MoveRoll Conveyor
Operating and Maintenance Manual

Simply the Smartest

1. Read this first!

This manual contains information for protection of personnel in the roll handling area from possible injury and/or equipment damage. **Read this manual before operating and maintaining MoveRoll conveyor.**

This manual indicates the level of potential hazard by label of ‘Caution’, ‘Warning’ and ‘Danger,’ followed by important safety information which must be carefully observed.

 **Caution**

 **Warning**

 **Danger**

To ensure the safety of personnel and equipment, the safety instructions contained in this manual, and other relevant manuals must be observed, along with other relevant safety practices.

This manual contains essential information regarding operation, maintenance, replacement of components, and adjustment of MoveRoll conveyor. Read this manual before operating and maintaining MoveRoll conveyor to ensure correct use.

2. Proper use of MoveRoll conveyor

 **Warning**

MoveRoll conveyors may only be used for applications described in MoveRoll sales and marketing material, and in relevant technical documentation. Proper transport, storage, installation, commissioning, and maintenance are required to ensure that MoveRoll conveyors operate safely and without any problems.

When leaving the manufacturer’s premises, the status of MoveRoll conveyors is ‘partly completed machinery’; meaning an assembly which is almost machinery but which cannot in itself perform a specific function. MoveRoll conveyors are only intended to be incorporated into or assembled with other roll handling systems or other partly completed machinery or equipment used in the paper industry. MoveRoll conveyors gain functionality through a third party control system (PLC).

3. Technical information

3.1 Control voltage

There are two components in MoveRoll conveyor that use control voltage, sensors and valves. These components have M12 connections. Cable installations from MoveRoll M12 connections to PLC controllers are carried out by the customer. The control voltage for a standard MoveRoll conveyor module system is 24 VDC (optionally 110 VAC). The maximum power consumption of one module using 24 VDC is 10 W and 20 W for a module when using 110 VAC.

3.2 Pneumatic connections

The required supply pressure for the device is approximately 4 bar (60 PSI). The MoveRoll conveyor module system should be equipped with a pressure switch which prevents operation in case of pressure drops.

The requirement for the compressed air is that it must be filtered and dry (ISO 8573-1, class 5.3.5).

- The minimum filter efficiency is minimum 40 microns.
- A dew point of at least -20 ºC is required.
- The maximum allowed oil residual concentration is maximum 25 mg/m3.

MoveRoll conveyor tolerates up to 10 bar excess pressure; the temporary maximum flow rate is max 50 l/s

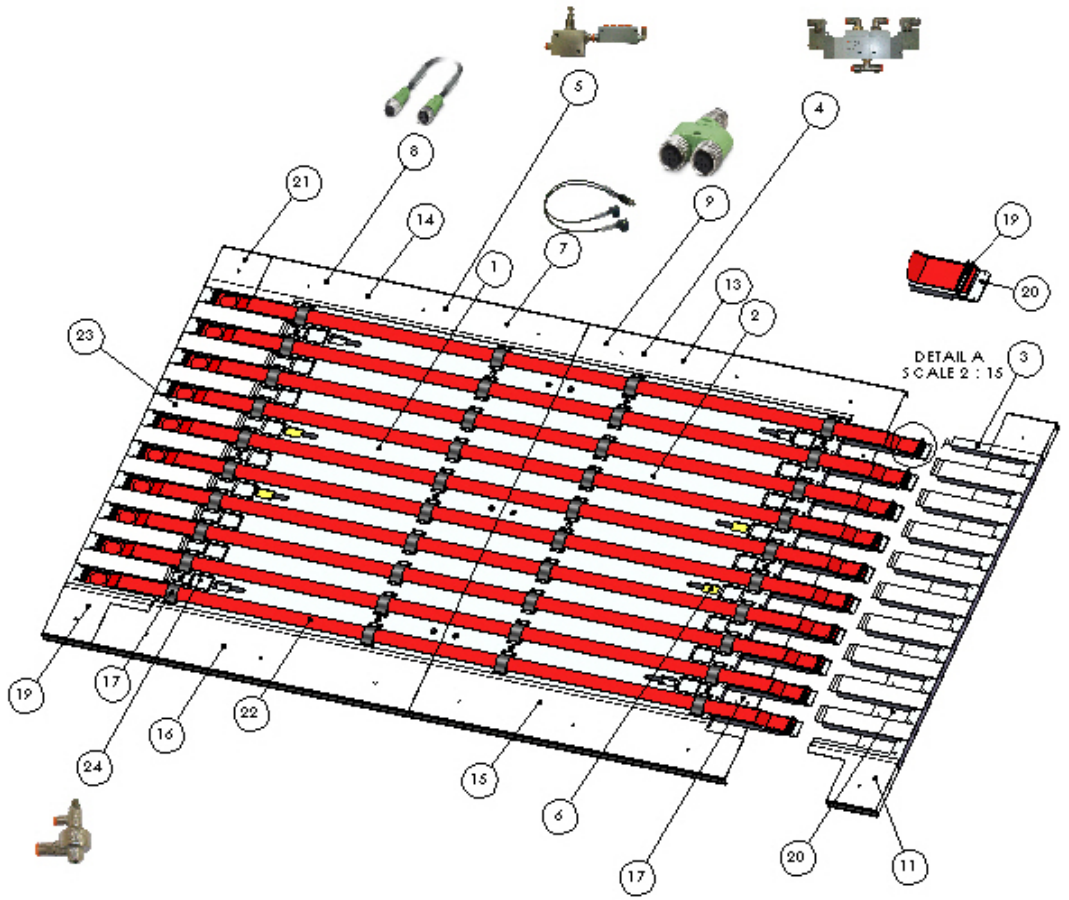
Each solenoid directional valve in MoveRoll modules has a 10 mm PIF (push- in fitting) connection for compressed air.

3.3 Operating temperature

The operating temperature for MoveRoll conveyor module systems is between +10 ºC and +50 ºC.

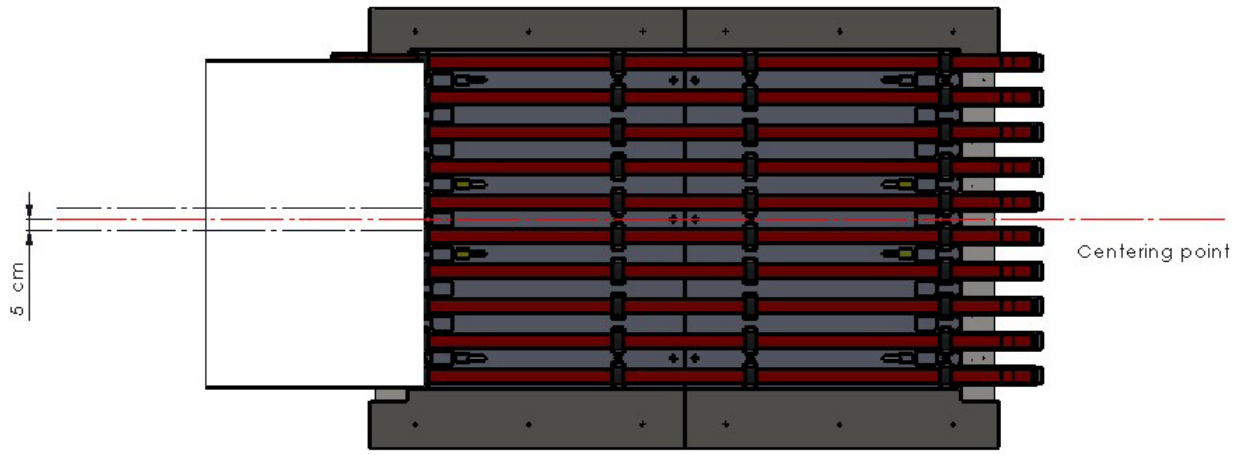
MoveRoll partlist

Item num.	Part name	Part code
1	H10-1450A	MR000619
2	H10-1450B	MR000620
3	H10-endpiece	MR000618
4	Magnetic solenoid valve	MR00697
5	Pressure regulator + divider 6	MR000019
5	Pressure regulator + divider 4	MR000593
6	Capasitive sensor	MR000594
7	M12 male, 2 x Clvalve socket 0,6 m cable	MR000704
8	M12-cable 2,0 m M/F	MR000700
9	Y-coupling M12	MR000702
10	Attachment U-clamp	MR000039
11	Connection plate	MR000038
12	Sash holder	MR000022
13	2900-N1	MR000528
14	2900-N2	MR000529
15	2900-W1	MR000530
16	2900-W2	MR000531
17	H10-2900-BP	MR000617
18	EH10-underplate	MR000621
19	EH-plate-wide	MR000536
20	EH-plate-wideR	MR000537
21	EH-plate-narrow	MR000538
22	Pressure element + 2Quick exhaust valve	MHQ-3250-04-65-2
23	Support plate	MR000622
24	Quick exhaust valve & regulator	



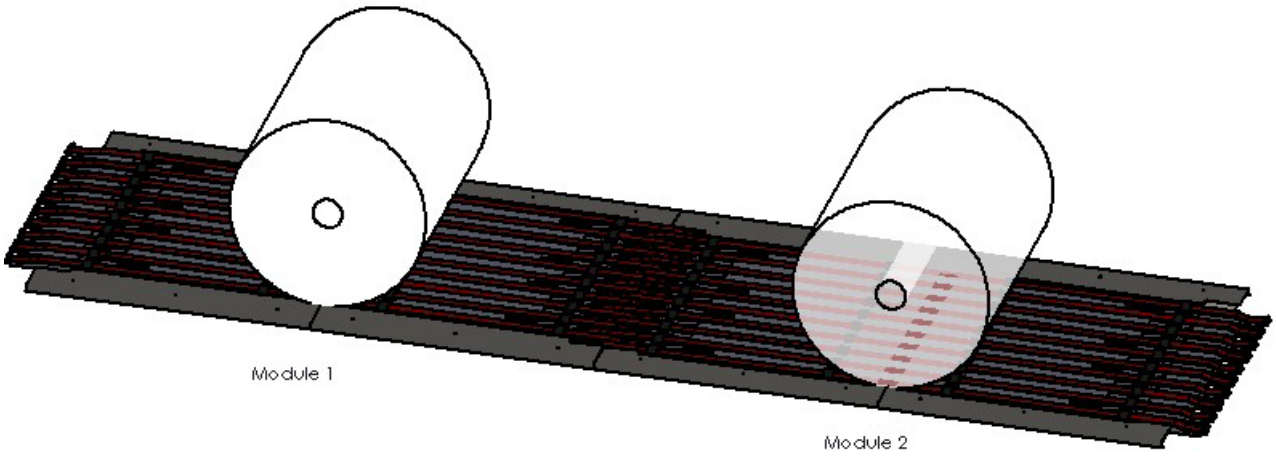
4. Technical specifications for paper rolls

Within a tolerance of ± 50mm, paper rolls must be straight aligned to a given centering point (Graphic 1). Paper rolls must move straight-positioned onto MoveRoll conveyor.



Graphic 1: Paper roll alignment

The maximum cycle time of the conveyor is 20 seconds from module to module (Graphic 2).



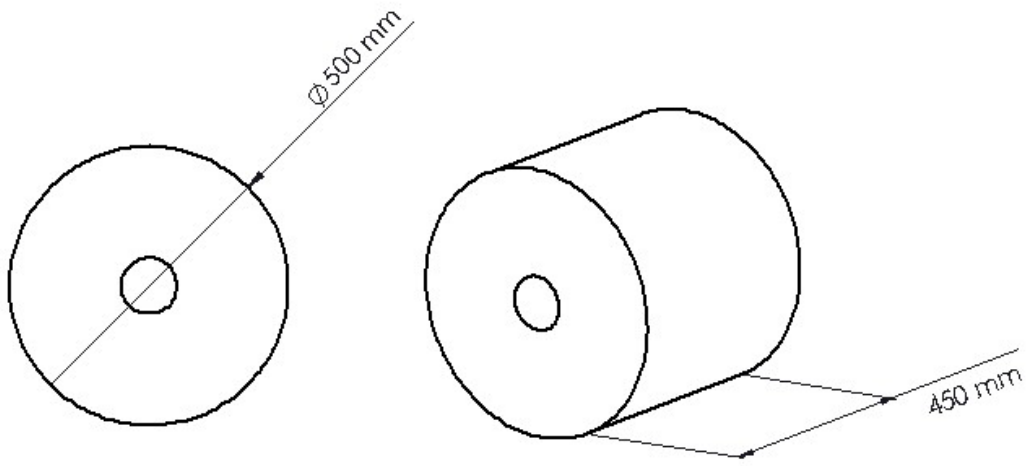
Graphic 2: Maximum cycle time

4.1 Roll weight

In order to be transported by MoveRoll conveyor, paper rolls need to weigh at least 100 kg. The decisive factor for the maximum allowed roll weight is module width: One pressure element can carry a weight of 500 kg. For a conveying length consisting of H10-modules, thus the maximum roll weight is 5000 kg; for a conveying length consisting of H20-modules, the maximum roll weight is 10000 kg.

4.2 Roll width and roll diameter

To be transported by MoveRoll conveyor, paper rolls must have a minimum diameter of 500 mm and a minimum width of 450 mm (Graphic 3). However, there are no actual upper limits for roll diameter and width.



Graphic 3: Minimum roll dimensions

5. Working in the vicinity of the conveyor

Danger

Entering the immediate vicinity of MoveRoll conveyor is forbidden, when the conveyor operates in automatic mode. Should the area near the conveyor have to be accessed, it needs to be ensured that the operation of the conveyor is set to manual mode, and it has to be ensured that no rolls can get onto the conveyor. Any other local safety practices instructions that are in use must also be observed when working in the vicinity of the conveyor and when working with the conveyor.

5.1 Working on the conveyor

Should the conveyor need to be accessed, e.g. in order to pick up some loose paper, it has to be secured that the conveyor is operating in manual mode or that the conveyor is completely offline. Since they are equipped with pressure regulators, accessing MoveRoll conveyor is very low-risk; the hoses cannot explode; hence hazard accidents that could be caused by explosions are avoided.

Caution

The pressure elements do however pose a tripping risk. Furthermore, to avoid tripping, step only on spots where the plywood is solid; there are e.g. gaps in the plywood in such places, where pressure elements are attached to the conveyor modules with U-clamps.

6. Basic information about maintenance

6.1 Maintenance schedule

The recommended maintenance interval is six months.

6.2 Safety

Only personnel with adequate training and experience in pneumatic machinery should perform the maintenance of MoveRoll conveyor.

Warning

Safety equipment must be used when carrying out maintenance works.

6.3 Preparation of maintenance work

Caution

Prior to the start of maintenance work, the following steps must be undertaken:

- Shut off the supply pressure for the filter regulator. The filter regulator is equipped with a secondary exhaust closing valve, which is located in the front side. Turn off the pressure and exhaust all residual compressed air. The closing valve has a locking option. If there is a possibility that outside personnel could by accident pressurize the system, the closing valve must be locked during the maintenance process.

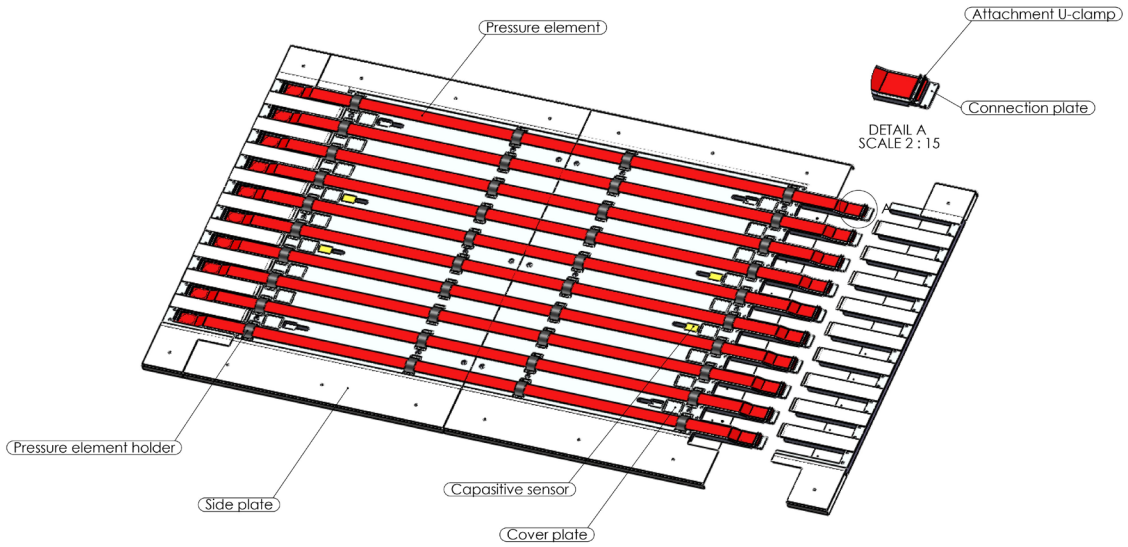
- Ensure that the control voltage is turned off, so that during the maintenance power supply to the secondary exhaust closing valve is prevented.

- Make sure that there are no unauthorized personnel in the vicinity of receiver, kicker or conveyor itself. To prevent accidental start-ups of the system, confirm that all parties involved are informed about the ongoing maintenance work.

- Prior to the start of maintenance work, the mechanical state of peripheral devices such as receiver and kicker must be checked. Ensure that these devices cannot cause danger under any circumstances.

7. Components

Over time, certain components of MoveRoll conveyors may need to be replaced e.g. in case of malfunction. After the replacement, some of the components may need adjustment to secure proper functioning. The drawing below (Graphic 4), displays the locations of components relevant for maintenance.



Graphic 4: Component locations

7.1 Pressure elements

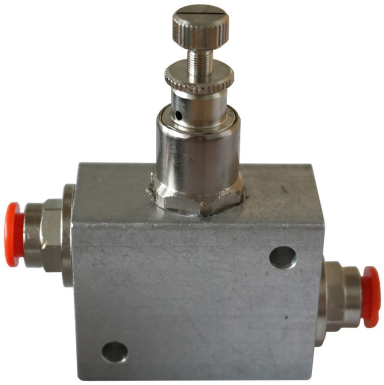
The pressure elements are of critical importance for the performance of MoveRoll conveyor, because they do the actual work of transporting paper rolls. Accordingly, it is crucial that the pressure elements function as intended. Depending on the application, the pressure elements must be renewed every two to five years. The optimal interval of renewal will be suggested by the supplier.

7.2 Pressure regulator

Pressure regulators are further components of MoveRoll conveyor that may need to be serviced and/ or replaced at a certain point in time. They can be found under the side plates of the conveyor.

The task of these pressure regulators is to ensure that the air pressure in MoveRoll never reaches unsafe levels. The pressure is normally set to 2.5 bar and can be adjusted via the regulators' top tap.

By adjusting the pressure you can increase or decrease air flow to manipulate the forces and movement speed of the paper rolls.



Graphic 5: Pressure regulator

Caution

When adjusting a pressure regulator, the supply pressure has to be connected to port nro. 1 and the pressure gauge has to be connected to port nro. 2.

7.3 Quick exhaust valve

The function of the quick exhaust valves is to help exhaust compressed air from the pressure elements. Currently, three different types of quick exhaust valves are installed in MoveRoll conveyor modules. They can be directly connected to a pressure element (Graphic 8) or are in some cases (Graphic 6 and Graphic 7) found under the cover plates of conveyor modules (see Graphic 4).

Graphic 6: Quick exhaust valve with regulator

Graphic 7: Quick exhaust valve

Graphic 8: Quick exhaust valve connected to a pressure element

7.4 Sensors

The modules are equipped with capacitive sensors that detect the current position of a paper roll on MoveRoll conveyor. Sensors, that are delivered as spare parts, are usually factory adjusted. Nonetheless, there are situations when small adjustments are needed. Sensors, for example, need to be adjusted, if they detect paper scraps, because they are too sensitive. They also have to be adjusted, if they do not detect rolls on the conveyor at all.

Graphic 9: Capacitive sensor

To adjust the sensors, remove the two fixing screws and rotate the adjustment screw located on the side of the sensor with a small screwdriver.

7.5 Solenoid directional valve

Solenoid directional valves control the paper roll movement with *drive – centralize - brake* functions. They are located under the side plates of MoveRoll conveyor (look for the pneumatic connection stickers on the side plate).

Graphic 10: Solenoid directional valve

7.6 MoveRoll tester (optional)

MoveRoll tester is a small and compact tool for maintenance and component adjustment. It can be used for:

• Testing and adjusting sensors

• Testing and setting pressure regulators

• Checking the magnetic valve functionality

• Searching for possible pressure element leakages

• Operating a single MoveRoll conveyor module manually

Graphic 11: MoveRoll tester

8. Components

The recommended general maintenance interval is six months. There are five main objectives for general maintenance:

1. Checking the attachment of conveyor modules to the foundation
2. Checking the condition of pressure elements and fastening
3. Checking the condition of the pressure element holders
4. Checking the condition of the sensors
5. Checking the pressure elements for leakages

Caution

In addition, condition inspection and leak test of pressure - and filter regulator system must be performed once a year.

8.1 Checking the attachment of conveyor modules to the foundation

MoveRoll conveyor modules are fastened to the floor or foundation by M8 socket screws. Check that the modules are firmly attached and that the screws are tight. Tighten them evenly if needed.

8.2 Checking the condition of pressure elements and fastening

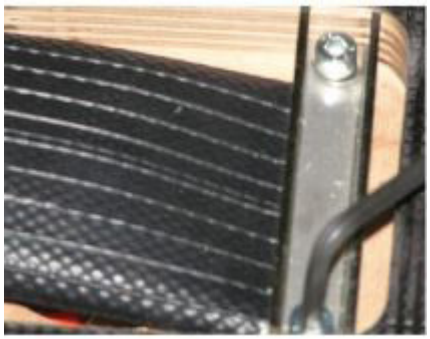
Check that there are no observable leaks and that the pressure elements are undamaged and not badly worn out. If the driving pressure element is not expanding, check the fastening of the pressure element. Change the pressure element and tighten the screws if necessary.

8.2.1 Replacing a pressure element

Spare pressure elements are delivered as complete spare part sets including the socket screws.

8.2.2 Opening the pressure element U-clamp

Unfasten the U-clamp by loosening the socket screws on top of it. (Graphic 12) Open the screws just enough so that you can pull the pressure element from underneath.



Graphic 12: Opening an U-Clamp

8.2.3 Disconnecting a compressed air tube

First, carefully pull the pressure element from underneath the clamp so that you can see the compressed air connection. Disconnect the air tube from the connector by pushing it. Repeat the procedure at the other end of the pressure element.

Graphic 13: How to disconnect a compressed air tube

8.2.4 Installing a new pressure element

Pull the new pressure element through the holders and make sure it is straight. Reconnect the air connections and check that the pressure element is properly attached by pulling it lightly backwards.

Place the pressure element under the U-clamp so that 0.5 – 1.0 cm of hose tip is visible on the other side. Change the socket screws of the U-clamp if needed and fasten them evenly.

Caution

Make sure that pressure element is straight. Pull it to see that it is firmly attached. You can pressurize the element and use leak spray to check for possible leaks.

8.3 Checking the condition of the pressure element holders

Check that the pressure element holders are undamaged and intact. If the pressure element holder strap is broken, attach a new pressure element holder with four screws.

8.4 Checking the condition of the sensors

Carry out sensor testing with MoveRoll tester. Make sure that all sensors are functioning properly and check that they are tightly fastened. Clean the sensor surface.

8.5 Checking the pressure elements for leakages

Observe that the pressure elements are not leaking. At least once per year, check for leaks in the pressure system with leak spray or soap water.

Caution

It is also important to regularly clean the space between the pressure elements and the surface of the conveyor modules with compressed air. This prevents litter flocking underneath.

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9. Troubleshooting

Problem	Possible cause	Investigation method	Countermeasure
A paper roll does not move	Leaking pressure elements	Use leak spray to check if there are leakages	Change the leaking pressure elements
A paper roll does not move	Something blocks the way	Check if there is any excessive material between the roll and the pressure elements	Remove excessive material
A paper roll does not move	Dysfunctional or broken sensors	Try to activate the sensors and check if the indication lights are working	Replace dysfunctional or broken sensors
A paper roll does not move	System pressure is too low	Check that the pressure level is as it should be	Restore the original system pressure