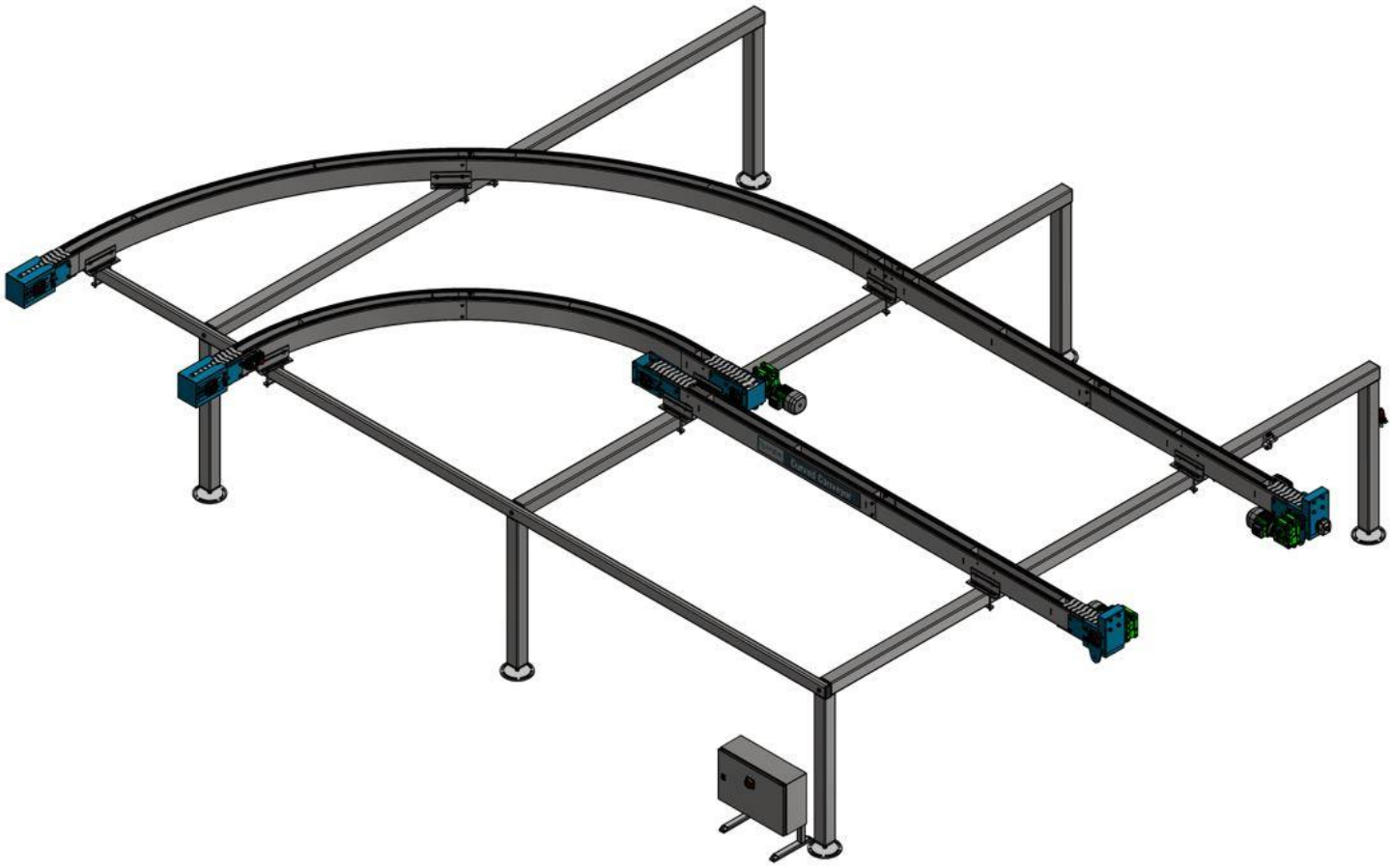
SPIDA MACHINERY
A MULTINAIL COMPANY

Curved Conveyor



OPERATION & MAINTENANCE MANUAL

WARNING

This machine ***must only*** be used by personnel who have been properly instructed in all aspects of the machine's safe operation.

Operators ***must*** also wear the recommended personal protective clothing and have thoroughly read and understood this manual.

Serial Plates

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Below is a copy of the serial plate displayed on the back of the machine

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2 Overview

The Curved Chain Conveyor is designed to provide is used for the transportation of material, from the designated machine to the required destination for packaging and shipment.

The Curved Chain Conveyor must be used per the standard operating procedures set out in this manual. Any actions carried out which are not contained in this manual are not endorsed by Spida Machinery and cannot be warranted.

All operators should read and then sign the register of this manual before operating the Curved Chain Conveyor to ensure they are thoroughly familiar with the machine capabilities, limitations and to ensure correct operating procedures are adhered too.

Only those operators that have received training on the correct operation of the Curved Chain Conveyor are deemed competent and qualifies to operate the machine.

The Curved Chain Conveyor test procedures must be performed at installation and after any maintenance, adjustment, repair or modification of the machine. The test procedure is available on request.

The competent operator must also regularly perform the recommended maintenance procedures and checks detailed in this manual.

All electrical wiring must be set as to not allow their movement through any areas of adjacent machinery that could cause them to be damaged or severed.

This manual offers many safety tips, but its purpose is not to provide instruction in all the skills and techniques required to manufacture timber frames safety and efficiently.

Due to improvements in design and performance during production, in some cases there may be minor discrepancies between the actual machine and the illustrations and text in this manual.

3 Specifications

Table 1, Curved Chain Conveyor Specifications

Specifications using the unloading end of the machine as the reference point

Overall Width	5740 mm
Overall Height	1647 mm
Overall Length	7675 mm
Working Width	Equal to width of widest component being made
Working Height	1523 mm
Weight	715 kg
Timber Feed	Left or Right (Depending on machine orientation)
Air Supply	6-8 Bar (600-800 kPa)
Power Requirement	25 Amp 230-460V 3 Phase

Specifications may change without notice

4 Installation

4.1 Handling & Transport

- Box all additional parts and secure with the machine.
- Using a single fork truck, lift the machine package underneath using the forklift spaces provided.
- Once on the truck, tightly strap the machine.
- Do **not** place any loads on top of the machine.
- The machine should be kept free from road grime and rain, and should always be covered while being transported

The Curved Chain Conveyor will be delivered in large component form and will require assembly on site by trained personnel. Due care and attention should be given whilst unpacking the components from their packaging materials. Any damage caused whilst in transit should be noted immediately and Spida Machinery informed. Refer to section 3 specifications for weights of individual components when selecting Manual Handling Equipment required, prior to positioning them on the selected site.

4.2 Installation

- It is advisable to forklift the machine package as close to the final assembly point as possible to reduce manual lifting.
- The final operating position of the machine must be free from any rubbish or impediments.
- There must be good lighting in the installation area to allow proper positioning of the machine.
- The ground on which the machine rests must not vary by more than 30mm over a 6m x 8m area.
- The Curved Chain Conveyor should be leveled using adjustable feet. Once level, machine should be bolted to the floor through holes provided.
- Electrical commissioning to be to local standards and be performed by a qualified electrician.

The site selected for the Curved Chain Conveyor will depend on the ground. The ground chosen should be clean and free of water or possible flooding. The area on which the framework sits must be as even and horizontal as possible. This can be achieved by adjusting the height of the feet. There should be no twist to the framework once the feet have been adjusted to take the ground into account.

The final operating position of the machine should be free of all rubbish or impediments, with general access to all areas of the Curved Chain Conveyor for the ease of loading and unloading material of varying sizes.

With the machine in position, a qualified engineer should be used to connect the pneumatic components to the machine and adjust the air pressure to the required setting (refer to 3 Specifications for pressure settings).

Check all pneumatic hoses and connectors to ensure that the fittings haven't worked loose during transportation of the machine. Re-tighten all fittings that appear to be leaking. If leaking persists undo the fittings and apply a sealing compound to the joints in question. Re-tighten the fitting. (Any serious leaking problems during the warranty period should be reported to Spida Machinery). Check the air pressure in the system is sufficient to operate the machine (refer to 3 Specifications for pressure settings).

To check the air pressure, turn the compressor on and allow the pressure to build up. When the controls are activated, normal pressure should read 6-8 bar or 600- 800 kPa. All maximum pressures are factory set and should not be changed.

Check that all safety equipment is functioning properly.

5 Safe Operation of Machinery

This section is provided as a guide only, it is the responsibility of the employer to ensure compliance with the relevant Health and Safety Regulations applicable to them at the time.

5.1 Young Persons

No person under the age of 15 should be allowed to operate or assist with the operation of machinery.

5.2 Long Hair and Loose clothing

Any long hair or loose clothing must be fully contained to eliminate the risk of entanglement with machinery.

PROTECTIVE SAFETY CLOTHING AND EQUIPMENT MUST BE WORN; INCLUDING:

Eyewear

Hearing protection

Respirator or Dust mask

Protective Clothing

Safety footwear

5.3 Cleaning and Maintenance of Machinery

For safe and reliable use, machinery should be regularly cleaned and maintained. During cleaning and maintenance, the Curved Chain Conveyor must be isolated from all sources of energy and locked out to prevent unexpected operation.

5.4 Training and Supervision of Curved Chain Conveyor Operators

No person should be expected or allowed to operate the Curved Chain Conveyor until they have been fully trained and authorised to do so. They must be familiar with:

- Actual and potential hazards and appropriate controls.
- Correct use and adjustment of guards.
- Emergency procedures.
- How the Curved Chain Conveyor works.
- Checks to perform prior to starting.
- How to recognise potential faults.
- Location of controls and how to Stop and Start the Curved Chain Conveyor.

5.5 Responsibilities of Curved Chain Conveyor Operators

Operators should:

- Check the Curved Chain Conveyor prior to use and during operation to ensure it is in sound operating order.
- Report immediately any defects noted to their supervisor.
- Use any, and all safety equipment provided.
- Not operate any machinery if under the influence of drugs or alcohol, consult a physician or pharmacist if unsure of any medication.

5.6 Operating Speeds and Vibration

Machinery should be operated within its designed limitations and for its designed use only, any unfamiliar noise, vibration or failure should be investigated and remedied promptly.

5.7 Machinery Stability and Location

The Curved Chain Conveyor should be securely fastened to the structure of the building to prevent movement or toppling over. Location should provide access all around for maintenance and cleaning. Lighting must be adequate to allow operator to clearly see controls and work pieces but not glaring or blinding.

Consideration should be given to the operators work area for product flow and to minimise repetitive actions and unnecessary movement.

An exclusion zone around the Curved Chain Conveyor should be maintained to prevent persons not directly involved with the operation of the machine from reaching any part of the machine.

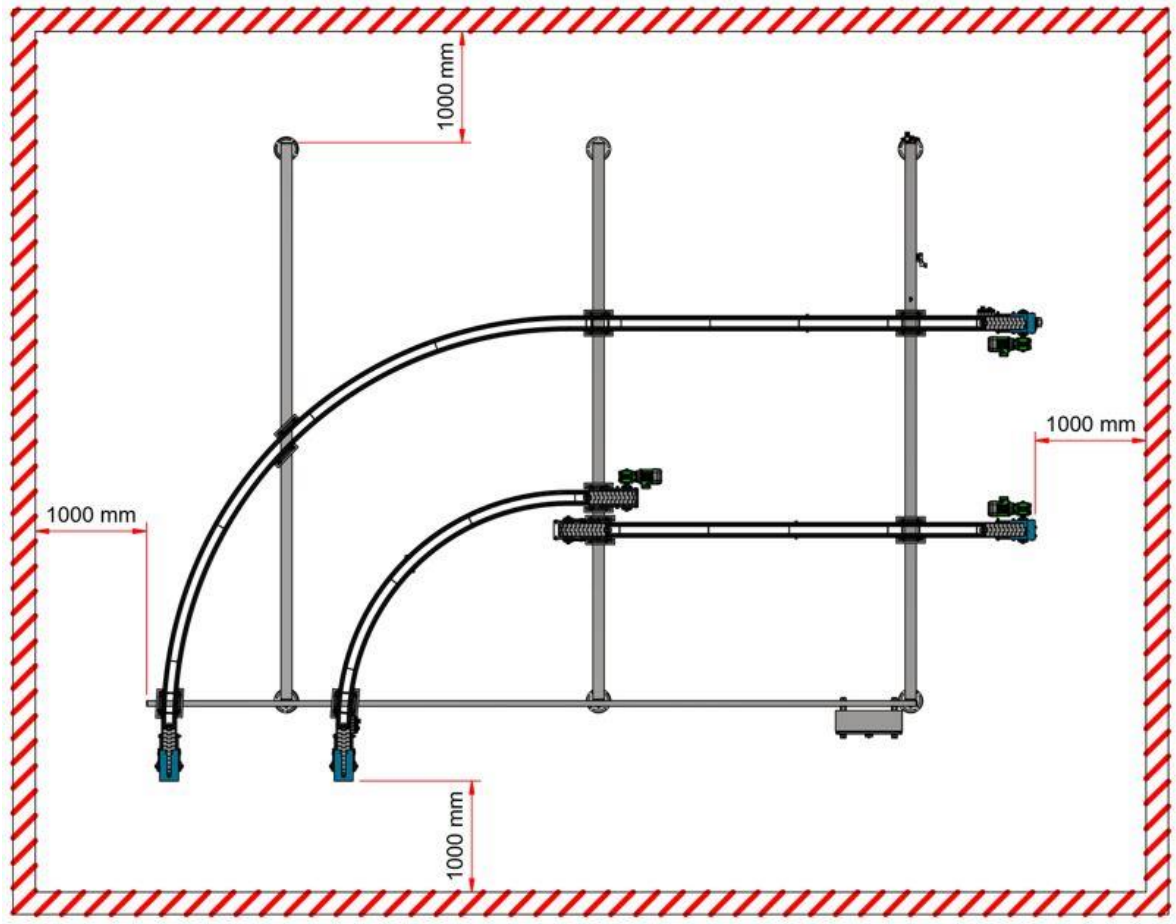

Figure 1, Recommended exclusion zone around the Curved Chain Conveyor.

5.8 Electrical Safety

Electrical wiring must be installed and maintained by a suitably qualified person in accordance with relevant regulations.

5.9 Isolation, hold cards and lock out devices

There should be procedures for isolating and locking out the Curved Chain Conveyor, for purposes of maintenance and to prevent unintended use should a fault have been identified.

5.10 Noise control

The normal operation noise of some machines will be more than permitted noise exposure levels. Employers must ensure adequate hearing protection is available and is used by all persons in the affected area.

5.11 Manual Handling

Manual handling should be avoided where possible, use of mechanical lifting and assisting equipment is recommended. Consider using forklifts, hoists, and trolleys to eliminate lifting and carrying components.

5.12 Recommended Service Interval

It is recommended that for optimal performance, the Curved Chain Conveyor should be serviced every 6 months.
It is also recommended that a service log be kept, as a reminder of when the next service should be due. Spida Machinery performs service runs on a regular basis throughout NZ; however, should the need arise for an early service, or should a service need to be booked in advance, please advise Spida Machinery accordingly.

WARNING! Do not operate the Curved Chain Conveyor without having received the proper instruction in operation and safety from this manual.

WARNING! It is recommended that the employers maintain training records demonstrating the competencies of each employee

6 Safe Operation

NOTE: The Curved Chain Conveyor is to be operated in accordance with this manual. Deviation from this specified operation may result in incorrect transportation, component storage or injury.

6.1 User Warnings

- The conveyor must be set so as not to allow its movement through the hazardous areas of adjacent machinery.
- All machine and components should be inspected upon delivery and at weekly intervals for looseness, fracture, bends, sharp edges or surfaces and any other condition that may contribute to a human mishap or further deterioration of the machine. We suggest a log be kept for this purpose.
- When broken, damaged, or loose parts (or any condition that may represent a hazard) are observed, corrective action should be taken immediately. Inadequate attention to maintain the machine can cause the premature failure of these parts. We suggest this information also be logged.
- The electrical boxes should always be locked to avoid casual entry by unauthorized persons, as touching live surfaces is hazardous.
- Split, broken, warped, twisted or material with excessive wane should be avoided or used with caution because of the greater possibility of the material not being held securely during manufacturing processes.
- The machine is not to be used for any other purpose than the transportation and storage of material.
- Keep hands out of moving parts on the machine. Operators should be instructed not to extend fingers or limbs into or beyond the vicinity of the warning labels. The danger here is obvious – fingers in these areas will risk mutilation.
- Be sure the machine is completely free of foreign objects, and that all guards are in place before connection to electrical and/or pneumatic supply.
- Any guards removed for maintenance or adjustments **must** be replaced before the machine is put back into service.
- Exceeding the capabilities of the machine will void the warranty and could lead to a serious injury.
- All Operators should read and then sign the register of this manual before operating the Curved Chain Conveyor to ensure they are thoroughly familiar with the machine capabilities and limitations and to ensure correct operating procedures are adhered to.
- Failure to perform the daily and weekly service checks as per the schedule may result in serious machine damage or a severe accident.

WARNING! This machine must only be operated by personnel who have been properly instructed in all aspects of the machine's safe operation. They must also be wearing the recommended protective clothing and have thoroughly read and understood this operation and service manual.

6.2 Manual Handling

The following is not a comprehensive list. Manual lifting has the potential to be hazardous; so, for a full description of material handling please refer to lifting standards, techniques, and your own company policies.

- Ensure material supply is via forklift or other support mechanism
- Ensure correct lifting techniques are adopted to transfer material
- Suggest use of trolleys or bench at required height and location to minimize handling and twisting
- Ensure required PPE is worn
- Ensure correct and appropriate lifting techniques are used
- Suggest the setup of a material supply via gravity roller transfer system
- Avoid twisting torso when moving components from one area to another
- Only lift components of weight which you assess to be within your limit
- Use machinery (forklift) for material decreed to be too heavy or ask for assistance from another worker

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6.3 General

Table 2, General Hazards

POTENTIAL HAZARDS	SAFE WORK PROCEDURE
Safety	Ask questions if you have any doubts about doing the work safely. Check and adjust all safety devices daily.
Poor Guarding	Ensure all guards are fitted correctly and are adequately guarding moving parts. Make sure guards are in position and in good working order. Do not operate machine without guards.
Poor Housekeeping	Inspect Curved Chain Conveyor and surrounding areas for obstructions, hazards, and defects. Remove built-up debris from around machine, electrical leads, pneumatic lines, and power points.
Electrical / Air Supply Faults	Inspect electrical leads and/or pneumatic lines for damage.
Inoperable Safety Switches	Check that start/stop and emergency stop buttons operate effectively.
Incorrect Accessories	Use only the accessories designed for each specific application
Foreign Objects	Check that foreign objects and maintenance tools etc. are removed from the machine before using the machine.
Defective/Damaged parts	Any identified defects must be reported and actioned prior to use of the Curved Chain Conveyor.

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6.4 Operation

Table 3, Operational Hazards

POTENTIAL HAZARDS	SAFE WORK PROCEDURE
Slip, Trip & Falls	Avoid awkward operations and hand positions where a sudden slip could cause your hand or part of your body to move into the line of travel. Electric power cords and pneumatic lines should be above head level or in the floor in such a way that they are not trip hazards. Floor areas should be level and non-slip. Clean up any spills immediately
Workplace	Use good lighting so that the work piece and machine controls can be seen clearly. Position or shade light sources so they do not shine in the operators' eyes or cause glare and reflections. Ensure that the floor space around the equipment is sufficient to allow the operator to process their work without bumping into other staff or equipment. Keep the work area free of clutter, clean, well swept and well lit.
Housekeeping	Clean built up debris from around the machine, electrical leads, pneumatic lines, and power points
Defects	Report all defects to the supervisor
Personal Protection	Wear safety glasses or a face shield. Wear hearing protection that is suitable for the level and frequency of the noise you are exposed to in the work area. Wear dust masks when required. Do not wear gloves when operating this machine. Do not wear loose clothing, work gloves, neckties, rings, bracelets or other jewellery that can become entangled with moving parts
Machine Guarding	Make sure all guards are fastened in position. The machine MUST NOT be operated with any of the guards removed. The machine is fitted with steel guards.
Improper Use	Only use the machine for what it has been designed for.
Material Defects	Inspect stock for nails or other foreign materials before transportation. Use only material that the machine has been designed to accommodate.
Operator Technique	Do not impede the movement of the Curved Chain Conveyor while in use. Ensure any body parts, clothing, or work tools do not get in the way of moving parts. Generally, the Curved Chain Conveyor will be continuously moving; so, take care when moving around the machine, and when placing/removing material. Do not attempt to place material on the conveyor until there is room enough to do so.
Hit by projectiles	Curved Chain Conveyor must be electrically and pneumatically isolated before attempting to clear blockages or material jams. Do not use fingers to remove items which have become entangled in movable parts.

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6.5 Maintenance

Table 4, Maintenance Hazards

POTENTIAL HAZARDS	SAFE WORK PROCEDURE
Cleaning and maintenance preparation	Ensure the Curved Chain Conveyor motors are off, and isolate power and air to the machine before inspecting, changing, cleaning, adjusting or repairing a machine. Do not use compressed air to remove sawdust etc. from machines or clothing.
Operational Buttons	Make sure that Operational buttons are in good working condition and within easy convenient reach of an operator. Buttons should be protected so that accidental contact will not upset the machine.
Emergency Stop Buttons	Make sure that Emergency Stop buttons are in good working condition and within easy convenient reach of an operator.
Incorrect electrical and pneumatic isolation of machine	Machine power must be switched off at the Main Power Switch, and the air locked out at the main isolator, before maintenance or cleaning.
Incorrect tools	Use Correct tools for the job to minimise personal injury and damage to the machine
Stalled Stopper Cylinder	Isolate air before attempting to free a stalled cylinder
Guarding	Ensure Guards are fitted correctly, adjusted and in good working order.

WARNING! This machine must only be operated by personnel who have been properly instructed in all aspects of the machine's safe operation. They must also be wearing the recommended protective clothing and have thoroughly read and understood this operation and service manual.

6.6 Recommendations

That the operator is trained, on induction, of the dangers of accessing the machine operating area.

The electrical system is to be serviced, by a qualified electrician only.

That all operators are walked through the operators' manual and all potential hazards are identified.

That good housekeeping is always maintained to avoid the risk of slips, trips or falls.

That approved eye and hearing protection is always used when operating the machine.

That approved dust masks and safety footwear are always worn when operating the machine.

That if the machine is not operating as efficiently as specified, the operator notify their supervisor; who in turn takes appropriate action and eliminates the problem if possible.

All guards and safety devices are not to be removed.

It is recommended that a visual exclusion zone be marked on the floor on a one metre (1000mm) perimeter surrounding the working area of the machine. To identify the work space to pedestrians.

WARNING! This machine must only be operated by personnel who have been properly instructed in all aspects of the machine's safe operation. They must also be wearing the recommended protective clothing and have thoroughly read and understood this operation and service manual.

7 Operating Controls

7.1 Curved Chain Conveyor Controls

Before attempting to operate the Curved Chain Conveyor, familiarise yourself with the location and function of each control.

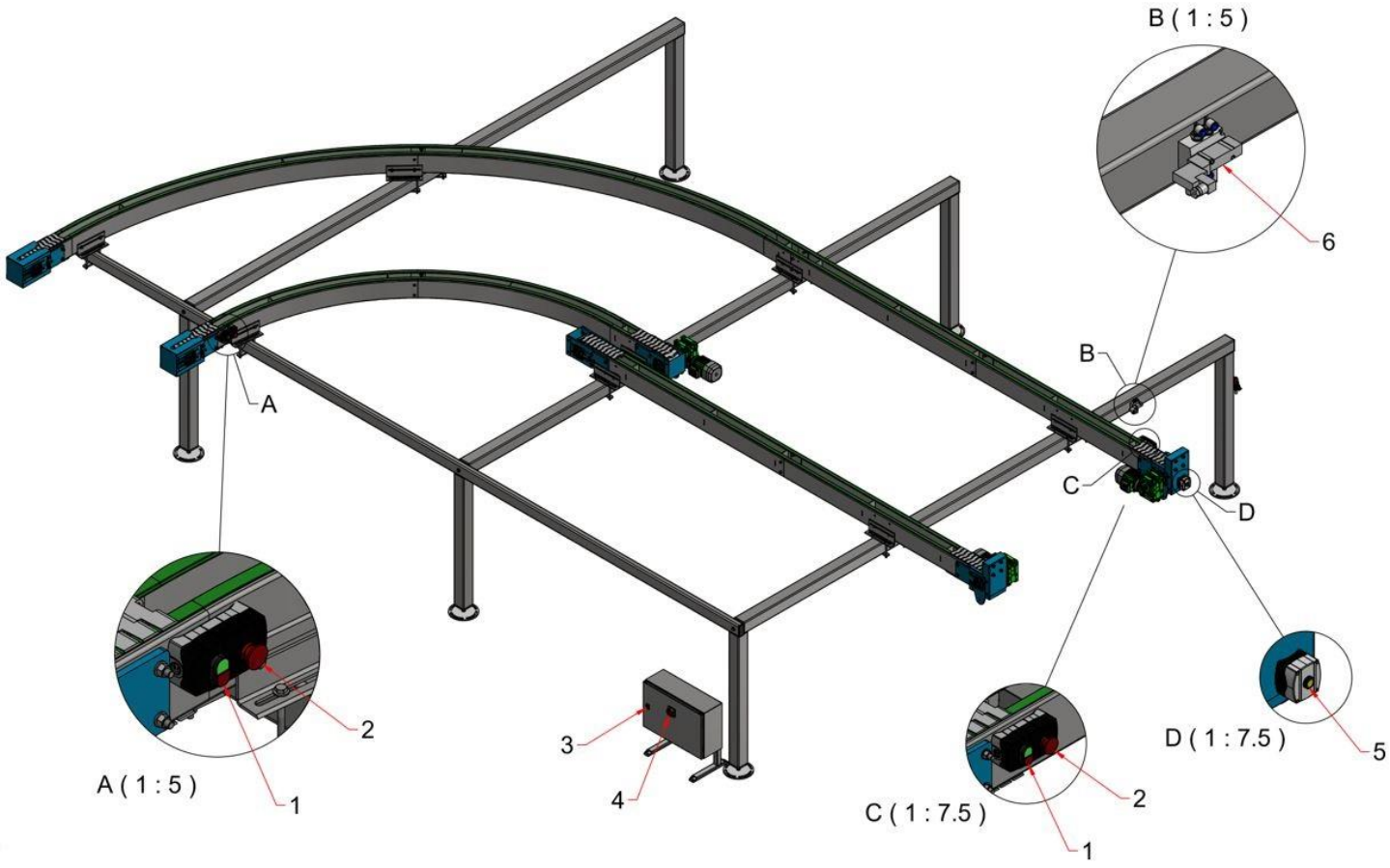

Figure 2, Curved Chain Conveyor controls

Table 5, Control functions see Figure 2

Control	Qty	Function	Description
1	2	Start/Stop Button	Starts/Stops the machine operation as required.
2	2	Emergency Stop Button	Cuts all power to the machine in case of emergency. This must be deactivated before operations can recommence.
3	1	Cabinet door latch	Allows the electrical cabinet to be locked/unlocked as required.
4	1	Power Control for Conveyor - On/Off switch	Turns the power to the machine on/off as required
5	1	Temporary Stop Button	When activated, stops the movement of the conveyor and activates the cylinders (creating a gap between the stopper and material), for an adjustable period of time.
6	1	Solenoid Valve	Changes the signal coming from the temporary stop button from electrical to pneumatic, allowing the temporary stop button to control the Pneumatic Stoppers as required.

WARNING! Do not operate the Curved Chain Conveyor without the correct knowledge and function of each of the controls.

7.2 Pneumatic Controls

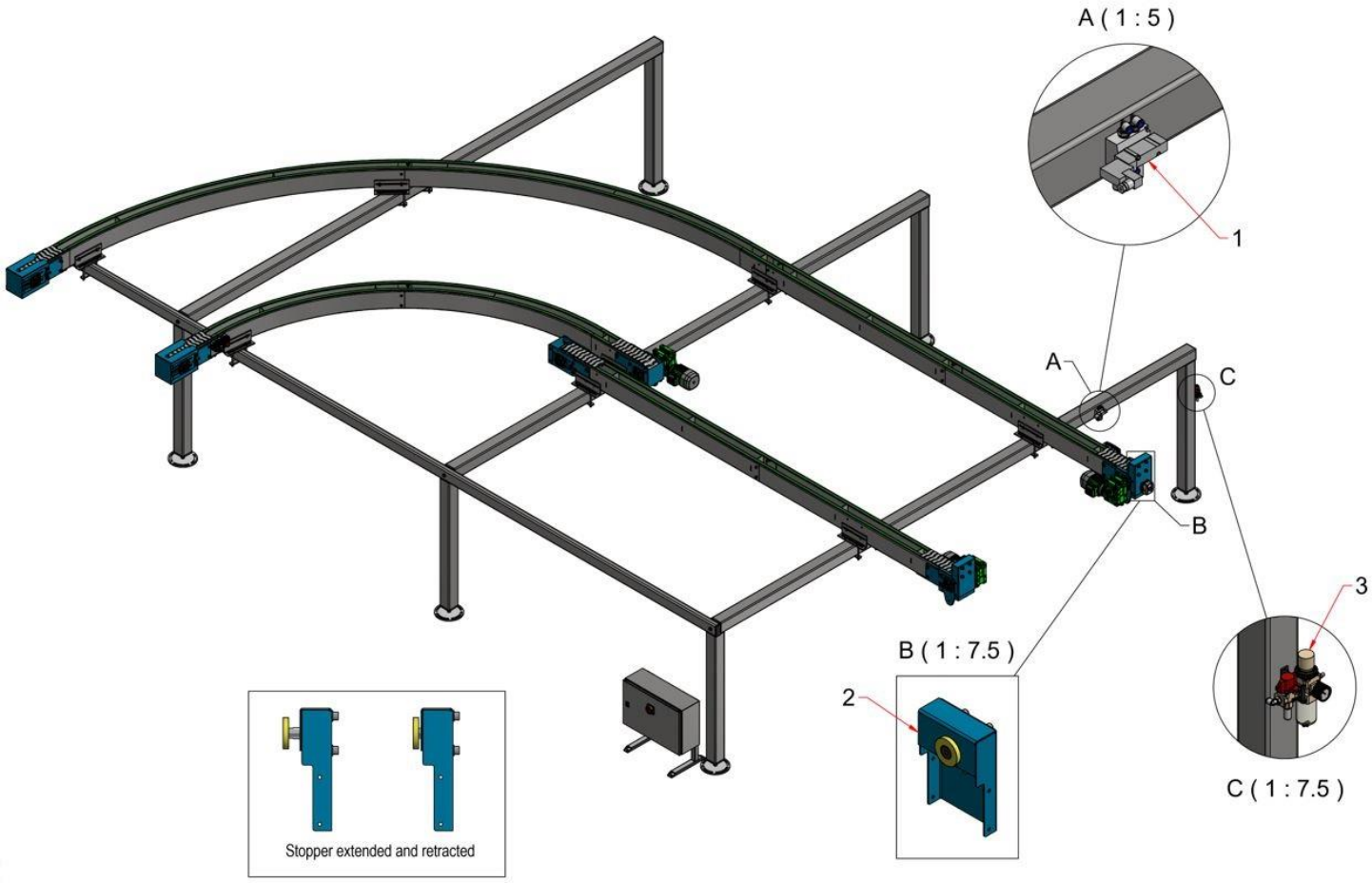

Figure 3, Curved Chain Conveyor pneumatic controls

WARNING! Do not operate Wall Extruder without the correct knowledge and function of each of the controls.

Table 6, Pneumatic Control functions (see Figure 3)

Control	Qty	Function	Description
Pneumatic			
1	1	Solenoid Valve	Changes the signal coming from the temporary stop button from electrical to pneumatic, allowing the temporary stop button to control the Pneumatic Stoppers as required.
2	2	Pneumatic Stopper Pin	When cylinder is deactivated, stopper pin is extended, keeping timber from being pushed up against the cylinder assembly. When activated (by temporary stop button), stopper pin is retracted.
3	1	Pneumatic filter/regulator	Filters and regulates the air coming in and out of the Curved Chain Conveyor. See section 7.3 for further information

WARNING! Do not operate Wall Extruder without the correct knowledge and function of each of the controls.

7.3 Pneumatic filter/regulator

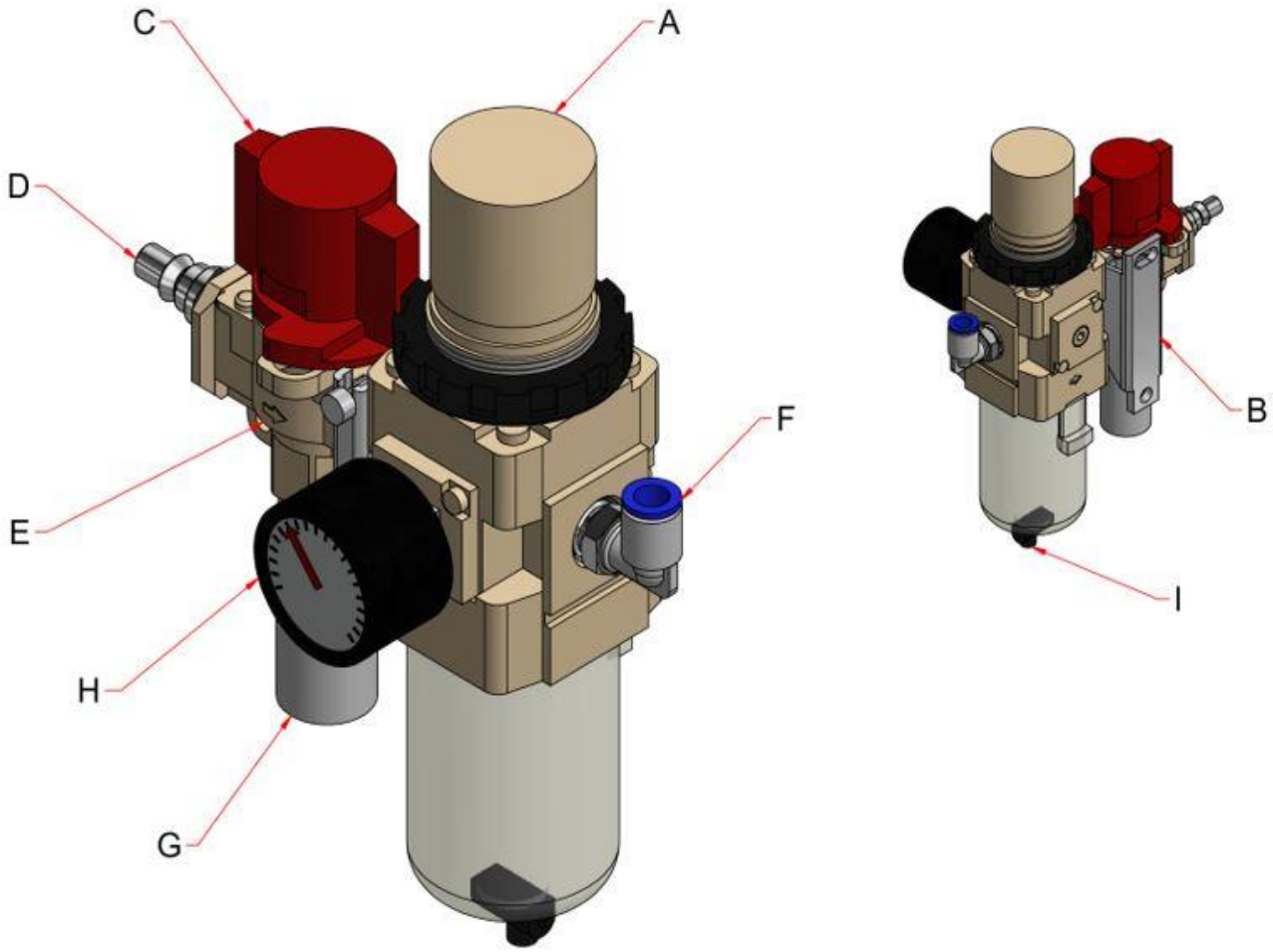

Figure 4, Valve/Filter/Regulator assembly

Table 7, Valve/Filter/Regulator parts

Control	Function
A	Regulator adjustment
B	Mounting bracket
C	Valve on/off
D	Air in
E	Pressure relief valve
F	Air to Conveyor
G	Silencer
H	Pressure gauge
I	Moisture release

8 Operation

NOTE: The Curved Chain Conveyor is to be operated in accordance with this manual. Deviation from this specified operation may result in defective products or injury.

8.1 Machine Set-up

Before operations commence, the operator must ensure that the Curved Chain Conveyor has been set-up correctly.

To set-up the machine:

- Ensure that the safety guards are secured and correctly positioned.
- Complete a visual inspection of potential hazards near the proximity of the machine.
- Check that there are no obstructions to any moving parts, in-between the Curved Chain Conveyor and any adjacent machining area, or further down the conveyor.
- Complete all safety checks required

Once the Curved Chain Conveyor and the surrounding area are satisfactorily clear, the Curved Chain Conveyor can be switched on.

8.2 General Operation

The set-up and use of each Curved Chain Conveyor will differ depending on the needs and requirements of the factory set-up/machines it is linked to; therefore, standard operating procedures will vary. Once the conveyor has been switched on, be sure to follow the specific operating procedures for that Curved Chain Conveyor; as detailed by the employer.

In general:

- Take care when placing/removing material, ensure that the conveyor has stopped moving.
- Do not place material if there is no available room on the conveyor belt.
- Be sure to place material securely, and in the correct orientation.
- Ensure body parts stay clear of moving machinery.

In all instances, the operators must:

- Stay aware of people/items moving around the Curved Chain Conveyor to avoid collisions.
- Ensure nothing gets in the way of moving parts/material.
- Switch off and isolate air to the Curved Chain Conveyor when not in use, or when performing maintenance.

8.2.1 Adding/Removing Material

Generally, there will be two operators using this machine. One will be adding material, and one will be removing material.

When an operator wants to add material:

- Ensure that there is enough room on the conveyor to add material
- Push the start/stop button (Figure 2, item 1) to stop the movement of the conveyor
- Place material onto the conveyor as required
- Push the start/stop button (Figure 2, item 1) to restart the movement of the conveyor

When an operator wants to remove material:

- Push the temporary stop button (Figure 2, Item 5) to activate it
- Wait for the chain to stop moving, and for the stopper pins to pull in
- Remove material from the conveyor as required

The temporary stop button only stops the conveyor for a set time. The conveyor will restart, and the stopper pins pop out again, automatically.

  - The set time in which the temporary stop button stops the conveyor, is generally 15 seconds; however, this is adjustable.

8.3 End of Operations

Once operations are complete, ensure that the Curved Chain Conveyor is switched off and any foreign tools/equipment are removed.

WARNING! Do not use the Curved Chain Conveyor for anything other than its intended use

9 Parts Identification

9.1 Top Level Assembly

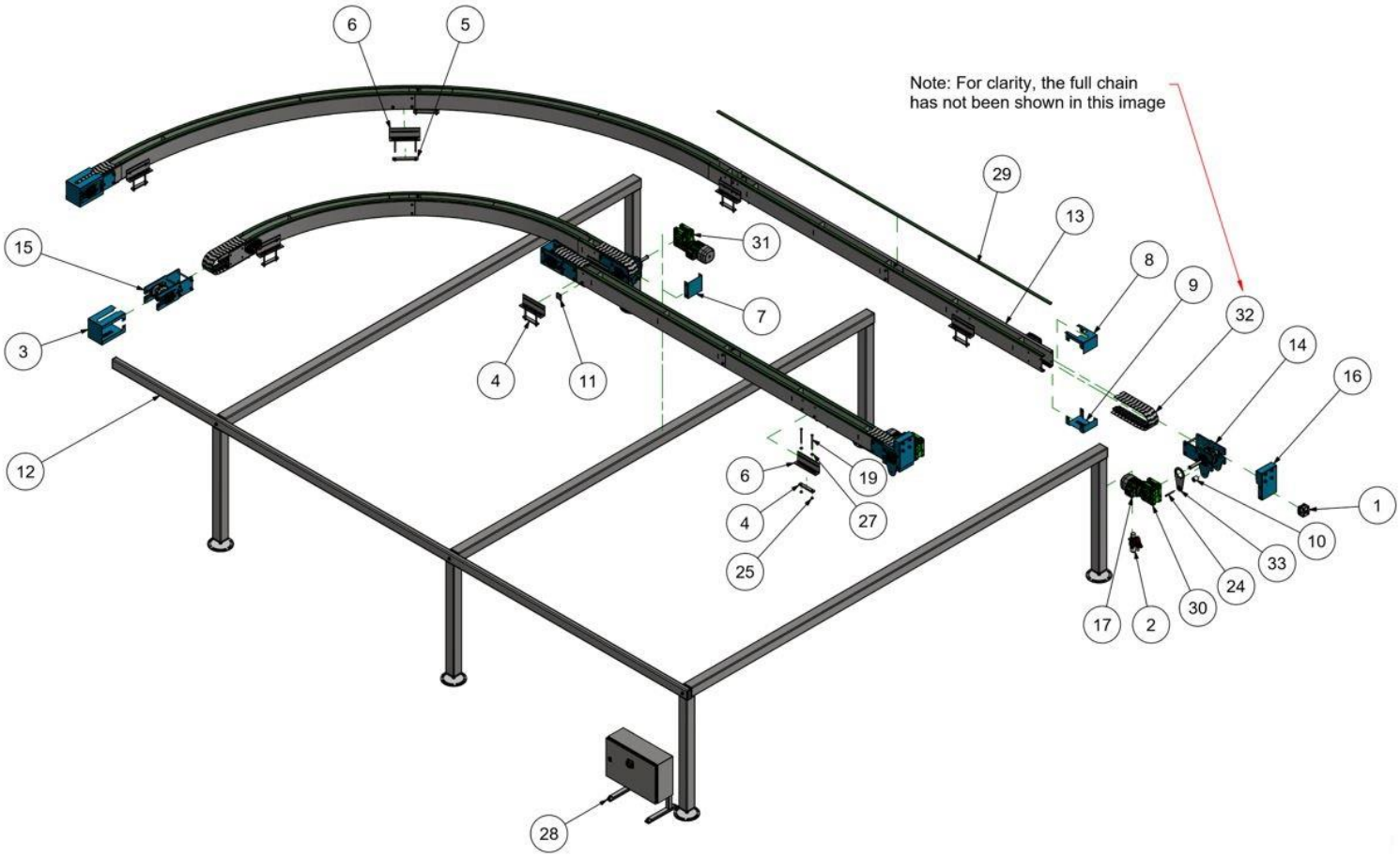

Figure 5, Complete Curved Chain Conveyor

Note: Only sections of the chain are shown in the above drawing. The full chain runs the entire length of the Conveyor.

Table 8, Curved Chain Conveyor parts list

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1002000 - EK	Curved Conveyor Electrical Kit
2	1	1002000 - PK	Curved Conveyor Pneumatics Kit
3	2	1002002	Idler End cover
4	14	1002003	Clamp plate
5	2	1002004	Clamp plate - Long
6	16	1002005	Conveyor Mount bracket - Straight
7	2	1002006	Mid conveyor Drive/Idler Cover
8	2	1002007	Driver End cover - Top Section
9	2	1002008	Driver End cover - Bottom Section
10	3	1002020	Spacer - Drive to Torque arm
11	4	1002023	Spacer - Bracket to Frame
12	1	1002100	Frame assembly
13	1	1002200	Conveyor frame assembly
14	3	1002300	Drive assembly
15	3	1002400	Idler assembly
16	2	1002600	Curved Conveyor Pneumatic Stopper
17	3	EMBN71B4-0.3KWB14	Bonfig Std Motor 0.37kW
18	16	HWCSM830BH	Button Head Cap Screw M8x30
19	32	HWHBM10140	Hex head bolt M10x140
20	6	HWHBM12160	Hex Bolt M12x160
21	4	HWHBM12170	Hex Bolt M12x170
22	2	HWHBM12190	Hex Bolt M12x190
23	2	HWHBM1235	Hex Bolt M12x35
24	3	HWHBM890	Hex bolt M8x90
25	46	HWNHM12	Hex nut M12
26	3	HWNHM8	Hex nut M8
27	50	HWWFM12	Flat washer M12
28	2	SMPBKT13	Computer box bracket
29	67.000 m	TR-LK25UHR	HabiPLAST Profile LK25 Black
30	2	TRGBW63U45P71B14B8	Bonfig Gearbox W64 - 1:45
31	1	TRGBW63U80P71B14B8	Bonfig Gearbox W64 - 1:80
32	35.966 m	TRLF882TAB-4.5.ipt	Plastic table top chain Rexnord 10177754
33	3	TRTAW63	W63 Torque arm

The Curved Chain Conveyor is available in both left and right configurations.

9.2 Frame Assembly (1002100)

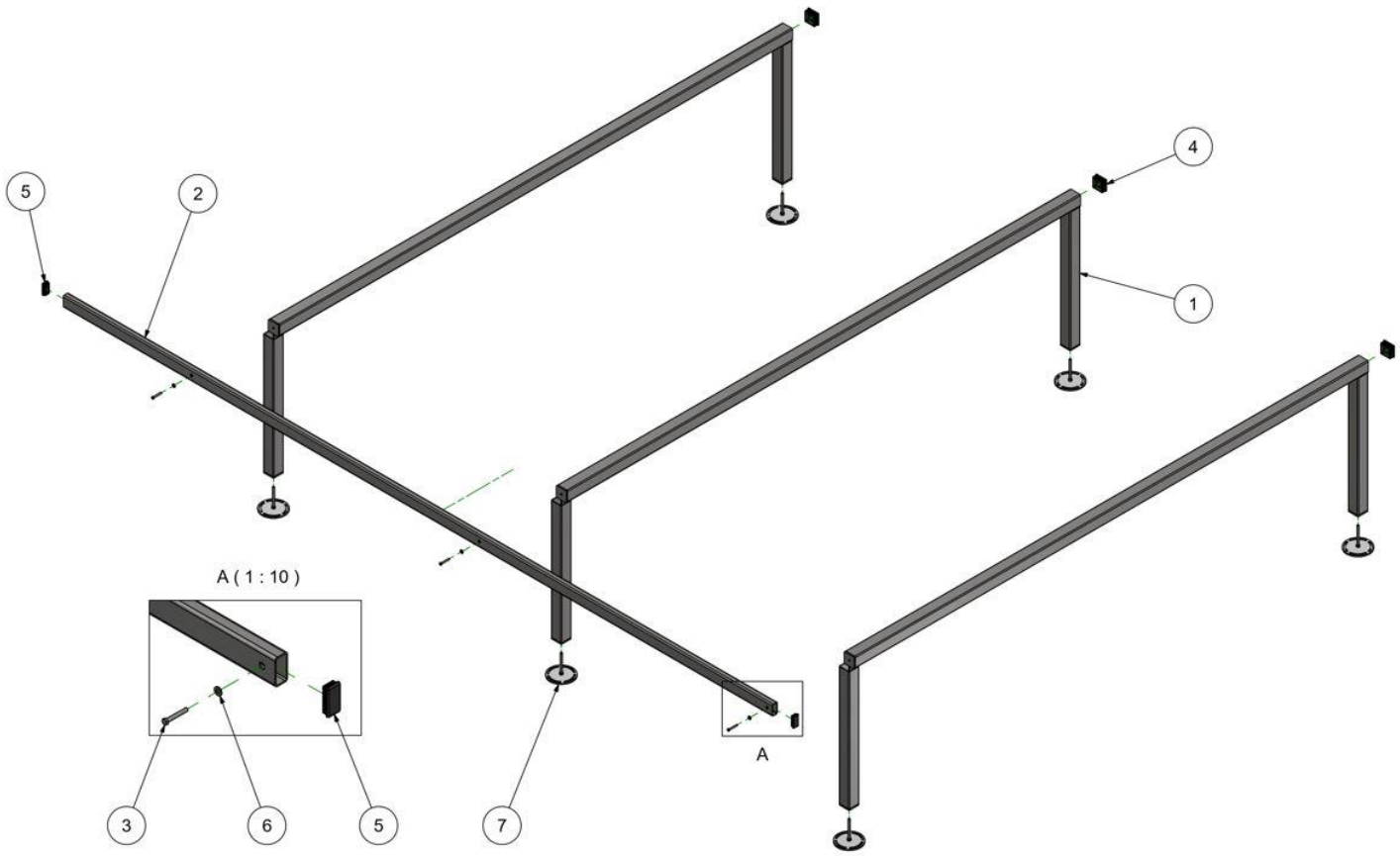

Figure 6, Frame Assembly

Table 9, Frame Assembly parts list

ITEM	QTY	PART NUMBER	DESCRIPTION
1	3	1002101	Support Frame - Main Support
2	1	1002102	Support Frame - Side Support
3	3	HWHBM1280	Hex bolt M12x80
4	3	HWPPRHS100100 long	Square Plastic Plug 100x100 #114
5	2	HWPPRHS10050 long	Rectangular Plastic Plug 100x50 #427
6	3	HWWFM1228	Flat washer M12 - Heavy
7	6	SMPTBF06	Table Bits - Foot round M16

9.3 Conveyor Frame Assembly (1002200)

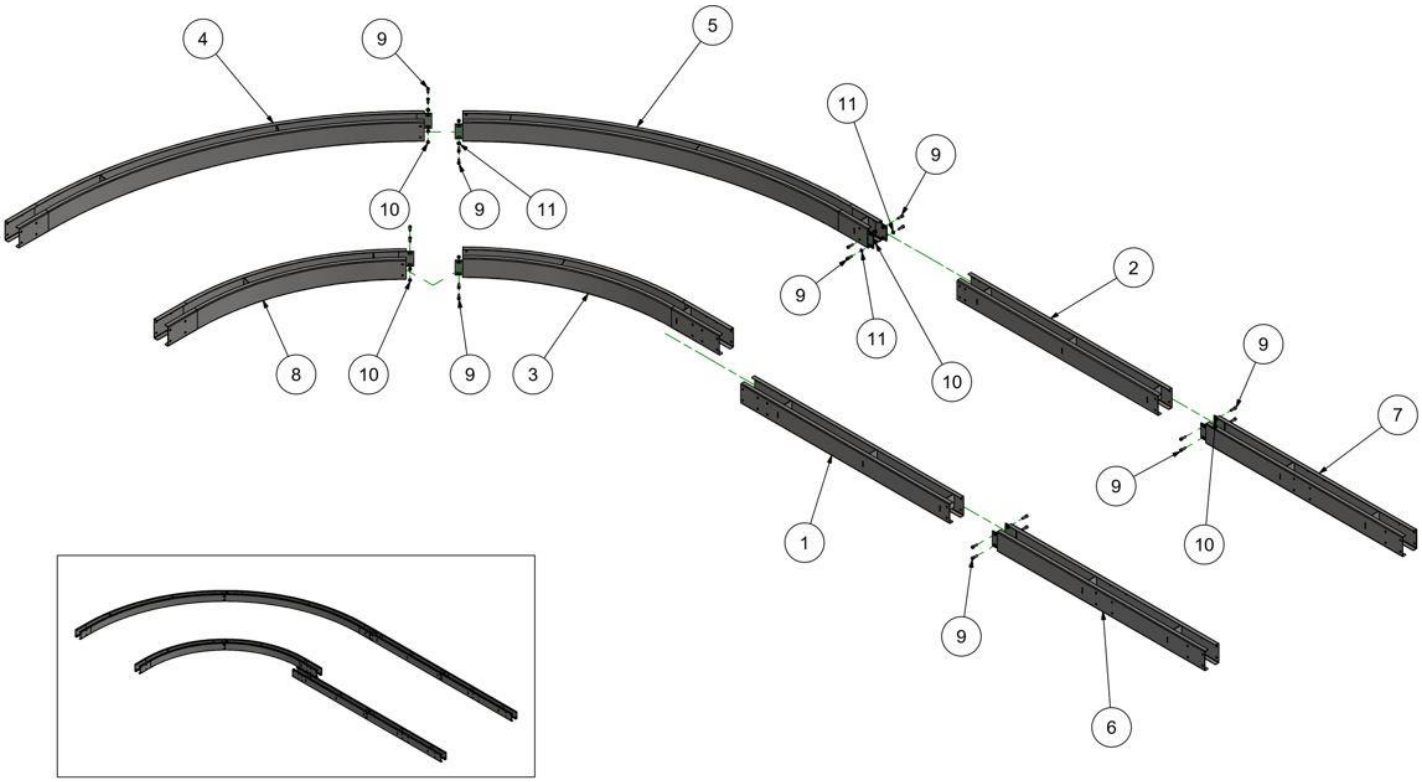

Figure 7, Conveyor Frame Assembly

Table 10, Conveyor Frame Assembly parts list

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1002201	Conveyor frame assembly - Lone Straight part 1
2	1	1002202	Conveyor frame assembly - Connected Straight part 1
3	1	1002203	Conveyor frame assembly - Small Curve part 1
4	1	1002204	Conveyor frame assembly - Large Curve P1
5	1	1002205	Conveyor frame assembly - Large Curve P2
6	1	1002206	Conveyor frame assembly - Lone Straight part 2
7	1	1002207	Conveyor frame assembly - Connected Straight part 2
8	1	1002208	Conveyor frame assembly - Small Curve part 2
9	20	HWHBM1235	Hex Bolt M12x35
10	20	HWNHM12	Hex nut M12
11	4	HWWFM12	Flat washer M12

9.4 Drive Assembly (1002300)

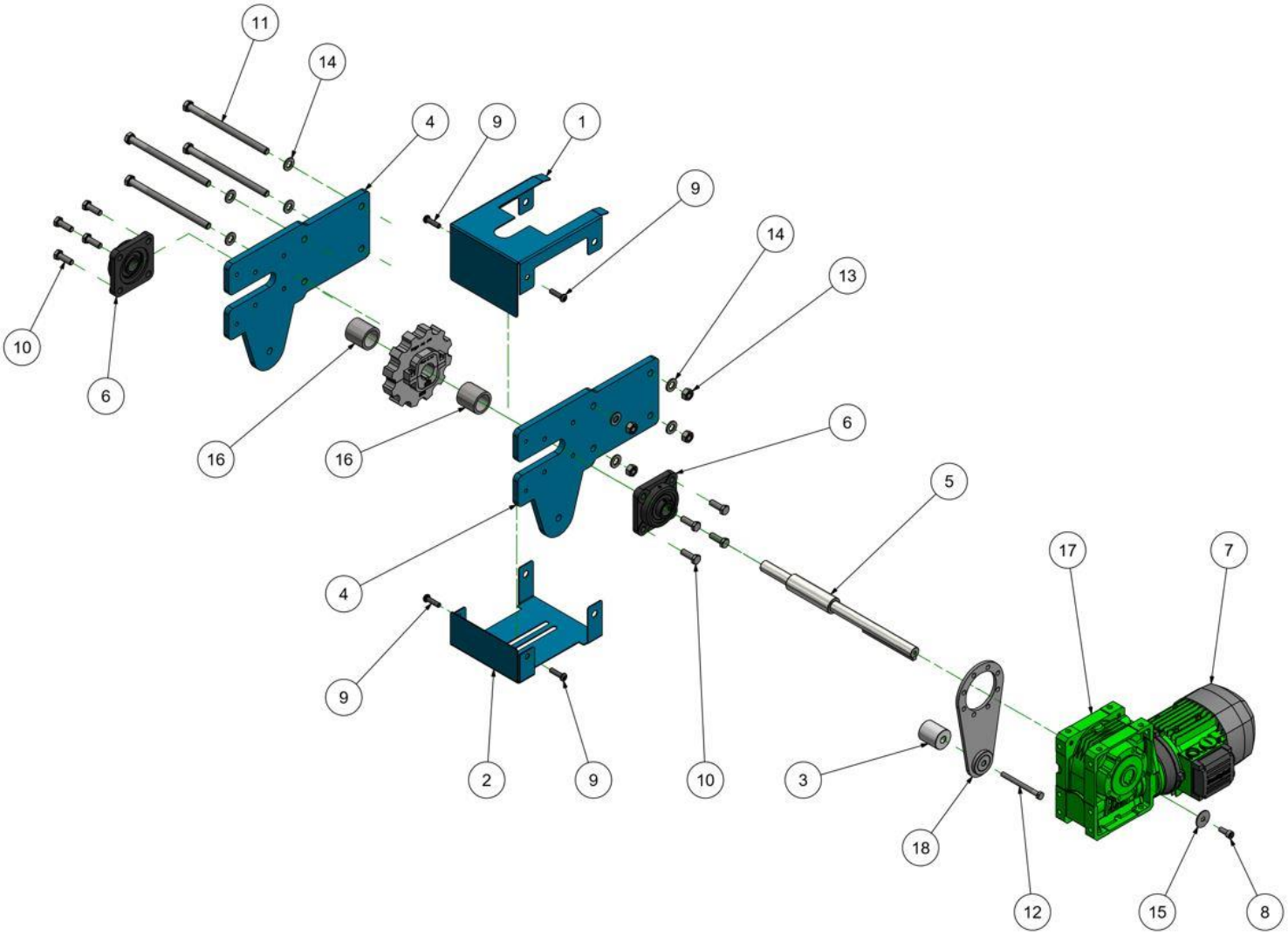

Figure 8, Drive Assembly

Table 11, Drive Assembly parts list

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1002007	Driver End cover - Top Section
2	1	1002008	Driver End cover - Bottom Section
3	1	1002020	Spacer - Drive to Torque arm
4	2	1002301	Drive assembly side plate
5	1	1002302	Chain Drive Shaft
6	2	BRGUCF205	4 bolt flange bearing 25mm
7	1	EMBN71B4-0.3KWB14	Bonfig Std Motor 0.37kW
8	1	HWCSM820	Hex Socket Head Cap Screw M8x20
9	4	HWCSM830BH	Button Head Cap Screw M8x30
10	8	HWHBM1030	Hex bolt M10x30
11	4	HWHBM12190	Hex Bolt M12x190
12	1	HWHBM890	Hex bolt M8x90
13	4	HWNHM12	Hex nut M12
14	8	HWWFM12	Flat washer M12
15	1	HWWFM832	Washer M8x32 #WM10212
16	84.000 mm	RMSHCT424M	Seamless line pipe 25NB 42.4x4.85
17	1	TRGBW63U45P71B14B8	Bonfig Gearbox W64 - 1:45
18	1	TRTAW63	W63 Torque arm

9.5 Idler Assembly (1002400)

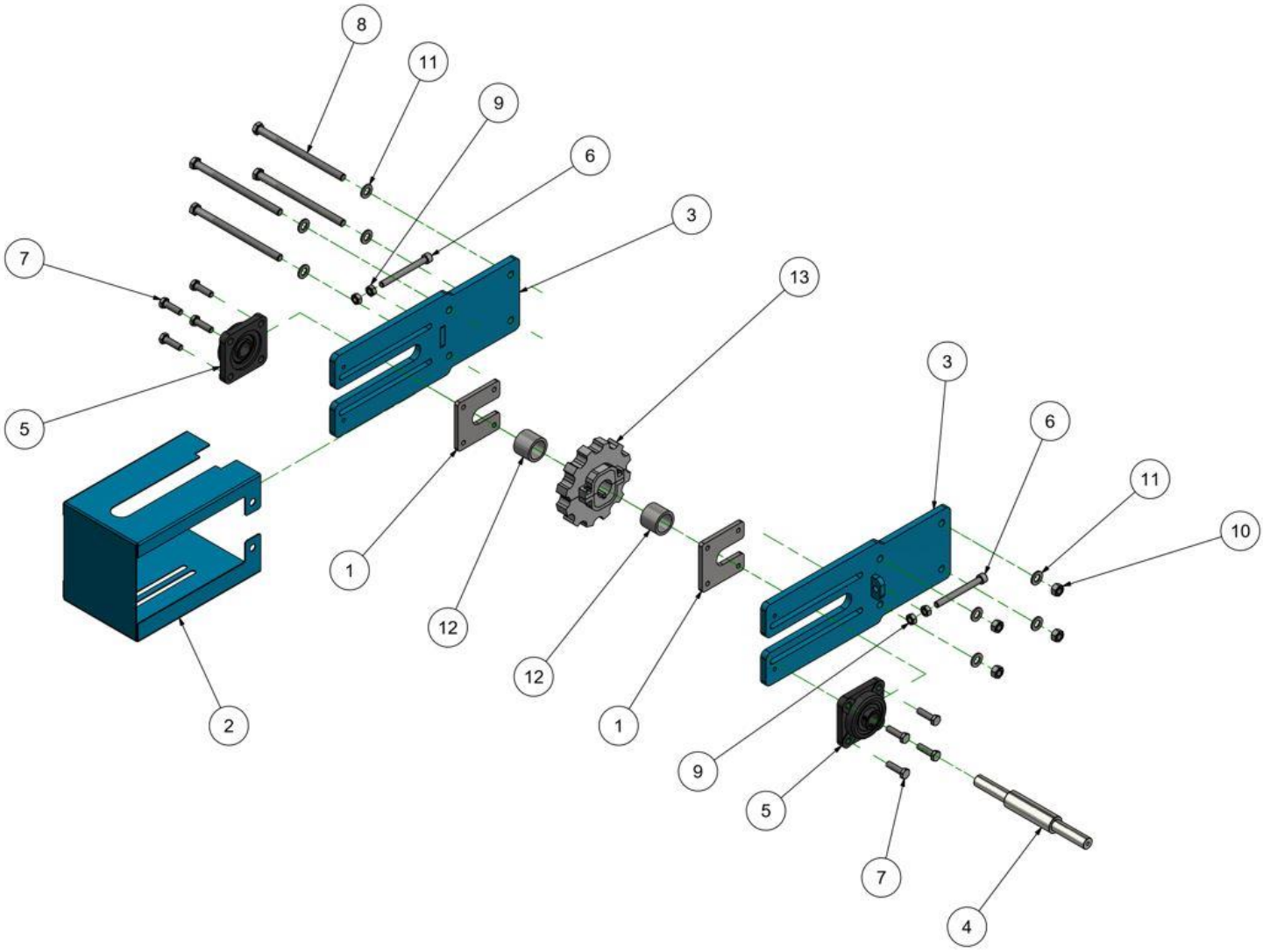

Figure 9, Idler Assembly

Table 12, Idler Assembly parts list

ITEM	QTY	PART NUMBER	DESCRIPTION
1	2	1001203	Bearing fixing plate
2	1	1002002	Idler End cover
3	2	1002401	Idler assembly side plate
4	1	1002402	Chain Drive Shaft
5	2	BRGUCF205	4 bolt flange bearing 25mm
6	2	HWCSM10100	Hex Socket Head Cap Screw M10x100
7	8	HWHBM1035	Hex bolt M10x35
8	4	HWHBM12190	Hex Bolt M12x190
9	4	HWNHM10	Hex nut M10
10	4	HWNHM12	Hex nut M12
11	8	HWWFM12	Flat washer M12
12	68.000 mm	RMSHCT424M	Seamless line pipe 25NB 42.4x4.85
13	1	TRC0882G12	Sprocket, 12 tooth

9.6 Pneumatic Stopper Assembly (1002600)

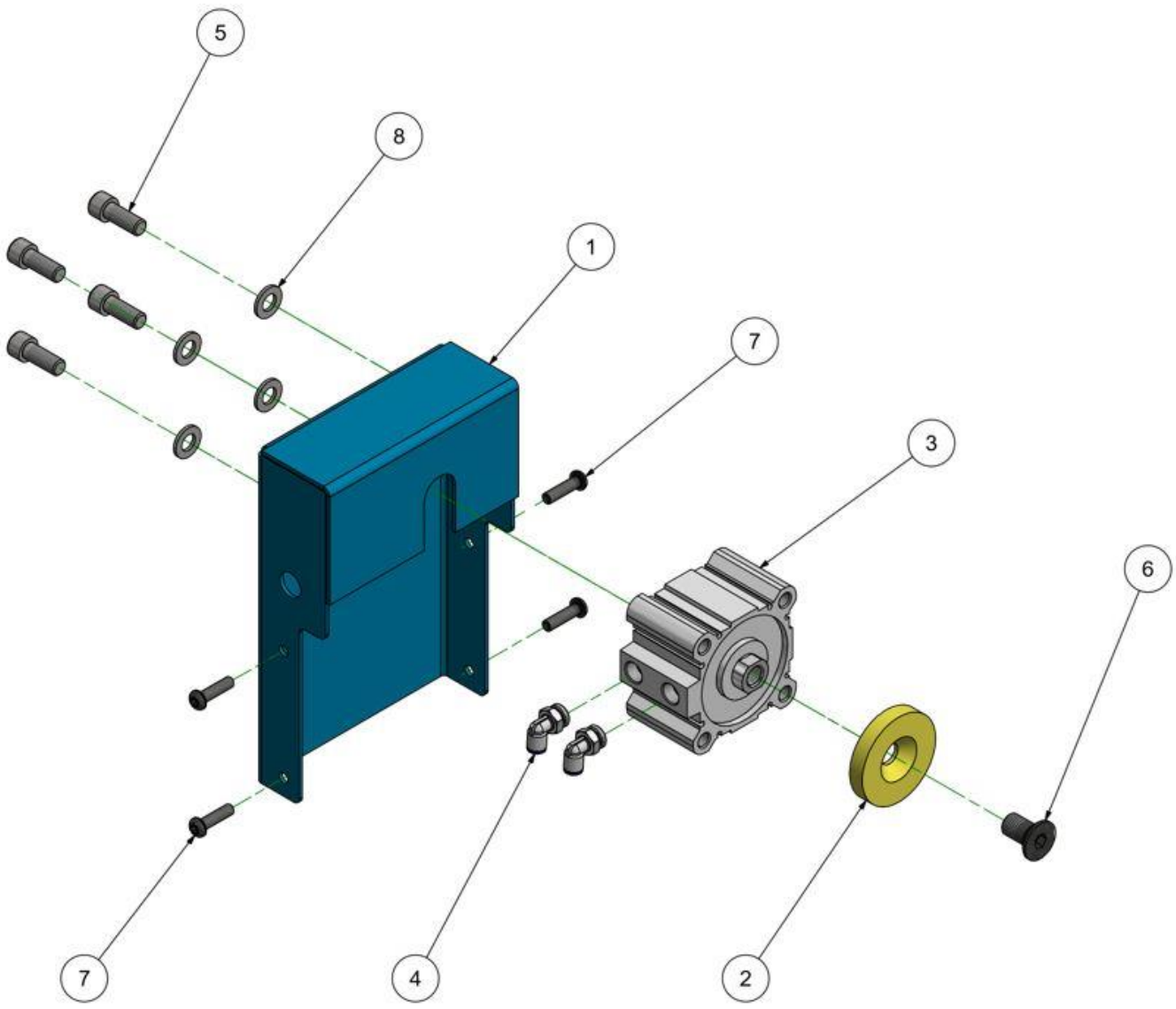

Figure 10, Pneumatic Stopper Assembly

Table 13, Pneumatic Stopper Assembly parts list

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	1002601	Ram Mount/Cover
2	1	1002602	Pusher Pad
3	1	ACCQ2A80-20DZ	CQ2-Z/CDQ2-Z-Compact Cylinder/Standard
4	2	AFKQ2L08-03S-X2	KQ2L-Male Elbow (Gasket Seal)
5	4	HWCSM1230	Hex Socket Head Cap Screw M12x30
6	1	HWCSM1630CS	Hex Socket CSK Cap Screw M16x30
7	4	HWCSM830BH	Button Head Cap Screw M8x30
8	4	HWWFM12	Flat washer M12

10 Maintenance

If a part is damaged substantially, or if anything covered in this maintenance section cannot be fixed by general maintenance; then do not use the Curved Chain Conveyor and contact a supervisor, maintenance engineer, or Spida Machinery.

Table 14, Maintenance intervals

Check	Day	Week	Month	½ Year
Guards in place	x			
Work area is clear	x			
Cylinder Operation	x			
Clean the Curved Chain Conveyor of any build up	x			
Noises or vibrations	x			
Emergency stop working	x			
Drain moisture from air reservoir		x		
Air supply pressure		x		
Pneumatic Filter		x		
Drive and Idler assemblies in good condition			x	
Motors running smoothly			x	
Inspect conveyor chain			x	
For loose or damaged bolts			x	
Floor bolts for tightness				x
Inspect the Curved Chain Conveyor				x

Failure to perform these checks as per schedule indicated in Table 14 may result in severe damage or a serious accident.

WARNING! Electrical power and Pneumatic Air supply must be isolated from machinery and appropriate danger tagging in place whenever any maintenance is being performed on machinery. Any defects, which are found on inspection should be rectified immediately and reported to the supervisor for appropriate action.

10.1 Guards in place

Check Guards are in place, and they are tight, with no loose bolts. Guards should always be operational.

10.2 Keep work area clear

Ensure that the area surrounding the Curved Chain Conveyor is free of trip hazards, unnecessary tools, or other debris. There should be no reason for passers-by to approach or pass near the Curved Chain Conveyor while it is in use.

10.3 Inspect Cylinders

All pneumatic cylinders should slide freely, push and pull evenly, and there should be no excessive wear visible on shafts. Check for loose fastenings or damage to the air cylinder.

Test both stopper cylinders before work commences each day. The stopper cylinders should activate/deactivate at the same time. The stoppers should only deactivate when the pneumatic stop button is activated; allowing for the removal of sub components.

Do not use the Curved Chain Conveyor if, during any of these tests; the stoppers are loose; the stoppers do not activate/deactivate at the same time; the stoppers are not activated while the conveyor is in use, other than when the pneumatic stop button is pushed; the stoppers do not deactivate when the pneumatic stop button is pushed and/or do not deactivate enough for sub components to be removed; or if any of the cylinders are not operating correctly in any way.

10.4 Clean the Curved Chain Conveyor of any build up

Keep the Curved Chain Conveyor free of any build-up of debris. Moving parts should not be obstructed, and the Curved Chain Conveyor should be usable without any hindrance. Remove and replace components as required to clean out any built-up debris or dust; ensure that any components removed are then replaced correctly.

Remain aware of the condition of the chain while in use, to ensure that no large pieces of debris become ensnared. Ensure that this is done with utmost care, and that body parts and clothing are well away from moving parts. If any large pieces of debris become entangled, isolate power to the motors and ensure the chain has stopped moving before the debris is removed.

10.5 Noises or vibrations

Take note of any unusual noises or vibrations. Do not use the Curved Chain Conveyor if the cause of any vibrations or unusual noises cannot be found.

10.6 Emergency Stop Buttons

Check emergency stops are working and that they stop the machine when activated. This test should be performed before using the machine, at least once a day.

Check operational controls are working, and that they function as designed. Inspect these other controls at regular intervals.

10.7 Dry Air Supply

For best results, clean dry air is essential. A drain valve is provided on the air reservoir and this should be opened weekly to drain any condensation; or when moisture is seen in the reservoir prior to commencing work.

10.8 Air Supply

Air pressure should be maintained at 600-800 kPa; this can be checked at the filter/regulator located on the side of the frame assembly (see

Figure 3, side dependent on orientation of conveyor). Take measures to ensure air quality; such as by installing an aftercooler, air dryer, or water separator. Do not use compressed air that contains chemicals; synthetic oils, including organic solvents; or salt or corrosive gases, etc., as it can cause either damage or a malfunction. If synthetic oil is used for the compressor oil, depending on the type of synthetic oil used, or on the conditions of use, there may be adverse effects on the resin of the pneumatic equipment or on the seals if the oil is flowed out to the outlet side; so, the mounting of a main line filter is recommended.

10.9 Check Filter/Regulator

Periodically check the filter and regulator for any cracks or damage. If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. Water can cause malfunction of pneumatic equipment. The filter and regulator are located on the side of the frame assembly (see
Figure 3, side dependent on orientation of conveyor).

Also, be sure to check the pneumatic lines at the same time for possible kinks, air leaks, or other damage.

10.10 Drive and Idler Assemblies

The chain should move easily around the sprockets contained within these assemblies while the motor is running. The assemblies should be generally maintained every month to check on the condition of the sprockets and shafts. However, if the chain is tracking sideways; is catching or not moving smoothly; or there are unusual vibrations or noises within the assemblies; then it may be necessary to remove the outer covers of the assemblies to check on the condition of the sprockets and shafts.

If the chain has slipped off the sprocket or is caught in some way; or if the sprocket/shaft has shifted; then loosen the chain and realign as necessary. If any teeth of the sprocket are chipped or broken, then replace the sprocket as required. Ensure the sprocket and shaft are well lubricated. If the sprocket itself is not turning, and cannot be fixed, then do not use the Curved Chain Conveyor.

In the drive assembly, ensure that the drive shaft is correctly located between the motor and sprocket, and that the contact area is well lubricated.

10.11 Motors

The motors should stop and start with no issues and should easily move the chain around the conveyor. Clean the motor regularly by blowing out dust and other debris with dry compressed air.

- Check the point where the motor joins the gearbox (Screws, mount connection, etc)
- Check the shaft locks (this shaft should not be loose)
- Check condition of the motor

Do not use the Curved Chain Conveyor if there are any substantial or unfixable issues with the motor.

10.12 Conveyor Chain

The chain should move around the conveyor smoothly and easily, and there should be no visible wear on either the chain or the conveyor beam. Check for loose or damaged links, and repair as required. Do not use the Curved Chain Conveyor if the chain is unable to be repaired or is damaged significantly.

10.13 Loose Fasteners and Fixings

Check for loose, missing, or damaged bolts especially on guards, conveyor frames, Idler and Drive assemblies, and floor fixing. Tighten or replace where necessary.

10.14 Maintain the Curved Chain Conveyor

Check all major operating components for wear, fatigue, and fixing. Adjust, tighten, or replace components as required.

Do not use the Curved Chain Conveyor if it is damaged significantly or if it is not working correctly, and all other mentioned maintenance is not applicable.

11 Foreseeable Misuse

Through experience, SPIDA's technical staff have listed (in order of occurrence) the most common misuses of the machinery by operators, the symptoms that result and the rectification required to address the misuse and return the machine to optimal working order.

Table 15, Common misuse issues

MISUSE	SYMPTOM	RECTIFICATION REQUIRED
Lack of cleaning	Conveyor chain not moving	- Clean conveyor, especially sprockets, drive shafts, moving surfaces, chains, and motor. - Remove any large pieces of debris and clean out any dirt. - Clean and check motor - Clean air lines, and service filter/regulator - Check all pneumatic cylinders, clean and service as required.
	Machine overheating	
	Idler/Drive assemblies blocked	
	Stopper Cylinder failing	
	Sub-component assemblies moving incorrectly down the line	
	Unusual amount of noise while parts are moving	
	Motor tripping out or overloaded	
Lack of care	Conveyor not moving correctly	- Repair or replace any damaged, loose, or missing parts. - Check for bent, broken, or leaking air lines, and replace as required. - Remove any loose or unnecessary objects. - Re-calibrate parts as required. - Note, if possible, how each part was mistreated, and train operators to prevent additional misuse of these and other parts. - Contact Spida Machinery in the event of a major issue
	Excessive wear of moving parts	
	Foreign objects in Main assembly/obstructing moving parts	
	Broken, damaged, or misaligned parts	
	Bent or stuck Stopper Cylinders	
	Parts not working as designed	
	Unusual amount of noise while parts are moving	

Any other misuse and resultant damage of the machine is deemed non-foreseeable as its occurrence is not consistent.

12 Trouble Shooting

12.1 Mechanical Faults

Table 16, Trouble shooting

Trouble	Probable Causes	Correction
Motor not running smoothly	Excessive noise or vibration	Tighten any loose bolts. Make sure motor is tightly secured.
	Motor not switching on	Check electrical leads for faults. Press reset button on EKDOL.
	Drive shaft not turning	Remove any debris that may be blocking movement. Tighten the coupling if necessary. Ensure both keyway and sprocket are correctly located.
	Drive shaft not turning uniformly	Tighten any loose bolts, ensure the shafts and sprockets are located correctly in both the Drive and Idler assemblies, check condition of internal motor bearings.
	Overheating	Blow out any debris with dry compressed air, ensure motor ventilation passages are unclogged, make sure there is nothing to obstruct the free circulation of air or dissipation of heat around the motor.
	Motor is damaged	Repair/replace motor
	Motor is tripping	Turn machine off and on again
Motor does not run at full speed	Power voltage too low	Test voltage
Motors tripping out	Moving parts obstructed	Clear obstruction
	Motor vents blocked	Clean motor
	Motor is damaged	Repair/replace motor
Stopper Cylinder not activating	Pins jammed/broken	Check for obstructions. Repair/replace parts/remove obstructions as required
	Cylinders/attached components jammed	Check for obstructions. Repair/replace parts/remove obstructions as required
	Solenoid Valve broken/malfunctioning	Replace/repair parts if possible. Turn machine off and on again, otherwise contact supplier for further information.
	Pneumatic Stop button broken/malfunctioning	Replace/repair parts if possible. Turn machine off and on again, otherwise contact supplier for further information.
	Air supply	Replace any broken air lines
Stopper Cylinder activating incorrectly	Each cylinder is supplied by different air pressures	Clean air lines and ensure regulated pressure to each cylinder is the same.
	Damaged air lines	Check for bent, broken, or leaking air lines, and replace as required.
	Damaged cylinders/attached components	Repair/replace parts as required
	Parts misaligned	Re-align parts as necessary. Ensure other assembly items are not interfering with stopper movement.
	Parts obstructed	Remove obstructions as required

Pneumatic cylinders ineffective/inadequately performing	Blocked air lines	Check for blockages. Flush system if required.
	Damaged air lines	Check for bent, broken, or leaking air lines, and replace as required.
	Loose, damaged, or missing parts	Inspect cylinder parts. Repair or replace items as required.
Unable to remove Sub Component assemblies	Pneumatic cylinders ineffective/inadequately performing	See possible corrections above.
	Chain broken/damaged/missing	Repair/replace parts as required.
	Obstruction	Clear obstruction.
Chain not moving	Motor not working	Check electrical leads. Ensure motor is clean, dry, and free of debris. Turn machine off and on again.
	Obstruction	Clear obstructions around chain, sprockets, and drive and idler shafts.
	Misalignment	Ensure that all parts of the conveyor are aligned correctly with the conveyor frame.
	Missing or damaged parts/parts moving incorrectly	Repair or replace parts as required.

If any of the above corrections do not solve the issue, then do not use the Curved Chain Conveyor and contact a supervisor, maintenance engineer, or Spida Machinery

12.2 Software Faults

CyberLogix MC2 Motion Controller

This describes the Ports and Indicators of the MC2 Motion controller

Version 12

The MC2 Motion controller is a network driven servo motor controller capable of driving brushed or brushless motors

Specs:
Motor supply voltage: 20 to 180V DC
Current: 10 amps continuous 30 amps peak

Status LED Display

Green LED flashes to indicate motion CPU is ok

See Below for LED status messages. Decimal Point indicates Drive Enabled

Green Control wiring Plug Connections Top to Bottom and Indicators

Number	Description	LED indication (if applicable)
1	24V Control Power Input (positive supply)	Green LED indicates 24V Supply OK
2	24V Control Power, internally connected to the terminal above (can be used for inputs below)	N/A
3	Drive Enable Input	Green LED indicates Enable Input is OK
4	Drive Home Sensor Input	Green LED indicates Home sensor is ON
5	Drive hardwired High limit, input is Fail safe so power to this terminal means its ok to move in positive direction (remember to enable limit switches in software)	Green LED indicates High Limit switch is OK (if limit inputs enabled in settings)
6	Drive hardwired Low limit, input is Fail safe so power to this terminal means its ok to move in positive direction (remember to enable limit switches in software)	Green LED indicates Low Limit switch is OK (if limit inputs enabled in settings)
7	0v Return control power, internally connected to the terminal below (can be used for sensors for inputs above)	N/A
8	0v Return control power supply (Negative return)	N/A

Motor Plug

Number	Description	LED indication (if applicable)
1	High voltage motor supply (Positive supply)	Green LED indicates Motor power is OK (Very dim if motor volts is 24v)
2	High voltage motor supply return (Negative return)	N/A
3	U connection to motor (or in brush systems + to Motor)	N/A
4	V connection to motor (or in brush systems – to Motor)	N/A
5	W connection to motor (no connection in brush motors)	N/A
6	Motor ground (connected internally to Negative return and also alloy case)	N/A

Front View of Motion Controller

Green indicators on front from top to bottom next to control wiring plug

- 24v control power indicator
- Drive Enabled input
- Drive home sensor input
- Drive hardwired low limit input (remember to enable limit switches in software)
- Drive hardwired High limit input (remember to enable limit switches in software)

- Drive Motor Supply LED (Will be very dim on 24v Motor supply and very bright on 180v motor supply!)

Encoder Plug and Indicators (Orange Lead connects to this port)
- Red LED indicates Encoder wiring Error
- Green LED indicates motion move complete

Hall Plug and Indicators (Purple Lead connects to this port)
- Red LED indicates Hall wiring error or incorrect brush/brushless setting in software
- Red flashing indicates Firmware update mode

Motor Wiring Plug and LED

Status LED Display
- Display will scroll around in a circle if all is OK
- Or flash a 3 alphanumeric code for status or fault

Status

Code	Meaning	Description
SLL	Software Low Limit	The drive is at a software limit and will only respond to higher position setpoints
SHL	Software High Limit	The drive is at a software limit and will only respond to lower position setpoints
HLL	Hardware Low Limit	The Low Limit switch is off and drive will only respond to forward motion
HHL	Hardware High Limit	The High Limit switch is off, and drive will only respond to Reverse motion

Faults

Code	Meaning	Description
F01	Invalid hall state on Hall inputs	Check hall wiring or motor hall sensors or that controller is set in correct brush/brushless mode
F02	Encoder Wiring Fault	Check encoder wiring or encoder on motor
F03	Encoder Power Fault	Internal auto reset fuse has tripped due to over current on encoder supply Check encoder wiring or encoder on motor
F04	Position Error limit exceeded	Check for jam on machine and that motor can turn freely, check if trying to drive motor too fast. Check for under voltage on motor or faulty motor or encoder, check current limiting and output limiting in drive
F05	Motor Over current fault	Peak current limit has been reached on servo drive check for faulty wiring or motor or overloaded
F06	Motor Power Fault	The motor supply voltage is either too high or low
F07	Temperature Fault	The drive is overheating ensure adequate ventilation, overloading etc fan force cooling if required
F08	Amp Disabled	Massive over current detected by Drive Amp, check for a short circuit on the motor or wiring or it's also possible for this to happen if the motor output is hard stopped very suddenly
F09	Enable Lost	While the drive was enabled and holding position or moving it lost its enable (Emergency stop) input
F10	Motor Stalled	The motor is not moving while it has full permissible power applied check as per F04
F11		Call Cyberlogix if you see this fault
F12		Call Cyberlogix if you see this fault
F13		Call Cyberlogix if you see this fault
F14	Comms Fail (in software)	Host device communications has timed out (Drive must have host comms every 3 secs, this can be adjusted
F15	Drive Not Setup	Drive has not been setup, send setup message to drive (normally by a reset button in software)
F16	No Address	Drive has not been configured by host device, check communication cables and host device
F99	CPU Not Running	Call Cyberlogix – Unit is in Flash update mode or the CPU has failed

13 Distributor & Repairer Contacts

13.1 Agent/Distributor

Company Name: _____

Address: _____

Contact Person: _____

Ph.: _____ Fax: _____

Mobile: _____ Email: _____

13.2 Automation Repairs

Company Name: _____

Address: _____

Contact Person: _____

Ph.: _____ Fax: _____

Mobile: _____ Email: _____

13.3 Mechanical Repairs

Company Name: _____

Address: _____

Contact Person: _____

Ph.: _____ Fax: _____

Mobile: _____ Email: _____

14 Warranty

SM2012 Ltd, SPIDA Machinery, Tauranga, New Zealand, warrants the equipment listed below to the initial purchaser of the equipment only against defective workmanship and materials only, for a period of twelve (12) months from the date of shipment from SPIDA's factory, subject to the following conditions:

1. SPIDA extends the original manufacturer's warranty to SPIDA on buy-in items such as motors, saw blades and air cylinders or other such buy-in items but does not add its warranty herein described to such items.
2. This warranty only applies if:
   a. The attached copy of this warranty is signed by the initial purchaser and returned to SPIDA's address shown above within 14 days of shipment of the goods from SPIDA's factory.
   b. The equipment is installed by SPIDA or its licensed installer.
   c. Regular routine maintenance has been carried out on equipment in accordance with instructions in manual provided by SPIDA and proper housing and shelter provided for the equipment.
   d. The equipment is operated by competent personnel in accordance with the operating instructions set out in the manual provided by SPIDA and not otherwise.
   e. The equipment has not been subjected to alterations or repairs or dismantling without prior written approval of SPIDA. Any parts returned to SPIDA either for repair or consideration of a warranty claim consequent to an authorisation to dismantle must be shipped prepaid.
   f. SPIDA may, at its option, either repair or replace the defective part upon inspection at the site of the equipment where originally installed. The warranty does not cover the cost of freight, Labour or traveling for the removal or replacement of the defective parts.
   g. This warranty does not apply to any deterioration due to average wear and tear or normal use or exposure.
   h. In all warranty matters, including any question of whether this warranty applies to any claim, the decision of SPIDA is final.

This warranty is the only warranty made by SPIDA as the manufacturer and is expressly in lieu of and excludes all other warranties, conditions, representations and terms expressed or implied, statutory or otherwise, except any implied by law and which by law cannot be excluded. Neither SPIDA or its agents or servants will be liable in any way for any consequential loss, damage or injury including any loss of use, profits or contracts.

The law applicable to this warranty shall be the law of New Zealand and the parties hereto submit to the exclusive jurisdiction of the Courts of New Zealand.

Machinery/Equipment

The item bearing the following serial plate:

_____

Date of Shipment: _____

Signed by: _____

Name: _____

Position: _____

Acceptance of Warranty

I acknowledge and accept the contents of this warranty.

Signed by: _____

Name: _____

Company: _____

Position: _____

Date: _____

15 Electrical Drawings

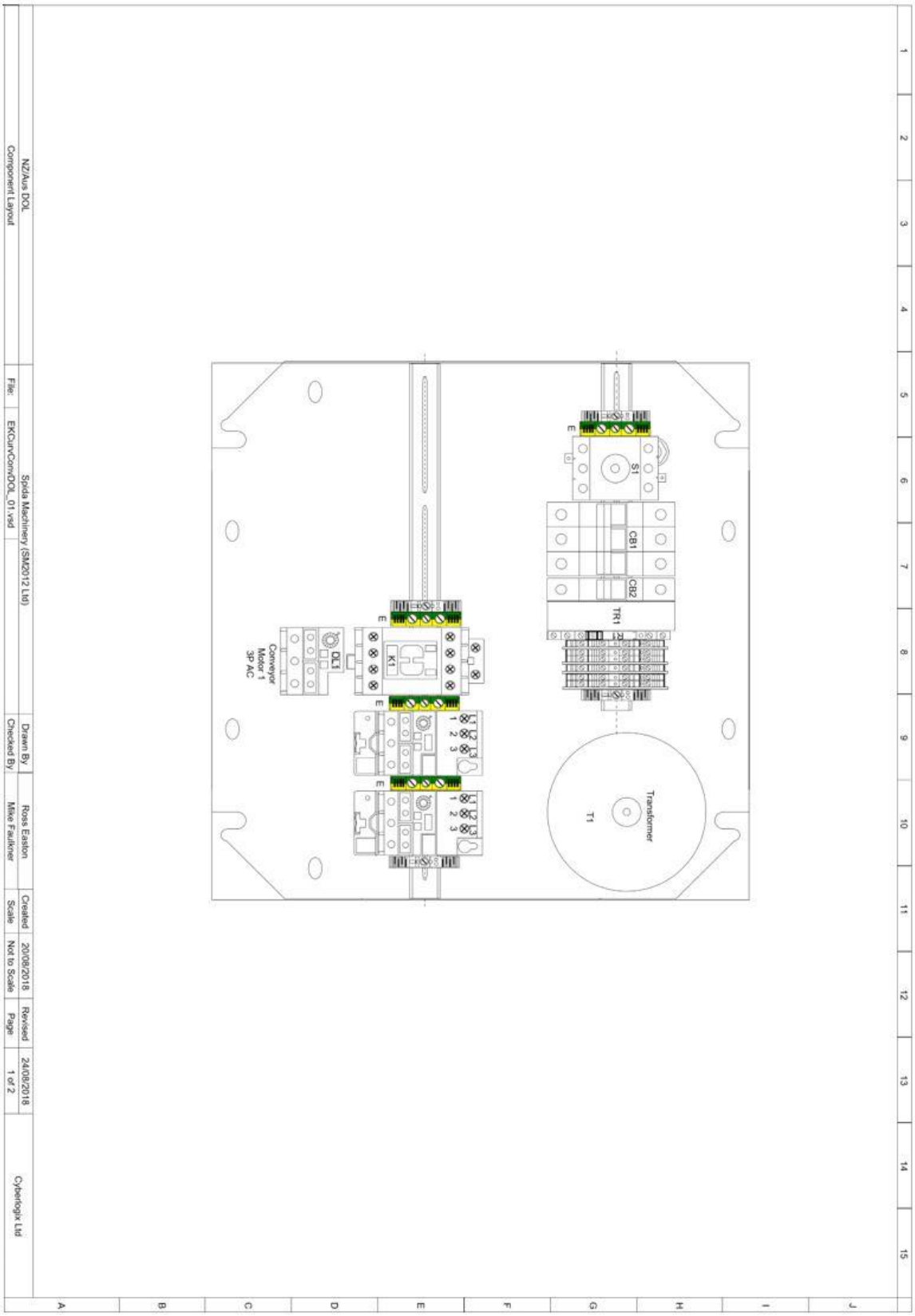

Figure 11, Curved Conveyor Electrical Drawings Part 1

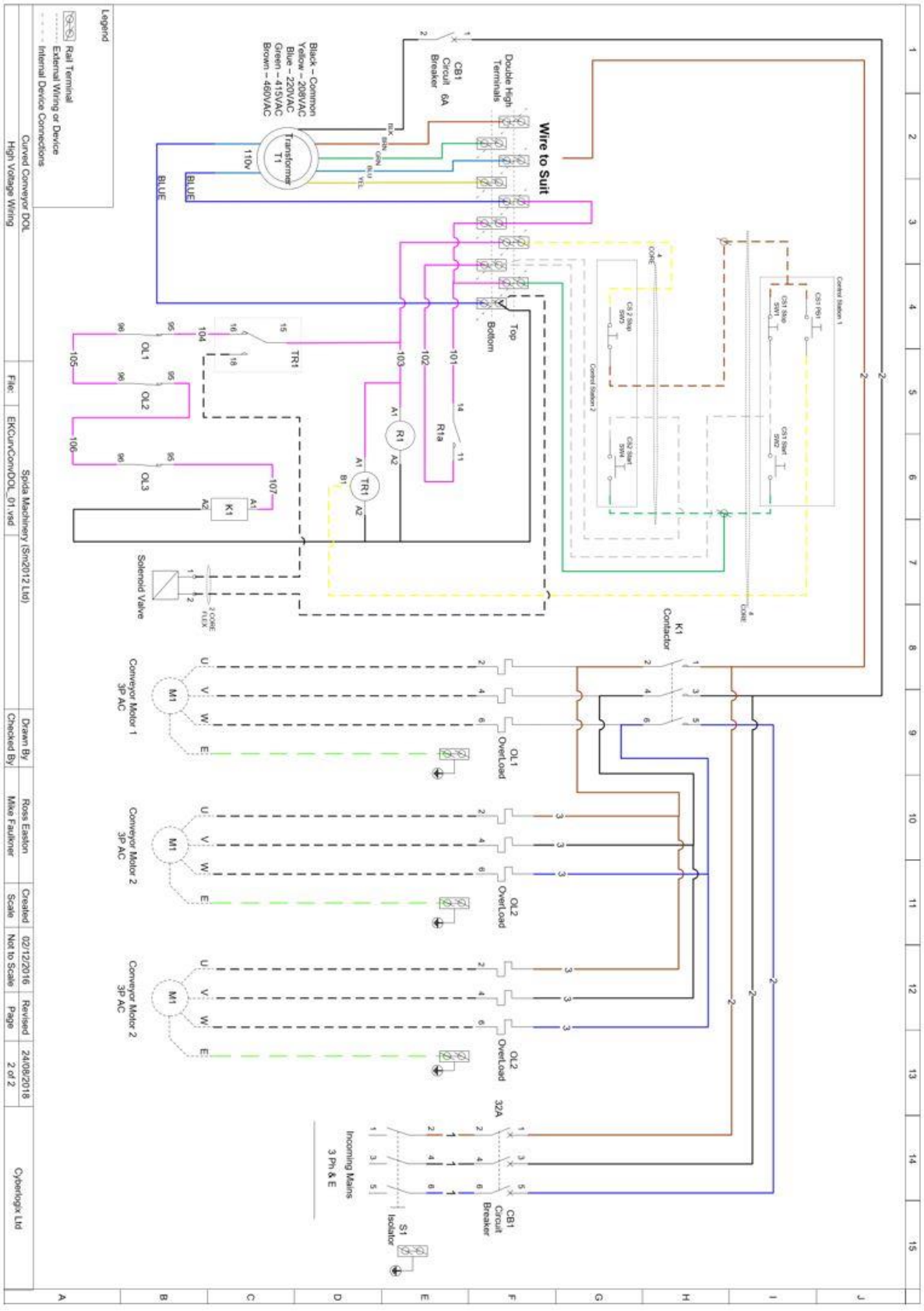

Figure 12, Curved Conveyor Electrical Drawings Part 2

16 Pneumatic Diagram

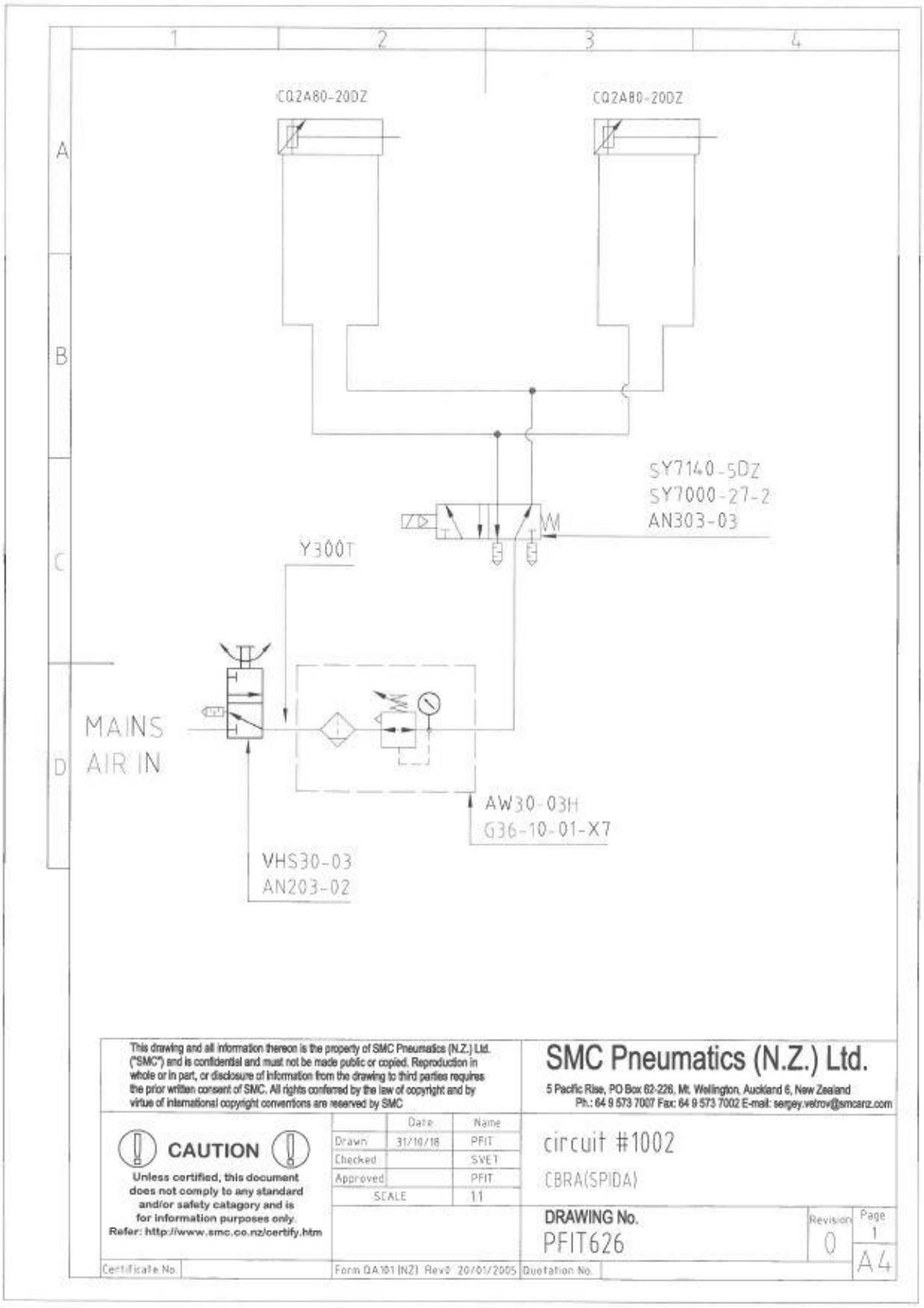

Figure 13, Curved Conveyor Pneumatic Diagram

17 Training Certificate – Curved Chain Conveyor

Instructor: _____

Company: _____

I declare that:

- I have trained the person names below ("the trainee") in the safe operation of the machinery/equipment detailed in the training manual.
- The trainee has demonstrated an understanding of the safe operation of the machinery/equipment.
- The trainee has indicated the he/she has read and understood this training manual.

Signed: _____

Date: _____

Trainee: _____

Company: _____

Position: _____

I declare that:

- I have received instruction from the person named above ("the instructor") for the safe operation of the machinery/equipment detailed in this training manual.
- All information in this training manual was demonstrated and explained by the instructor.
- I have thoroughly read and understood this training manual.

Signed: _____

Date: _____

Witnessed by:

Name: _____

Company: _____

Signed: _____

Date: _____