PAPERFOX EPT-1

Edge Protektor Tape applicator

Instructions manual

Version: 15. Jan. 2023
Last modification: 15. Jan. 2023

Table of contents

Brief description

With the PAPERFOX EPT-1 Edge Protektor Tape applicator you can apply up to 20mm wide double sided adhesive tape on cardboard edge protectors or othersimilar profiles. The adhesive tape should be easy to tear. Strong plastic based, reinforced or foam based tapes can't be used reliably. The EPT- can place up to 4-4 tape strips at programmed positions. The taping accuracy is about +/- 2mm (depending on the tape used).

Technical parameters

Dimensions without stand:	L=110cm W=60cm H=155cm
Weight:	37 kg
Voltage:	230V 50Hz
Power consumption:	180W
Pneumatic pressure:	8 Bar
Sheet forwarding method:	Conveyor belt (40x1270mm)
Tape cutting method:	With toothed knives. (So the cutting lines are not straight, they are zigzag shaped.)
Speed: (machines with frequency controller)	2, 10, 20, 30 m/min
Max. sheet thickness:	3mm
Max. tape width:	20mm
Max. programmable taping length:	20m (at 20 m/min speed)
Accuracy of tape application:	+/- 2mm (depending on the tape used)
Tape type:	Easy to tear tapes. Strong or foam based tapes can't be processed accurately and reliable.
Nr. of tape heads: (standard configuration)	2pcs (1pc left, 1pc right)
Edge protector dimensions:	Min.: 35 x 35mm; max.: 100 x 100mm
Minimal length of taping:	40mm
Minimal gap between tape strips:	20mm
Nr. of tape strips on an edge protector:	1-4

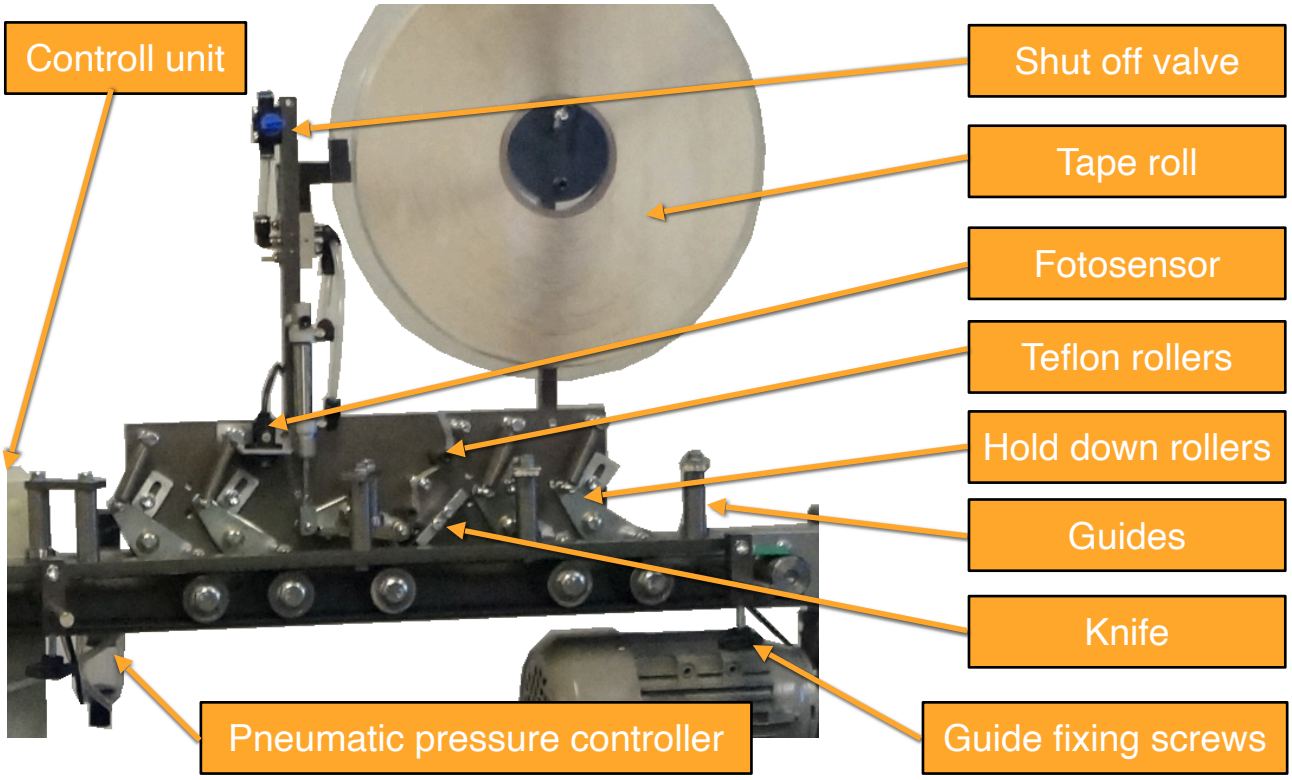
Safety instructions

Please read the operating instructions before you use the Paperfox EPT-1 Tape applicator to prevent accidents and ensure the trouble-free operation.

- The Paperfox EPT-1 may not be operated by anyone who does not read or does not fully understand the operating manual.
- The device may not be used in wet or explosive environment.
- Always use a proper lighting.
- To ensure the easy unplugging use a socket in a height 0,6 and 1,9m.
- Use a proper socket with a safety ground.
- Never change the fuse to any other type as the designated value.
- Repairs should be carried out by qualified persons using original parts.
- There are sharp knives in the taping heads. Be careful if you change the tape or doing maintenance around the knives.

Parts of the Paperfox EPT-1 Edge protector Tape applicator and their adjustment possibilities

The configuration is subject to change. This parts are supplied in standard configuration.



After making the necessary adjustments you can place the edge protectors on the conveyor belt and the EPT-1 inserts the tape in the programmed position.
With the shut-off valve you can switch on/off the tape application.
This valve should be switched off if you insert the adhesive tape into the taping head and should be opened during normal operation.
The hold down rollers are equipped with two springs, you can use one or booth of them according the needs.
The position of the hold down rollers can be adjusted individually with a 10mm wrench.
The position of the hold down rollers can be adjusted together after loosing the guide fixing screws.

The pneumatic filter and regulator

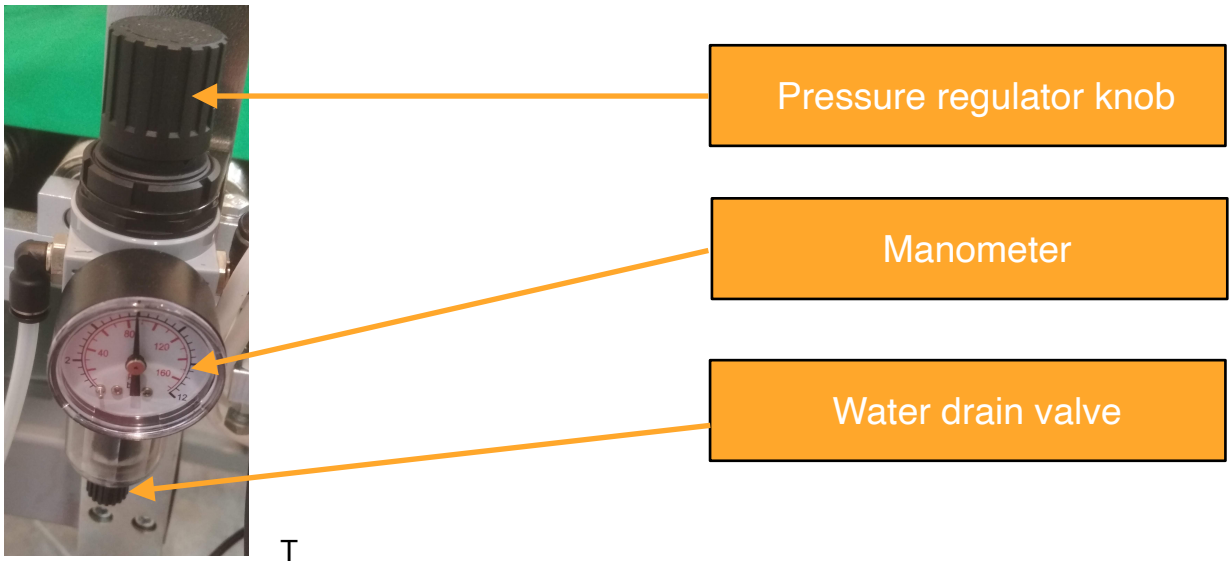
With the main switch you can switch on/off the device. The light of the display should be on now. If the display doesn't lights, then check the safety stop button.

If the safety stop button pressed down you can't operate the device. It can be set into normal operating position by turning the head of the pushbutton a bit clockwise.

The sheet forwarding motor can be switched on/off with the motor on/off switch.

The operating parameters of the device can be set with the programmable controller as it is described in "The programmable controller (PLC)" section.

The pneumatic filter and regulator



T

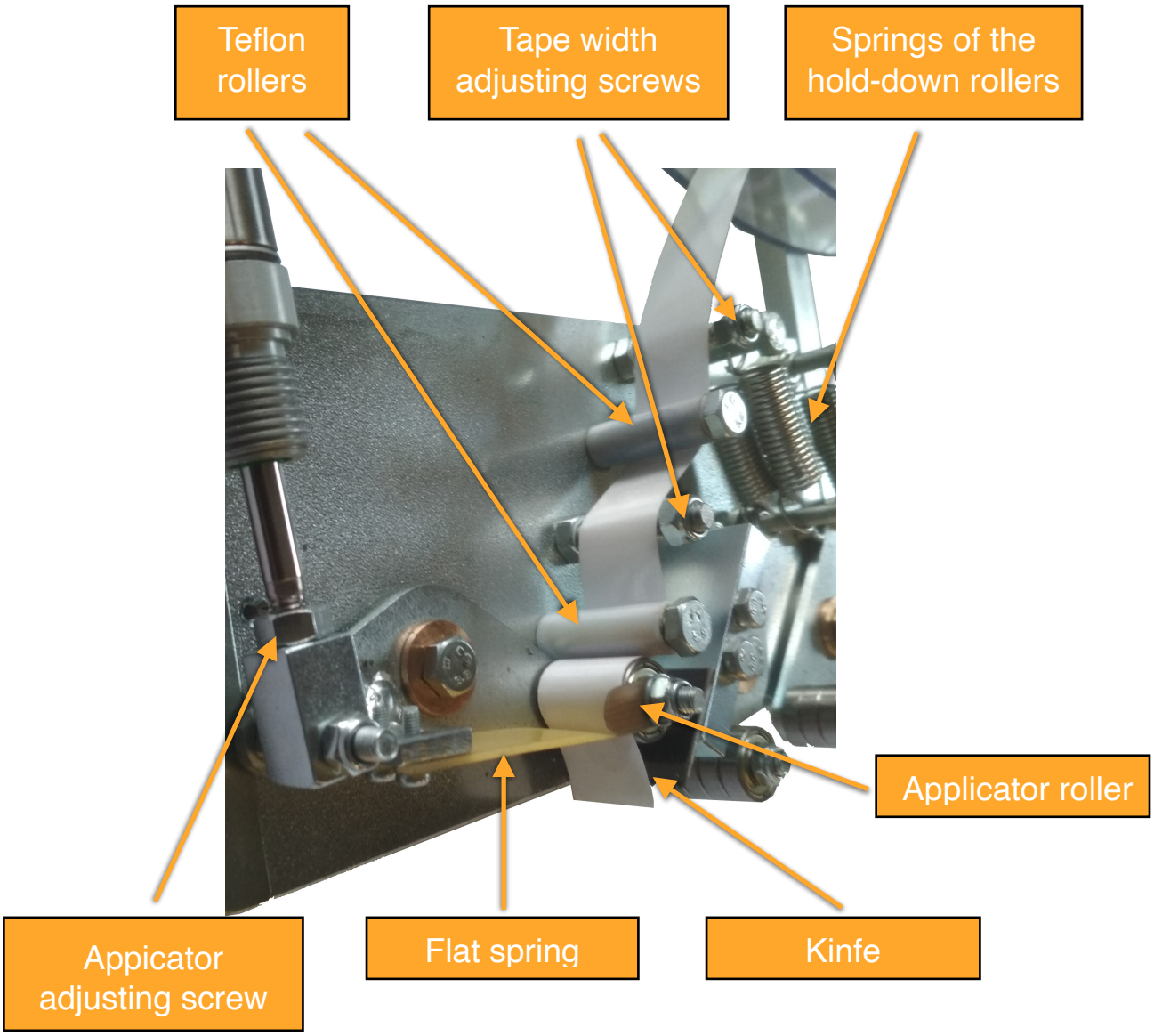
he pneumatic filter removes the small particles and the harmful oil/water condensate from the compressed air flow. You can adjust the pressure with turning the pressure regulator knob. If you can't turn it, then pull it up. After adjusting you can prevent it from the unwanted adjustment by pushing it down.

There is a water drain valve a the bottom of the pneumatic filter and regulator. If the device is not under pressure, then you can release the condensed water from the transparent water tank with this screw.

There is a pneumatic connector at the end of the pneumatic tube for connecting the device to the compressor.

Inserting the self adhesive tape into the TD-1 applicator head

The applicator head uses 3"(76mm) inner core size and max. 30cm outer diameter rolls. The maximum tape width is 20mm. It is recommended to use easy to tear adhesive tapes, because with strong adhesive tapes made of plastic film, operation may be instabile. The adhesive tape should be placed into the head as shown. The adhesive side of the tape should roll on teflon rolls, which will not stick to it. When changing the roll, it is advisable to close the manual shut-off valve.



Adjusting the head to the tape width

Adjust the tape width adjusting screws to the width of the adhesive tape, otherwise the position of the tape in side direction may be uncertain.

Adjusting the pressure of the hold down rollers

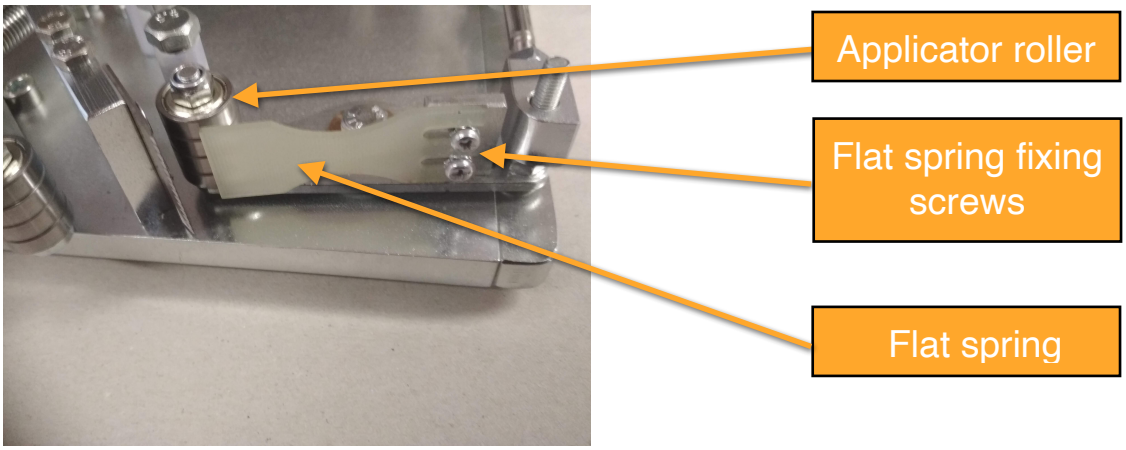
The sheet with the tape is forwarded by the hold down rollers. For thinner, easily to tear tapes, the use of 1-1 springs is sufficient, the more rigid tapes require 2-2 springs.
When repositioning the TD-1 tape applicator head, we suggest to hook off all springs because in this way it is easier to move the heads.

Adjusting the the applicator adjusting screws

With the applicator adjusting screw, you can adjust the upper position of the applicator roller so that it would be pressed to the teflon roller. In this way the teflon roller and the applicator roller holds firmly the tape ensuring that the knife should cut the tape in the desired place. If the tape is too sticky but easy to tear, you can set this screw so that it wouldn't touch the teflon roller so the tape won't stick on it.

Flat spring

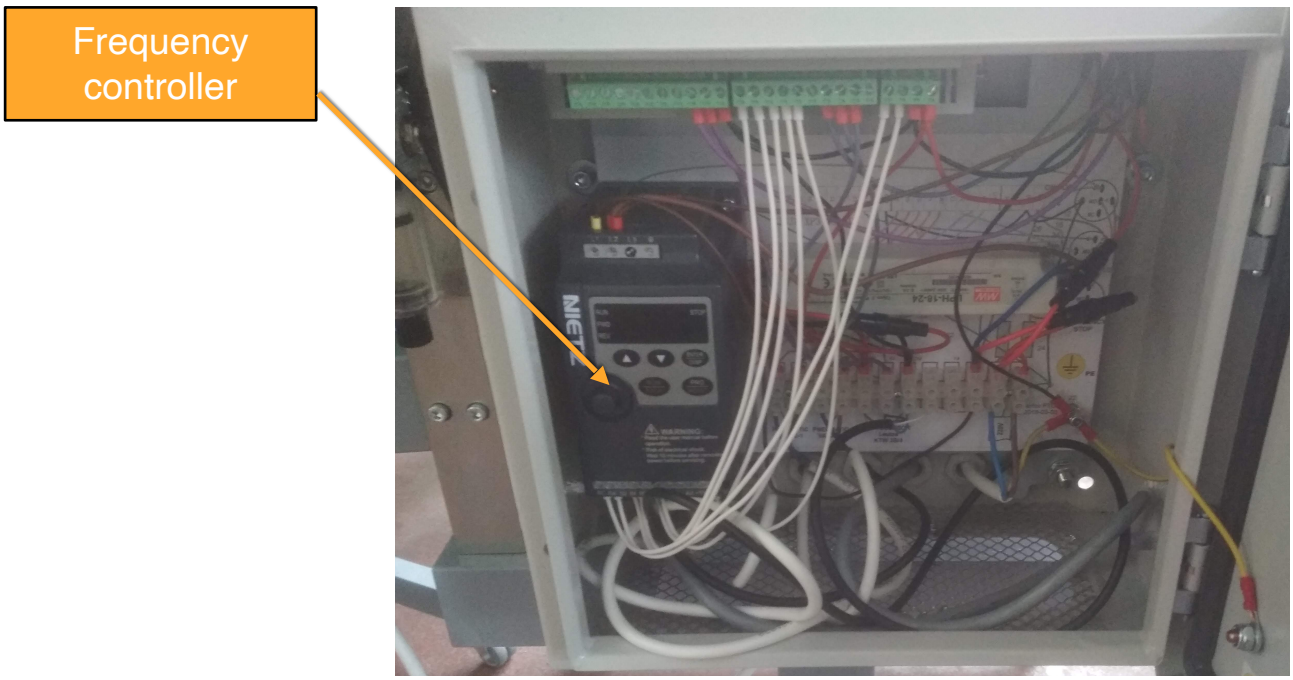
A flat plastic spring holds the tape against the applicator roller.



After loosing the flat spring fixing screws you can adjust the flat spring. It should hold the tape strong enough that the tape wouldn't sleep back from the applicator roller. If the pressure is not enough then the tape can be pulled back and the next tape application will be unsuccessful. If the pressure is too much then the flat spring can collect the glue from the tape or even can jam.

Adjustable speed and direction

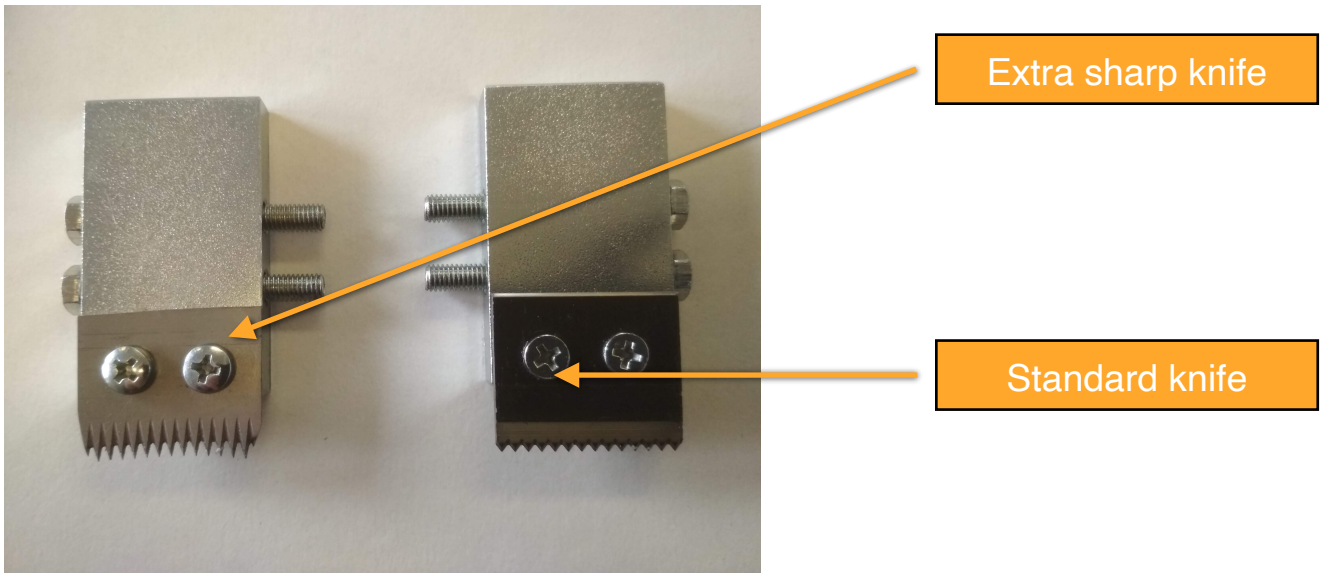
The EPT-1 is equipped with a frequency controller. In this way you can adjust 2, 10, 20 and 30 m/min speed.



The slowest speed (2 m/min) is for testing and adjustment purpose, but if you select this speed then you can increase it with a potentiometer on the frequency controller.

You can change the running direction of the conveyor belt on the controller with the “Motor reverse direction” checkbox. This function can be useful at removing paper jam or when sticking white insulator tape under the optosensor if the sheet has such colour which otherwise can’t be indicated by the optosensor.
If you change the speed, the operational parameters are changing automatically according the selected speed.

Sharper knives



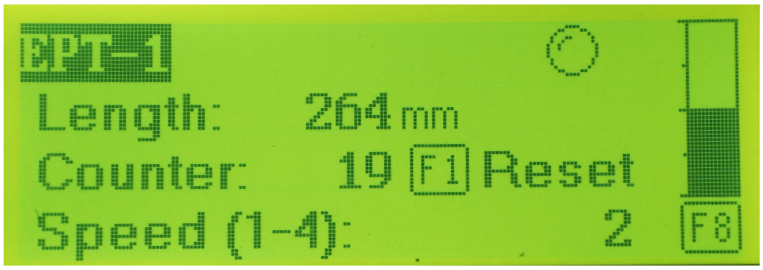
The standard life cuts the easy to tear tapes well and does not leave much tooth marks on the tape when cutting it.
The extra sharp knife cuts the stronger tapes better, but leaves more tooth marks and it is very sharp and dangerous. This knife has a possibility for vertical adjustment.

The programmable controller (PLC)

You can set the position of the tape application and other parameters with the PLC. There are several screens with different function on the display.
You can change the active screens with the “up” and “down” arrow buttons on the left side the PLC. The operating instructions and the datas can be set on the function and

numeric buttons. After pressing the “SET” button you can write a numeric value into the highlighted data field on the display and you can confirm this data and go to the next data field by pressing the “ENT” button. If you don’t want to go trough all data field you can exit from the setting mode by pressing down the “ESC” button.

Main screen



After switching on the device the main screen appears on the display.
The displayed value after the label “Length:” is the length of the sheet which passed through the device.

The displayed value after the label “Counter:” is the number of sheets passed through the device since it was reseted. You can reset this counter with the “F1” function key.

You can change the speed of the device by pressing the “F8” function key.
The actual speed is indicated by a bar indicator at the right side.

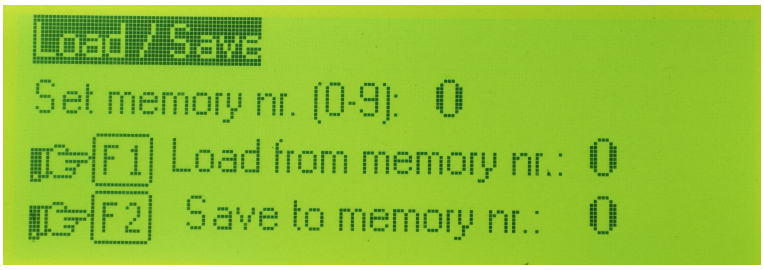
Y can change the speed not only in this screen, but at any screen by pressing the “F8” key.
If this bar indicator appears in any screen it always indicates the actual speed.
The selectable speeds are 2, 10, 20, 30 m/min.

Taping positions **screen**

There are 8 numeric field on this display. The first field is the starting position of the first tape strip, the second is the end position of the first tape strip. The third is the starting position of the second tape strip, … So you can program up to four tape strips in a sheet.

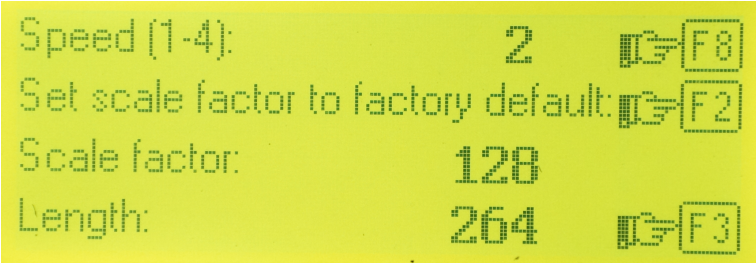
Do not write “0” as a starting position because this value means that this position is inactive. To start at the beginning of the sheet write “1” to the first start position.
Press the “SET” key to enter into the first field, press “ENTER” to accept the data and write the following field. If you don’t have to write into all fields, the you can exit with “ESC”.

Load/Save screen



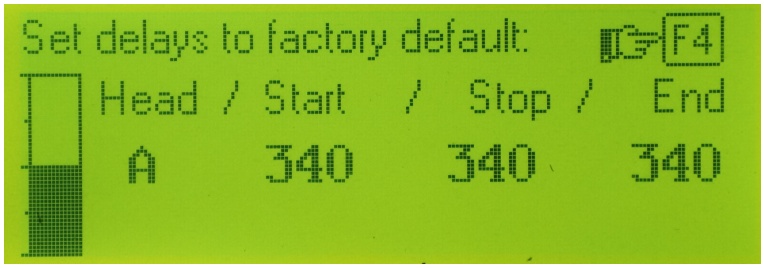
You can save the actual settings or load the saved settings. Press the “SET” key and set the Nr. of store location (0-9).
Press the “F1” key to load the saved settings or “F2” to save the actual setting to the selected store location.

Scale factor screen



You can change the speed by pressing the “F8” key.
The data field “Scale factor” indicates the actual value of the scale factor. Actually it is the speed of the conveyor belt in mm/sec.
The data field “Length” is the calculated length of the sheet last passed through the device.
After pressing the “Set” key you can enter the new scale factor but there is an easier way for setting the proper value of the scale factor: Enter the real length of the last sheet and press “F3”. The device calculates and sets the optimal value of the scale factor.
You can set the scale factor to the default value by pressing the “F2” key.

Delays screen



In this screen you can set the speed of the machine and the operational parameters in each speed. If you press the “F8” key then the actual speed changes and the parameter set of the actual speed appears in the data fields. You can set them by pressing the “F4” key to the default value or you can edit them after pressing the “Set” key. The default parameters are not so accurate as the accurately adjusted parameters, but they are a good starting point for the fine adjustment. The parameters of the left and right heads can be edited independently.

The parameters of each speed stored separately and the actual parameters are automatically activated automatically if you change the speed.
(Actually the speed nr. 1. is adjustable with the potentiometer on the frequency controller and the minimal setting is 2m/min. You can change the speed, but in this case the parameters won’t change according the adjusted speed.)

With the **„Start”** delay you can compensate the distance of the optosensor and the tape applicator head. This value used to calculate the starting positions of tape laying. To adjust this parameter use „1” as first tape starting position and adjust this value to start the tape laying 1mm from the sheet edge.

You can calculate the accurate “Start” value in the following way:
- measure difference between the actual taping position and the programmed position.
- divide it with the “Scale” value and multiply it by 1000 to calculate the “Start” value correction.
- add the “Start” value correction it the actual “Start” value if you want to move the taping position farther from the beginning of the sheet or subtract it if you want to move it closer.

[“Start” value correction] = [distance difference] / [Scale] x 100

You can calculate the accurate “Stop” an “End” values in a similar way.

The **„Stop”** is similar to “Start” but a bit different because of mechanical differences. This value used to calculate the stop positions of tape laying. You can adjust this value by measuring the tape ends and adjusting this delay according that.

The **„End”** similar to “Taping start delay” but a bit different because of mechanical differences. This value used to calculate the time when the end of the sheet arrives to the applicator head. At this point the head stops the tape laying even if the programmed length is not achieved.
If you want to place tape on a long sheet until the end of the sheet you can write higher end position as the real length of the sheet and the tape laying stops at the end of the sheet. In this case this value should be accurate.
Otherwise you can write just a bigger value as the „Stop” value and the device works well.

If the processed paper have a punched whole or if the printed paper has similar color as the conveyor belt, that can confuse the optosensor the tape application can be terminated before time because the device thinks that the paper has ran out from the device. In this case you can increase the „End” delay to ensure the stabile work.

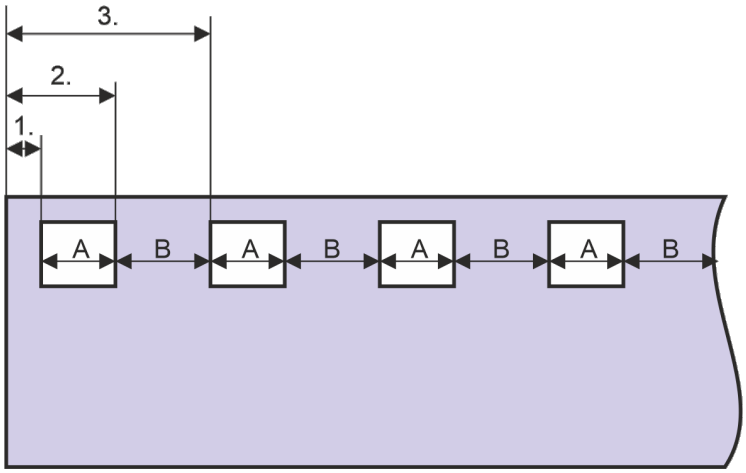
You can write the parameters by pressing the „Set” button, entering the values and confirming them with „Enter”.
The parameters are different in each speed and stored separately.

Sheet end detection screen

If there is a hole in the sheet under the optosensor the device may handle the sheet as if it would be two sheets after each other. The tape laying ends at the hole and after the hole the device starts a new taping cycle. Not only a hole in the sheet can cause such problem, but the printed elements of the sheet as well.
To eliminate this problem you can deactivate the sheet end detection. Deactivate the sheet end detection by pressing the “F1” key. Edit the “Disable length” value. It should be a bit more than the actual length of the sheet. During the “Disable length” distance, the device lay the tape in the programmed way even if the optosensor detects sheet end.

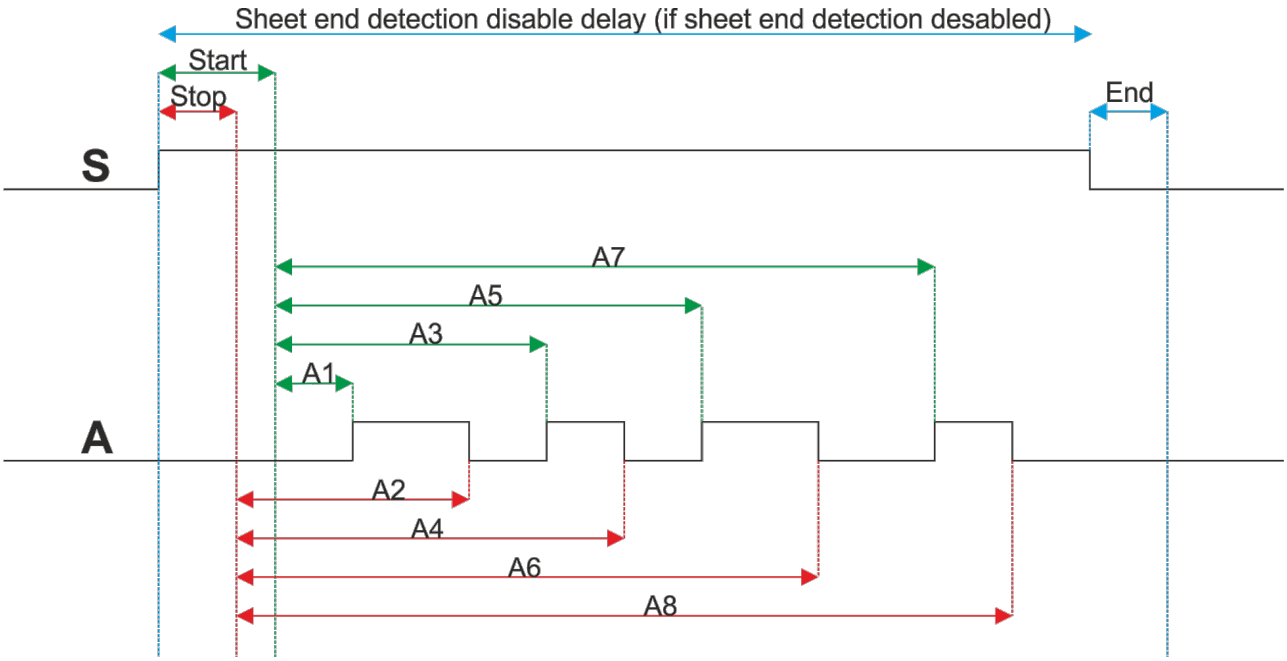
With pressing the “F2” key you can activate the “Auto repeat” function. This function is used when you want to stick a series of tape strips on a very long sheet or continuous roll material. The FTD-1 places tapes strips in the same lengths and distances. If this function is active, you should write only in the first 3 fields of the “Head A” and “Head B” screens. The other values should be “0”.

- The first value (1.) is the distance of the first start position of tape application.
- The second value (2.) is the end position of the first strip.
- The third value (3.) is the start position of the second strip.
- The device applies self adhesive tape in “A” length with “B” gap continuously.



Setting the parameters

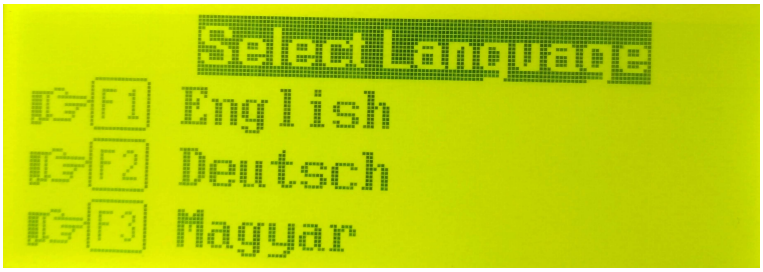
in the drawing above you can see the function of the parameters.



- S: Sign of the optosensor
- A: Driving signal of head

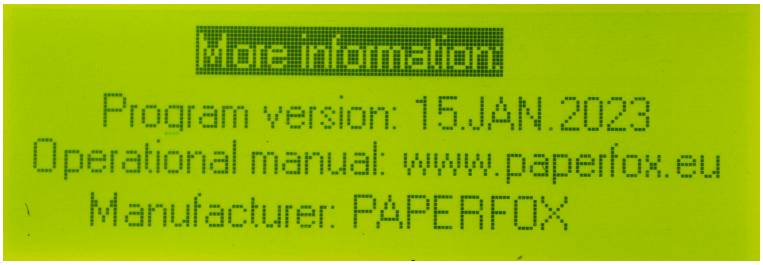
The sheet arrives under the optosensor, after the “Start” delay arrives to the taping rollers. (The optosensor is not in the same position as the taping rollers.) The device adds this “Start” delay to the taping start position delays. The taping stop points are calculated with the “Stop” delay. It can be slightly different because of mechanical differences. (The knife slides a bit on the surface of the tape before cutting it.) The “End” sheet end delay is used to calculate the time difference when the sheet runs out from the optosensor until the sheet runs out out from the taping head. When the sheet has ran out from the taping head the taping process stops even if the programmed position is still not achieved. (B8 position on the picture.)
You can postpone this stop function at the sheet end with activating the “Sheet end detection disable” function. In this case the device continues the tape application even if the optosensor can’t detect the sheet until the value of the “Disable length” parameter.

Language screen



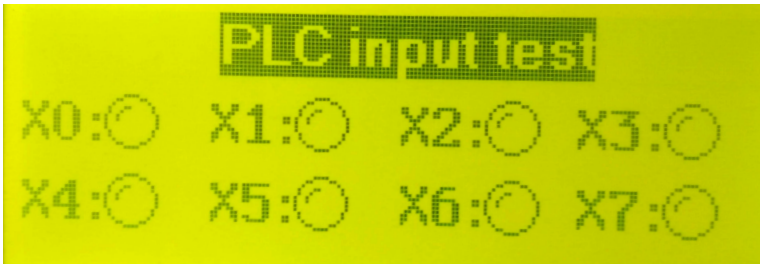
You can select the desired language for operating the device by pressing the F1, F2 or F3 buttons.

Information screen



There are some useful information about the device at the “More information” screen.

PLC Input test screen



You can check the inputs of the PLC for diagnostic purpose. The X0 input is the optosensor, the X1 is the motor switch the other inputs are not used.

PLC Output test screen

You can set the outputs of the PLC for diagnostic purpose. Y0 and Y1 outputs are driving the pneumatic valves at the head-a and head-b. Y2 drives the lamp at the motor switch. Y4 switches the motor. The other outputs are not used.

Head-A (ms) screen

For diagnostic purposes you can study the timing values. The following Head-B (ms) screen is similar to this screen.

About the tapes

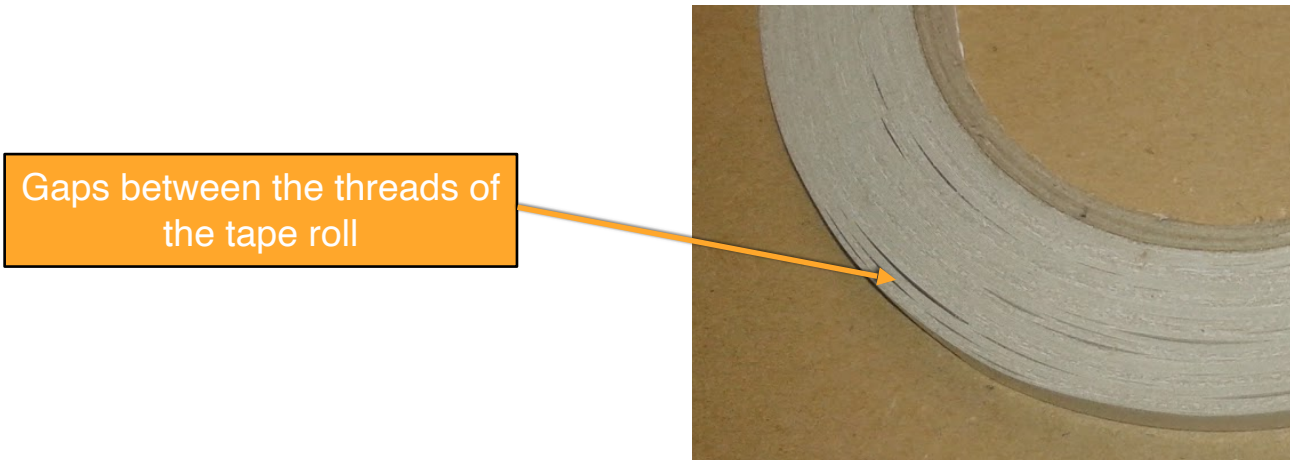
Self adhesive tapes

The Paperfox TD-1 and TD-50 tape application heads were designed for usage with easy to tear tapes with the following properties:

- The carrier material on which an adhesive is applied should be fabric or paper. Usage of strong plastic foil or foam based tapes are not suggested. You can use this kind of tapes but the optimal result is not granted. We suggest to use “vlies” (non-woven natural or synthetic fabric) tapes.
- The liner is a one or booth side siliconised material on which the adhesive not adheres tightly. Usage of tapes with strong plastic foil liner are not suggested. You can use this kind of tapes but the optimal result is not granted. We suggest to use tapes with siliconised paper liner.
- The adhesive can be acrylic, rubber-solvent, butyl rubber… etc. You can use all kind of adhesives, but maybe some kind of adhesive works better than the others.

Tape storage

Storage can cause changes to the tape’s adhesive properties. The self adhesive tapes are loosing their quality during storage even by the best storage circumstances. Store the tapes in a cool, dry place and do not open the package of the tapes before usage. Do not keep a lot of tapes on stock, order them direct from the manufacturer if it is possible.



If there are gaps between the threads of the tape roll then the adhesive dries out at the gaps and the tape don’t sticks well at this points. That can cause inaccuracy or even tape jam.

Additional information

The controll unit of the EPT-1 is similar to the controll unit of FTD-1 with reduced functions.
So you can find additional information in the following documents:

https://www.paperfox.hu/pdf/manual-ftd-1-2021-mar-02-en.pdf
https://www.paperfox.hu/pdf/manual-td-1-2018-apr-01-en.pdf

Declaration of conformity

We the manufacturer

Fürcht Zoltán ev. (Trademark: “Paperfox”)
H-2142 Nagytarcsa, Ganz Ábrahám u. 3/7.
www.paperfox.eu
+36 30 948-2491

Declare that the product

Kind of product: Tape applicator
Type of product: Paperfox EPT-1

Is in compliance with the essential requirements and other relevant provisions of the following directives:

EMC Directive	2004/108/EC
Low voltage directive	2014/35/EU

The product is compatible with the following standards:

EN 60204-1 Safety of machinery. Electrical equipment of machines
EN 1088 Interlocking devices associated with guards
MSZ EN ISO 12100:2011 Safety of machinery

Nagytarcsa, 15.01.2023.

Fürcht Zoltán