BUILDING MACHINE BI 2E

INSTRUCTION MANUAL

ELGI Rubber Company Limited

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Foreword

The Building Machine BI 2E is a compact and space efficient machine. It is designed to stitch the cushion gum and the tread on the prepared casing when it is in an inflated, road-running condition. This machine stitches treads on the tyre with tight bonding, which will be more prevalent in the emerging market. It has the capability to mount 14” to 24.5” bead size tyres on same hub.

The machine is designed and manufactured for accurate and trouble free performance and can be operated by persons with little training. This instruction manual provide details of installation, commissioning, operation and preventive maintenance procedures

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Introduction

Elgi Rubber Company Limited is a pioneer in Tyre Retreading, providing one stop solutions for the Tyre Retreading Segment.

Thank you for purchasing our product Building Machine.

Company Profile:

ELGI Rubber Company Limited has its headquarters in India with subsidiaries in Australia, Brasil, Kenya, the Netherlands, Sri Lanka and the United States of America. ELGI manufactures a comprehensive range of raw material, equipment, tools and accessories used in the 'Rubber Industry', predominantly in the 'Tyre sector'. With state of the art manufacturing facilities, testing laboratories and R&D centers around the world, ELGI is able to deliver products to the most demanding users.

ELGI's products are sold under the following brands:

Jet

Retread and Repair Systems

CRS

Cincinnati Retread Systems

Expandable Rims & Hubs

Armonas

Retread Process Equipment

Pincott

Rasp Blades, Hubs & Spacers

Carbrasive

Brazed Carbide Tools

Midwest Rubber

Midwest Rubber

Gums, Adhesives & Sealants

Westernweld

Tyre & Tube Repair Products

Rubber Resources

Ecorr® Reclaim Rubber from Rubber Resources

Reclaim Rubber

1. General Information / Contact Information

Contact information

Our Head Office is located at Coimbatore, Tamil Nadu,

India.Address : ELGI Rubber Company Limited,
Super A Unit,
Coimbatore Private Industrial Estate,
Kurichi, Coimbatore - 641021

Phone : (91)-422-2321000

E-Mail : enquiry@in.elgirubber.com

Website : www.elgirubber.com

Technical Support

ERCL's Technical team will answer your technical queries regarding the installation, use, troubleshooting, and maintenance of our products. You may also email your queries to enquiry@in.elgirubber.com

Reference materials

Upon email request to enquiry@in.elgirubber.com, reference materials including Outline, Mounting drawings, Operator's Manuals, Technical Bulletins, Pneumatic schematics, Electrical schematics, Troubleshooting procedures and Spare parts details will be provided.

Warranty

Warranty of the equipment is applicable for a period of 6 months from the date of commissioning or 9 months from the date of Invoice whichever is earlier, against manufacturing defects only. Warranty for bought out Electrical Pneumatic items etc., will not be governed by the manufacturer's warranty.

Limitation of Liability

The manufacturer assumes no liability for damage resulting from:

- Disregard / non-observance of the operating manual
- Intentional misuse
- Use other than as intended
- Operation by untrained personnel
- Operation by lay persons (to carry out maintenance work, etc)

Technical modifications to the unit have not been agreed with the manufacturer

Use of replacement parts that have not been approved by the manufacturer

Responsibilities of the operator

The unit is used for commercial purposes. The operator of the unit is therefore subject to the statutory obligations relating to occupational safety. In addition to the safety instructions in this instruction manual, the regulations on safety, accident prevention and environmental protection that apply to the unit's field of use must be complied with.

In particular, the following apply:

- The operator must be familiar with the applicable occupational safety regulations.
- The operator must ensure that all employees who use the unit have read and understood this operating manual.
- The operator must also train personnel at regular intervals and inform them of the dangers that can arise when using the unit.
- The operator must provide personnel with the necessary protective equipment.
- The operator must have all safety devices checked regularly for operability and completeness.

Documentation

Content and structure

This instruction manual is an essential part of this unit. It contains instructions and information on how to use the unit safely and must be available to all users throughout the unit's service life. This instruction manual is intended for use by trained operating personnel.

2. Safety

Safety

The Building Machine is a commercial machine, used in Tyre retreading facilities for Stitching Gum and Tread on the Buffed Tyres.

Requirements for personnel

Trained and qualified personnel who know how to use the unit and whose specialist training, skills, experience and knowledge of the relevant regulations enables them to carry out the tasks assigned to them independentlyand recognize and avoid potential hazards.

Hazard information

Hazard information includes terms, symbols, and instruction used in this manual or on the equipment to alertboth operating and service personnel to the recommended precautions in the care, use and handling.

Labeling scheme for integrated text boxes and references

The following safety notices are used in this manual.

Certain terms are used throughout this manual or on the equipment labels. User need to familiarize with theirdefinitions and significance.

⚠ Danger:

Imminent hazards which, if not avoided, will result in fatal or serious injury.

⚠ Warning:

Potential hazards which, if not avoided, could result in fatal or serious injury.

⚠ Caution:

Potential hazards or unsafe practices which, if not avoided, may result inminor or moderate injury.

Caution:

Potential hazards or unsafe practices which, if not avoided, may result in Product damage.

Important:

Important information or recommendation concerning the subject underdiscussion.

Note:

Point of interest for more efficient or convenient equipment operation;additional information or explanation concerning the subject under discussion.

Symbols and Definitions

Earth / PE:

Earth or PE connection to be made to avoid the earth leaked shock

Warning:

Disconnect Power supply before Servicing or Cleaning

Warning:

No Loose Connection

Warning:

Foot Protection Required

Warning:

Crush Hazard - Keep feet clear

Warning:

Finger protection on rollers

Warning:

Electric Shock Hazard

Danger:

Electrical Shock or Burn Hazard
Turn off power supplying this equipment before working inside.

Warning:

Electric & Pneumatic power sources present. Disconnect electric power and compressed air supply

Danger:

Crush Hazard
Keep Hands Clear, Follow lockout procedure before servicing

2. Safety / General Hazards

General hazards

Following are description of general hazards and unsafe practices that could result in fatal, severe injury, or product damage. Specific warnings and cautions not appearing in this section are found throughout the manual.

Danger Serious personal injury 	This is Electrical Class 1 product which runs with 220 V AC, Single Phase, 50 Hz, AC source. This machine has DC converter Drive, which converts 220 V AC source into high Direct Current source to Operate the Machine. Do not allow or Direct or indirect contact with Electrical Parts without proper PPE and safe procedure. Direct or indirect contact with Electrical part inflicts severe corneal injuries leading to permanent disability or fatal accident. This product is not intended for use in explosive, or potentially explosive, atmospheres.

Warning Serious personal injury 	This Machine has Stitching unit which is operated by Pneumatic Cylinder. Do not allow or Direct or Indirect contact with Stitching unit during the stitching process. Direct or indirect contact with moving parts may leading to serious personal injury on hands.

2. Safety / General Hazards

Caution Minor or moderate injury 	This Machine has rotating shaft which run with product running speed Do not allow or Direct or Indirect contact with rotating shafts. Don't Try or alter the safety protection at rotating shaft section. Direct or indirect contact with rotating shaft may leading to minor or moderate injury.

Danger Serious  personal injury	This Machine has Power and Control circuit electrical panel which is operate 220 V, Single Phase AC, 50Hz, source. Do not operate the machine at Electrical panel at open condition. Always ensure that, the electrical panel is completely in locked condition. Direct or indirect contact with electrical panel components or conductive foreign materials or dust deposition may cause highly flammable in and around the machine area. It may lead to serious personal injury to the Operator.

2. Safety / Hazard Information

Hazard information

BI 2E should be installed and operated in manufacturing or laboratory facilities by trained personnel only. Due to the considerable risks and hazards associated with the installation and operational use of any equipment, the operator must follow product warning labels and instructions to the user regarding safety. To prevent exposure to direct or indirect hazards, following all safety precautions specified throughout this manual andexercise safe operating practices as per electrical safety standards.

Lock Out Tag Out (LOTO)

This Machine designed with LOTO concept as per OSHA standards. Whenever the machine undergoes any Electrical or Mechanical or Cleaning activity, turn OFF the main ISOLATOR switch and follow LOTO procedure.

List of Hazards Associated with this Machine

- Electrical hazards.
- Pneumatic hazards.
- Sharp Edge hazards.
- Rotating and pinch point hazards.

Use standard safety procedure while working with respective source and use proper recommended PPE's.

Grounding

This machine needs additional body protecting grounding or Earth, which needs to be connected with theMachine to Ground / Earth with Copper wire or conductor or rod.

Other Hazards

The following hazards are typical for this product family when incorporated for intended use:

a) Risk of injury when lifting or moving the unit;
b) Risk of exposure to hazardous Electrical energy through unauthorized removal of access panels, doorsor protective barriers;
c) Risk of exposure to hazardous Electrical Energy and injury due to failure of personnel to use proper PPEwhile involving in maintenance or troubleshooting;
d) Risk of exposure to hazardous or lethal voltage through unauthorized removal of cover, doors, oraccess panels;
e) Risk of exposure to hazardous when connected with non-standards voltage source apart from mentionspecification in machine electrical name plate.

Disposal

This product contains components that are considered hazardous industrial waste. If a situation occurs where the machine is non-functional and cannot be repaired, it may be returned to ELGI Rubber Company Limited who,for a fee, will ensure adequate disassembly, recycling, and/or disposal of the product.

2. Safety / Personal Protecting Equipment

Personal Protecting Equipment

Caution Serious personal injury	Personal Protecting Equipment listed below to be used wherever applicable. Failing to use may cause serious personal injury

Industrial Safety Shoes to be used to protect the foot from impact due to Tyre rolling on the foot. Electrical Safety Shoes to be used to protect from any Electrical Shock.

3. Getting started

Getting started

Chapter Overview

Use information in this chapter to prepare your Builder Machine BI 2E for operation. The order of information presented in this chapter is the same as the order of task that you will need to perform. The bestway to get your machine ready for operation is to start at unpacking and work your way through connection.

This chapter contains the following information:

- **Introduction**- Introduces the Builder Machine BI 2E, lists important feature, and describes about machine function.
- **Unpacking**- Provides important information about unpacking the Builder Machine BI 2E.
- **Package Contents**- Displays and describes all components shipped with this machine may vary as per the optional features purchased.
- **Mounting**- Describes how to assemble the Builder Machine parts
- **Connections**- Explains how to connect power, control cables and pneumatic connections of this machine.

Introduction

The Introduction section includes subsection:

- About BI 2E
- Builder Machine's nomenclature
- Unpacking
- Package Contents

About BI 2E

The Building Machine BI 2E is a compact and space efficient machine. It is designed to stitch the cushion gum and the tread on the prepared casing when it is in an inflated, road-running condition. The stitching unit is capable of effectively stitching Wing treads, which will be more prevalent in the emerging market. It has the capability to mount 14" to 24.5" bead size tyres on same hub.

It features an automatic (motorized) building pass for stitching bonding Gums and Tread over the Buffed Tyre in Inflated Condition.

This machine is designed for building a wide range of tyres and can be operated by unskilled persons with very little training.

3. Getting started / Builder Machine

Builder Machine - Nomenclature

Builder Machine BI 2E major sections

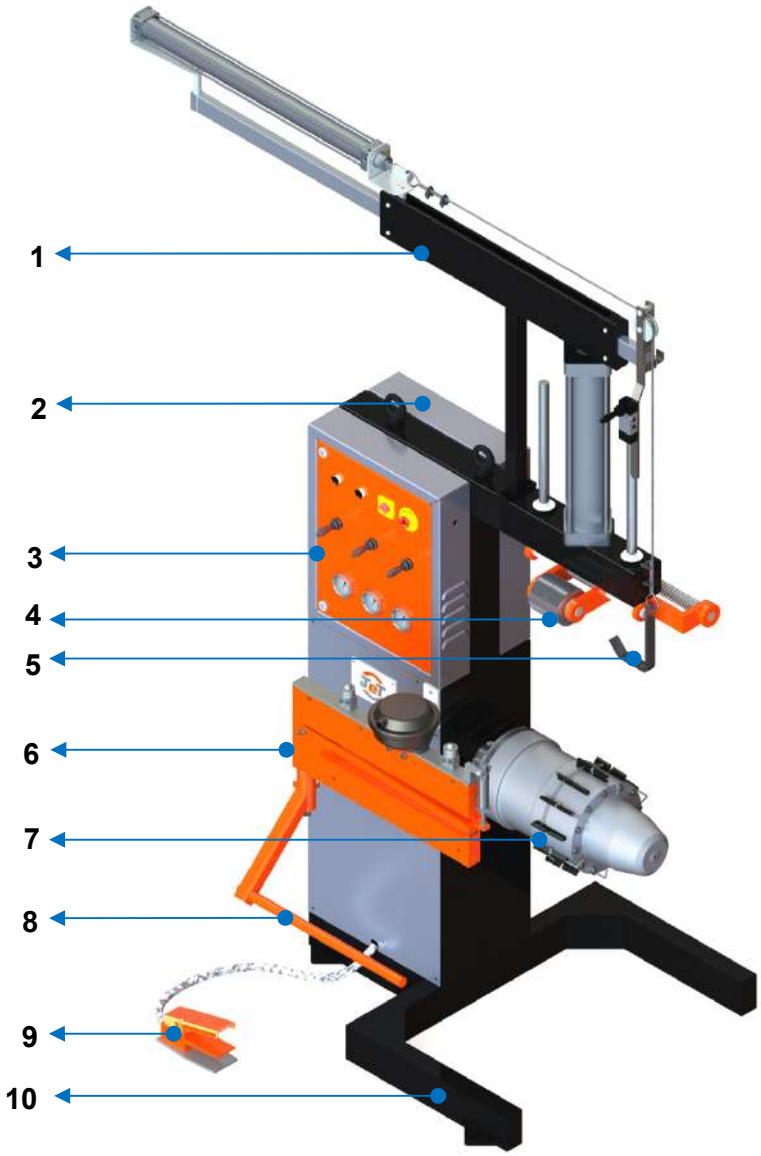

Figure 3-1 Building Machine

1	Tyre Lift - Optional	6	Tread Cutter - Optional
2	Control Panel	7	Expanding Hub EH5
3	Operator Panel	8	Bonding Gum Feeding Unit
4	Stitching Roller Unit	9	Foot Switch
5	J- Hook	10	Main Frame

3. Getting started / Unpacking

Unpacking

The unpacking section includes the below:

- Incoming inspection.
- Un-Packaging guidelines.

Incoming inspection

Upon arrival, inspect all shipping containers for singles of damage. If you discover shipping damages, document the damage (photographically if possible), then immediately notify the shipping carrier and ELGI Rubber Company Limited.

The shipping carrier is responsible for any damage occurring during transportation from ELGI Rubber Company Limited to your receiving dock.

Packing guidelines

Unpacking

- To prevent equipment damage or loss of small components, use care when removing packaging materials.
- After unpacking, review the Package Contents section and verify that all components are available (optionalitems would be available only if purchased).
- Lift the machine only at the indicated locations of the machine.
- Save all shipping containers and packaging materials, including cover and plugs. Use these specialized packingmaterials when shipping the machine to another location.

Packing

- When packing a machine for shipment, be sure to remove all accessory items not originally attached to the machine including external electrical and pneumatic incoming connections.
- Refer to Builder Machine packaging instruction drawings and image in the technical reference chapter fordetails on packaging the machine using ELGI Rubber Company Limited supplied shipping materials.
- When shipping machine, release the stored energy like pneumatic supply locked in cylinder.
- Ensure the proper fixing of shipment lock clamps before shipping.

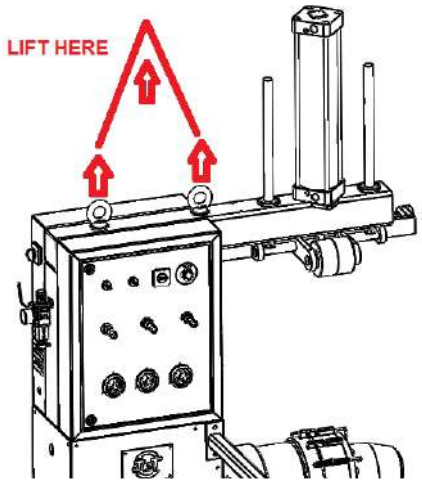

Figure 3-2 Lifting Point

3. Getting started / Package Contents

Package Contents

S. No	Shipping Box Contents	Qty
1	Builder Machine Assembly	1 No
2	Bonding Gum Feeding Unit	1 No
3	Tread Cutter (Optional)	1 No
4	Tyre Lift Assembly (Optional)	1 No

Contents description

Each item listed in above Table is described below

1. Builder Machine Assembly: A complete mechanical assembly of the Tyre Builder Machine includes the geared DC motor for operation.

2. Bonding Gum Feeding Unit: Feeder Shaft for Boding gum Spool mounting and feeding.

3. Tread cutter - Cutter assembly for cutting the tread at required length.

4. Tyre Lift Assembly - Pneumatic Assembly for Loading & Unloading of tyres.

3. Getting started / Specifications of the Product

Specifications of the product:

Model	BI 2E
Power Requirement	~0.75KW
Machine control system	Electrical
Tyre drive motor power	1HP DC Motor
Expanding Hub – 12 Segment	Included
Method of stitching	Manual
Foot Switch and Fwd / Rev Direction Stitching	Included
Tyre RPM	Low 2RPM / High 10RPM
Bonding gum feeding unit	Included
Tread roll support stand	Optional
Tyre lift	Optional
Tread cutter	Optional
Mechanical tread cantering device	Optional
Tread edge marking lasers	Optional
Wing tread Stitching Compatibility	Not Applicable
Minimum Tyre Size	6.50 - 14
Maximum Tyre Size	12.00 - 24.5
Machine Dimension – LxWxH (With Tyre lift)	~1600 x 1300 x 2330
Machine Weight	~300kg
Supply Voltage	220V 50/60Hz (Based on Customer requirement)
Control Voltage	220V AC
Air Pressure Requirement	7 to 8 bar
Installation	Free standing / Grouted

Description

The Builder Machine BI 2E consists of the following major components:

1. **Mainframe:** The main frame houses all the main components of the machine with the Tyre lifting adjustment and the Tyre Building Parts.
2. **Stitching Unit:** The stitching unit mounted in top portion of the main frame. It consist of pneumatic cylinder and screw rod with stitching rollers. Pneumatic cylinder is used to press the stiching roller assembly. Rollers is used to stitch the Precured tread and Retreaded tyre for uniform bonding of Bonding gum with Precured tread.
3. **Tyre Drive:** The tyre drive is mounted inside of the main frame. The tyre is driven by a 1 HP motor coupled to a gear box on which the expandable hub is fixed for stitching of different size tyres.
4. **Electrical Panel:** This is located on the column right side of the main frame. All electrical components are located inside the panel.
5. **Pneumatic Circuit:** The pneumatic components are located left side column of main frame and are controlled from the operating panel.
6. **Tyre Lift:** For easy loading and unloading of tyres on to the expanding rim lift is provided.

Assembly and Commissioning Tools

1 Accessories

Optional	Tyre Lift
Optional	Tread Cutter

2 Tools

- Spanners - Double end 6-26 - 1 Set
- Spanners - Ring End 12-19 - 1 Set
- Adjustable Spanner - 1 No
- Cir-clip Pliers external 6” - 1 No
- Screw Driver 6 & 8 - 1 No. Each
- Allen Keys 3-10mm and 7/32” - 1 Set
- Line Tester - 1 No
- Nylon Hammer - 1 No
- Star Screw Driver - 1 No
- Screw Driver Set - 1 No
- Insulation Tape - 1 No
- Teflon Tape - 1 No
- M seal - 1 No
- WD 40 Rust Removing Spray - 1 No
- Pipe Wrench - 1 No

3 Materials

- Gear oil ISO VG-Grade 320 or SAE 140 - 1 Ltr.
- 2.5 Sq.mm x 4 core flexible copper cable Length as per installed position
- PU8 Pneumatic Hose – 6 Mtr.

Preparing Product for Use: Installation and Commissioning

Unloading

Unload the machine only by using eye bolt provision given in the machine. Remove the machine bed bolt & take out the wooden pallet.

Positioning

The machine does not need any foundation. Machine should be grouted to the floor, at the indicated anchoring points. Position the machine in the desired location on a level surface. The area where the machine is located should be well illuminated and free of noise.

- Rear side of the machine should be provided with the clearance of 1.25 m, to do maintenance and service onthe panels.
- Right side and left side of the machine should be provided with the clearance of 0.6 m from the Panels.
- Front side of the machine should be provided with the clearance of 2 m to bring and load the Tyre onto the machine.

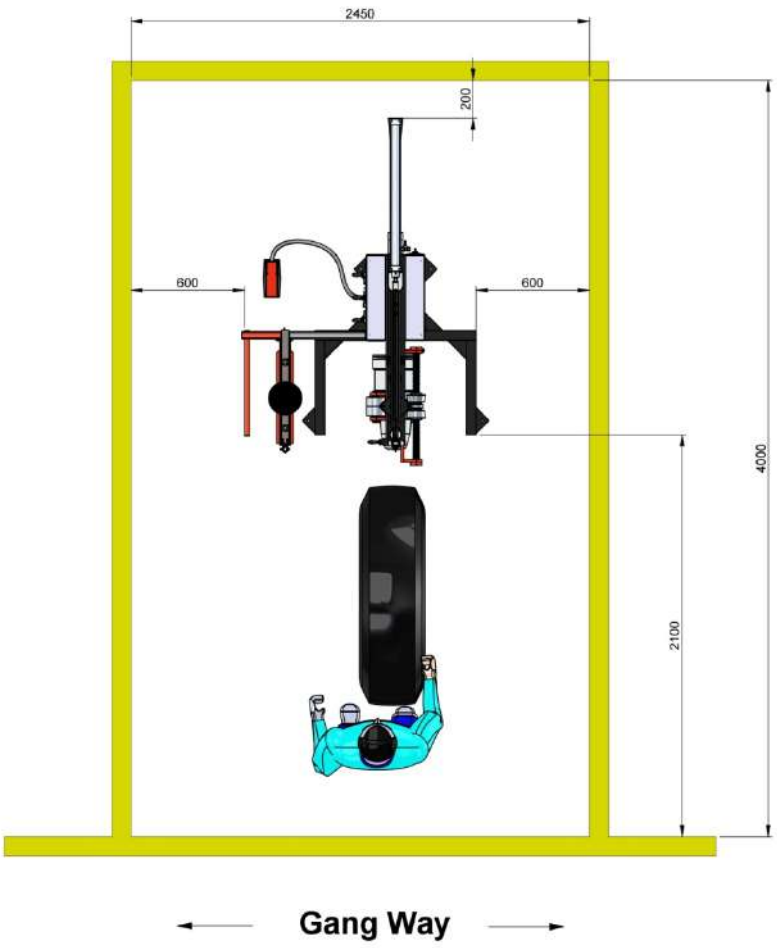

Figure 3-2 Machine Footprint

3. Getting started / Connection Layout

Connection Layout

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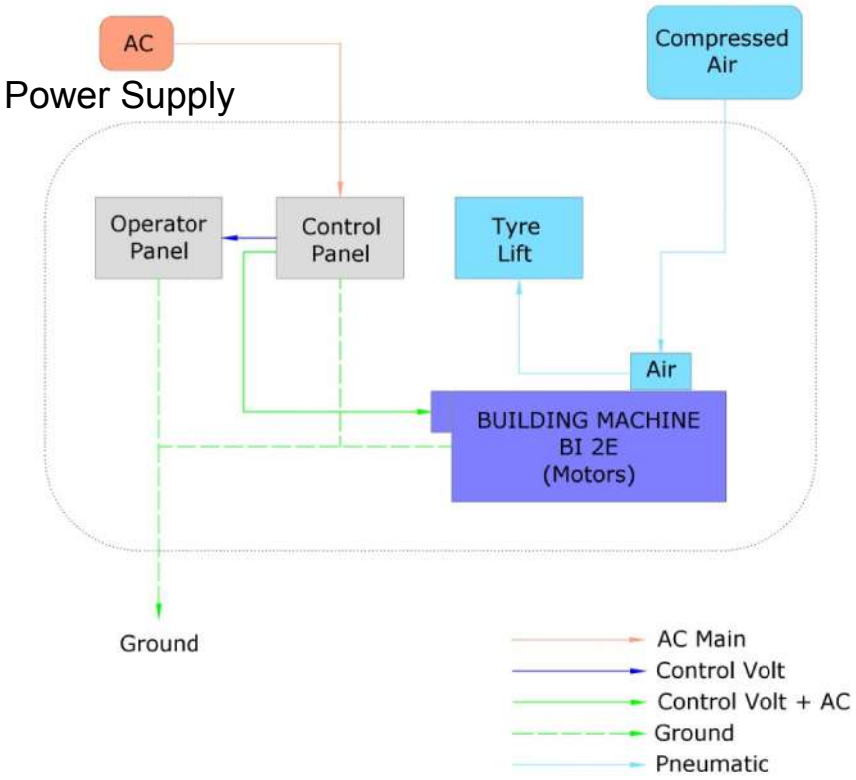


Figure 3-3 Connection Layout

3. Getting started / Connections

Connections

Connections section describes the below:

- Electrical Connection
- Grounding
- Pneumatic connection

Caution Possible equipment damage	The Pneumatic connections and Electrical connections should be made after completion of mounting instruction. After the connection, don't turn on the energy sources until understand the Operation Instructions. Failing of above caution will lead to machine damage or non-recoverable parts damage.

Danger Serious personal injury 	Electrical and Pneumatic source should be connected as specified in machine specification. Follow proper safety procedure. Don't Power on the machine until understand the machine operating Procedure. Failing of this may lead to serious personal injury.

Electrical Connection

Follow the below instructions to establish power connection to this machine.

- Connect the machine with the help of 2.5 Sq mm copper 3 core cable.
- From the nearest air point, draw a line using PU8 Pneumatic hose with quick connection fittings.

AC Power supply

1. Verify the input voltage before connecting the power cables to the machine terminals.
2. Recommended input voltage is 220 V AC, 50 Hz, 3ϕ , (Factory set configuration is 220V AC, 50Hz).

Important: To operating with 220 V AC, 50Hz contact Elgi Technical Support Team to set the configuration.

3. Getting started / Connections

3. Connect the input supply as depicted in Fig 3-4.

Important: The Earth cable (Yellow Green) of the AC input 3 core cable is internally connected to the machine Electrical panel and machine parts. Separate Ground connection to the machine body to be made as described in the Grounding section (Fig 3-5).

Figure 3-4 Electrical Connection - AC main line input at Control Panel

Caution Possible machine damage	Do not reverse the polarities when connecting the AC electrical power cables to your builder machine. Reversed AC supply connection will damage the electrical components.

Caution Possible machine damage	When relocating the machine to another country, verify the input voltage rating configured in the machine with the Voltage specification of the country where the machine is to be installed and operated. Failing to verify and modifying the configuration may possibly damage the machine.

3. Getting started / Connections

Grounding

The Builder Machine BI 2E metal body needs Ground / Earth to be connected. Use suitable connector and copper wire to make ground connection.

Figure 3-5 PE / Ground connection on Panel and Machine

Pneumatic connection

Follow the below instructions to establish the pneumatic connection to this machine.

1. Connect PU-8 pneumatic tube to the quick connection port. Input pressure should be in the range of 8-12 bar.
2. Set the regulator at 8 Kg/cm^2 by rotating the knob clockwise and then lock it.

Important: Incoming air pressure should be maintained at 8 bar during machine operation. Impact - when the pressure goes less than 8 bar, it affects the next cycle of Inflation / Deflation of Hub Tyre.

Figure 3-6 Pneumatic Connection at Mainframe machine assembly

Operation

Chapter Overview

This chapter provides the information to start up and control the Builder Machine BI 2E.This

chapter describes the following sections:

- **Controls and Indicators** - displays and describes exterior controls and indicators on Control Panel and Operating Panel.
- **Initial Startup** -Explains how to start the Builder Machine and to verify the proper operation and running.

4. Operation / Controls and Indicators

Controls and Indicators

The Controls and indicators section describes the below:

Electrical Panel

Control Panel has Isolator / LOTO switch

Panel Door has a white indicator which indicates the presence of electrical power in the Panel.

Figure 4-1 Connectors in Panels

ISOLATOR/LOTO:

- ISOLATOR/LOTO is the main Electrical ISOLATOR for this machine to Power ON / OFF.
- It is a Two position rotatory, maintained type ISOLATOR switch which has the indication mark ON/OFF.
- It's has the feature of LOTO (Lock Out & Tag Out), whenever the machine undergoes maintenance, the service personnel can use the safety padlock provision to isolate and lock the Electrical Energy of the machine for safety.

Danger

Serious personal injury

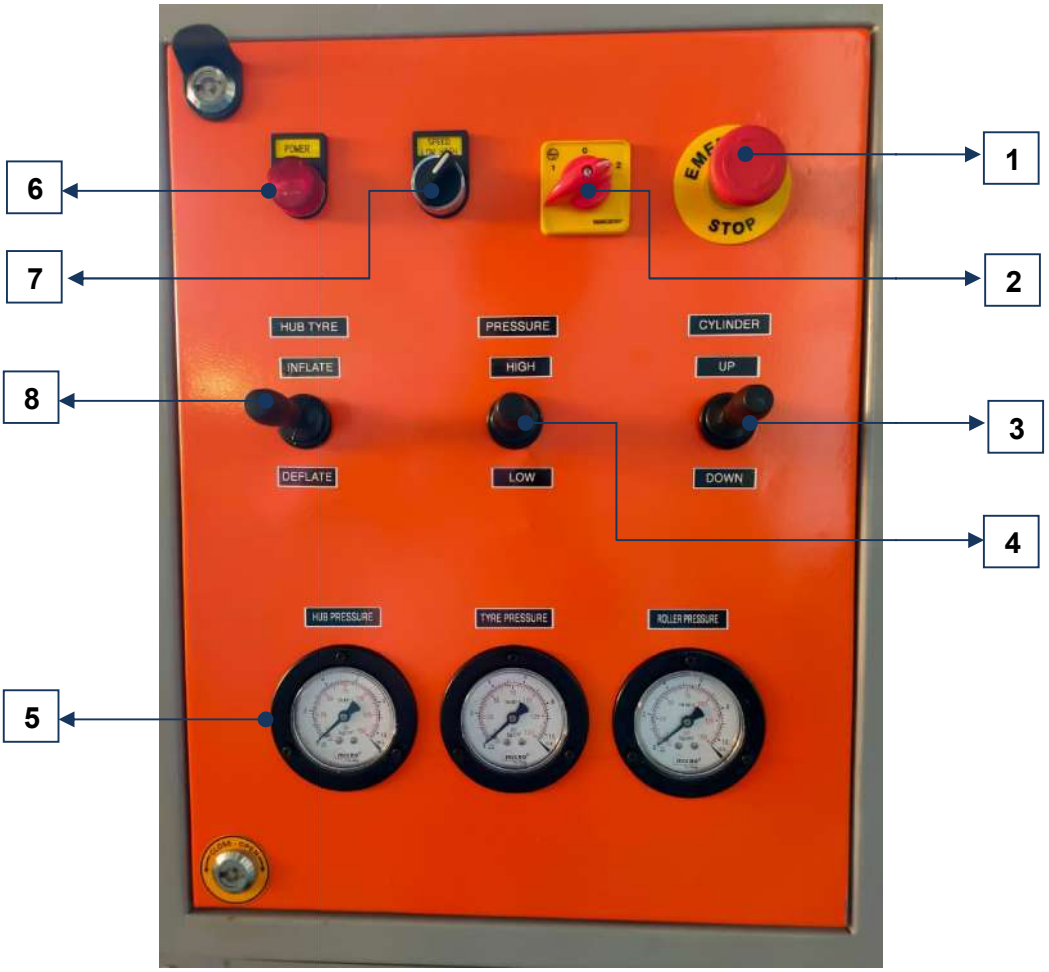
When the ISOLATOR/LOTO is in OFF position, the electrical energy to the electrical circuit only isolated. However, the incoming electrical supply still exists in input terminals of ISOLATOR/LOTO.

The ISOLATOR/LOTO will only isolate the electrical supply to other electrical parts to the machine. It will not isolate the pneumatic energy source.

When the ISOLATOR/LOTO is in OFF position, the pneumatic energy still exists in the machine. The pneumatic energy should be released from the machine manually by reducing pressure using regulator in pneumatic section.

4. Operation / Controls and Indicators

Operating Panel / HMI - Machine Control



Control Elements and Descriptions:

1. **Emergency Stop**

   Emergency Stop - Mushroom Head push button provides machine halt function when it is pressed inemergency condition.

2. **Tyre Drive Direction - Forward / Reverse / Neutral**
   It is a 3 position Selector Switch

   Forward - To rotate the tyre in forward direction
   Reverse - To rotate the tyre in reverse direction
   Neutral - To rotate the tyre manually in both forward and reverse direction

3. **Cylinder - Up/Down**
   It is a 2 position Pneumatic Hand operated Valve

   Up – Stitching Unit moves upward Direction
   Down - Stitching Unit moves downward Direction

4. Operation / Controls and Indicators

4. **Pressure - High / Low**
   It is a 2 position Pneumatic Hand operated Valve

   Low – Low Stitching pressure Selection
   High - High stitching pressure Selection

5. **Pressure Gauge – Tyre / Hub / Roller**

   Indicate the stitching pressure values of Tyre, Hub & Roller.

6. **Power – Indicator**
   It Is a red Indication Lamp

   Indicate the incoming power Supply.

7. **Speed - Low /High**
   It is a 2 position selector switch.

   Low – Slow Speed Tyre rotation Selection.
   High - High Speed Tyre rotation Selection.

8. **Hub Tyre - Inflation / Deflation**
   It is a 2 position Pneumatic Hand operated Valve

   INFLATE
   Selecting the Pneumatic selector switch INFLATE, Expanding Hub to be energized to Hold the Tyre. At the same time tyre getting pressurized.

   DEFLATE
   Selecting the Pneumatic selector switch DEFLATE, Expanding Hub to be exhausted to release the Tyre. At the same time tyre pressure getting released.

Caution Serious personal injury 	The Emergency Stop Button is only for stopping the machine function during uncertainty situation. It is not a regular Function Button to Stop the machine. Do not use the Emergency Stop Button as a safety interlock. It will not protect from any accident during machine troubleshooting / operation / maintenance. Use ISOLATOR/LOTO to isolate the electrical energy of machine. Use LOTO while doing troubleshooting or maintenance.

Initial Startup

Danger Serious personal injury 	Read and familiarize with all the instructions given in this manual. Do not bypass the safety and Operating Instruction which is given in this manual. Do not energize the machine with any out of specification source like over voltage or low-pressure air supply. Failing this will lead to serious personal injury.

Powering the Energy Sources of machine

The Builder Machine BI 2E needs two type of energy sources.

1. Electrical Energy Source
2. Pneumatic Energy Source

1. Electrical Energy Source.

- Establish the electrical connection as per Fig 3-4.
- Energize the Builder Machine with single Phase 220 V AC, 50 HZ AC supply.
- Refer the detailed instructions given in section 3-Getting Started / connections / Electrical connection.

2. Pneumatic Energy Source.

- Establish the pneumatic connection as per Fig 3-6.
- Energize the builder machine by providing 8 bar air pressure.
- Refer the detailed instructions given in section 3-Getting Started / connections / Pneumaticconnection.

Danger Serious personal injury 	Before turning on the main ISOLATOR/LOTO, ensure that the main electrical panel door in the machine should be in closed condition and the Emergency Button should be in released condition. Failing of this will lead to Serious personal injury.

Pre - Operation Checks

- Check all the oil level in the gear box by removing the mainframe cover.
- Check fasteners in the expandable hub to the main shaft are tight.
- Check expandable rim segments are properly assembled and locked in position.
- Check if the safety valve fitted on the expandable rim functions properly, by slowly increasing the pressure to 2 Kgs/Cm^2 by operating the miniature air regulator on the hub.
- Mount a tyre on the expandable hub. Expand the hub and check if the expansion and inflation of the tyre are proper and the pressures shown on the respective gauges are correct.
- Check the tyre while rotating for any wobbling or eccentricity (face out or run out)
- Check for any air leak in the system.

4. Operation / Operating Instructions

Operating Instruction:

Builder Machine

1. Mount the cemented tyre on the expandable rim and inflate.
2. Load the bonding gum spool on the bonding gum let off unit and swing the unit in position.
3. On the control panel, turn the tyre “forward/reverse” switch to “forward” position and high speed/low speed switch to “low speed”.
4. Press the foot switch and as the tyre rotates slowly, apply the bonding gum on the tyre carefully, centring over the crown.
5. Cut off the remaining bonding gum after one full revolution.
6. Remove the poly liner by running the tyre in the “reverse” direction.
7. Apply the cemented tread to the tyre following procedures similar to bonding gum application.
8. Cut the excess tread by marking and positioning it in the pneumatic tread cutter assembly for cutting.
9. Rasp the fresh cut end by suitable tool, taking precaution to cover the exposed bonding gum.
10. Cement the end, dry and apply a strip of bonding gum.
11. Remove the poly from it.
12. Press the “ON switch” on Inspection lamp.
13. Carefully join the two ends of the tread without touching the cemented surface.
14. Stitch the tread at low pressure / high speed once.
15. Stitch the tread again at high pressure / high speed twice.
16. Staple the tread joints properly.

Do’s and Don’ts

Do's

a) All moving parts should be cleaned and lubricated periodically.
b) Gearbox oil should be changed regularly (when colour changes).
c) Air filter should be drained at regular intervals.
d) Ensure that all gauges indicate correct reading.
e) The silencer to be cleaned regularly.
f) Ensure that the locking arrangement on the rims is always good.
g) Ensure correct pressure for hub and tyre as recommended are maintained.

Don'ts

a) Never inflate the hub, when a rim is not mounted.
b) Do not use the tread cutter for cutting other materials.
c) Do not run the machine without oil in the gear box.
d) Do not release the air by pulling the safety valve of the expandable rim to deflate the tyre.
e) Do not release the hub suddenly. This will cause the air inside the tyre to escape through the bead with a loud bang, dislocating the rim.

5. Maintenance & Troubleshooting

Maintenance &Troubleshooting

Chapter Overview

Use information in this chapter to perform maintenance or troubleshooting Builder

Machine BI 2E

This chapter contains the following information:

- Maintenance - describes typical Builder machine maintenance procedures.
- Troubleshooting - explains how to troubleshoot the Builder machine when problem occurs.

Maintenance

The Maintenance section includes the below:

- Disabling the Builder Machine.
- Daily inspections.
- Cleaning Machine Parts.

Disabling the Builder Machine

Before performing any maintenance on your Builder Machine, be sure to completely disconnect themachine by disconnecting electrical and pneumatic energy source from the machine.

Daily inspections

Perform the following steps daily to keep your Builder Machine in optimum operation condition. Except for the procedures described below, no other service is required or should be attempted.

Caution Possible equipment damage	Operating the Builder Machine without performing the daily checkwill lead to the possibility of machine parts getting damage or the life time of machine spare parts would reduce.

- Check the Machine Control Panel is in closed condition.
- Check any loose parts in Machine Control Panel (control and indicators).

Cleaning of Machine Parts.

Perform the following steps daily to keep the Builder Machine clean and healthy.

- Avoid keeping any unwanted objects / irrelevant material closer to the Builder Machine.
- Clean the machine with the help of clean cloth. If needed use cleaning agents like IPA for removing stains.

Troubleshooting

Introduction

This section helps to isolate problems in electrical and electro pneumatics parts only. Problems in motor, Drive module are outside the scope of this guide because they are not user-serviceable assemblies; do not attempt to repair them.

Contact ELGI authorized service person for repair/replacement information. For troubleshooting the Builder Machine, it is necessary to understand the sequence of events that must happen before turning the machine ON and operate.

Before you attempt to perform any service, we advise you to read the entire documents, troubleshooting guide and review the connection layout diagram, electrical schematics and pneumatic schematics. Symptoms and possible causes are highlighted by dark print and bullet points throughout this document. Information about each symptom and cause can be found in following paragraphs.

Caution Possible equipment damage	Attempting repair of Builder Machine without the express authorization of ELGI Rubber Company Limited will void the product warranty. If troubleshooting or service assistance is required, please contact ELGI Customer Service.

Danger Serious personal injury 	Read and familiarize with all the instructions which is given in this manual. Don't bypass any safety and Operating Instruction which is given this manual. Use recommended PPE while troubleshooting the machine with electrical and pneumatic energy sources. Failing of this will lead to serious personal injury.

Preventive Maintenance

Preventive Maintenance Program – Building Machine ES 2E																															
Month	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**Sign**
January																																
February																																
March																																
April																																
May																																
June																																
July																																
August																																
September																																
October																																
November																																
December																																

Daily

- Clean the Machine thoroughly.
- Drain the water from the filter at the inlet.
- Check the tyre inflation pressure is 1.4kg/cm^2
- Check Hub Pressure 7.2 - 8 kg/cm^2
- Check the stitching roller pressure low 1.4 kg/cm^2 High pressure at 4.2 kg/cm^2
- Check , Clean and lubricate the roller head assembly.
- Check the air line and fitting for any leakage.
- Check and tighten the expandable hub fastening bolts.
- Check the stem with locks / without locks replace if necessary.

Weekly

- Drain the moisture in the air filter oil bowl.
- Clean the exhaust air silencer.

Monthly

- Check the expandable rim safety valve to operate air 2.2 kg/cm^2
- Clean & lubricate the tyre drive gears with multipurpose grease.
- Check and tighten the electrical connection.
- Check the tread cutter blade & Base pad for damage replace if necessary
- Check the leakage's in pneumatic components Replace if required.

Half Yearly

- Flush and replace gear box oil with SAE 90
- Clean Check and replace the stitcher rollers

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5. Maintenance & Troubleshooting / Troubleshooting

Trouble Shooting

S.No	SYMPTOMS / PROBLEMS	POSSIBLE CAUSES	REMEDIES
1	Motor do not run	1. Incoming supply failure 2. Fuse blown off 3. Improper connection 4. Foot switch faulty 5. Contactor faulty	1. Check incoming supply 2. Check and replace fuse 3. Check and correct 4. Check and correct 5. Check contactor coil and rectify or replace
2	Tyre shows jerky movements while running	1. Loose connection in wiring 2. Improper connections	1. Clean terminals and tighten firmly 2. Correct as per circuit diagram
3	Tyre rotates only in one direction	1. Loose connection or damage in forward/reverse switch 2. DC Drive failure	1. Correct connection and replace if needed. 2. Check DC Drive and replace parts, if needed.
4	Motor runs either at high or low speed only	1. Loose connections in auto transformer tappings 2. Loose connections in strip 3. Loose connections in control panel switch	1. Fasten connection tightly 2. Correct connections 3. Remove control lead check connections to the switch. Replace, if necessary.
5	Inflation time increases	1. Leakage or blockage in hose	1. Check and correct joints
6	Stitching rollers do not traverse properly	1. Worn out Bushes 2. Stitching rollers not fitted on the screw rod properly 3. Screw rod worn out	1. Replace Bushes 2. Replace rollers on left and threads for the screw rods 3. Replace screw rods
7	Tyre drive assembly is noisy	1. No oil in gear box 2. Gear box failure 3. Gear drive failure 4. Drive bearing failure 5.Gear box mounting bolts loosen	1. Fill with suitable lubricating upto level. 2. Dismantle gear box. Check gears for any wear. Replace worn out gears 3. Check gears for wear Replace worn out gears 4. Replace bearing 5.Tighten the bolts
8	Tread cutter blade does not cut tread completely	1. Worn out blades 2. Worn out wear pad	1. Sharpen and replace 2. Replace base pad
9	Stitching rollers are not in the centre	1. Expanding Hub not in center 2. Traverse roller not in position	1. Adjust main shaft and motor Base if required. 2. Adjust screw rod for centring
10	Inflation pressure is not attained in tyre	1. Air leakage in joints 2. Restricted air flow through air line	1. Check and rectify joints 2. Check hoses for any bend or twist and correct.

11	Pressure cylinder shows jerky movement	1. Low air pressure 2. Air leakage in line 3. Improper tightening of tie rods	1. Correct air pressure 2. Check air lines and correct 3. Tighten all the tie rods uniformly
12	Air valve leak	1. Failure of O' rings and parts 2. Air passing through the piston	1. Replace the valve 2. Check the seal and replace
13	High pressure not attained	1. Air inflow not proper 2. Bend or twist in the air hose 3. Worn out seals and 'O' rings	1. Check air line and correct 2. Correct hoses and replace, if damaged 3. Dismantle cylinder. Change seals and 'O' rings

6. Technical Reference

Technical Reference

Chapter Overview

Information provided in this chapter are technical references of this Builder Machine and will be useful in maintenance aspects for the technicians while troubleshooting.

This chapter contains the following information.

- Technical Overview - briefly describes the basic concept.
- Parts List
    - Exploded View
    - Ordering Information

Technical Overview

The Technical overview section includes the below:

- Key features.
- Machine working concept.

Key features

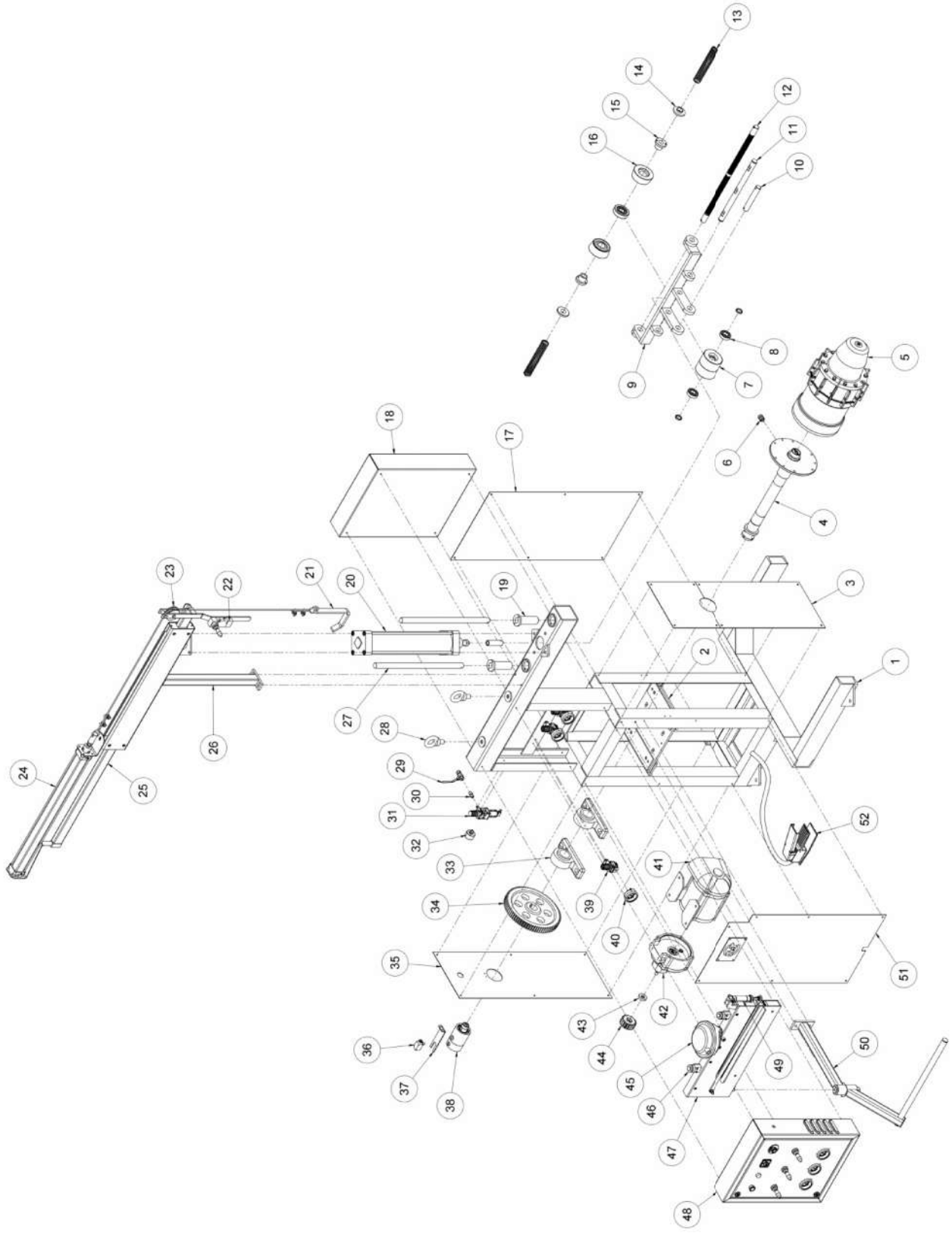
- This machine works with standard relay logic with all the necessary safety features required.
- This machine capable of building treads on tyres of 14” to 24.5” Tyre size

Machine working concept

- Rollers pressing pneumatically tread on tyre and spreading by LH & RH Screw is the basic mechanical concept.
- Building machine helps to proper stitch
- ching/Sticking of bonding gum and procured tread.

Parts List

Exploded View



6. Technical Reference / Parts List

Order Information

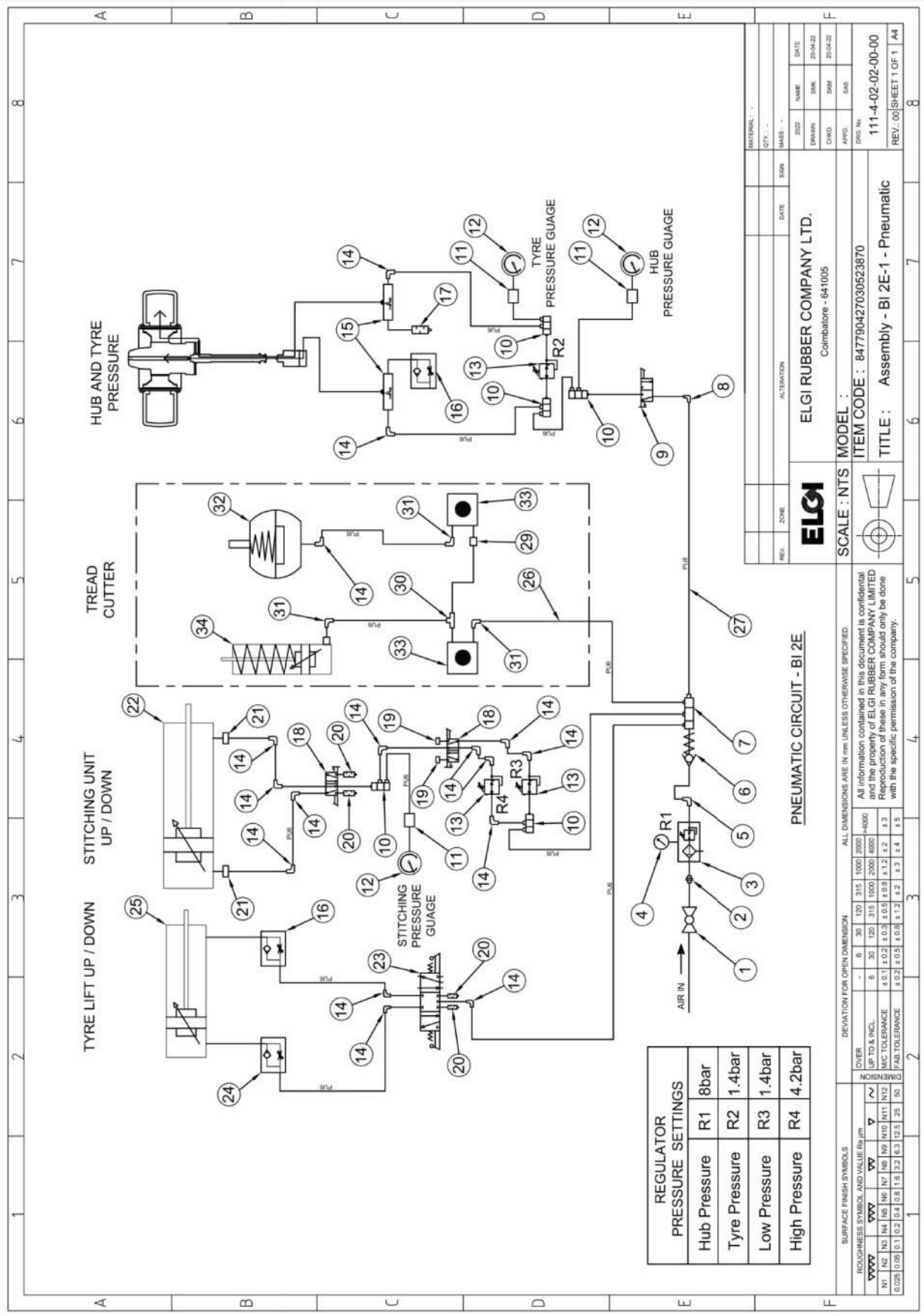
SL NO	ITEM CODE	DESCRIPTION	UOM	QTY.
1	847790427120373770	Frame - BI 2E - Main	NOS	1
2	847790427290013770	Plate - BI 2E - Motor Mounting	NOS	1
3	847790427080213770	Cover - BI 2E - Front	NOS	1
4	847790427380373770	Shaft - BI 2E - Main	NOS	1
5	847790136100150111	Expanding Hub EH 5-1	NOS	1
6	741220917406090052	Coupling - Quick - MS - 1/4"	NOS	1
7	847790427350560160	Roller - BI - Pressure Truck	NOS	1
8	848210900111092522	Deep Groove Ball Bearing - 6205 / ZZ	NOS	3
9	847790427350013760	Roller - BI 2E - Head Bracket	NOS	1
10	847790421270043770	Pin - BI 2E - Pressure Bearing Roller	NOS	1
11	847790427350283760	Roller - BI 2E - Head Pivot Rod	NOS	1
12	847790427370781860	Screw Rod - BI 2B - Stitching Roller	NOS	1
13	847790427400781860	Spring - BI 2B - Stitching Roller	NOS	2
14	847790427350830160	Roller - BI - Stitching Spring guide	NOS	2
15	847790427350074070	Roller - BI 2E Delrin - Bush Stitching M30x 2.5	NOS	2
16	847790427350743770	Roller - BI 2E - Stitching	NOS	2
17	847790427080603770	Cover - BI 2E - Right	NOS	1
18	853710902730325113	Control Panel Board Assembly - Building Machine BI 2E-1 - 220 V, 50/60 Hz / 1 PH - 220 V AC	NOS	1
18.1	850490902902011101	Drive - DC - 1 HP - I/P 220 V - O/P 180 V DC	NOS	1
19	847790472120040070	Guide Rod - Bush Roller head	NOS	1
20	841231909320411023	Pneumatic Cylinder - A12 100 400	NOS	1
21	847790422770014770	Hook - BF / BI 2E - Tyre Lift	NOS	1
22	848180902007062404	Valve - Hand Lever - DS265HC61	NOS	1
23	847790427540003770	Rope Roller - BI 2E	NOS	1
24	841231909321007018	Pneumatic Cylinder - A12 050 700	NOS	1
25	847790422021474770	Tyre Lift Sliding Arm - BF 2E	NOS	1
26	847790427030023770	Tyre Lift Frame Assy - BI 2E	NOS	1
27	847790427380243770	Shaft - BI 2E - Guide Pneumatic Cylinder	NOS	2
28	731815900606005484	Eye Bolt -MS -M20 x2.5 x25 mm	NOS	2
29	848180902001023001	Valve - Ball - Brass - 1/4"	NOS	1
30	741220917940020300	Nipple - Hex -Cone -Brass -1/4"	NOS	1
31	841290930901024006	Air Filter Cum Regulator - 1/4" - FRC 136134	NOS	1
32	902620907821510015	Pressure Gauge - 42 mm Dial - 0 - 10 Bar - A2G02	NOS	1
33	848320900141704510	Flanged Pillow Block Bearing - UCP 211-200 DI	NOS	2
34	847790427130000970	Gear - BI - 78 Teeth	NOS	1
35	847790427080593770	Cover - BI 2E - Rear	NOS	1
36	848140902010030009	Valve - Pressure Relief - Rapid - 1/4" - C185	NOS	2
37	847790427070013770	Rotary Seal Coupl Lock Clamp - BI2E	NOS	1
38	847790422131185770	Coupling - BF 5 - Rotary Seal	NOS	1
39	842139911310201008	Regulator - Air - R13614 - 1/4"	NOS	3

6. Technical Reference / Parts List

40	902620907805030315	Pr.Gau -Pan Mtg-2-1/2"x1/4" (0-10 Bar)	NOS	3
41	850110915122370909	Motor - DC - Foot Mount - 1000 RPM / 1 Hp - 0.75 KW - 230 V / 1 Ph	NOS	1
42	848340900309112079	Gear Box - Spur - 20 : 1 - BI 2B/2C/2D	NOS	1
43	847790427390411870	Spacer - BI 2B - Motor Pinion	NOS	1
44	847790427130000570	Gear - BI - 19 Teeth	NOS	1
45	841231909350402137	Brake Chamber - P20 - 60 x 16 - BI / IS	NOS	1
46	848190902051060153	Valve - Push Button - 1/8"	NOS	2
47	847790420020040270	Assembly - TC 2E - Tread Cutter Main Frame	NOS	1
48	847790427500013770	Panel Box - BI 2E - Pneumatic	NOS	1
49	841231909320304041	Pneumatic Cylinder - A81 025 025 O	NOS	1
50	847790427030013770	Tread Cutter Arm Assy - BI 2E	NOS	1
51	847790427080363770	Cover - BI 2E - Left	NOS	1
52	853650903805011003	Switch - Foot - 1NO / 1NC - IDFS302	NOS	1

6. Technical Reference / Circuit Diagram

Pneumatic Circuit Diagram



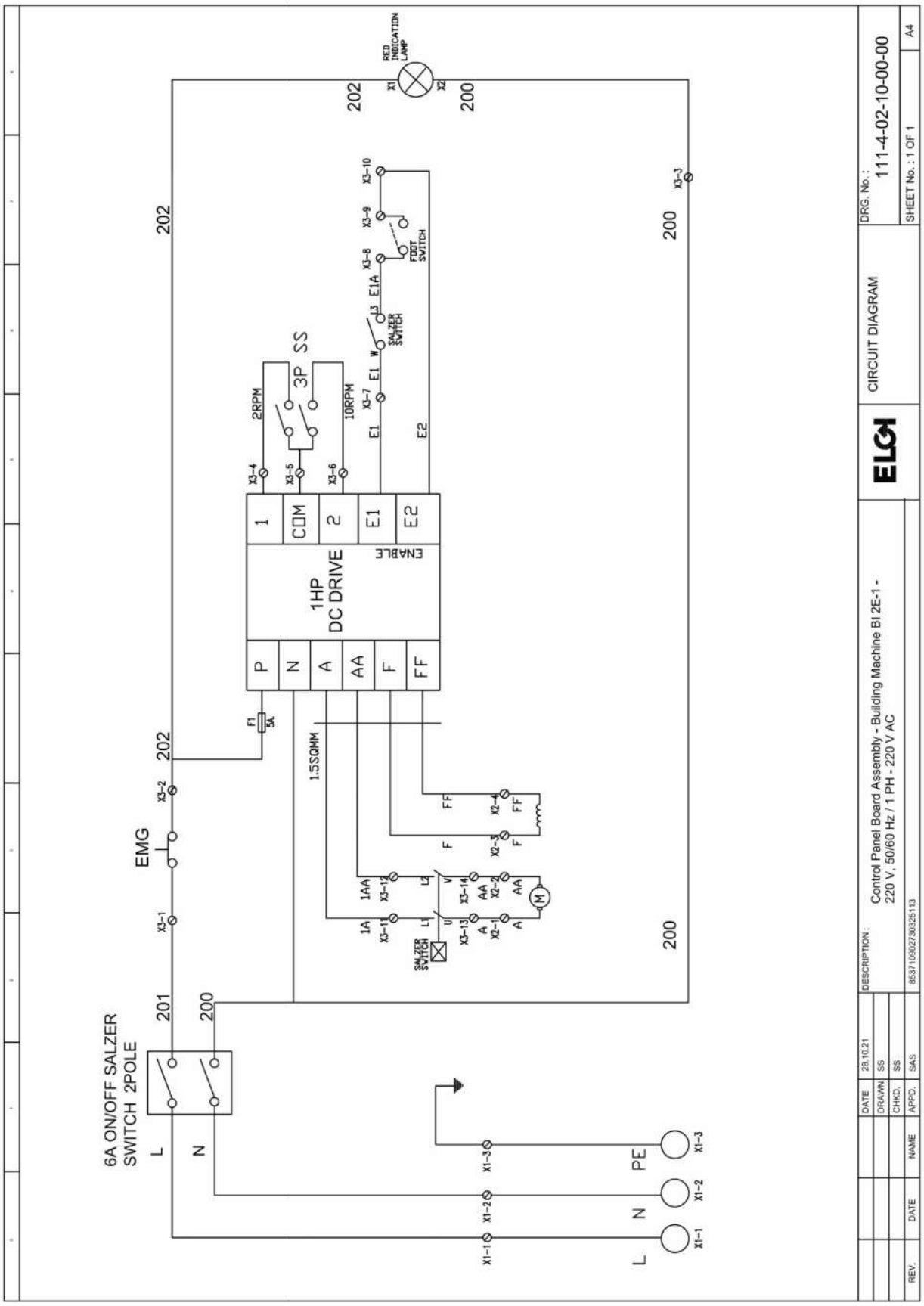
6. Technical Reference / Circuit Diagram

Pneumatic Part List

PARTS LIST - PNEUMATIC ITEMS				
S.No	**ORDER CODE**	**DESCRIPTION**	**UOM**	**QTY**
1	848180902001023001	Valve - Ball - Brass - 1/4"	1	No
2	741220917940020300	Nipple - Hex -Cone -Brass -1/4"	1	No
3	841290930901024006	Air Filter Cum Regulator - 1/4" - FRC 136134	1	No
4	902620907821510015	Pressure Gauge - 42 mm Dial - 0 - 10 Bar - A2G02	1	No
5	741220917600025200	Elbow - Brass - 1/4"	1	No
6	848130902008000001	Valve - Non-Return - 1/4" - GV 161	1	No
7	841290910230402036	Elbow - Swivel - WD211080651 - Multiple port	1	No
8	848790910220402017	Elbow - Male - WP2210851	1	No
9	848180902007022913	Valve - Hand Lever - 1/4" - DS245HD61	1	No
10	841290910230302035	Elbow - Swivel - WS0120651 - 2 Port	5	No
11	841290910210302013	Elbow Female 6D X 1/4"-WP2220661	3	No
12	902620907805030315	Pr.Gau -Pan Mtg-2-1/2"x1/4" (0-10 Bar)	3	No
13	842139911310201008	Regulator - Air - R13614 - 1/4"	3	No
14	848790910220302015	Elbow - Male - 6 mm D x 1/4" - WP2210651	16	No
15	848140902010030009	Valve - Pressure Relief - Rapid - 1/4" - C185	2	No
16	848180902005109308	Valve - Flow Control - 6D x 1/4" - GR5105106	2	No
17	841290911010202008	Silencer - 1/4" - ASC0161	1	No
18	848180902007060603	Valve - Hand Lever - 1/4" - DS255HD61	2	No
19	853890912001143004	Port Plug - 1/8" BSP - WAP060	2	No
20	841290911010201019	Silencer - Button - 1/8" - ASB0160	4	No
21	741533900902013019	Bush Nut - Brass - 1/2" x 1/4"	2	No
22	841231909320411023	Pneumatic Cylinder - A12 100 400	1	No
23	848180902007062404	Valve - Hand Lever - 1/4" - DS265HC61	1	No
24	848180902005122301	Valve - Flow Control - 6D x 1/4" - GR1105106	1	No
25	841231909321007018	Pneumatic Cylinder - A12 050 700	1	No
26	391729901902092021	Polyurethane Tubing - WH00B06	20	M
27	391729901902092022	Polyurethane Tubing - WH00B08	1.5	M
28	841239904208050221	Regulator Clamp – A2C01	4	No
29	841290909810303024	Male Connector -WP2110650	1	No
30	841290911520451001	Male Run Tee - WP2330650	1	No
31	848790910220301010	Male Elbow - WP2210650	3	No
32	841231909350402137	Brake Chamber - P20 - 60 x 16 - BI / IS	1	No
33	848190902051060153	Valve - Push Button - 1/8"	2	No
34	841231909320304041	Pneumatic Cylinder - A81 025 025 O	1	No

6. Technical Reference / Circuit Diagram

Electric Circuit Diagram



ELGI Retreading Machinery - Model Plant