
PAPERFOX FTD-1

Tape applicator

Instructions manual

Version: 22.Dec.2018

Last modification: 14.April.2019



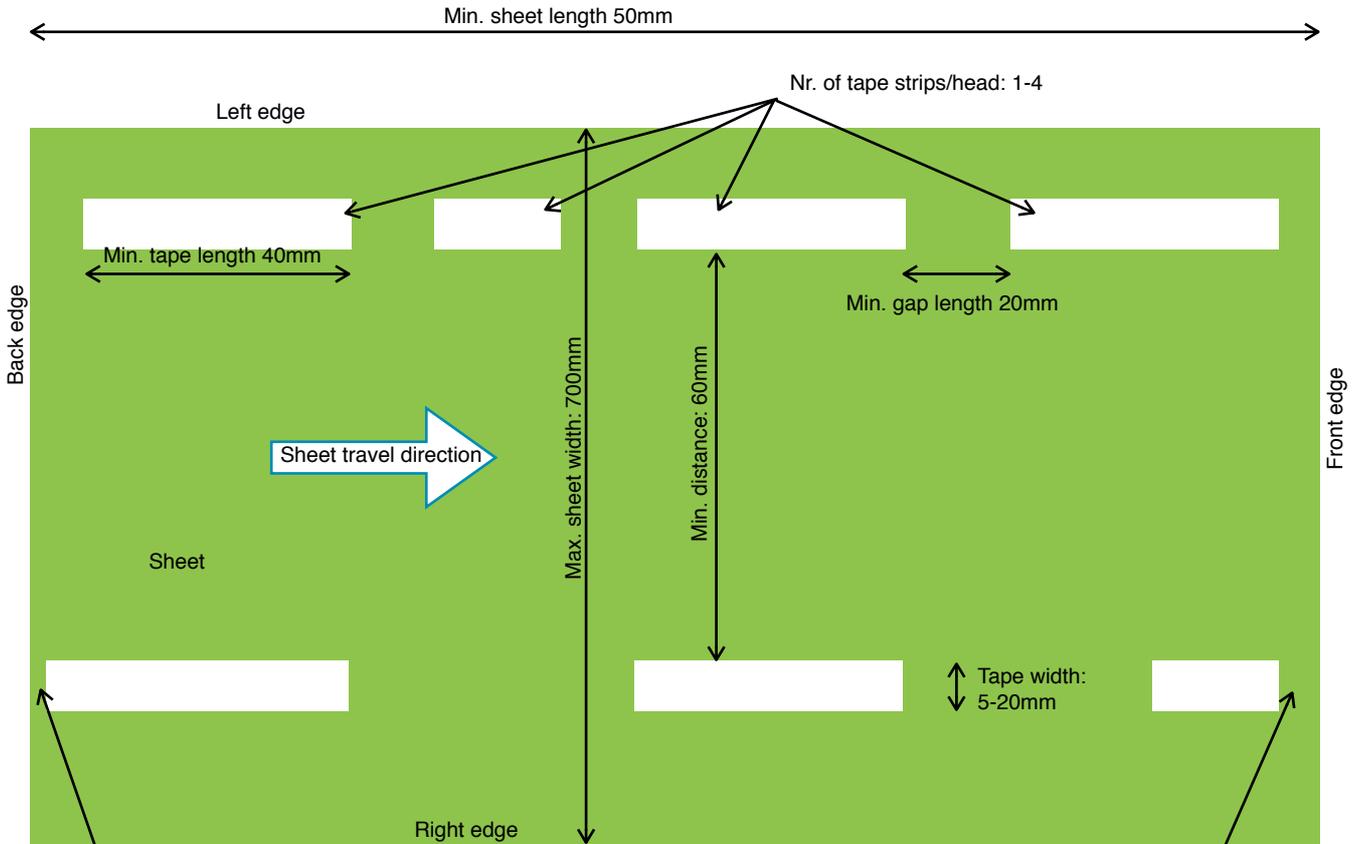
Brief description

With the Paperfox FTD-1 Programmable tape applicator you can apply up to 20mm wide double sided adhesive tape on paper, cardboard or similar sheet materials.

Technical parameters

Dimensions without stand:	L=110cm W=100cm H=75cm
Dimensions with stand:	L=110cm W=100cm H=150cm
Weight with stand:	75 kg
Voltage:	230V 50Hz
Power consumption:	180W
Pneumatic pressure:	8 Bar
Sheet forwarding method:	Conveyor belt (700x700mm)
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
Speed: (without frequency controller)	20 m/min
Max. sheet width:	700mm
Min. sheet width:	40mm
Min. sheet length:	50mm
Max. sheet thickness:	3mm
Max. tape width:	20mm
Accuracy of tape application:	+/- 1..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)

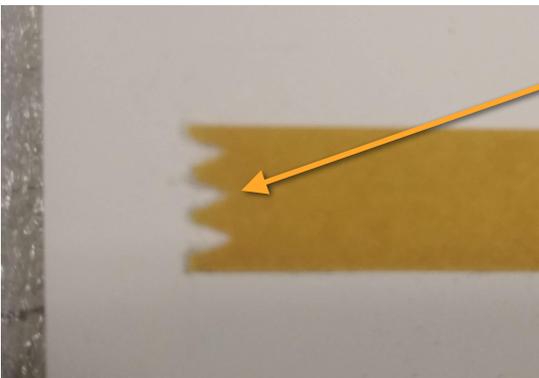
Taping parameters



Min. distance of the tape from the back edge of the sheet: 1..2mm

Min. distance of the tape from the front edge of the sheet

- with thick, rigid cardboard: 2..5mm
- with thin, flexible paper: 5...10mm
- with thin paper close to the sheet corner: 10...30mm



The cutting line is not straight, there are toothed.

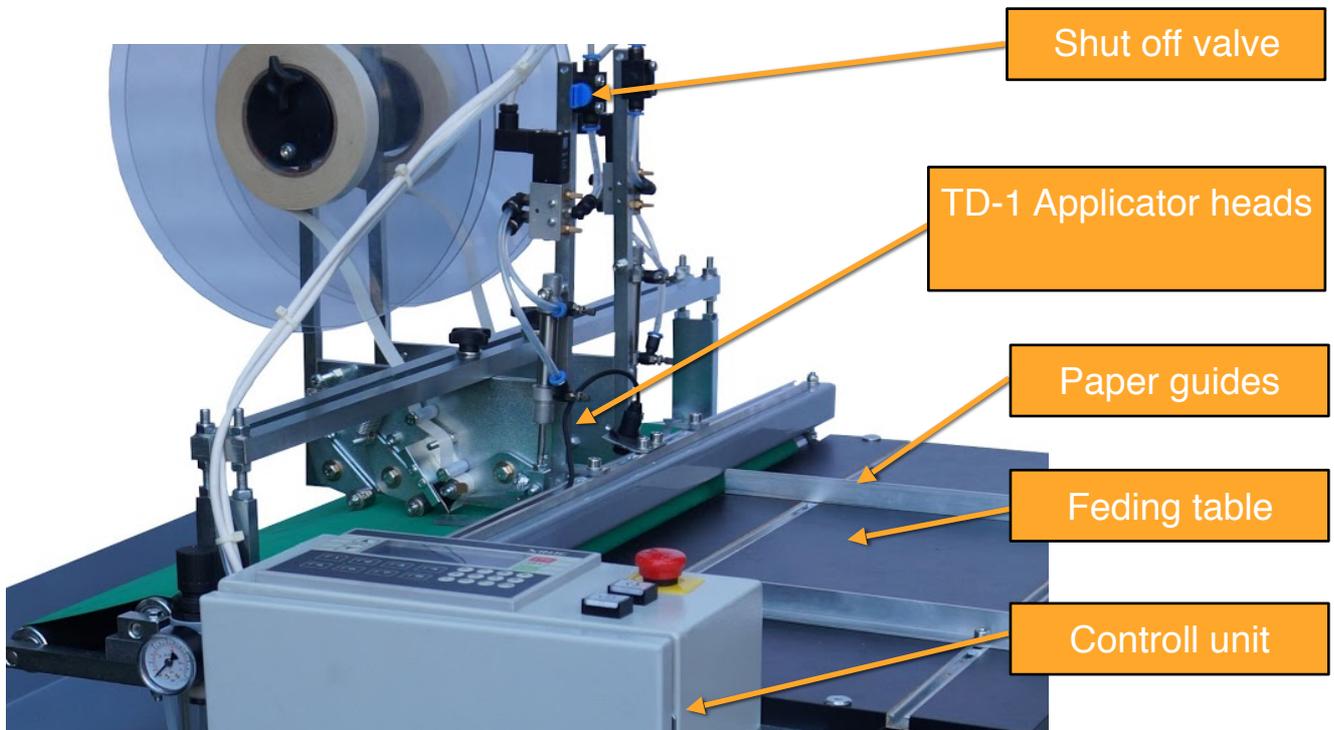
Safety instructions

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

- The Paperfox FTD-1 Tape applicator 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 FTD-1 Tape applicator

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



You can place the sheets on the feeding table and set the paper guides to the proper 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 TD-1 head and should be opened in normal operation.



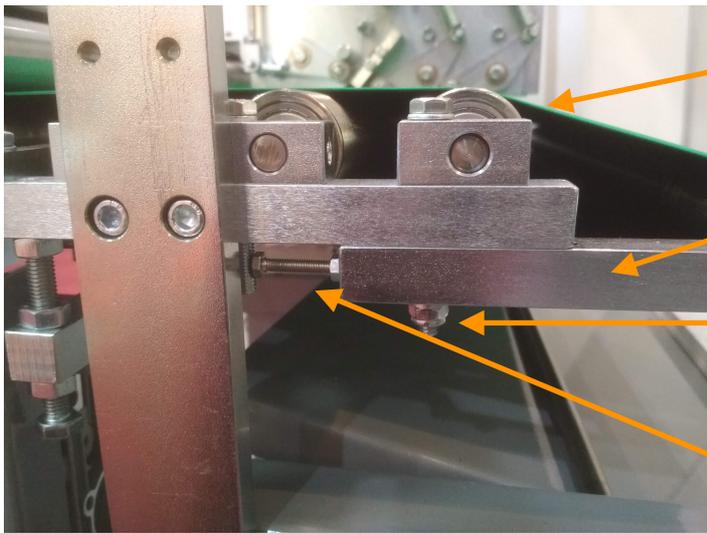
With the main switch you can switch on/off the device. The light of the display should be on now. If the display doesn't light, then check the safety stop button.

If the safety stop button is 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.

Adjusting the tension of the conveyor belt



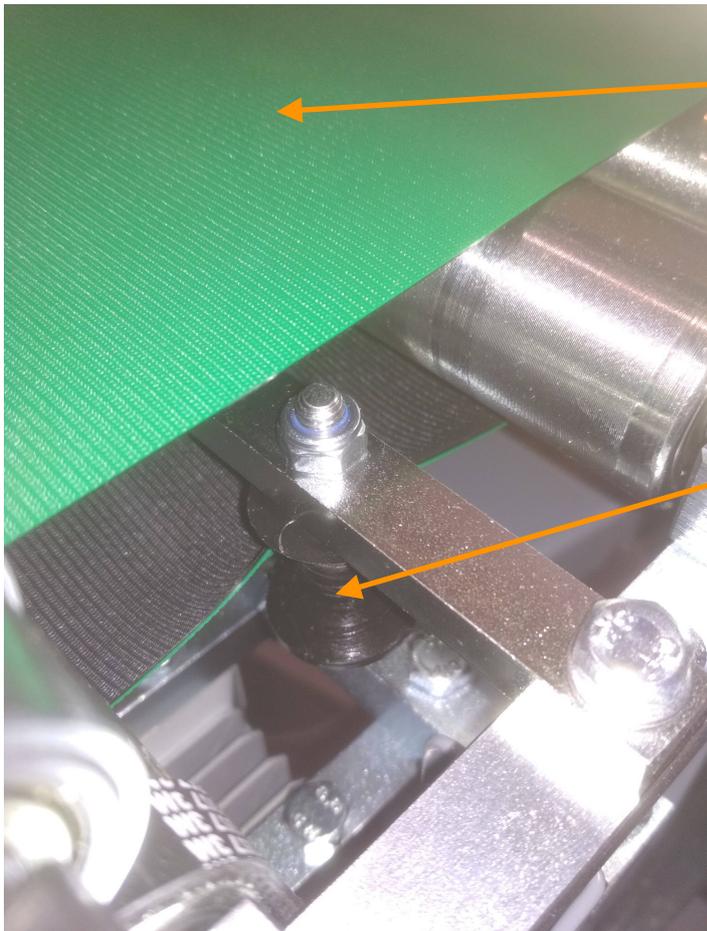
Conveyor belt

Adjustable roll holder

Fixing nut

Adjusting screw

After loosening the M6 fixing nut you can adjust the tension of the conveyor belt with the adjusting screw. After adjustment fix the adjusting screw with its M4 nut. Do the same process at the other side. Try to adjust the belt tension so that the belt should run between the left and right belt guiding roller symmetrically.



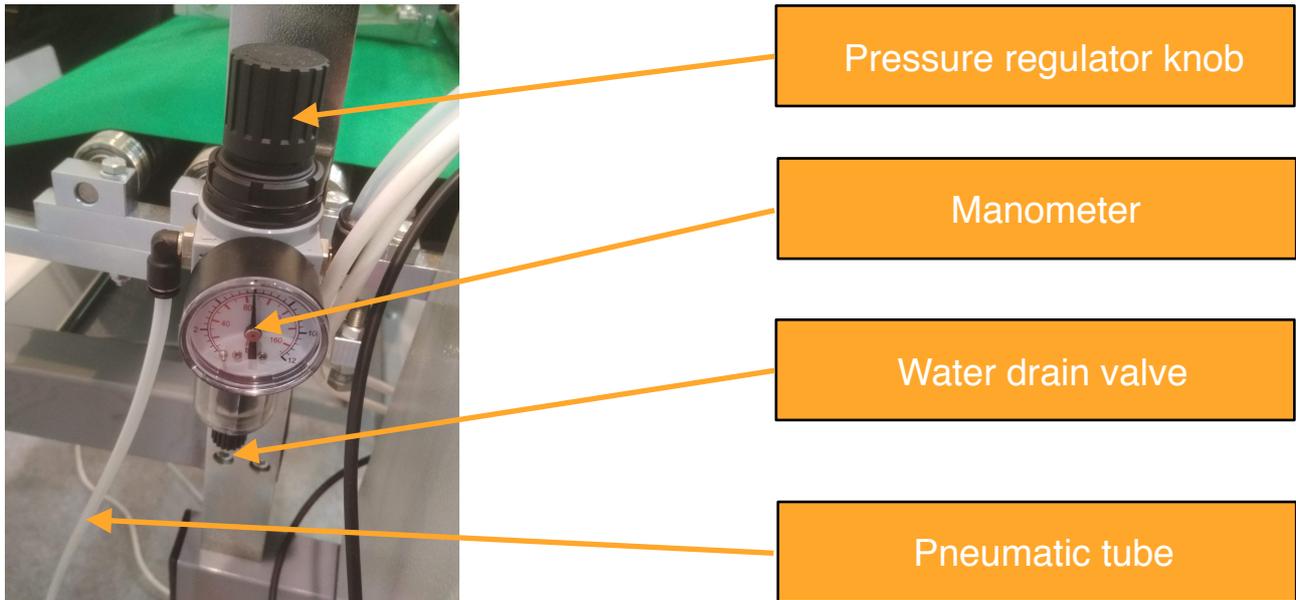
Conveyor belt

Conveyor belt guiding roller.

There is a similar roller at the other side.

The belt should run between the two guiding rollers symmetrically without pushing them too hard.

The pneumatic filter and regulator



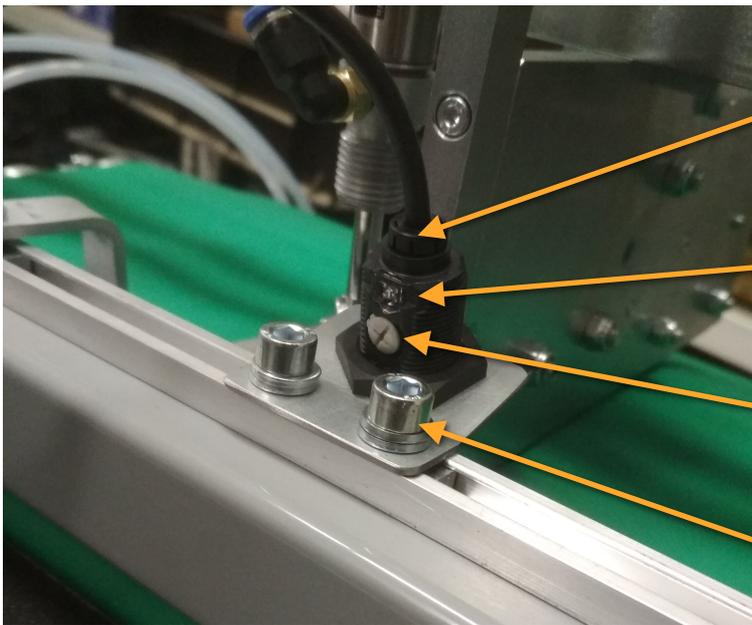
The pneumatic filter removes the small particles and the harmful oil/water condensate from the compressed air flow. You can adjust the pressure with turning the pressure regulator knob. If you can't turn it, then pull it up. After adjusting you can prevent it from the unwanted adjustment by pushing it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

There is a water drain valve at the bottom of the pneumatic filter and regulator. If the FTD-1 is not 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.



Optosensor



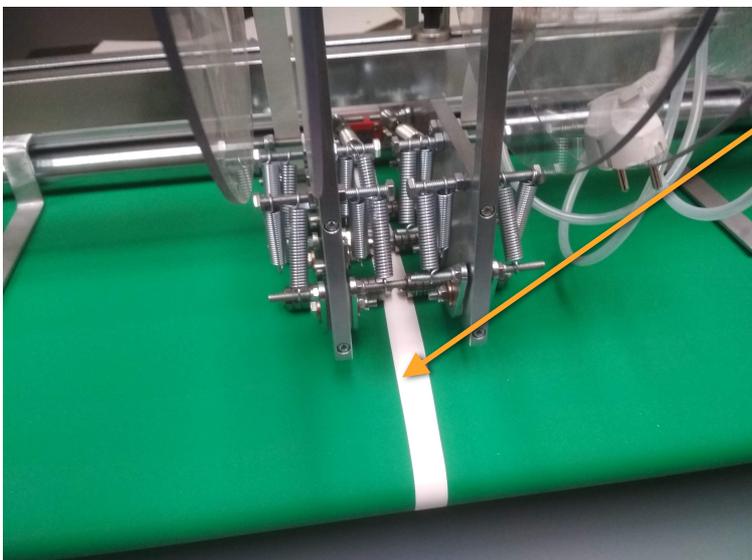
Omron E3F1-DP11-2M
optosensor

LED

Sensitivity adjusting

Fixing screws

The standard FTD-1 is available with an Omron E3F1-DP11-2M optosensor. The sensitivity of this optosensor can be adjusted with a screw driver. The state of the optosensor is indicated with LEDs. This sensor indicates only the lighter sheets as the background. If you want to process dark sheets, then you can stick a white insulator tape strip on the conveyor belt under the optosensor and use the “Invert optosensor” function on the controller.

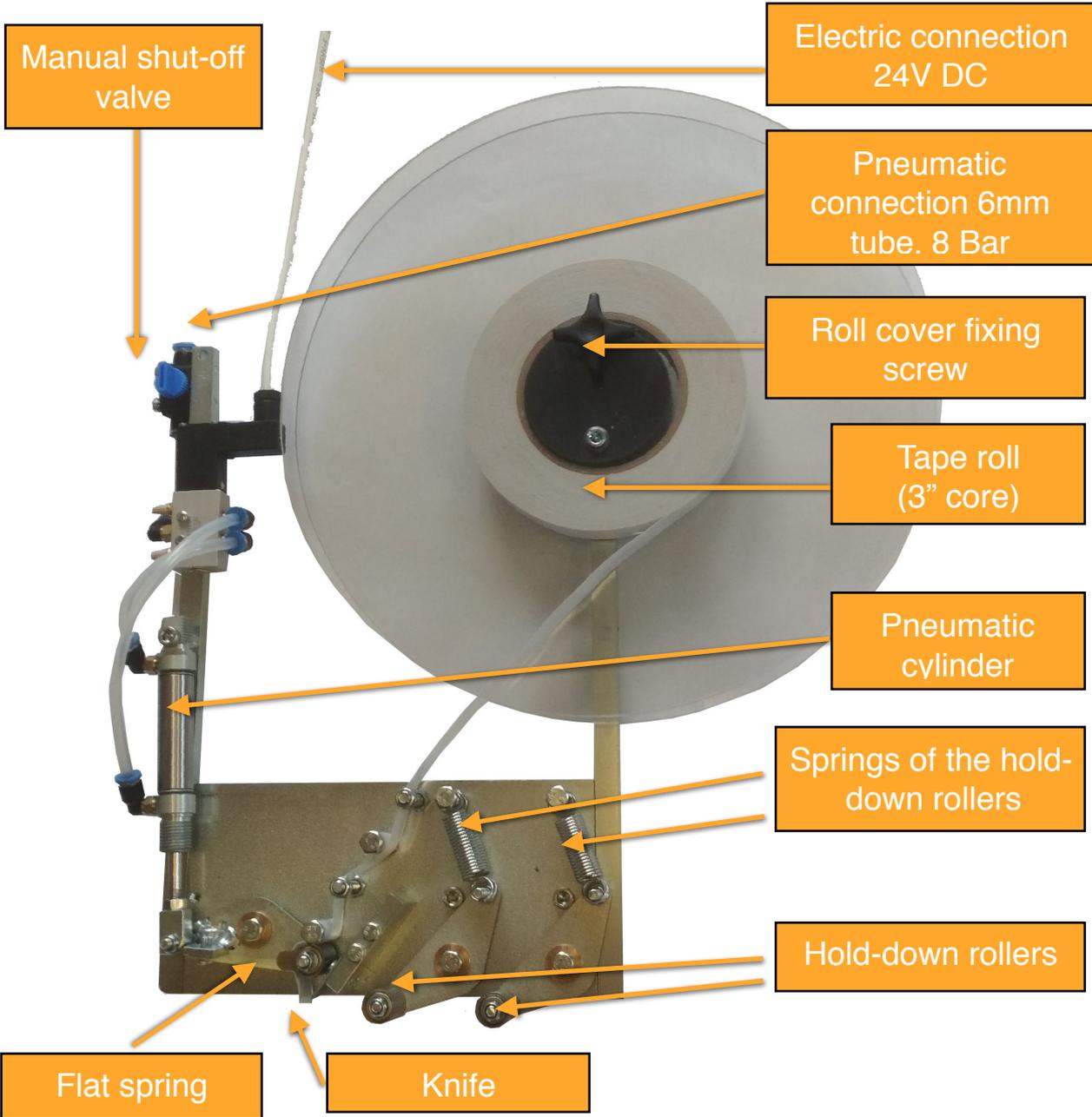


White insulator band

(There are also extra paper hold-down roller on this photo)
The usage of the white insulator tape can be useful at other optosensors as well, if they can't different the sheets from the background because they has similar color.

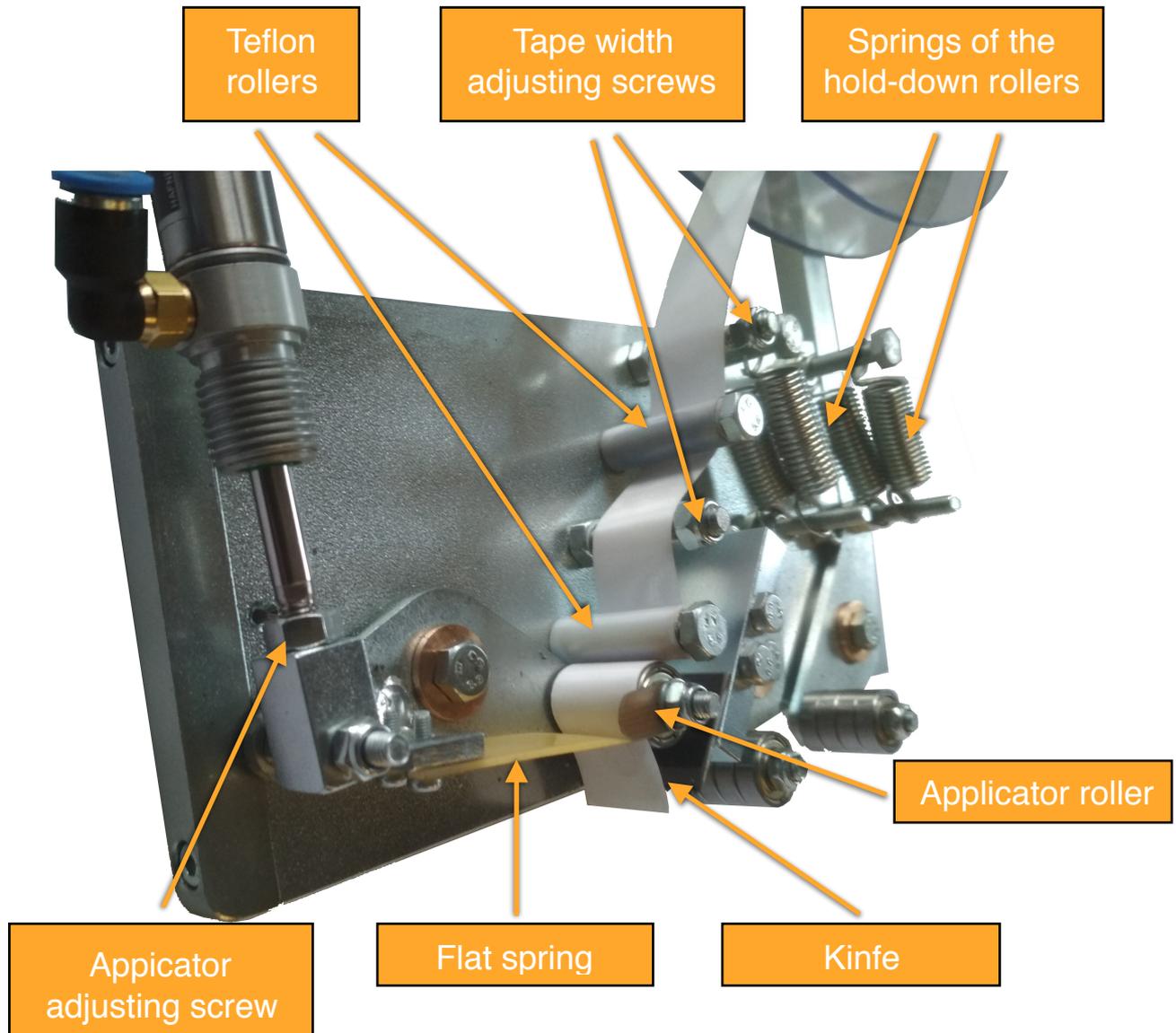
Taping heads

The Paperfox FTD-1 in standard configuration equipped with two TD-1 taping heads. The right head is a mirrored image of the left head.



Setting and using the TD-1 applicator head

The TD-1 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.



We suggest to 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. The compressed air required for operation can be connected with a 6mm outer diameter plastic tube.

The electrical control is carried out with 24V DC. When the voltage is applied, the TD-1 starts to apply the tape, when switched off then the applicator roller is lifted, the knife cuts the adhesive tape.

The sheet with the tape forwarded through 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.

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. 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.

Setting the position of the tape applicator heads

The longitudinal position of the tape application can be set through program but the side position should be set manually.

Hook out all springs of the paper hold on rollers. Loose the applicator head fixing screws and slide them to the desired position.

Fix the applicator head fixing screws. Hook back as many springs as you need.

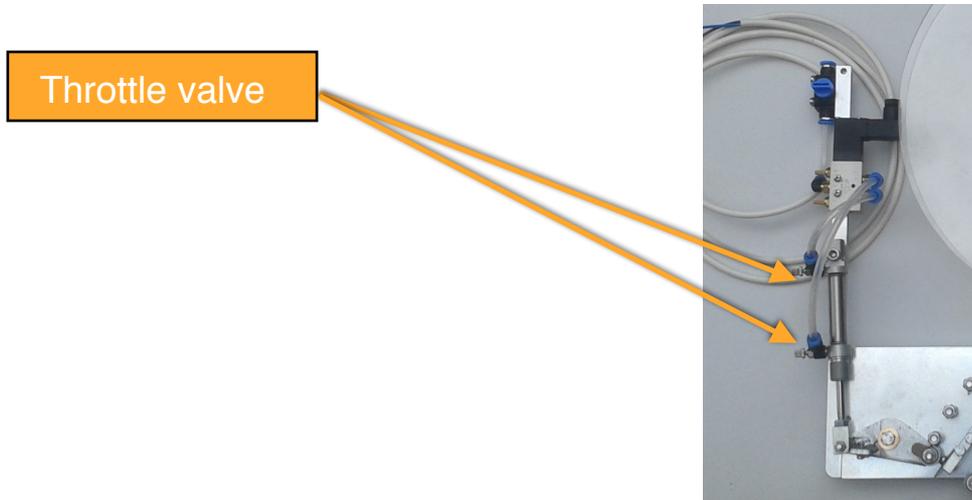
You can adjust the height of the tape applicator heads with the M8 adjusting screws. This can be useful if you want to process thick materials.



Extra accessories, special solutions

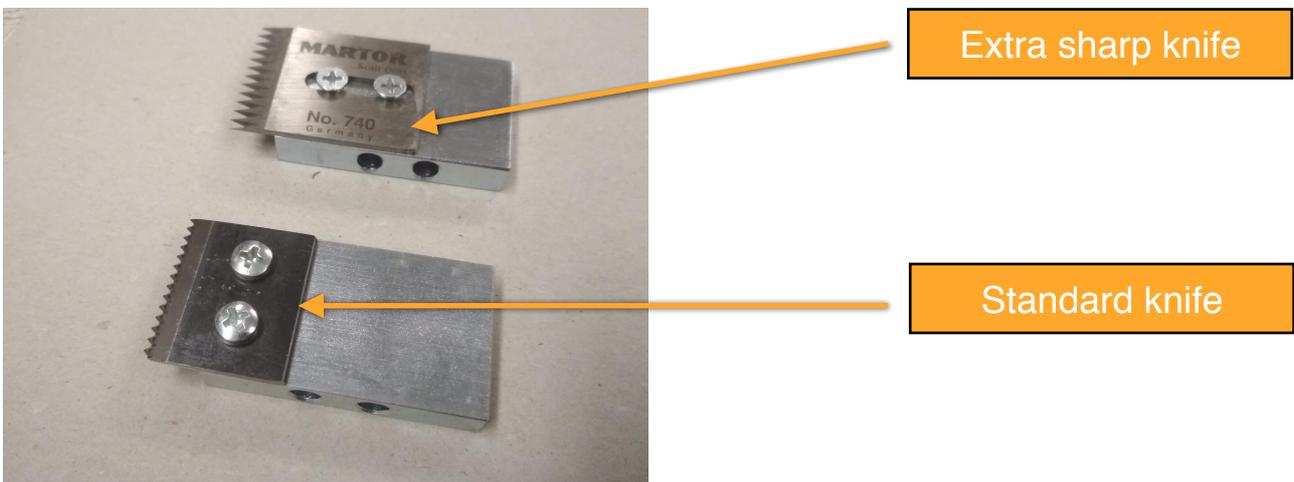
Throttle valves

The TD-1 heads can be equipped with throttle valves. The main function of this valves is the fine adjustment of taping positions.



The FTD-1 is a programmable device, so there is no much need for this function, so this valves usually should be fully open. Sometimes the FTD-1 tears off the tape from the sheet or the knife hurts the surface of the sheet during cutting. In this case you can use the lower throttle valve to reduce the speed of the up-movement of the applicator roller to reduce this effect.

Sharper knives



The standard knife 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.

Leuze KRTW 3B/4.1321-S8 optosensor

This is a contrast sensor with white LED, and it can sense not only the lighter, but also the darker sheets as the conveyor belt. It has a good sensitivity, and there are several possibilities for adjustment. So there is usually not need to stick white insulator tape on the conveyor belt if you want to process paper with similar or darker color as the conveyor belt. (But sometimes it is useful)

Setting for standard sensitivity

Don't put anything under the optosensor. Press the button of the optosensor for 2-7 second for teaching the background. The two LEDs on the sensor are flashing simultaneously. After releasing the pushbutton the green led lighting and the yellow led lights only if there is a sheet under the optosensor.

Setting for high sensitivity

Usually we suggest to use this sensitivity. Don't put anything under the optosensor. Press the button of the optosensor for 7-12 second. The two LEDs on the sensor are flashing alternatively. After releasing the pushbutton the green led lighting and the yellow led lights only if there is a sheet under the optosensor.

Reducing the sensitivity

Press the button of the optosensor for 0.2-2 second. You can press it several times to reduce the sensitivity.

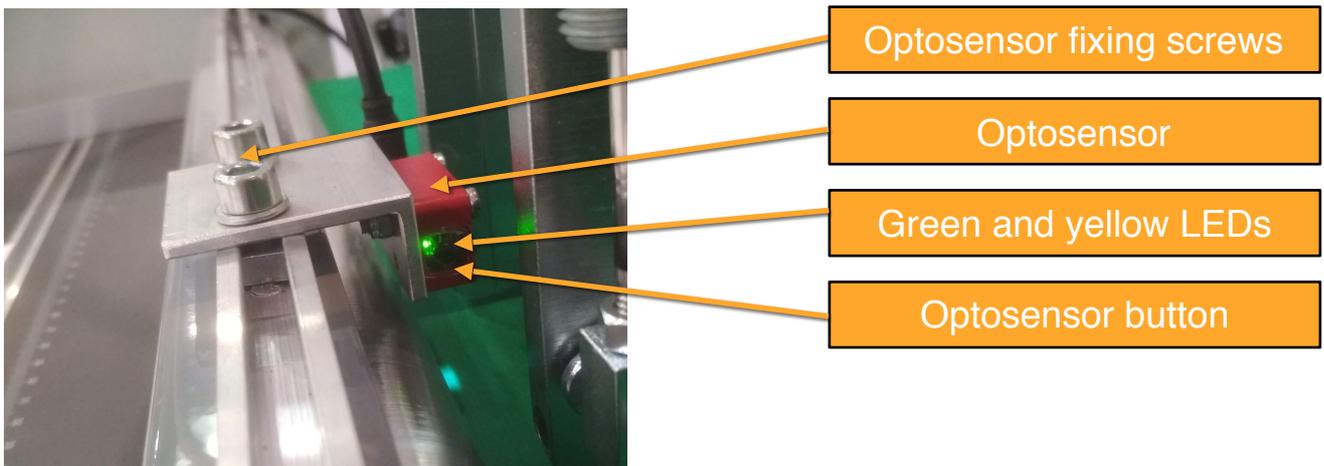
Increase the sensitivity

Press the button of the optosensor for 0-0.2 second. You can press it several times to increase the sensitivity.

You can find more description about this sensor at the manufacturers website.

Adjusting the position of the optosensor

After releasing the optosensor fixing screws, you can set the optosensor into the desired position.



Adjustable speed and direction

The FTD-1 can be 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.

Frequency
controller

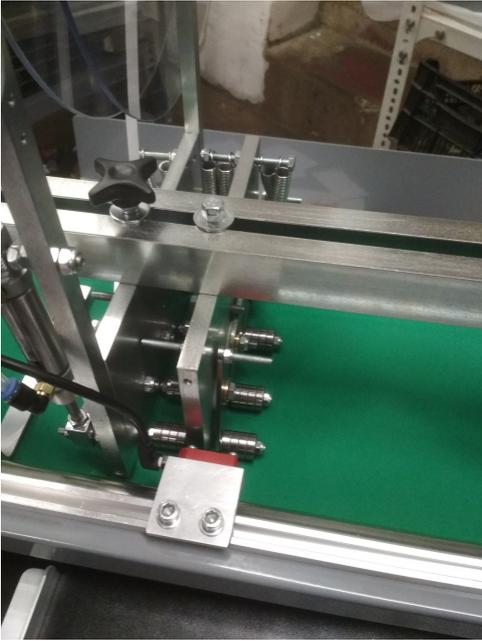


You can change the running direction of the conveyor belt on the controller with the “Motor reverse direction” checkbox. This function can be useful at removing paper jam or when sticking white insulator tape under the optosensor if the sheet has such color which otherwise can't be indicated by the optosensor.

If you change the speed, the operational parameters are changing automatically according the selected speed.

The FTD-1 without frequency controller has a fixed, 20 m/min speed, but the software is the same. In this case you should always use the speed “3”, because at his speed the selected parameters are the same as at the standard 20 m/min speed.

Extra hold-down rollers



With cardboard usually the FTD-1 works well, but there are difficult materials which may need extra, special hold-down rollers. They can be used if the moral rollers can't hold the sheet enough or if the normal rollers living a track on the sensitive surface.

Extra paper guides



With this small paper guide you can use heavy paper without creating unwanted "dog ears".

Additional TD-1 heads

The FTD-1 is designed to work with two TD-1 heads, a left and a right one. You can mount more than two heads on the FTD-1 with some limits.



- The FTD-1 can control only two groups of heads, so the additional heads can work only simultaneously with the first two heads.
- The insertion of tapes and the adjustment of the heads needs some space, so the heads can't be too close, and the adjustment can be uncomfortable.

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 switch on/off the sheet forwarding motor not only with the motor on/off switch but also with the “F2” function key when the main screen is on the display.

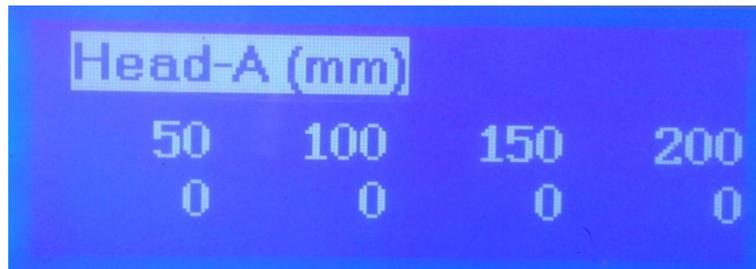
The lamps at the right side of the display are for diagnostic purposes. (Optosensor, Override time, Head-A and Head-B)

Head-A, Head-B screens

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.

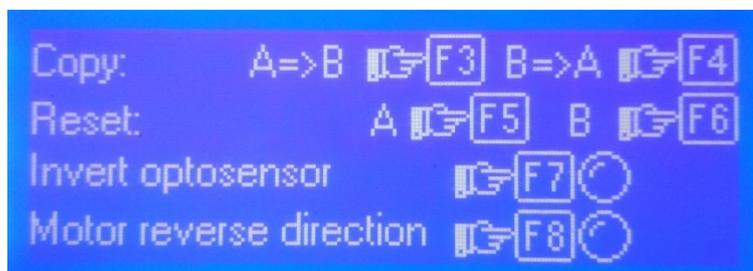
Press the "SET" key to enter into the first field, press "ENTER" to accept the data and write the following field. If you don't have to write into all fields, the you can exit with "ESC".



The Head-B screen is very similar.

Copy/Reset screen

You can copy the setting of the head-1 to head-2 by pressing the "F3" and the head-2 to head-1 by "F4". You can reset all values to "0" with the buttons "F5" or "F6".

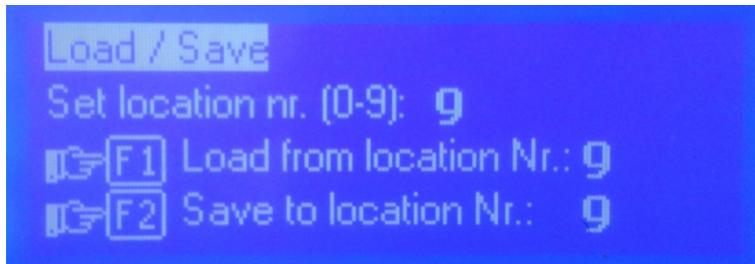


With „F7” you can invert the sign of the optosensor. This function can be useful with optosensors which can't indicate dark objects well. You can put a white insulator band on the conveyor belt and if you invert the optosensor signal it can indicate the dark objects.

With „F8” you can reverse the conveyor direction. (This function is available only at models with frequency controller)

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.

Parameter Screen

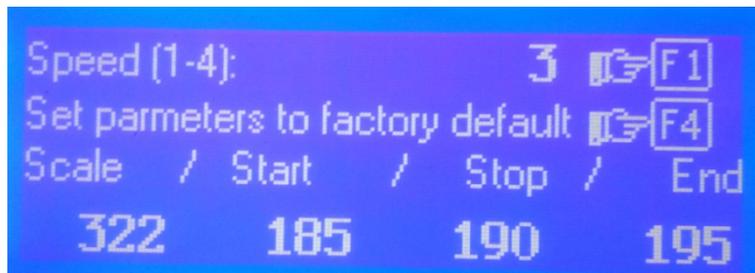
In this screen you can set the speed of the machine and the operational parameters in each speed with pressing „F1”

The selectable speeds are 2, 10, 20, 30 m/min.

Actually the speed nr. 1. is adjustable with the potentiometer on the frequency controller and at minimal setting is 2m/min. You can change the speed, but in this case the parameters should be changed as well.

If you don't have frequency controller in your machine, then you can't change the speed of the conveyor.

In this case we suggest to use the settings of speed „3” because in this case the motor is driven by 50Hz, which is similar to the speed of the models without frequency controller.



With pressing „F3” you can change the speed of the conveyor.

With pressing „F4” you can load the factory settings of the parameters of the actual speed. This parameters are not so accurate as the accurately adjusted parameters, but they are a good starting point for the fine adjustment.

The number under the „Scale” is a scale factor. is the ratio between the time delay and the position of the tape. You can set or correct this value by passing a sheet of paper through the machine and setting this value so that the “Length” parameter on the main screen should be the size of the paper in millimetre. Actually this is the speed of the sheet under the heads in mm/s. 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.

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 hegher 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.

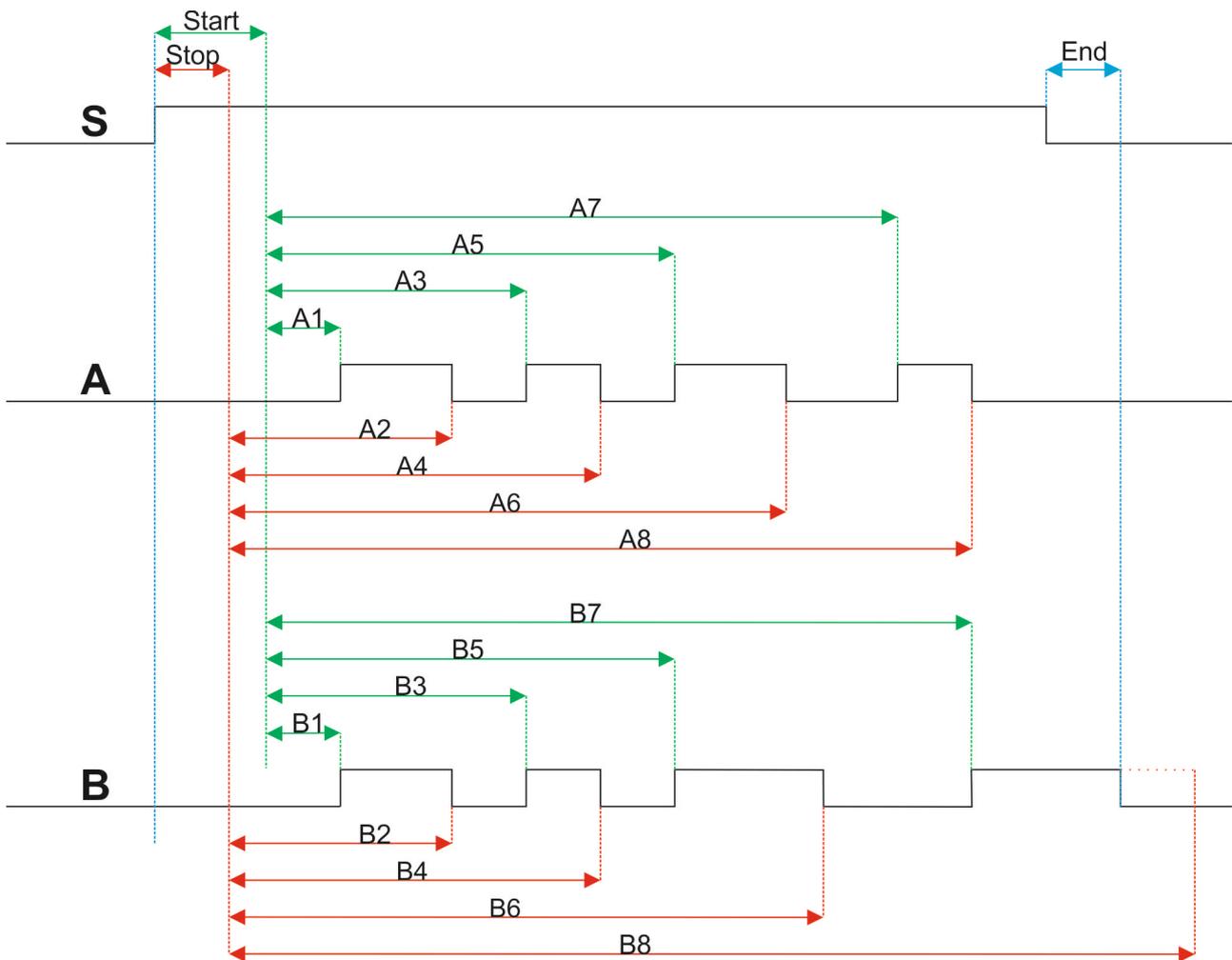
If the processed paper have a punched whole or if the printed paper has similar color as the conveyor belt, that can confuse the optosensor the tape application can be terminated before time because the device thinks that the paper has ran out from the device. In this case you can increase the „End”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

Setting the parameters

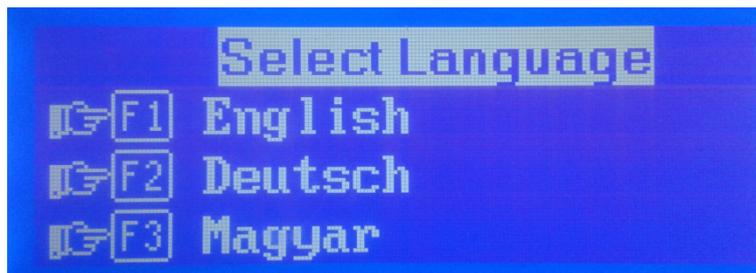
in the drawing above you can see the function of the parameters.



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

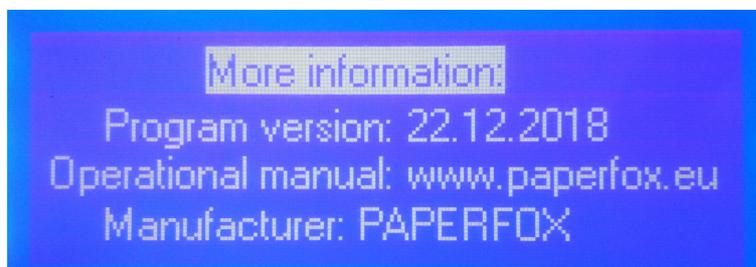
The sheet arrives under the optosensor, after the Start delay arrives to the taping rollers. (The optosensor is not in the same position as the taping rollers.) The device calculates the taping start positions to this delay. The taping stop points are calculated with the Stop delay. It can be slightly 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 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.)

Language screen



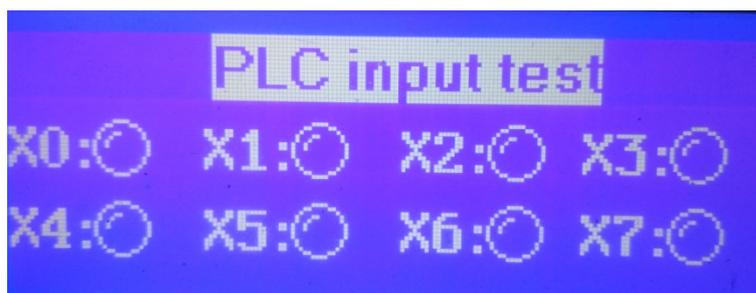
You can select the desired language for operating the device by pressing the F1, F2 or F3 buttons.

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.

Delay screens

The screenshot shows a screen titled 'Head-B (ms)' with a table of delay values. The table has two rows of data. The first row contains the values 33, 92, 462, and 511. The second row contains the values 0, 0, 0, and 0.

Head-B (ms)			
33	92	462	511
0	0	0	0

For diagnostic purposes you can study the delay values.

Problems and solutions

<p>There is no light on the controller and on the main switch after switching on the TFD-1.</p>	<ul style="list-style-type: none">• Check the safety stop button and reset it with turning its head clockwise.• Check the cable and the plug if it is connected.• Check the fuses.
<p>The tape applicator heads don't move at all. The light of the optosensor changes if you insert a sheet of paper under the optosensor.</p>	<ul style="list-style-type: none">• Check the pneumatic pressure on the manometer. If it doesn't show any pressure, then check if it is connected to a compressor and if the compressor is under pressure.• Check the pressure adjusting knob if the right pressure is adjusted. If you can't turn the knob, then pull it up.• Check the position settings on the PLC. If not all of them are zero.
<p>The tape applicator heads don't move at all. The light of the optosensor doesn't change if you insert a sheet of paper under the optosensor.</p>	<ul style="list-style-type: none">• The upper light on the main screen shows the state of the optosensor and there is a light on the optosensor to check the state. Check the optosensor. Is there any change if you insert a sheet of paper under the optosensor?• Is the optosensor in a right position, the paper goes under it?• If the sheet has a similar color as the conveyor belt, maybe that the optosensor can't sense the difference. Adjust the sensitivity of the optosensor as it is described in the part "Optosensor".
<p>The tape applicator head moves, but the tape doesn't stick on the sheet.</p>	<ul style="list-style-type: none">• Check the quality of the tape. Self-adhesive tape loses its quality after long storage.• Check if the tape is inserted to the taping head as it is described in the user manual of the TD-1 taping head.• Check if the tape roll can turn easily in its holder.• Test it manually if the tape sticks well on the sheet.
<p>The tape application is inaccurate.</p>	<ul style="list-style-type: none">• If you use strong or foam-based tapes, then the knife can't cut it well, it slides on the surface of the tape before cutting it. It can cause inaccuracy or even jam.• Check the tension of the conveyor belt. Measure the sheet length first pass through a sheet of paper without tape application, (close the manual closing valves) then with tape application. If there is much difference in the measured length, then maybe the belt is loose. Fasten it with the adjusting screws.• Check the pneumatic pressure and adjust it to 6...8 bar.

<p>At the end of the tape application, the device tears-off the paper or the knife cuts in the paper.</p>	<ul style="list-style-type: none"> • Normally all pneumatic throttle valves should be open, because they have no much function in FTD-1. If you close the lower throttle valve, then the FTD-1 lifts up of the tape before cutting slower. So you can reduce the tear-off effect, but be careful, because this may cause inaccuracy. • Use a less sharp knife to prevent cutting in th paper.
<p>The device applies tape, but absolutelly not in the desired position, or stops the application before the desired length.</p>	<ul style="list-style-type: none"> • Check the “Invert optosensor” in the Copy/Reset screen. Usually this parameter should be off. • Check the “Speed” in the “Parameters” screen. If your FTD-1 has no adjustable speed the set it to “3”. If you have changed the parameters, you can restore the factory setting by pressing “F4”. • Check the sheet under the optosensor. If there is a hole or a printed part with similar color than a conveyor belt, maybe that the device thinks that it is the end of the sheet. If you can’t adjust the position of the optosensor to avoid this region, then try to increase the “End” parameter on the “Parameters” screen so that the device should continue the tape application until the real end of the sheet.
<p>The hold-down rollers of the taping heads living trace on the sheets.</p>	<ul style="list-style-type: none"> • If the sheet is soft and thick, the hold-down rollers may leave trail on it. Reduce the pressing force of the rollers with unhooking a spring, using only on spring on a roller. If the paper guiding is not stabile, then use two springs to holding stronger the sheets.
<p>The taping position in side direction is not stabile.</p>	<ul style="list-style-type: none"> • Check the adjustment of the tape width adjusting screws. This screws guiding the tape to the proper position.

CE-Declaration of Conformity

Product name: Paperfox FTD-1 Tape applicator

GManufacturer: Fürcht Zoltán ev. H-2142 Nagytarcsa Ganz Á. u. 3/7.

Applied standards:

- EN 292-2/ A1 1995
- EN 60204-1
- EN 50082-2:1993
- EN 50081-2:1993
- EN 1088

Nagytarcsa, 2016.Mai.22.



Fürcht Zoltán e.v.

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www.paperfox.eu