



Envelope Spreader ES 2E

INSTRUCTION MANUAL



ELGI Rubber Company Limited

Super A Unit, Coimbatore Private Industrial Estate,

Kurichi, Coimbatore - 641021

Tel: +91-422-2321000

Email: enquiry@in.elgirubber.com

Website: www.elgirubber.com

Foreword

The Envelope Spreader ES 2E is a simple and compact machine which facilitates the operator to envelope and de-envelope the tyre easily. This machine functions pneumatically and ensures a uniform expansion of envelope. This extends the life of the envelope.

The machine is built to custom specifications and can be manufactured with a lifting arrangement or Separate loading Trolley arrangements.

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1. General Information / Introduction

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 Envelope Spreader Machine.

Company Profile:

Elgi Rubber Company Limited has its headquarters in India with subsidiaries in Australia, Brazil, Kenya, 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



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 Unit A, Private Industrial Estate,
Kurichi, Coimbatore - 641021
Coimbatore – 641021
Tamil Nadu. India



Say **Hi** to 
Whatsapp no **6380101000**

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.

1. General Information / Limitation of Liability

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 Envelope Spreader machine is a commercial machine, used in Tyre retreading facilities for Envelope and De-enveloping the 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 independently and recognize and avoid potential hazards.

2. Safety / Symbols and Definitions

Symbols and Definitions



Warning:
Foot Protection Required



Warning:
Crush Hazard – Keep feet clear



Warning:
Finger protection on rollers

2. Safety / Hazard Information

Hazard information

ES 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 incorporating automated functions, 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 and exercise safe operating practices as per electrical safety standards.

List of Hazards Associated with this Machine.

- Pneumatic hazards.
- Rotating and pinch point hazards.

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

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;

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.

3. Getting started

Getting started

Chapter Overview

Use information in this chapter to prepare your Envelope Spreader ES 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 best way 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 Envelope Spreader ES 2E, lists important feature, and describes about machine function.
- Unpacking- Provides important information about unpacking the Envelope Spreader ES 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 Envelope Spreader parts
- Connections- Explains how to connect power, control cables and pneumatic connections of this machine.

Introduction

The Introduction section includes subsection:

- About ES 2E
- Envelope Spreader Machine's nomenclature
- Unpacking
- Package Contents

About ES 2E

The Envelope Spreader ES 2E is a simple and unique machine which facilitates the operator to envelope and de-envelope the tyre easily. This machine functions pneumatically and ensures a uniform expansion of envelope. This extends the life of the envelope.

The machine is built to custom specifications and can be manufactured with a lifting arrangement or as a stand-alone.

3. Getting started /Envelope Spreader Machine

Envelope Spreader Machine - Nomenclature

Envelope Spreader Machine ES 2E major sections

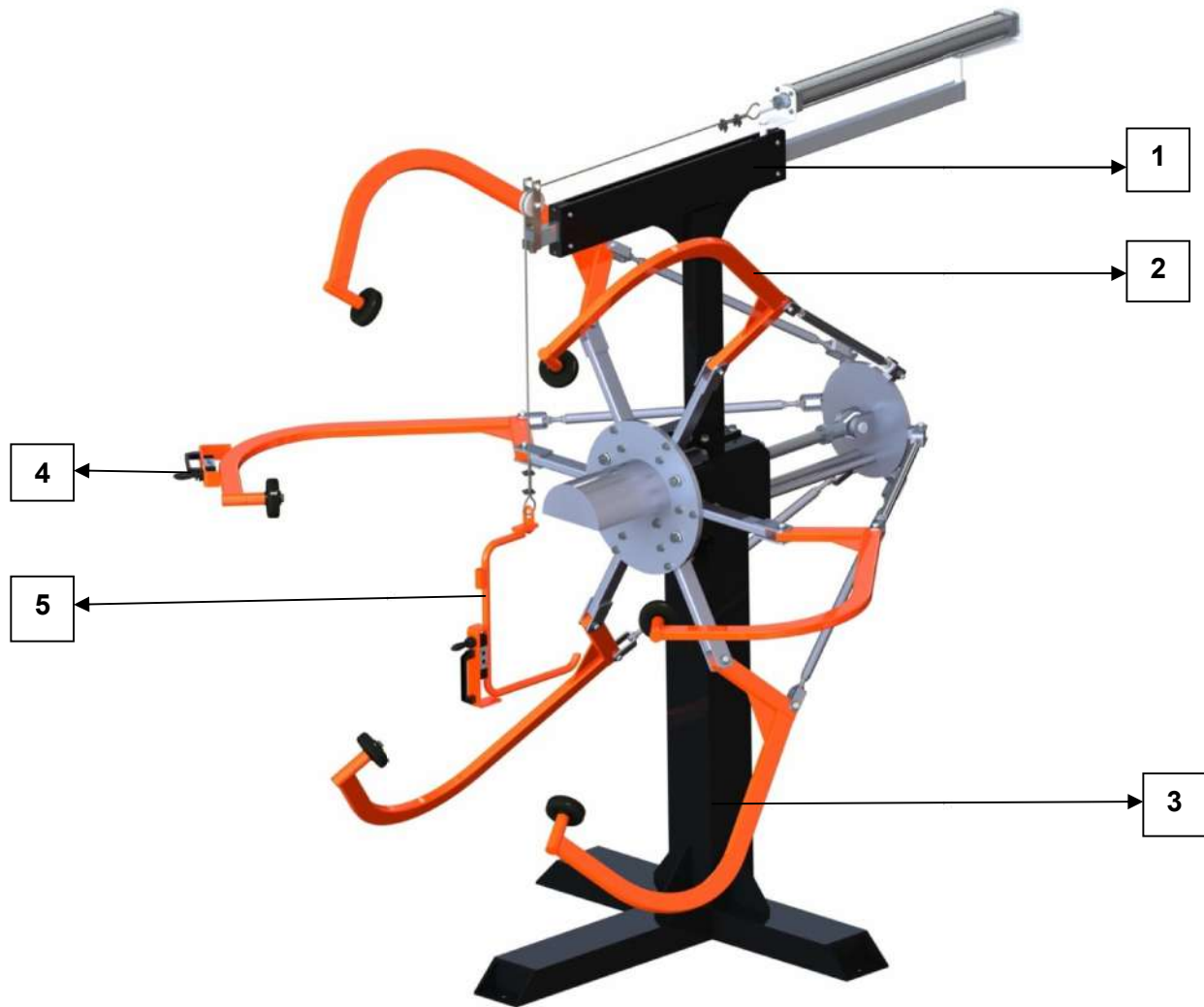


Figure 3-1 Envelope Spreader

1	Tyre Lift Unit (Optional)
2	Spreading Claws
3	Base Frame
4	Hand Lever Operating Valve
5	Lifting Hook

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 signs 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 (optional items 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 packing materials when shipping the machine to another location

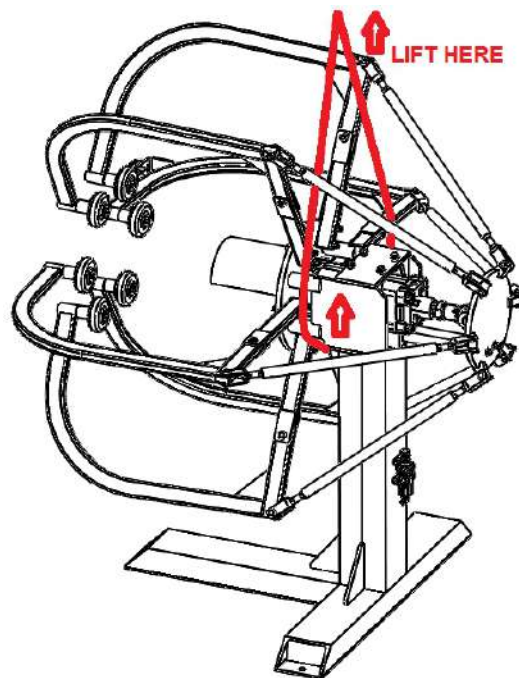


Figure 3-2 Lifting Point

3. Getting started / Package Contents

Package Contents

S No.	Shipping Box Contents	Qty
1	Envelope Spreader Machine Assembly	1 No
2	Tyre Lift Assembly (Optional)	1 No

Contents description

Each item listed in Table1-1 is described below

1. Envelope Spreader Machine Assembly: A complete mechanical assembly of the Tyre Envelope Spreader machine includes the Pneumatic Cylinder Setup.
2. Tyre Lift Assembly – Tyre lift Post with Pneumatic Cylinder Assembly

3. Getting started / Specifications of the Product

Specifications of the product:

Model	ES 2E
Machine	Envelope Spreader
Electrical Power Requirement	Not Required
Machine Weight	~270 Kg
Machine control system	Pneumatic
No of Claw Arms	6 Nos
Electronic Position and Height Control	Not Applicable
Spread Control	Manual control
Tyre Lift	Optional
Supply Voltage	Not Applicable
Control Voltage	Not Applicable
Air Pressure Requirement	7 to 8 Bar
Minimum Tyre Size	7.50 - 16
Maximum Tyre Size	12.00 – 24.5
Machine Dimension – LxWxH	~2100 x 2100 x 2100
Installation	To be Grouted

Description

The Envelope Spreader Machine ES 2E consists of the following major components:

1. **Mainframe:**
The main frame houses all the main components of the machine with the lifting adjustment claw arrangements and airline assembly.
2. **Spreading Controls :**
This machine is provided with 6 Nos. Spreading arms and Hand Lever operated Pneumatic Valve to Spread require span with respect to the Tyre Sizes . This prevents over stretching of the envelope.
3. **Lifting Controls:**
This machine is provided with Hand Lever operated Pneumatic Valve to position the opening of the envelope to the centre of the casing depending on tyre size.
4. **Air Line Assembly:**
This is provided with a shut off valve, filter cum regulator, solenoid valve and pneumatic cylinders.

3. Getting started / Assembly and Commissioning

Assembly and Commissioning Tools

1. Accessories

Optional	<ul style="list-style-type: none">• Tyre Lift ES2E
Optional	<ul style="list-style-type: none">• Tyre Loading Trolley TLT 2

2. Tools

- Spanners - Double end 6-26 - 1 Set
- Spanners - Ring End 12-19 - 1 Set
- Screw Driver - 6" & 8" 1 No. Each
- Allen Keys 3-10mm -1 Set
- Combination Pliers 8" - 1 No.
- Nylon Hammer 1 No
- Cir-clip Pliers - Internal & External - 6" 1 No Each
- Adjustable Spanner 12" – 1No

3. Materials

- Multipurpose grease –250 gm.
- PU8 Pneumatic Hose – 6Mtr.

Getting started / Preparing Product for Use

Preparing Product for Use: Installation and Commissioning

Unloading

Unload the machine only by using Loading Belts or Portable Pallet Truck. 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 minimum clearance to do maintenance and service on the panels.
- Right side and left side of the machine should be provided with the clearance of 0.6 m in Full Spreading Condition
- Front side of the machine should be provided with the clearance of 1.6 m to bring and load the Tyre onto the machine.

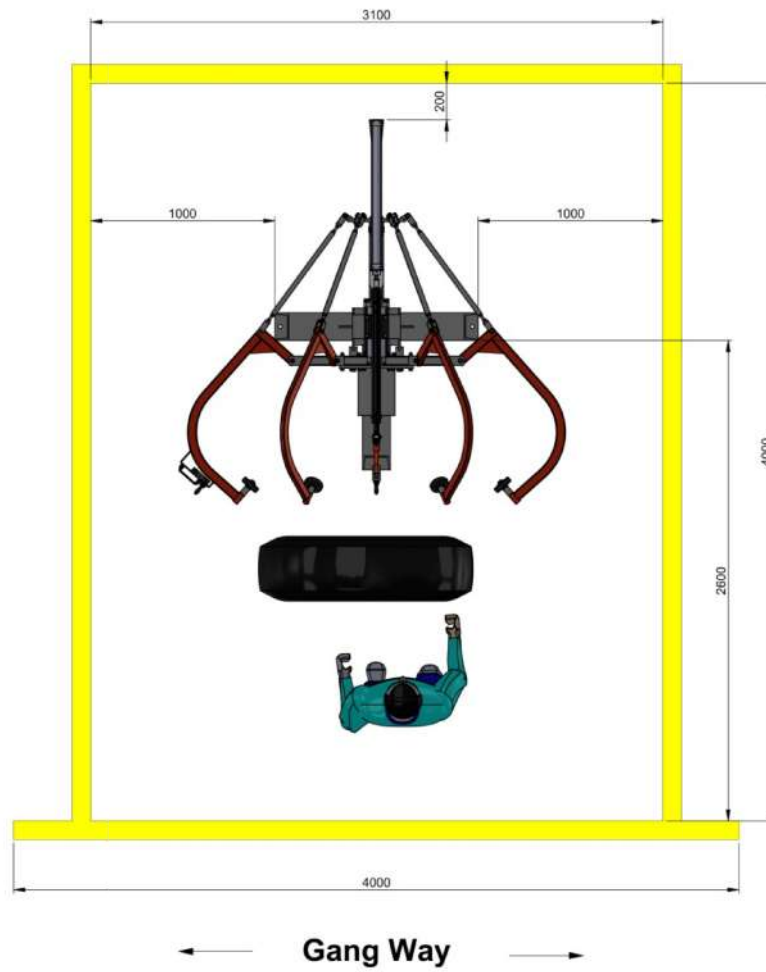


Figure 3-3 Machine Footprints

3. Getting started / Connection Layout

Connection Layout

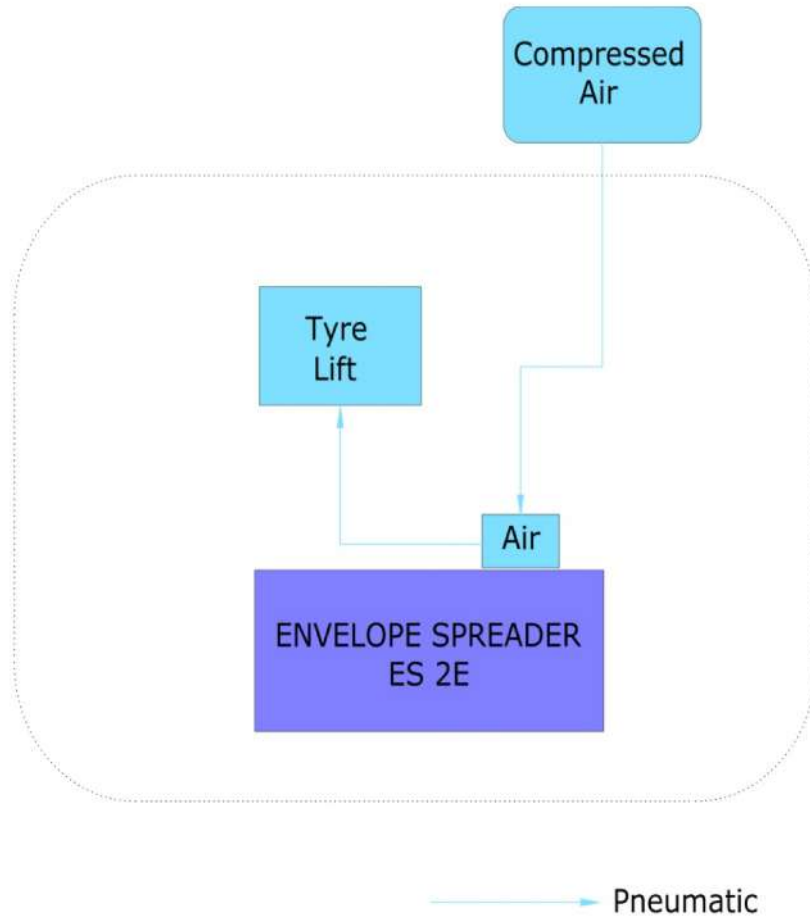



Figure 3-4 Connection Layouts



3. Getting started / Pneumatic Connection

Connections

Connections section describes the below:

- Pneumatic connection

 <h2 style="margin: 0;">Caution</h2> <p style="font-size: 1.2em; margin: 10px 0;">Possible equipment damage</p>	<p>The Pneumatic connections should be made after completion of mounting instruction.</p> <p>After the connection, don't turn on the energy sources until understand the Operation Instructions.</p> <p>Failing of above caution will lead to machine damage or non-recoverable parts damage.</p>
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 <h2 style="margin: 0;">Danger</h2> <p style="font-size: 1.2em; margin: 10px 0;">Serious personal injury</p> 	<p>Pneumatic source should be connected as specified in machine specification.</p> <p>Follow proper safety procedure.</p> <p>Failing of this may lead to personal injury.</p>
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3. Getting started / Pneumatic Connection

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/cm² by rotating the knob clockwise and then lock it.

Important: Incoming air pressure should be maintained at 8 – 12 bar during machine operation. Impact – when the pressure goes less than 8 bar, it affects the Spreading Arm Movements.



Figure 3-5 Pneumatic Connection

4. Operation / Pre - Operation Checks

Pre - Operation Checks

- Remove the shipment materials that are provided for packing.
- Check for the free movement of all moving parts.
- Check if all nuts and bolts are properly tightened.
- Check if the insert locking of the claws is uniformly fitted.
- Check and ensure no twists, or crush in air line.
- Check for any air leakage on the pneumatic lines.
- Check incoming Pressure setting 8bar.

Important: It is recommended to conduct the above checks weekly once and document it. This is to ensure that the human and machine safety functions are working properly. Practicing these safety checks will reduce accidents and these safety check documents can be used for safety audit and quality audit purposes.

4. Operation / Operating Instructions

Operating Instruction:

- Before mounting the envelope on the claws, ensure that the claws are in closed position.
- Based on the tyre size, adjust the height of the tire by using Operating valve in the Lifting Hook.
- Mount the appropriate envelope.
- Expand the Envelope by operating the lever of the pneumatic valve.
- Move tyre to the inside of the envelope by using tyre lift system.
- Release the lever to close position and allow the envelope to seat on the tyre.
- Release the envelope from the claws.
- Spread the Arms for unloading the tyre.
- Move the tyre out from the machine.
- Reverse the process for de- enveloping.

4. Operation / Operating Instructions

Do's and Don'ts

Do's

- a) Check for even movement of arms.
- b) Place the machine in an open space where there is ample light and ventilation.
- c) Ensure that there is no leakage in the pneumatic valve and cylinder.
- d) All locking nuts are to be tightened firmly.
- e) Lubricate the Moving parts frequently by using silicon grease.

Don'ts

- a) Do not operate the machine when the arms are un even spreading.
- b) Do not load the tyre without ensuring Pressure Settings.
- c) Do not expand over envelope size. This may damage the envelope
- d) Do not replace the parts which is not recommended by manufacturer

5. Maintenance & Troubleshooting / Maintenance

Maintenance

The Maintenance section includes the below:

- Disabling the Envelope Spreader Machine.
- Daily inspections.
- Cleaning Machine Parts.

Disabling the Envelope Spreader Machine

Before performing any maintenance on your Envelope Spreader Machine, be sure to completely disconnect the machine by disconnecting pneumatic energy source from the machine.

Daily inspections

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

<p>Caution</p> <p>Possible equipment damage</p>	<p>Operating the Envelope Spreader Machine without performing the daily check will lead to the possibility of machine parts getting damage or the life time of machine spare parts would reduce.</p>
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Cleaning of Machine Parts

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

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

5. Maintenance & Troubleshooting / Troubleshooting

Troubleshooting

Introduction

This section helps to isolate problems in pneumatics parts only.

Contact Elgi authorized service person for repair/replacement information. For troubleshooting the Envelope Spreader Machine.

Before you attempt to perform any service, we advise you to read the entire documents, troubleshooting guide and review the connection layout diagram, pneumatic schematics

Caution

Possible
equipment
damage

Attempting repair of Envelope Spreader 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.

5. Maintenance & Troubleshooting /

Preventive Maintenance

Preventive Maintenance Program – Envelope Spreader 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	<ul style="list-style-type: none"> Clean the Machine thoroughly. Drain the water from the filter at the inlet. Clean the Guide Shafts Check inlet Pressure 8 kg/cm² Check the condition of arm movements Check the Air leakages in pneumatic components. 										Weekly <ul style="list-style-type: none"> Drain the moisture in the air filter oil bowl. Lubricate the Guide shafts with grease Lubricate the Hinging Points 										Monthly <ul style="list-style-type: none"> Check the leakage's in pneumatic components Replace if required. <p>-----</p>													

5. Maintenance & Troubleshooting / Troubleshooting

Troubleshooting

S.No	SYMPTOMS / PROBLEMS	POSSIBLE CAUSES	REMEDIES
1	Arms not spreading	<ol style="list-style-type: none"> 1. No air supply 2. Air pressure less 3. Kinked hoses 4. Seals damaged in claw spreading cylinder. 	<ol style="list-style-type: none"> 1. Check main air line and correct if required 2. Check the input air line and set it to 8 kg/cm² 3. Check and replace 4. Check and replace
2	Arm spreading unevenly	<ol style="list-style-type: none"> 1. Tie Rods loosened 2. Leakage of air / less supply 3. Guide Shafts damaged 	<ol style="list-style-type: none"> 1. Correct the tie rods and arm movements and tighten the nuts. 2. Rectify the leakage and set the air pressure to 8 kg/cm² 3. Check and replace
3	Either expanding or closing	<ol style="list-style-type: none"> 1. Main Cylinder Seal Damage 2. Hand lever valve not getting actuated 3. No air supply at direction control valve 	<ol style="list-style-type: none"> 1. Check and replace the seal kit. 2. Check and change the valve 3. Check the main line to valve and replace if needed

6. Technical Reference

Technical Reference

Chapter Overview

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

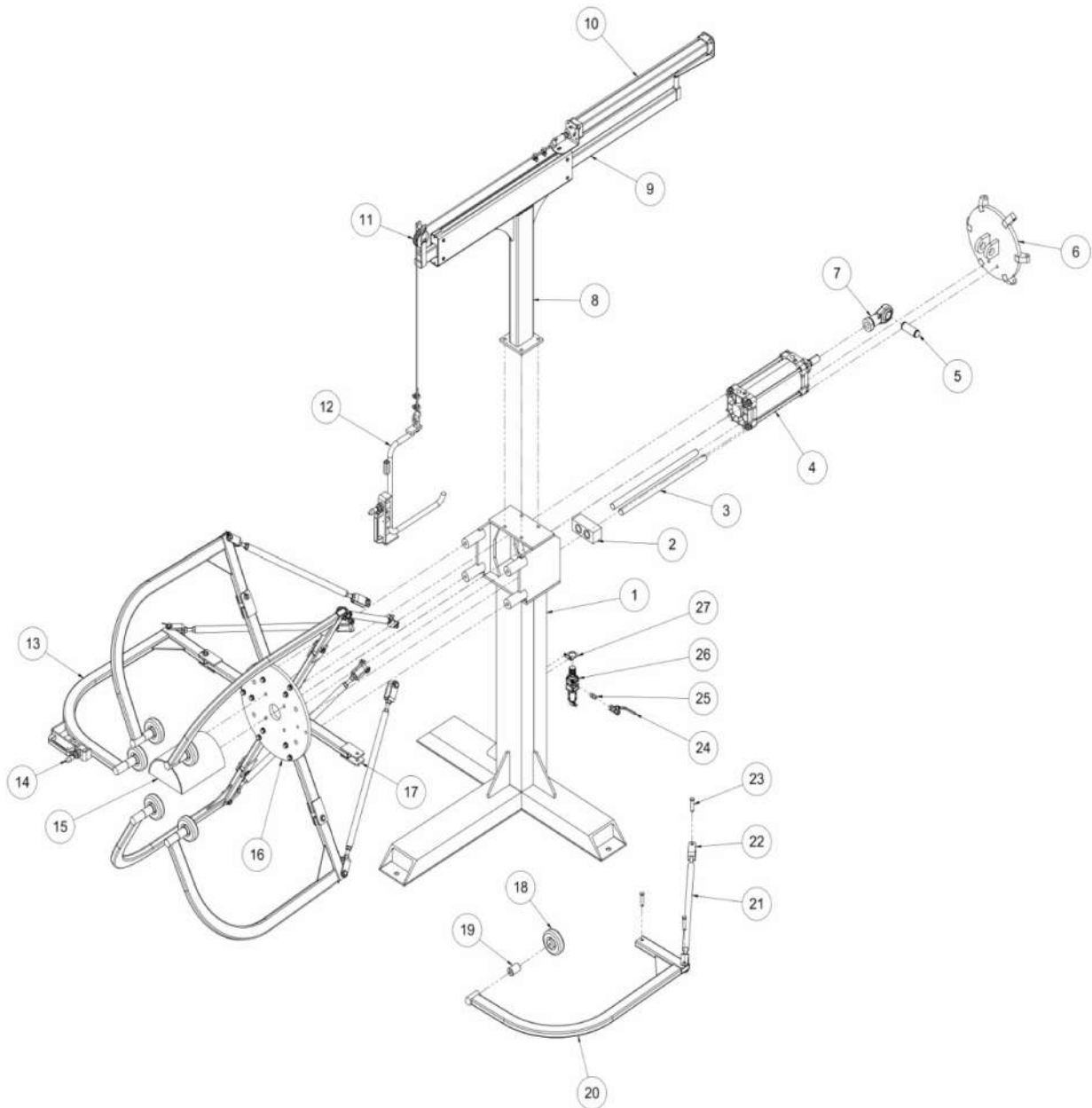
This chapter contains the following information.

- Parts List
 - Exploded View
 - Ordering Information
 - Pneumatic Circuit

6. Technical Reference / Parts List

Part List

Exploded View



6. Technical Reference / Parts List

Order Information

S.No	ORDER CODE	DESCRIPTION	UOM	QTY
1	847790428280010170	Base Frame Post - ES 2E	NO	1
2	847790428310000170	Guide Block - ES 2E	NO	1
3	847790427380243770	Shaft - BI 2E - Guide Pneumatic Cylinder	NO	2
4	841231909321705181	Pneumatic Cylinder -A16 125 200	NO	1
5	847790428120020170	Pin Rear Flange Mount - ES 2E	NO	1
6	847790428120030170	Rear Flange Mount - ES 2E	NO	1
7	841290909999030002	Rod End Sph Eye -AP027	NO	1
8	847790428080340170	Lift Frame - ES 2E	NO	1
9	847790422021474770	Tyre Lift Sliding Arm - BF 2E	NO	1
10	841231909321007018	Pneumatic Cylinder - A12 050 700	NO	1
11	847790427540003770	Rope Roller - BI 2E	NO	1
11.1	848210900111055522	Deep Groove Ball Brg -6000 /ZZ	NO	10
12	847790435030020170	Tyre Transfer J Hook - ES 2E	NO	1
12.1	681299930528000035	Wire Rope - MS - 5D	M	2
12.2	731815900606015062	Wire Rope -U Bolt -MS -1/4"	NO	4
13	847790428260020160	Tube - ES 2E - Spreading with Handle Mount	NO	1
14	848180902007062404	Valve - Hand Lever - DS265HC61	NO	2
15	847790428120010170	Front Flange Mount - ES 2E	NO	1
16	847790428070010170	Flange - ES 2E - Front	NO	1
17	847790428260010170	Hinge Tube - ES 2E	NO	6
18	830220932007110004	Caster Wheel -Rubber -4"	NO	6
19	847790428040010170	Bush - ES 2E - Rubber Wheel	NO	6
20	847790428260020170	Spreading Tube - ES 2E	NO	5
21	847790428170010170	Tie Rod - ES 2E	NO	6
22	847790428290020170	Tie Rod Brkt - ES 2E	NO	12
23	847790428150010460	Hinge Pin - ES 2E	NO	18
24	848180902001023001	Valve - Ball - Brass - 1/4"	NO	1
25	741220917940020300	Nipple - Hex -Cone -Brass -1/4"	NO	1
26	841290930901024006	Air Filter Cum Regulator - 1/4" - FRC 136134	NO	1
27	841239904208050221	Clamp- MS- Regulator- 1/4"- P.NO:A2C01	NO	1

6. Technical Reference / Parts 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	841290910230302034	Elbow - Swivel - WS0120651 - 2 Port	1	NO
6	848790910220302015	Elbow - Male - 6 mm D x 1/4" - WP2210651	6	NO
7	848180902007062404	Valve - Hand Lever - DS265HC61	2	NO
8	841290911010201019	Silencer - Button - 1/8" - ASB0160	4	NO
9	848180902005109308	Valve - Flow Control - 6D x 1/4" - GR5105106	2	NO
10	848180902005122301	Valve - Flow Control - 6D x 1/4" - GR1105106	2	NO
11	741533900902013019	Bush Nut - Brass - 1/2" x 1/4"	2	NO
12	841231909321007018	Pneumatic Cylinder - A12 050 700	1	NO
13	841231909321705181	Pneumatic Cylinder – A16 125 200	1	NO
14	841290909999030002	Rod end Sph Eye - AP027	1	NO
15	391729901902092021	Polyurethane Tubing - WH00B06	17	M
16	841239904208050221	Clamp - Mild Steel - Regulator - 1/4" - A2C01	1	NO

ELGI Retreading Machinery - Model Plant

