometric Drawing Of Outer Vise Of Automatic Vise



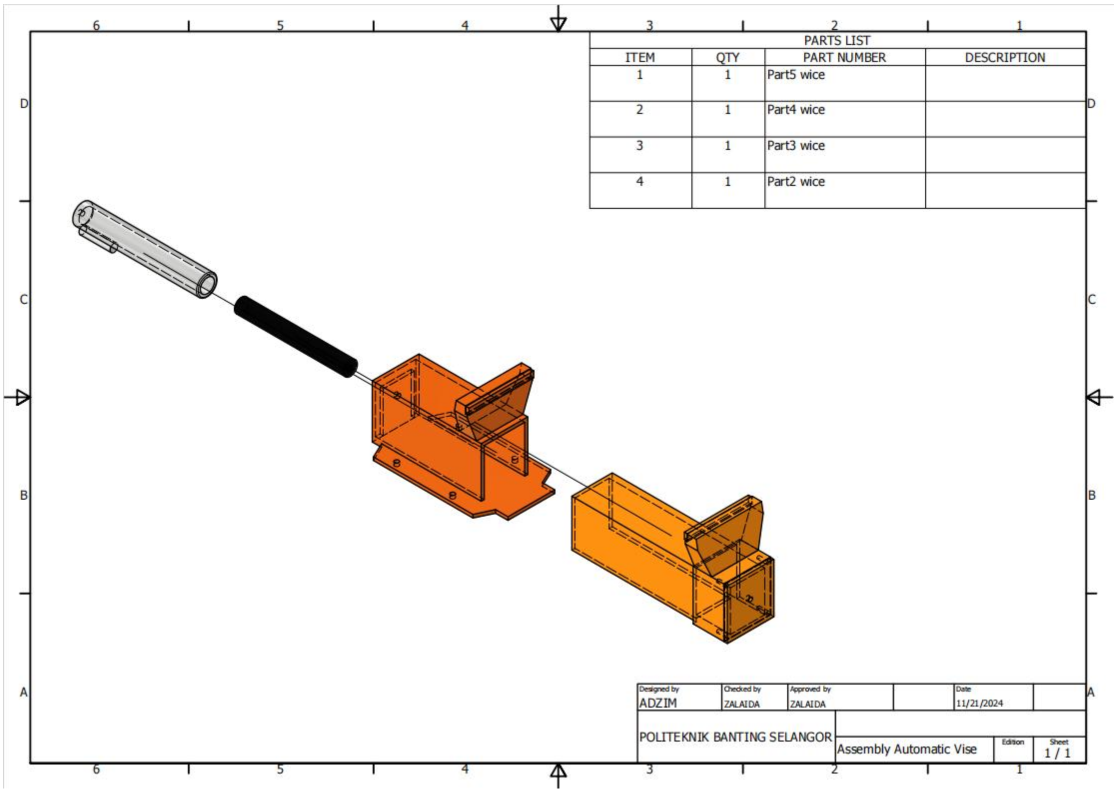
Orthographic And Isometric Drawing Of Motor Tube Of Automatic Vise



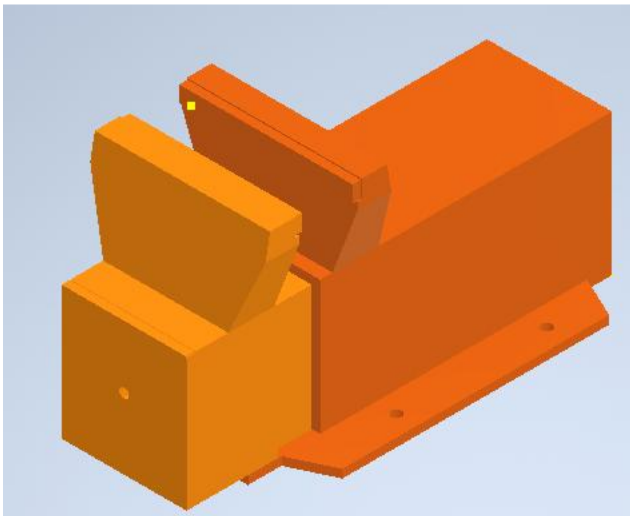
Orthographic And Isometric Drawing Of Motor Sleeve Of Automatic Vise



Orthographic And Isometric Drawing Of Inner Vise Of Automatic Vise



Exploded Drawing Of Automatic Vise



Assembly Of Automatic Vise

APPENDIX C

Full Circuit Diagram For Controller Box

Motor Battery That Is Connected With Modular And Main Power Switch On The Cover

Modular That Is Connected With Actuator

Modular That Are Connected With Extending, Retracting And Adjustable Speed Controller Switches On The Cover