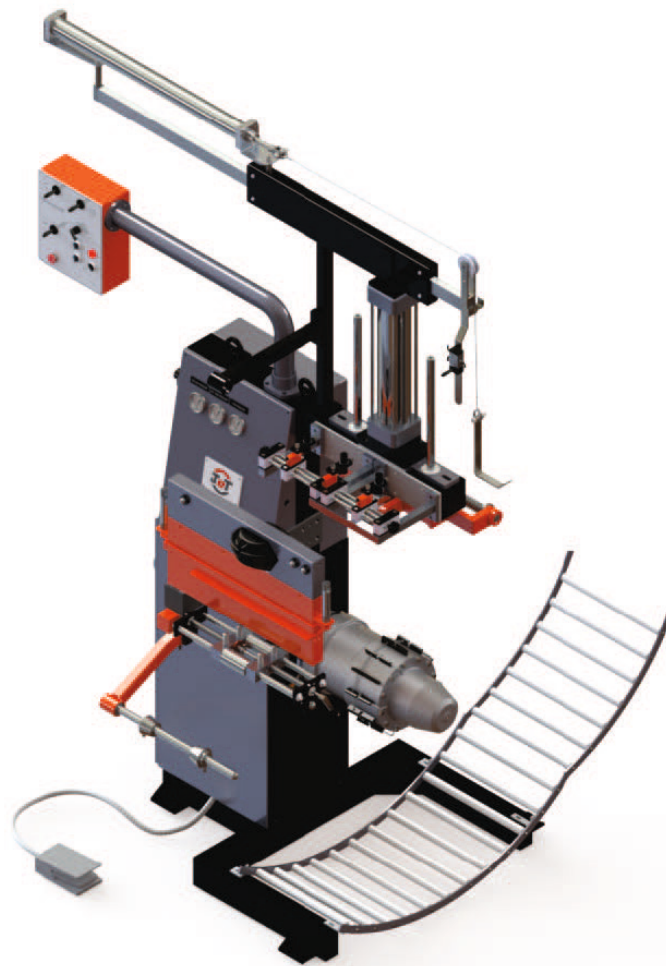




Building Machine BI 2D



Instruction Manual

The company reserves the right to change equipment specifications and models without notice. Pictures are representative and may not be part of the standard equipment.

Elgi Rubber Company Limited

2000 Trichy Road • Coimbatore 641 005 • Tamil Nadu • India • +91 (422) 232 1000 • info@in.elgirubber.com • www.elgirubber.com

Foreword

The Building Machine BI 2D is a versatile machine designed to stitch the cushion gum and the tread (Precured or Top cap) on the prepared casing when it is in an inflated, road-running condition

This machine is designed for building a wide range of casings and can be operated by unskilled persons with very little training. This instruction manual details installation, commissioning, operation and preventive maintenance procedures.

Contents

01 Description	3
02 Specifications	4
03 Assembly and Commissioning Tools	5
04 Installation and Commissioning	6
05 Pre-Operation Checks	7
06 Operation	8
07 Do's and Don'ts	9
08 Troubleshooting	10
09 Preventive Maintenance	13
10 Electrical Drawings	14
11 Pneumatic Circuit	19
12 Parts List	20

01 Description

The Building Machine BI 2D consists of the following major components:

Main Frame

The main frame is a fabricated steel structure which houses all the major components.

Tyre Drive

The Tyre drive has a 0.75 kW DC motor with gear box and an Expandable Hub on which the Expandable Rim for various sizes can be mounted. It rotates at two speeds - one to enable application and stitching of the cushion gum at a very low speed and the other for stitching the tread at higher speed. The tyre rotation is bi-directional. An airline is provided with individual regulators for the stitching pressure and for inflating the tyre.

Stitched Head

The stitching head has traversing rollers operated by a pneumatic cylinder. These traversing rollers are designed to move from the centre line of the casing outwards, to expel any air trapped between the tread, cushion gum and the casing. These rollers move on the casing with the help of the screw rod. The pneumatic cylinder can be operated at two pressures namely, low pressure for stitching the cushion gum and high pressure for stitching the tread.

Tread Cutter

A pneumatic tread cutter is provided for trimming the excess length of precured tread. This attachment is mounted on a swing arm, so that it can be retracted after use. The tread cutter holds and cuts the tread exactly at right angles to the length of tread.

Panel Board

The operator panel board is provided with the following operations:

- i) Expand and inflate or deflate the tyre
- ii) Rotate the tyre forward or reverse at high or low speeds

This panel board is located on a swivel arrangement for the operator's convenience.

02 Specifications

Model	BI 2D
Catalogue Number	MA46 2D - X*
Tyre Range	6.50 - 14 to 12.00 - 24.5
Air Pressure Requirement (kPa / kg/cm ²)	700 / 7
Dimensions (L x W x H) (mm)	1200 x 1400 x 2150
X* in Cat. No. denotes power supply specifications (V / Hz / ph)	E - 220 / 50 / 31
Electrical Load (kW / hp)	0.75 / 1.0
Weight (kg)	~300
Installation	Free standing

03 Assembly and Commissioning Tools

Accessories

Standard	Installation kit
Optional	Tyre lift
	Polytloff
	Extruder gun hanger
	Tread Cutter
	Laser Unit (Single / Triple)

Tools

Spanners	
Double end 6 - 26	1 Set
Ring end 12 - 19	1 Set
Adjustable spanner	1 Set
Allen keys 3 - 10 mm and 7/32"	1 No. each
Star screw driver	1 No.
Screw driver set	1 No.
Screw driver - 6" & 8"	1 No.
Circlip plier external 6"	1 No.
Cutting plier (medium)	1 No.
Line tester	1 No.
Nylon hammer	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.

Materials

Electric cable 4 core, 1.5 sq.mm	Length as per installed position
Gear oil ISO VG-Grade 320 or SAE 140 or SAE 90	3 L

04 Installation and Commissioning

Positioning

- The Building Machine BI 2D does not need any grounding.
- Position the machine in the allocated area, leaving enough space all around for the work bench and operating space.

Connection

- Connect the pneumatic line from the nearest point to the inlet of the control panel.
- Connect the electrical line to the electrical panel from the nearest point.

Setting

- Set the main incoming line to 8 kg/cm²
- Set the miniature regulator on the expandable hub to a pressure of 1.4 kg/cm²
- Set the high pressure regulator to 4 kg /cm²
- Set the low pressure regulator to 1.4 kg/cm²

Lubrication

- Fill the Gear Box with SAE 40 to the required (approx 1L).

Expanding Rim Fixing

- Set the needed rim to the hub of the machine. The stem with / without lock should slide into the groove of the segments and should be locked.
- Connect the hose line of the rim into the quick coupler on the hub.

05 Pre-Operation Checks

- Check all the oil level in the gear box by removing the mainframe cover.
- Check if the 6 bolts fastening the expandable hub to the shaft are tight.
- Check if the 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 kg/cm² by operating the miniature air regulator.
- Mount a casing on the expandable hub. Expand the hub and check if the expansion and inflation of the casing are proper and that the pressure shown on the respective gauges are correct.
- Check the casing while rotating for any wobbling or eccentricity (face out or run out).
- Check for any air leak in the system.

06 Operation

1. Mount the cemented tyre on the expandable rim and inflate.
2. Load the cushion gum spool on the cushion 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 cushion gum on the casing carefully, centering over the crown.
5. Cut off the remaining cushion gum after one full rotation.
6. Remove the poly liner by running the tyre in the REVERSE direction.
7. Apply the cemented tread to the casing following procedures similar to cushion gum application.
8. Cut the excess tread by marking and positioning it in the pneumatic cutter assembly for cutting.
9. Rasp the fresh cut end by suitable tool, taking precaution to cover the exposed cushion gum.
10. Cement the end, dry and apply a strip of cushion gum.
11. Remove the poly from it.
12. Carefully join the two ends of the tread without touching the cemented surface.
13. Stitch the tread at LOW PRESSURE / HIGH SPEED once.
14. Stitch the tread again at HIGH PRESSURE / HIGH SPEED twice.
15. Staple the tread joints.

07 Do's and Don'ts

Do's

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

Don'ts

- Never inflate the hub when there is no rim mounted.
- Do not use the tread cutter for cutting other materials.
- Do not run the machine without oil in the gear box.
- Do not release the air by pulling the safety valve of the expandable rim to deflate the tyre.
- 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.

08 Troubleshooting

Symptoms / Problems	Possible Causes	Remedies
Machine does not run when switched on	<ol style="list-style-type: none"> 1. Incoming supply failure 2. Fuse blown off 3. Improper connection 4. Faulty foot switch 5. Faulty contactor 	<ol style="list-style-type: none"> 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
Tyre shows jerky movements while running	<ol style="list-style-type: none"> 1. Loose connection in wiring 2. Improper connections 	<ol style="list-style-type: none"> 1. Clean terminals and tighten firmly 2. Correct as per circuit diagram
Tyre rotates only in one direction	<ol style="list-style-type: none"> 1. Loose connection or damage in forward / reverse switch 2. 12 V relay not working 3. PCB failure 	<ol style="list-style-type: none"> 1. Correct connection and replace if needed 2. Replace relay 3. Check PCB and replace parts, if needed
Motor runs either at high or low speed only	<ol style="list-style-type: none"> 1. Loose connections in auto transformer tapplings 2. Loose connections in strip 3. Loose connections in control panel switch 	<ol style="list-style-type: none"> 1. Fasten connection tightly 2. Correct connections 3. Remove control lead check connections to the switch. Replace, if necessary.
PCB glass fuse blows off	<ol style="list-style-type: none"> 1. PCB not inserted properly in holder 2. Short circuit in PCB 3. Diodes not functioning 4. Improper supply to PCB 	<ol style="list-style-type: none"> 1. Remove and insert properly 2. Rectify it and replace if necessary 3. Replace diodes 4. Check and rectify

Symptoms / Problems	Possible Causes	Remedies
Motors does not work though contactor functions	<ol style="list-style-type: none"> 12 V step down transformer not working Faulty field reverse relay 	<ol style="list-style-type: none"> Replace transformer Check and repair
Inflation time increases	<ol style="list-style-type: none"> Leakage or blockage in hose 	<ol style="list-style-type: none"> Check and correct joints
Stitching rollers do not traverse properly	<ol style="list-style-type: none"> Worn out gun metal bushes Stitching arm not fitted on the screw rod properly Screw rod worn out 	<ol style="list-style-type: none"> Replace gun metal bushes Adjust the arm properly Replace screw rods
Tyre drive assembly is noisy	<ol style="list-style-type: none"> No oil in gear box Gear box failure Gear drive failure Drive bearing failure 	<ol style="list-style-type: none"> Fill with suitable lubricating up to level Dismantle gear box. Check gears for any wear. Replace worn out gears. Check gears for wear. Replace worn out gears. Replace bearing
Tread cutter blade does not cut tread completely	<ol style="list-style-type: none"> Worn out blades Worn out wear pad 	<ol style="list-style-type: none"> Sharpen and replace Replace hylem sheet
Stitching rollers are not in the centre	<ol style="list-style-type: none"> Pneumatic cylinder not in centre Traverse roller not in position 	<ol style="list-style-type: none"> Adjust cylinder to centre by placing an inflated tyre Adjust screw rod for centering

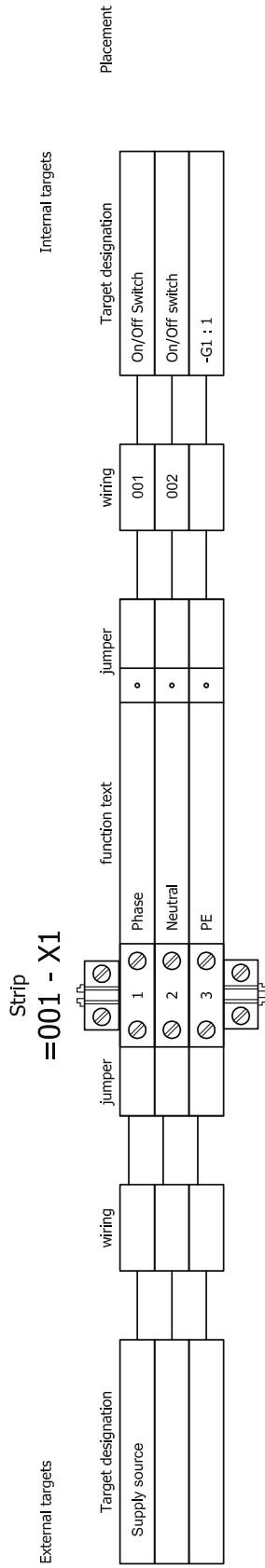
Symptoms / Problems	Possible Causes	Remedies
Inflation pressure is not attained in tyre	<ol style="list-style-type: none"> 1. Air leakage in joints 2. Restricted air flow through air line 	<ol style="list-style-type: none"> 1. Check and rectify joints 2. Check hoses for any bend or twist and correct
Pressure cylinder shows jerky movement	<ol style="list-style-type: none"> 1. Low air pressure 2. Air leakage in line 3. Improper tightening of tie rods 	<ol style="list-style-type: none"> 1. Correct air pressure 2. Check air lines and correct 3. Tighten all the tie rods uniformly
Air valve leak	<ol style="list-style-type: none"> 1. Failure of 'O' rings and parts 2. Air passing through the piston 	<ol style="list-style-type: none"> 1. Replace the 'O' rings and sealing nylon bushes. 2. Dismantle cylinder. Check for 'O' ring or seal failure and replace
High pressure not attained	<ol style="list-style-type: none"> 1. Air inflow not proper 2. Bend or twist in the air hose 3. Worn out seals and 'O' rings 	<ol style="list-style-type: none"> 1. Check air line and correct 2. Correct hoses and replace, if damaged 3. Dismantle cylinder. Change seals and 'O' rings.

09 Preventive Maintenance

Name of the Post	Tread Building
Name of the Equipment	Building Machine
Model No.	BI 2D

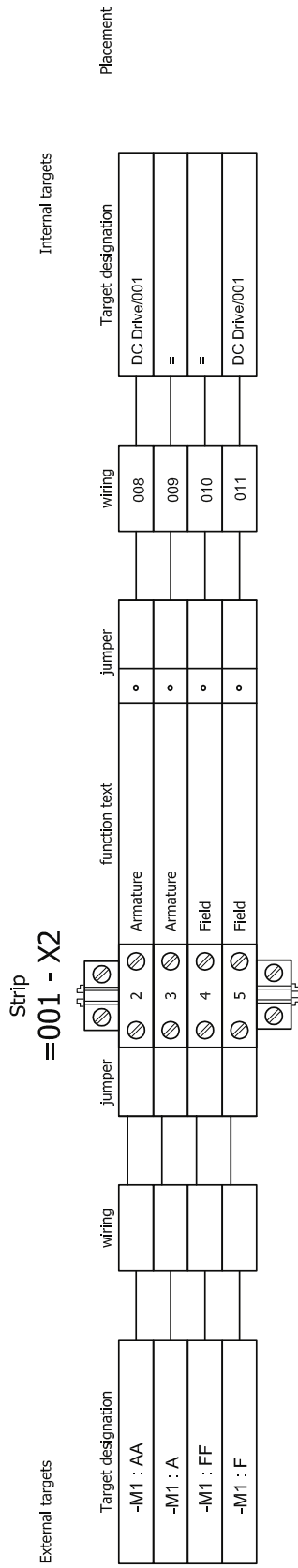
S. No.	Activity	Frequency	Acceptance Criteria
1	Clean the machine	Daily	Dust free
2	Drain the water from the air filter	Daily	No water in the filter unit
3	Check tyre inflation pressure is 1.4 kg/cm ²	Daily	Pressure in between - 1.4 ± 0.3 kg/cm ²
4	Check expandable hub pressure is 7.2 kg/cm ²	Daily	Pressure in between - 7.2 ± 0.5 kg/cm ²
5	Check the stitching roller pressure low 1.4 kg/cm ² and high pressure at 3.6 kg/cm ²	Daily	Stitching roller low pressure should be 1.4 ± 0.2 kg/cm ² and high pressure 3.6 ± 0.2 kg/cm ²
6	Clean the roller head assembly	Daily	Dust free
7	Check the air line and fitting for any leakage	Daily	No leakage
8	Check the stem with locks / without locks replace if necessary	Daily	Expandable rim should be locked properly
9	Check the working of foot switch	Weekly	Proper working
10	Check the condition of ceiling wire for tyre lift arrangement	Daily	No damage
11	Check the expandable hub mounting bolts and tighten if necessary	Weekly	Bolt should be properly tight
12	Clean the exhaust air silencer	Weekly	Dust free
13	Check the expandable rim safety valve to operate at 2.2 kg/cm ²	Monthly	Safety valve should be open if pressure is more than 2.2 kg/cm ²
14	Clean and lubricate the tyre drive gears with multi-purpose grease	Monthly	Properly lubricate
15	Check and tighten the electrical connection	Monthly	No loose connection in electrical panel board
16	Check and replace the stitcher roller bush	Monthly	Smooth movement stitcher roller
17	Flush and replace gear box oil with SAE 90	Half yearly	Replace the oil
18	Lubricate the sliding bar of tyre lifter with graphite grease	Weekly	Properly lubricated and smooth movement of tyre lifter

Terminal diagram



Date		21/12/14	Elgi	Elgi Rubber company Limited		Terminal diagram=X1	ELGI		Page 3
Drawn	SS								Page 14
CK'd	SSK								
App'd	BSR								
Date	Name	Replaced by		Replaced by					
		Bullker BIZC-24V DC Control							

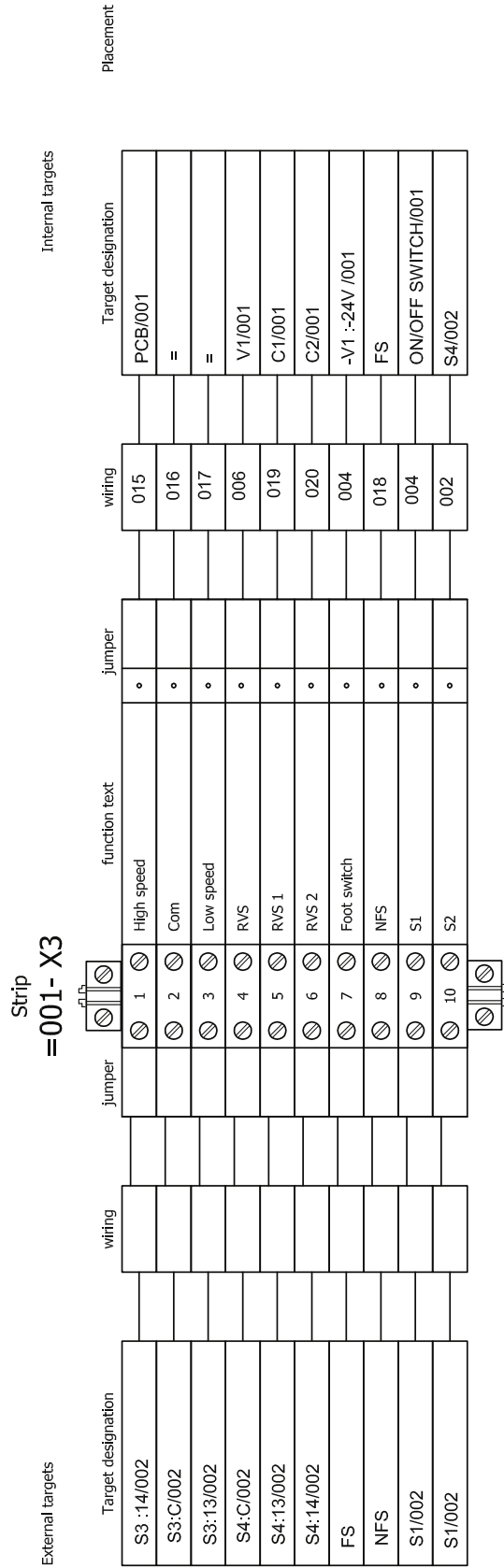
Terminal diagram



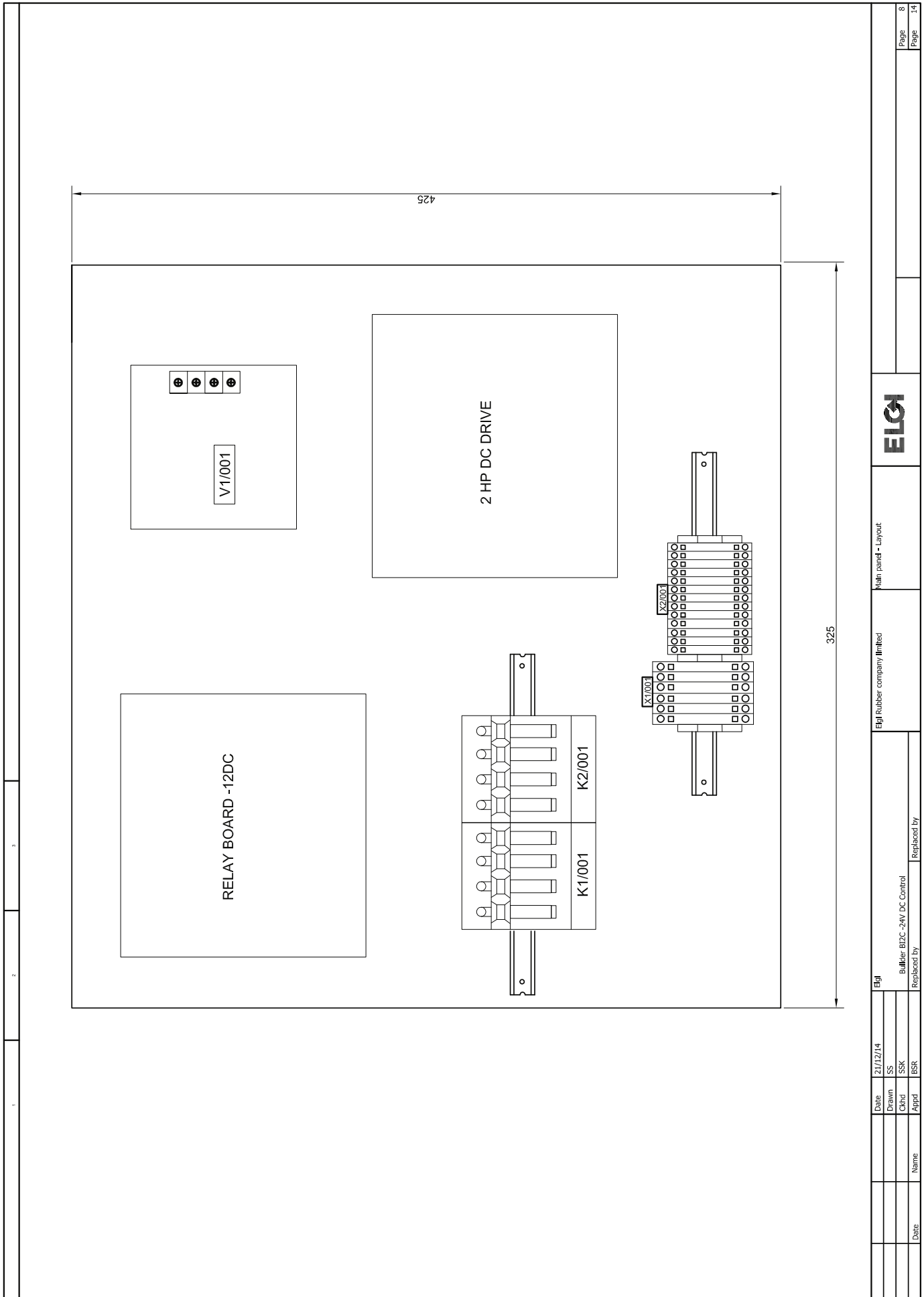
Date	21/12/14	Elgi	Elgi Rubber company limited	Terminal diagram=++X2	Page	4
Drawn	SS				Page	1,4
Checked	SSK	Bullier BIZC -24V DC Control				
Appd	BSR	Replaced by	Replaced by			



Terminal diagram



Date	21/12/14	Elgl	Terminal diagram=++X4	Page	5
Drawn	SS			Page	14
Okhd	SSK	Bulker B12C -24V DC Control			
SS	BSR	Replaced by			
		Replaced by			
			Elgl Rubber company limited		



Main panel - Layout

Elgi Rubber company limited

Elgi
Builder B12C-24V DC Control

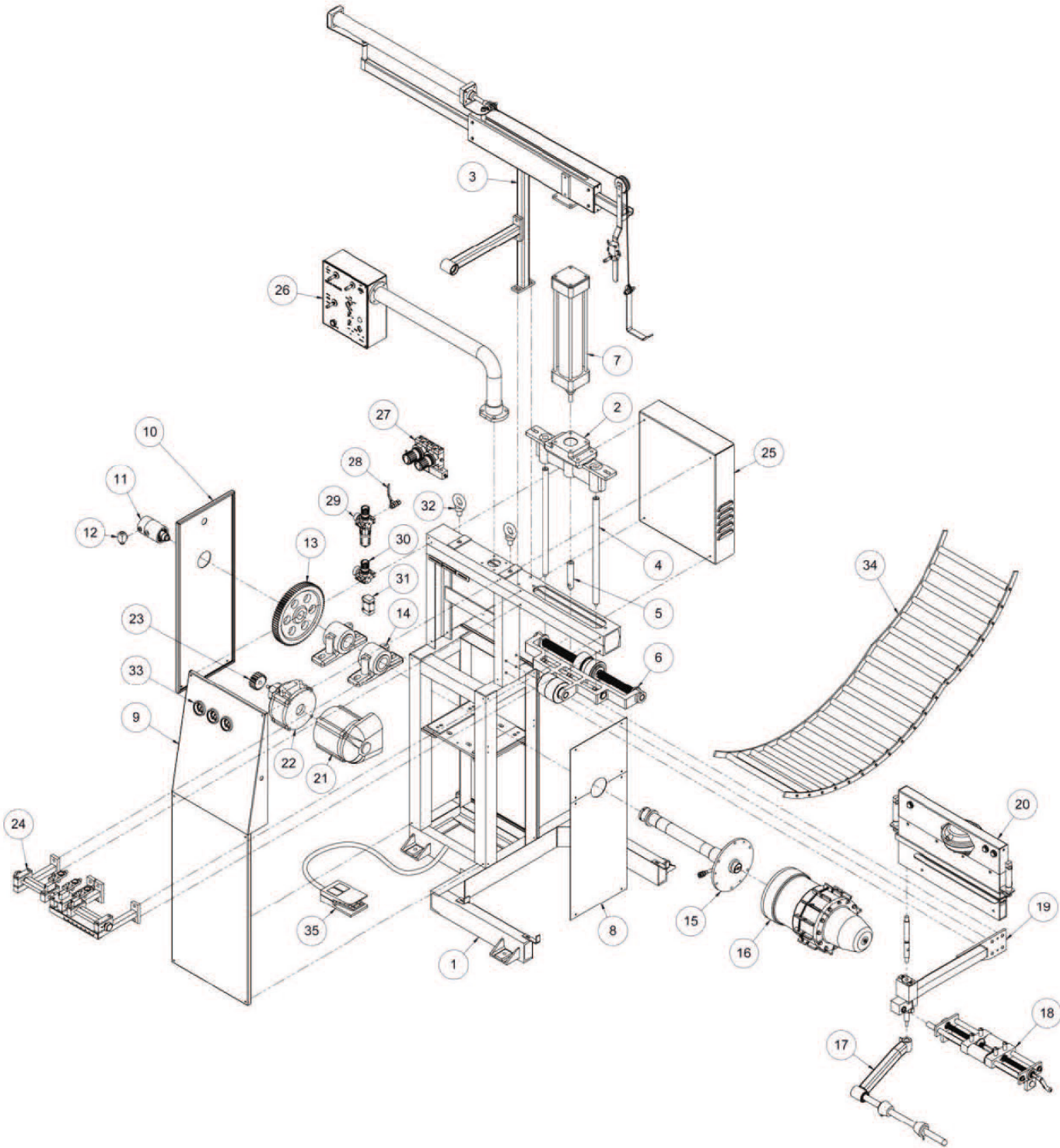
Date 21/12/14
Drawn SS
CKhd SSK
Appd BSR

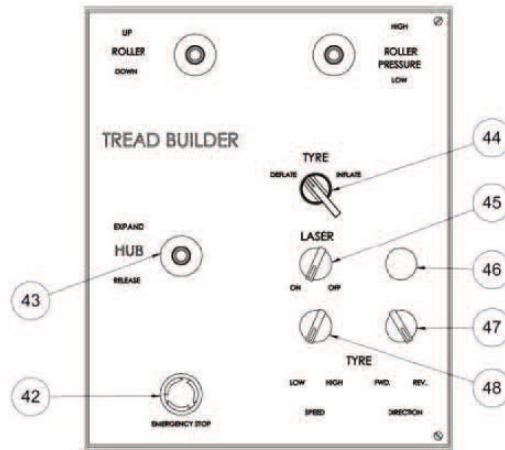
Date Name

Replaced by

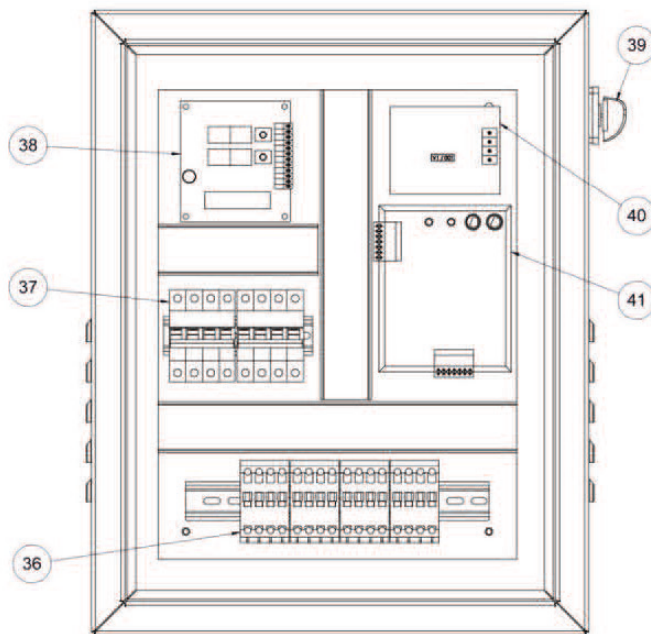
Page 8
Page 14

12 Parts List





ITEM - 26



ITEM - 25

Parts List - BOM

S. No.	Order Code	Description	UOM	Qty
1	MA462D/1	Main Frame	Nos	1
2	MA462D/2	Housing Roller Head Guide	Nos	1
3	MA462D/3	Tyre Lift	Nos	1
4	MA462D/4	Guide Shaft Pneumatic Cylinder	Nos	2
5	MA462D/5	Front Flange With Adaptor	Nos	1
6	MA462D/6	Roller Head	Nos	1
7	MA462D/7	Pneumatic Cylinder (100 - 400)	Nos	1
8	MA462D/8	Cover Front	Nos	1
9	MA462D/9	Cover Left	Nos	1
10	MA462D/10	Cover Rear	Nos	1
11	MA462D/11	Rottary Seal Coupling (dual Pr)	Nos	1
12	MA462D/12	Rapid Relif Valve	Nos	1
13	MA462D/13	Gear Wheel 78 T	Nos	1
14	MA462D/14	Bearing Pillow Block	Nos	2
15	MA462D/15	Main Shaft	Nos	1
16	MA462D/16	Expanding Hub - Eh5	Nos	1
17	MA462D/17	Bonding Gum Let Off Assembly	Nos	1
18	MA462D/18	Tread Centering Guide	Nos	1
19	MA462D/19	Tread Cutter Arm	Nos	1
20	MA462D/20	Tread Cutter Assembly	Nos	1
21	MA462D/21	Dc Motor 1 Hp / 1000 Rpm / F.t.mount	Nos	1
22	MA462D/22	Tyre Drive Gear Box – 1 Hp / Dc	Nos	1
23	MA462D/23	Gear Wheel 19 T	Nos	1
24	MA462D/24	Laser Unit	Nos	1
25	MA462D/25	Control Panel Board Assembly	Nos	1
26	MA462D/26	Remote Panel Board Assembly	Nos	1
27	MA462D/27	Regulator Lr 1/4-d	Nos	2
28	MA462D/28	Ball Valve - 1/4"	Nos	1
29	MA462D/29	Air Filter Cum Regulator Lfr 1/4 D Mini	Nos	1
30	MA462D/30	Regulator Lr 1/4-d Mini	Nos	1
31	MA462D/31	3/2 Single Pilot Operated Valve	Nos	1
32	MA462D/32	Eye Bolt M20	Nos	1
33	MA462D/33	Presure Gauge 0 To 10kgf	Nos	3
34	MA462D/34	Tread Roller	Nos	1
35	MA462D/35	Foot Switch 2no+2nc Fsgx2/bch	Nos	1
36	MA462D/36	Connector – 24v / Wago	Nos	4
37	MA462D/37	Contactora – 24v Siemens	Nos	2
38	MA462D/38	Speed Control Circuit Board PCB – LI	Nos	1
39	MA462D/39	6A On/off Switch	Nos	1
40	MA462D/40	SMBS 6A	Nos	1
41	MA462D/41	DC Drive Unit	Nos	1
42	MA462D/42	Emergency Push Button Switch	Nos	1
43	MA462D/43	Hand Lever Valve 5/2 Way	Nos	3
44	MA462D/44	Selector Switch - Tyre Inflation / Deflation	Nos	1
45	MA462D/45	Selector Switch - Laser On Off	Nos	1
46	MA462D/46	Pilot Lamp / Integral Led / Red	Nos	1
47	MA462D/47	Selector Switch - Tyre Direction	Nos	1
48	MA462D/48	Selector Switch - Tyre Speed	Nos	1