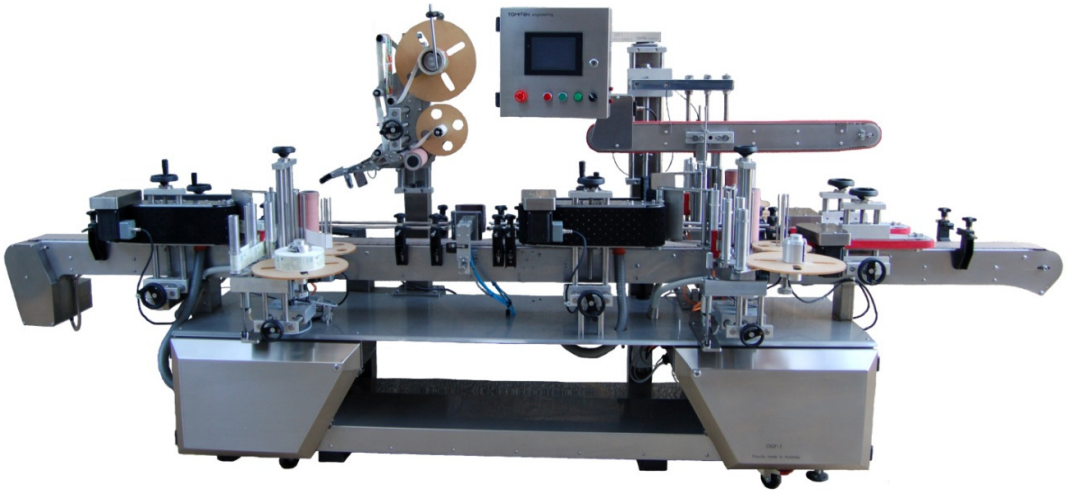
TOMTEC

AUTOMATIC LABELLING MACHINE

Model OGF-1



CONTENTS

SECTION 1 3
INTRODUCTION 3
Warranty 3
Description on Machine and Limits of Use 3
Abbreviations 4
Section 2-User's Manual 5
SCREENS 5
OPERATIONAL SETTINGS 5
1. CHECK SCREEN (Check) 5
2. MAIN SCREEN (Main) 7
3. PRODUCT LIST (Prod) 8
4. TRIGGER DELAYS AND FLAG LENGTHS (DlyFlg) 9
5. MOTOR SPEED ADJUSTMENTS (Speed) 9
6. ENABLE/DISABLE DEVICES (OnOff) 10
7. TRIGGERS (Trigs) 10
PROTECTED SETTINGS (SyS) 10
1. DRIVE ACCELERATIONS- Labellers 11
2. DRIVE ACCELERATIONS-Conveyors 11
3. MAXIMUM LABEL LENGTHS 12
4. DRIVE SCALLING 13
5. SET LABELLERS POSITIONS 14
6. MANUAL POSITIONS INPUT 15
7. CALIBRATION 15
ANNEX A 17
OPERATION PROCEDURE 17
ANNEX B 19
LABELERS POSITION CALIBRATION 19
ANNEX C 21
INSTALLING LABEL REELS 21
ANNEX D 22
SYNCHRONIZATION THEORY 22
ANNEX E 24
SYNCHRONIZATION DELAYS 24
ANNEX F 25
TROUBLESHOOTIG 25

SECTION 1

INTRODUCTION

This booklet describes the use instructions for the **Labelling Machine** for self-adhesive labels, model OGF-1. Proper machine operation depends on correct use and adequate maintenance.
The manufacturer disclaims all responsibility due to negligence or failure to observe the rules given in the following booklet. In addition it disclaims al responsibility deriving from improper use of the machine and the equipment.

Warranty

The manufacturer guarantees its products for a period of twelve months from the date of testing.

This warranty is expressed solely in the repair and replacement free of charge of those parts that after a careful examination carried out by the manufacturer turn out to be defective.

Warranty, is considered limited to solely material defects and ceases to have effect if the parts returned anyhow turn out to have been dismantled, tampered with or repaired outside the manufacturer's factory.

Description on Machine and Limits of Use

This machine is a labelling machine for self-adhesive labels.

Using this machine in its standard version, it is possible to apply front, back and top labels as well as wrap around labels.

The machine is equipped with a spare front labeller which can be used independently or synchronised with the main front labeller.

The machine is also equipped with a set of pneumatic pistons that can help press the label onto the bottle if needed. The pistons have one set of gripping pads as standard. Additional pads may be manufactured at request to accommodate for a larger range of shapes and sizes.

The labellers can be programmed to automatically get to their position when a new product is selected.

The machine is not designed to operate in special environments such as ones with explosion hazard.

Abbreviations

• **Check**	Visual check and synchronization screen
• Main	Main screen
• Prods	Product List
• **DlyFlg**	Delay distance and flag length screen
• **Speed**	Speed adjustments screen
• **OnOff**	Secondary on and off buttons
• **Trigs**	Manual triggers for labelers and piston settings
• **Sys**	System settings (protected)
• **Lab Acc**	Labelers accelerations
• **Cnv Acc**	Conveyors accelerations/decelerations
• **Max Lab**	Maximum label lengths
• **Drv Scl**	Drivers scale
• **Set FL1**	Set Front Labeler 1
• **Set FL2**	Set Front Labeler 2
• **Set BL**	Set Back Labeler
• **Set TL**	Set Top Labeler
• **Man Pos**	Manual input of labelers positions
• **Calibr**	Calibration (labelers)
• **FL1 Calibr**	Front Labeler 1 Calibration
• **FL2 Calibr**	Front Labeler 2 Calibration
• **BL Calibr**	Back Labeler Calibration
• **TL Calibr**	Top Labeler Calibration

Section 2-User's Manual

SCREENS

OPERATIONAL SETTINGS

The OGF-1 Model can memorize up to 100 products making switching between settings easier.

The following parameters need to be set for each product and then saved in the Product List on display for the program to be effective:

1. The position of the labelling heads
2. The selection of labelling heads and conveyors to be used for that product
3. The speed of the machine
4. The speed of conveyors and label heads that will be used for the product
5. The delay distance and flag length for each labelling head to be used
6. If the piston will be used, the delay of the piston and the time it stays closed

Additional settings include:

7. Drivers accelerations/decelerations
8. Maximum length of the labels used for that particular product
9. Drivers' frequency at 100% of machine speed

These parameters (7 to 9) have been preset by the manufacturer to ensure smooth operation of the machine. Only appropriately trained and experienced staff should change these setting if they need to be modified.

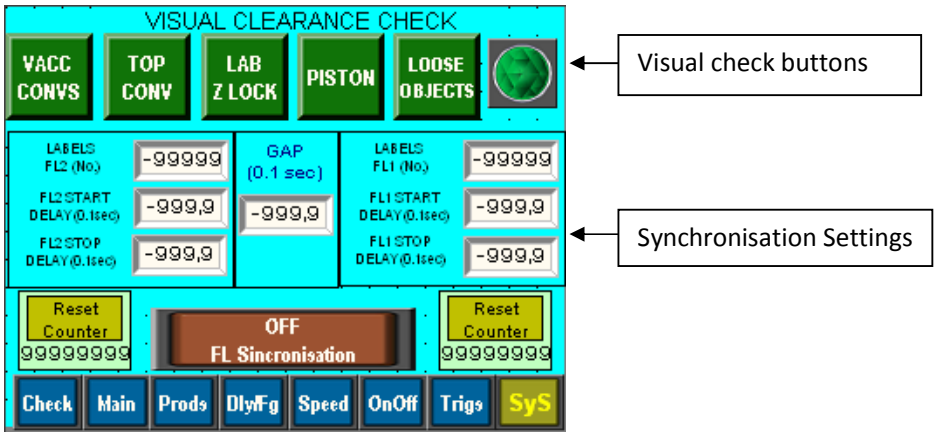
All the settings above can be done by switching between the following screens on the OGF-1 Model Display:

1. CHECK SCREEN (Check)

VISUAL CHECK

To protect the operator and the machine a series of visual checks should be performed before starting the machine.

The machine will not start until these visual checks are confirmed by pressing the correspondent buttons on this screen.

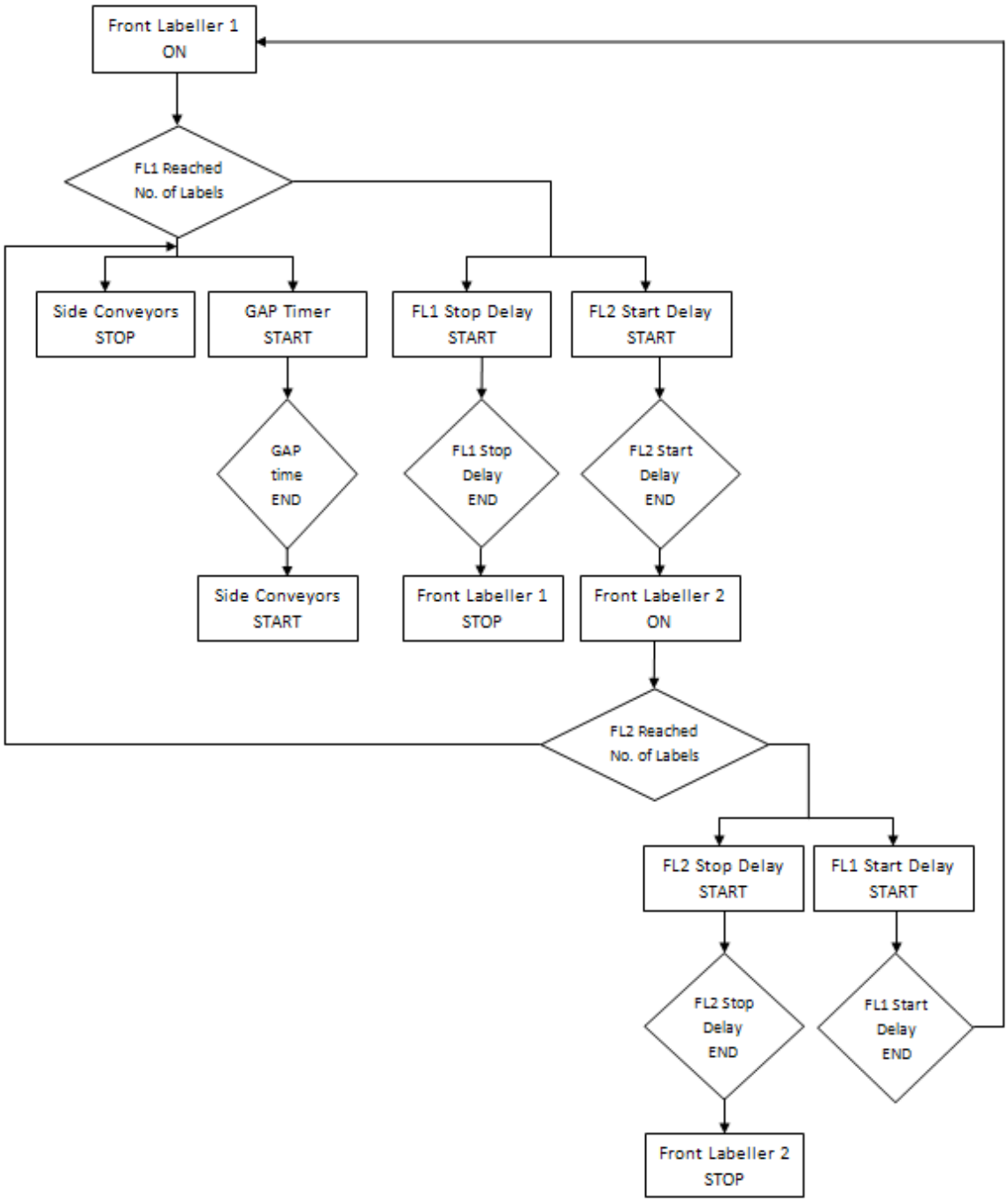


1. Vacuum conveyors: The vacuum conveyors should be fully retracted from the main conveyor whenever a new product is going to be selected from the product list. This is to ensure that enough room is provided for the labellers auto-positioning.
2. Top Conveyor: The top conveyor should be raised at a safe distance from the main conveyor to allow the free positioning of the label heads.
3. The Vertical Locking System on Labellers: The system should be locked
4. The Piston: the pneumatic pistons should be withdrawn to allow the free passage of bottles.
5. Loose Objects: No loose objects should be on the machine and/or labellers at start up.

The second half of this screen represents the settings for the synchronisation of the two front labellers.

SYNCHRONISATION

The synchronization of the two front labellers follows the flow chart below:



See the Synchronization Theory-Annex D and Synchronized Delays Procedure -Annex DE for more details.

The number of labels applied by each front labeller is counted by a correspondent counter.

Both counters turn red after they reach the set number of labels.

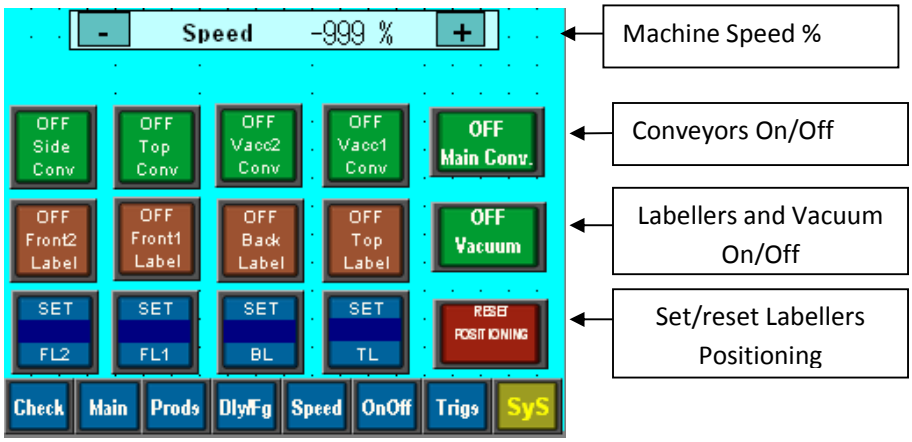
The labeller will not turn back on for as long as its counter remains red.

If both counters turn red, the machine stops.

For continuous application of labels the counters need to be reset to zero when they reach the set number of labels and after the label roll has been replaced.

2. MAIN SCREEN (Main)

The on/off buttons for most of the equipment are on this screen.



There is also a second set of on/off buttons for the conveyors and labellers on the "OnOff" screen for safety reasons.

The labellers and conveyors must be set ON on both Main and OnOff screens for them to work.

The on/off button for the pneumatic piston is on screen Trigs for safety reasons as well.

The buttons on the Main screen are different colours and sizes to avoid any confusion.

All the equipment can be set on and off on this screen independent of one another.

If the synchronization in used, leave the second front labeller off on the main screen. It will turn on automatically when the set number of labels is reached at the main front labeller.

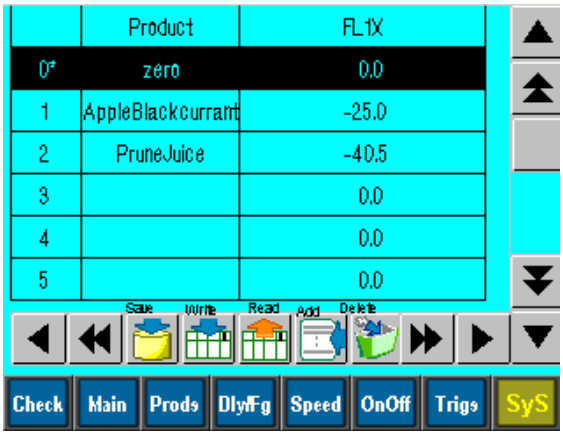
The speed of the machine can also be adjusted on this screen. Use the top window to increase or decrease the speed to suit the other equipment connected to the machine.

3. PRODUCT LIST (Prod)

This list contains all the preset parameters for the products intended to be labelled on this machine:

- The coordinates of the labellers- *Protected Settings 5*
- Machine Speed %- *Operational Setting 2*
- Delay distances- *Operational Setting 4*
- Drivers' speed adjustment- *Operational Setting 5*
- Labels Flag - *Operational Setting 4*
- Which device will be used- *Operational Setting 6*

It is manufacturer's recommendation to leave all parameters '0" on the first line (line no.0). This will be handy when calibration of the label heads is needed for instance.



One hundred products can be added to this list.

To add a product set all the parameters for the new product using the appropriate screens.

On the 'Prod" screen select a new row in the Product list and press Read at the bottom of the screen. Wait until all the new parameters are transferred from the PLC. This may take a couple of seconds.

After the new row is populated with the new parameters, tap on the Product cell and enter the name of the new product. Press Save/Hardware.

If the new entries are not saved they will be lost when the operator leaves the Prod screen.

To switch between the products, select the product you want from the list and press 'Write" at the bottom of the screen. The new parameters will be sent to the PLC.

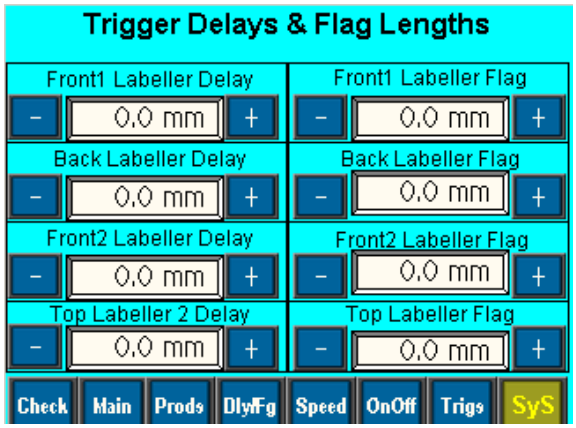
To bring the labellers to the new positions set in the PLC, press "Set FL1" to "Set TL" on the main screen if not already in position.

Before you do so, make sure nothing is in their way: check the vacuum conveyors distance from the main conveyor, etc.

4. TRIGGER DELAYS AND FLAG LENGTHS (DlyFlg)

The distance at which the labellers are triggered after the product sensor sees the product and the amount the labels protrude from the peel plate can be set on this screen.

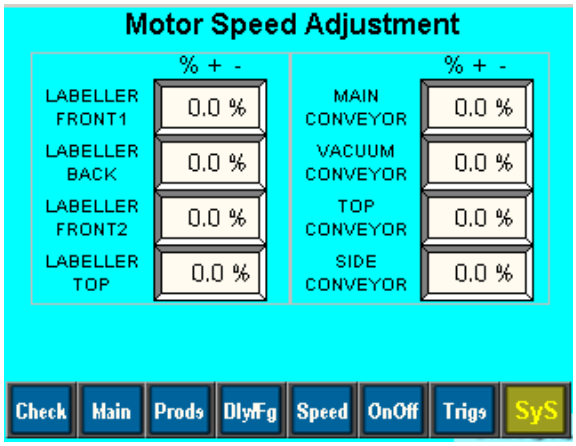
Non-zero delays must be set here for all labellers



While the flag lengths can be set to zero, the labellers will not be automatically triggered when the machine is running unless a non-zero trigger distance is set.

5. MOTOR SPEED ADJUSTMENTS (Speed)

The speed of the conveyors and labellers can be individually adjusted using this screen.

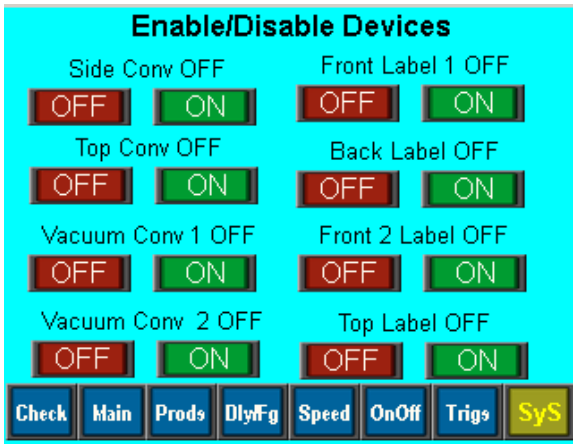


This is particularly useful when the speed of the vacuum conveyor needs to be increased/decreased to suit the wrap around labelling of the product.

It is also very useful when the speed of the side conveyors needs to be adjusted in relation to the speed of the main conveyor to increase/decrease the gap between bottles.

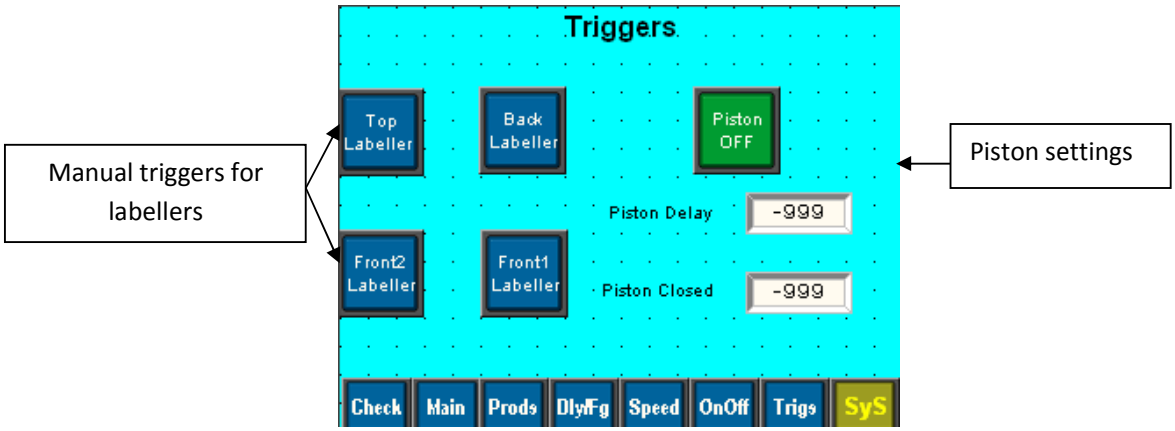
6. ENABLE/DISABLE DEVICES (OnOff)

This is the second screen containing the On/Off buttons for the conveyors and labellers. Each of these devices must be turn on both on this screen and on the Main screen for them to operate.



7. TRIGGERS (Trigs)

There is one manual trigger for each label head on this screen. This is particularly useful when setting the flag for new products. The machine only needs to be powered, not turned on, for this buttons to be active.



Alternatively, passing an object in front of the product sensor should trigger the labeller with the machine off as well (the power still needs to be on).

The Piston On/Off button and the piston settings are also on this screen. The piston delay is the time between the moment the sensor on the piston sees the product and the moment the piston is triggered.

“Piston closed” is the time the piston remains closed.

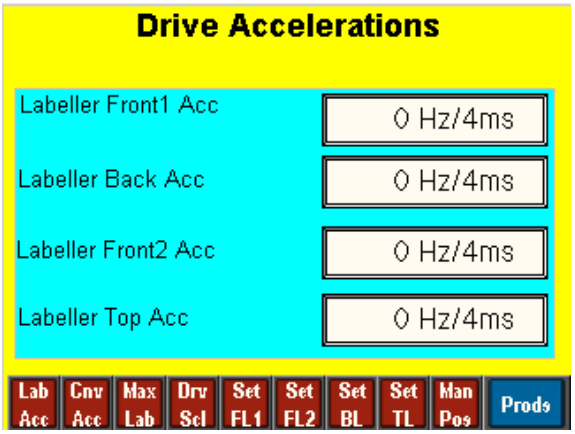
PROTECTED SETTINGS (SyS)

The OGF1 Model has the following default settings. These settings have been preset by the manufacturer to ensure smooth operation of all devices.

It is recommended that only properly trained and experienced staff modifies these values if they need changing for any reason.

1. DRIVE ACCELERATIONS- Labellers

The acceleration rate of the labellers can be set using this screen.

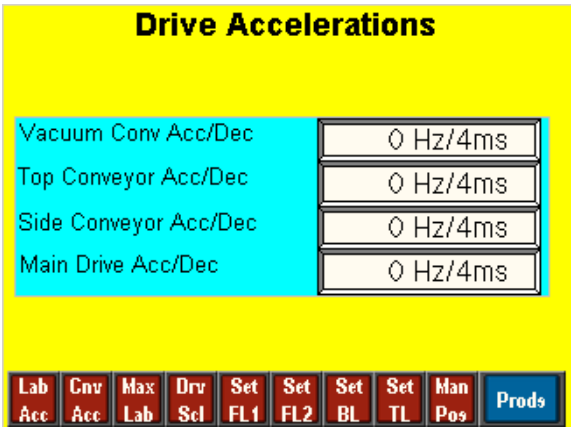


To ensure smooth operation of the labellers and proper synchronisation between the labellers and the main conveyor/vacuum conveyors these drive accelerations were preset by the manufacturer to:

- Labeller Front 1 Acceleration= 25 Hz/4ms
- Labeller Front 2 Acceleration= 25 Hz/4ms
- Back Labeller Acceleration= 25 Hz/4ms
- Top Labeller Acceleration= 25 Hz/4ms

2. DRIVE ACCELERATIONS-Conveyors

The acceleration and deceleration rate for the conveyors can be set using this screen.

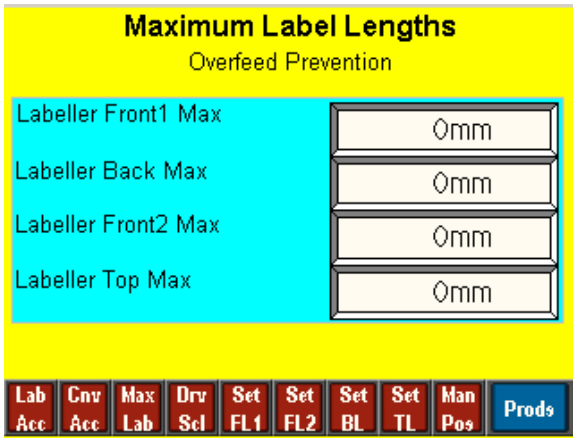


To ensure smooth operation of the drivers these rates were preset by the manufacturer to:

- Vacuum Conveyors Acceleration/Deceleration= 25 Hz/4ms
- Top Conveyor Acceleration/Deceleration= 25 Hz/4ms
- Side Conveyors Acceleration/Deceleration= 25 Hz/4ms
- Main Drive acceleration/Deceleration= 25 Hz/4ms

3. MAXIMUM LABEL LENGTHS

A maximum label length must be set on this screen for each labeller. This length is the linear movement of the labeller's drive after which it stops regardless of the label sensor reading.



This is particularly useful in the event the support paper breaks. It is also useful for the calibration of the label sensor when 5-7 labels have to pass through the sensor's fork.

The maximum label length must be bigger that the actual length of the label. Otherwise the labeller will not work properly- it will stop before completely releasing the label.

If for any reasons the maximum label length is reached, the labeller stops and an error is displayed on the main screen. Once the cause for error is rectified (label breakage, maximum label length too short, etc), the labeller should start again and the error message will disappear from the screen.

The default settings for the maximum label lengths are:

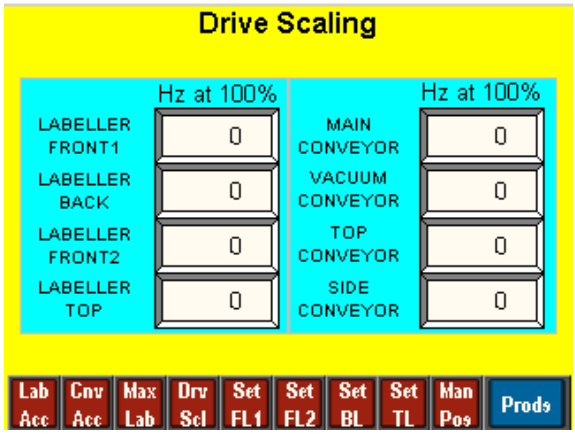
- Labeller Front 1 Maxim= 500 mm
- Labeller Front 2 Maxim= 500 mm
- Labeller Back Maxim= 500 mm
- Labeller Top Maxim= 500 mm

These settings, like any other settings of this machine, can be changed by the operator to suit a particular product.

However, it is manufacturer's recommendation that such changes be performed only by properly trained and experienced staff.

4. DRIVE SCALLING

Drivers' frequency at 100% of machine's speed can be set here.



The default values were set so that the speeds of all devices at 100% of machine speed are the same.

Some products will need differential speeds of the side conveyors (for gaps between products) and/or vacuum conveyors (for wrap around labels), etc. The appropriate speed ratios can be adjusted using the Motor Speed Adjustment screen (see Operational Settings-Screen no. 5).

The default settings ensure the speed of all devices will increase and decrease by the same rate when the speed of the machine is changed on the main screen.

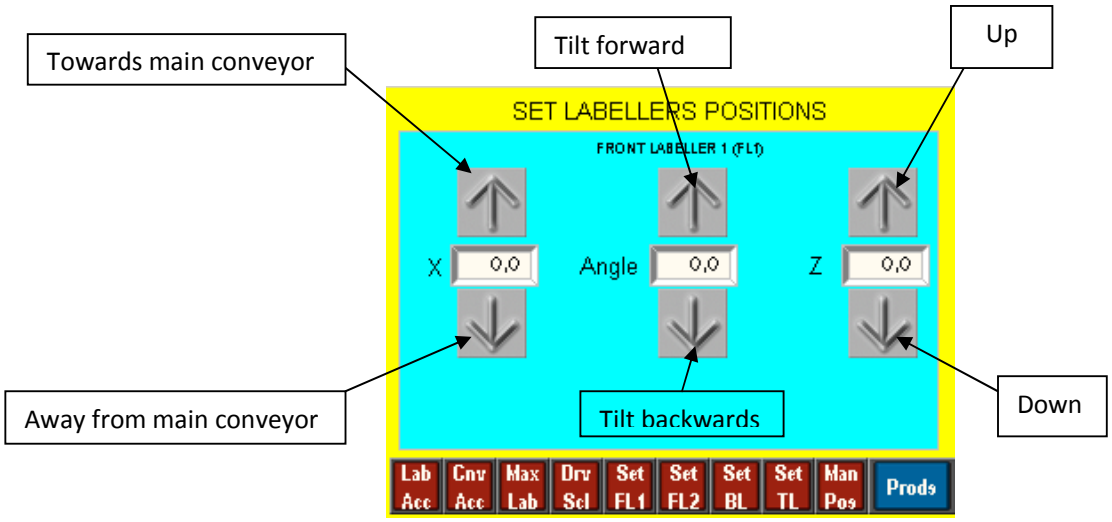
The default settings of the drivers' scaling are:

- Labeller Front 1= 1100 Hz@100%
- Labeller Back = 1100 Hz@100%
- Labeller Front 2= 1100 Hz@100%
- Labeller Top = 1100 Hz@100%
- Main Conveyor= 2960 Hz@100%
- Vacuum Conveyors= 2550 Hz@100%
- Top Conveyor= 3800 Hz@100%
- Side Conveyors= 5830 Hz@100%

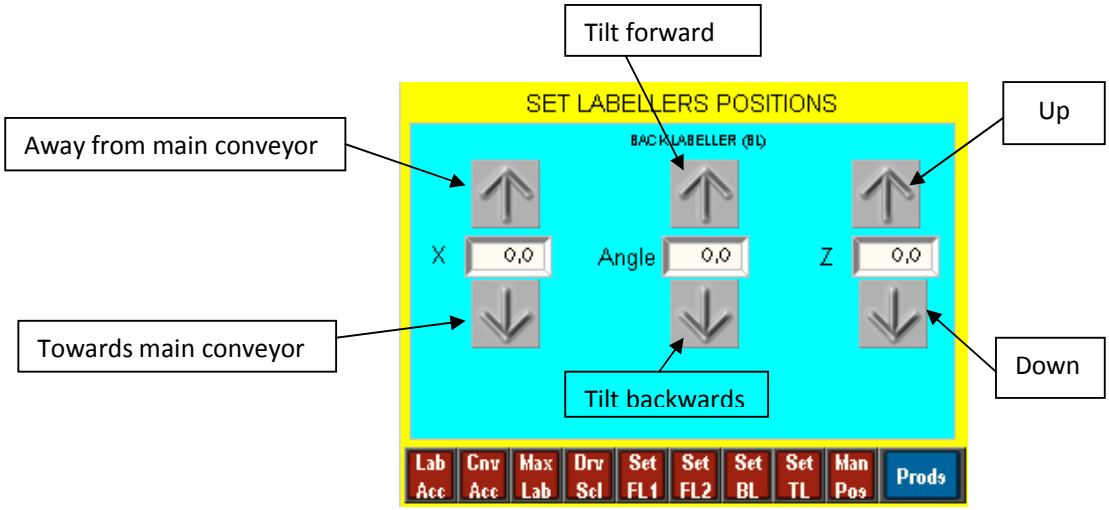
5. SET LABELLERS POSITIONS

There are 4 screens where the operator can set new positions for labellers, one for each labeller.

When a new product that is not already in the Product List is to be labelled, use the appropriate screen to bring the labellers to their new positions:



Front Labellers Positioning

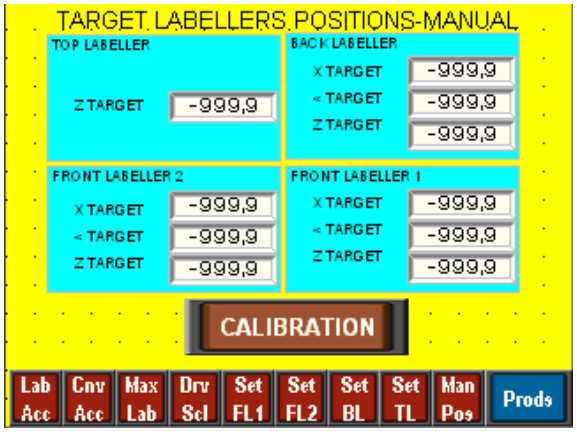


Back Labeller Positioning

After bringing the labellers to the new positions and after setting all other parameters for the new product, go to the Product List, select a new row and press "Read" to copy these values from the PLC. Save changes.

6. MANUAL POSITIONS INPUT

In case the coordinates of the labellers for new products are known they can be manually entered here and then saved into the Product List.



Changing the settings on this screen will not result in any immediate movement of the labellers but their target positions will be changed in the PLC. The "Set FL1" to "Set TL" buttons on the main screen will therefore indicate that the labellers in question are not in position anymore.

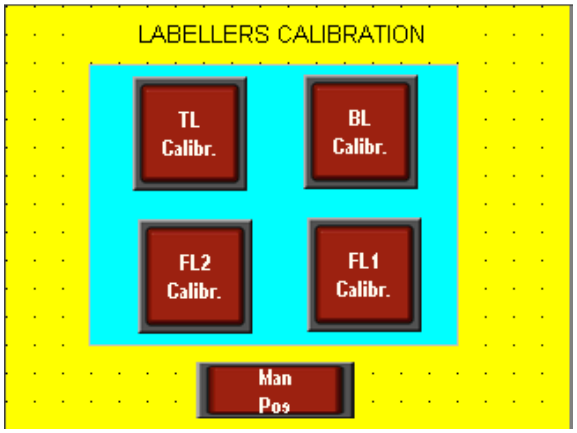
The manual input is useful and should only be used when a number of products are entered in the list and the coordinates for the labellers are known for these products. The manual writing of coordinates will reduce the time necessary to establish a list of known positions.

Care should be taken when manually entering new coordinated as any mistake (ie. too large displacements) may lead to movements of the labellers during the automatic positioning that are hard to control. The manual input should be carried out by properly trained and experienced staff only.

At the bottom of this screen there is a "Calibration" button. Press this button to open the labellers positioning calibration screens.

7. CALIBRATION

By pressing the buttons on this screen the calibration window of the correspondent labeller will open.



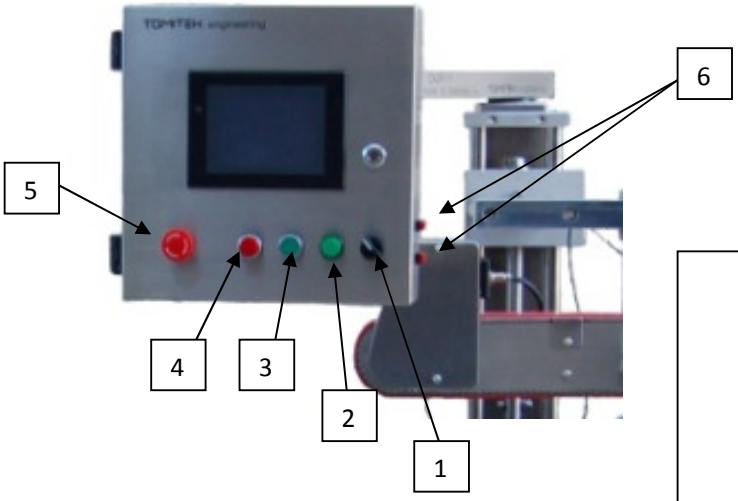
Some errors of labellers positioning are expected to add up in time depending on the frequency of labellers repositioning. These errors are due to the design tolerances of the mechanical components such as actuator's screw and nut etc.

If these added up positioning errors exceed the label positioning tolerance established by the user, the labellers need to be calibrated back to their original zero position (See Annex- Labellers Positions Calibration Procedure).

It is also recommended a maintenance calibration be performed at the user's set time intervals.

ANNEX A

OPERATION PROCEDURE



1- Power switch
2- On lamp
3- Start button
4- Stop button
5- Emergency stop button
6- Top conveyor up/down buttons

1. Turn on the power by turning the switch 1.
2. Perform a visual check to ensure the vacuum conveyors and the top conveyors are at safe distance from the main conveyor to allow the free positioning of the labellers if needed.
3. If not already at safe distance, withdraw the vacuum conveyors by turning their hand wheels and the top conveyor by pressing the up button 6. Press the correspondent buttons on the main screen after this check is performed.
4. Check that the pneumatic piston is withdrawn to allow the free passage of bottles.
5. Perform a visual check to ensure there are no loose objects on the conveyors and/ or labellers and remove if any. Press the correspondent buttons on the main screen after this check is performed.
6. Press the Start button 3.
7. Select the product to be labelled from the Product List and press “Write” to copy the new values to PLC.
8. On the main screen press the Set buttons of the labellers not already in position to bring them to the correct positions. Press one button at a time.
9. Turn on the devices to be used :
    - Labellers, conveyors, vacuum pump on Main screen and on OnOff screen if not already on
    - Pneumatic piston on Trigs screen
10. If synchronisation is used:
    - 10.1 On the Main screen only turn on the front labeller 1 (main labeller). The second front labeller will turn on automatically when the main one stops.
    - 10.2 On the Check screen set the number of labels on the front labeller 1 roll. Ensure enough labels remain on the roll after this number is reached for all products between the first product sensor and the side conveyors’ exit to receive a label from this labeller.
    - 10.3 Set the gap (in 0.1 seconds) between the products labelled by each of the front labellers.
    - 10.4 Set the stop delay for the front labeller 1 and the start delay for the front labeller 2:
        - The stop delay for front labeller 1 should be long enough to ensure all the products between the first product sensor and the side conveyors’ exit get a label from this labeller.

- The stop delay should also be short enough to stop the front labeller 1 before the first product after the gap reaches the product sensor.
- The start delay for front labeller 2 should be long enough for all already labelled products to exit the machine and short enough to ensure it starts labelling the first un-labelled product that comes its way (first product after gap).

10.5 Set the number of labels on the second front labeller. Ensure enough labels remain on the roll after this number is reached for all products between the second product sensor and the side conveyors' exit to receive a label from this labeller.

10.6 Set the stop delay for the second labeller and the start delay for the front labeller 1.

- The stop delay for front labeller 2 should be long enough to ensure all the products between the second product sensor and the side conveyors' exit get a label from this labeller.
- The stop delay should also be short enough to stop the front labeller 2 before the first product after the gap reaches the second product sensor.
- The start delay for front labeller 1 should ensure that it starts labelling from the first product after the gap.

10.7 If the counters display a non-zero value reset them.

10.8 Press the "Synchronisation" button at the bottom of the screen.

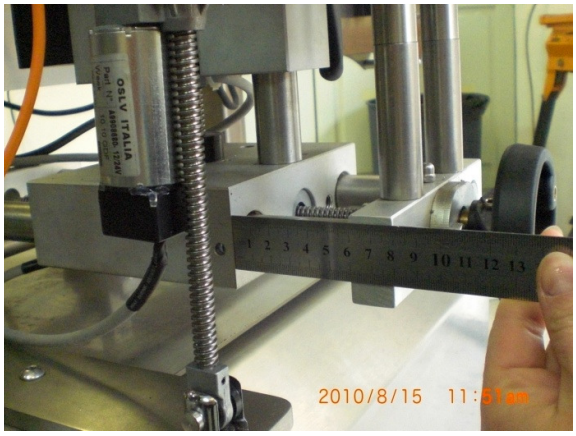
The speed of the front labellers must be higher than the speed of the main conveyor when applying wrap around labels. In this case set the maximum speed of the machine on the main screen as 100-Motor Speed Adjustment of the front labellers.

For example if the motor speed adjustment is set to +20% for the front labellers on the "Speed" screen, set the machine speed to maximum 80% on the main screen.

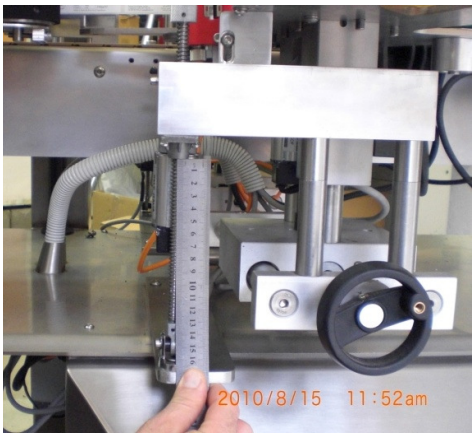
ANNEX B

LABELERS POSITION CALIBRATION

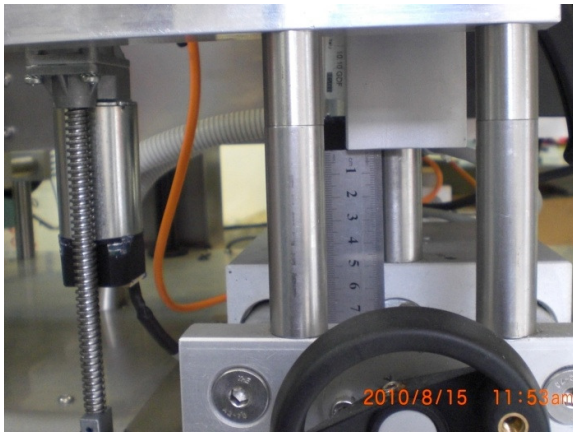
1. Performed a visual check of the labeller's surrounds to make sure there is nothing in its way to stop it come to zero (ie. vacuum conveyors are sufficiently withdrawn from the main conveyor, etc)
2. Bring the labeller to be calibrated to zero by one of the following methods:
   - In the ManPos screen , enter zero on all three coordinates of the labeller to be calibrated or,
   - If the labellers' positions are zero for the Product no 0 in the Product List, select this product.
3. On the main screen press the Set button of the labeller to be calibrated. The labeller should now go to zero automatically on all axes.
4. With the labeller at zero, measure its position on the horizontal, angled and vertical actuators' screws as shown in the following pictures:



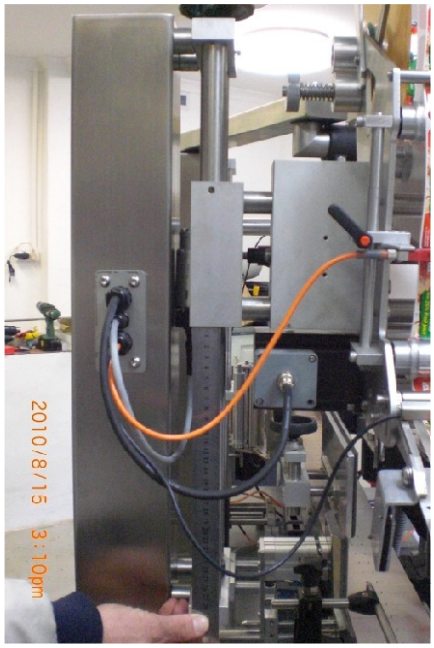
Horizontal Position



Angle Position



Vertical Position

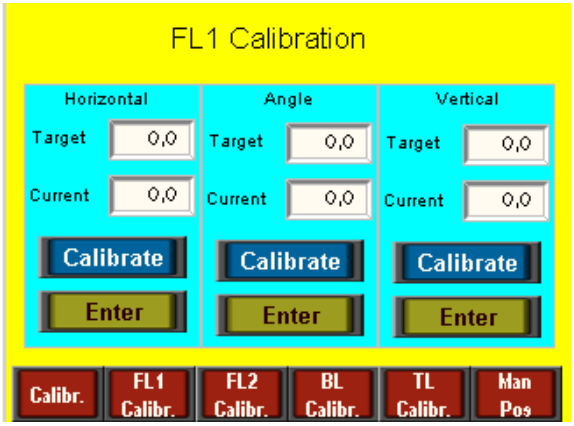


Top Labeller- Vertical Position

5. Compare these measurements to the original zero coordinates shown in table below:

ORIGINAL ZERO COORDINATES			
	HORIZONTAL SCREW	ANGLED SCREW	VERTICAL SCREW
Front Labeler 1	60 mm	132 mm	50 mm
Front Labeler 2	60 mm	134 mm	50 mm
Back Labeler	60 mm	125 mm	50 mm
Top Labeler	-	-	280 mm

6. In the correspondent calibration window write the difference “original-measured” including its sign (- or +) in the X, Angle and Z “Target” cells.

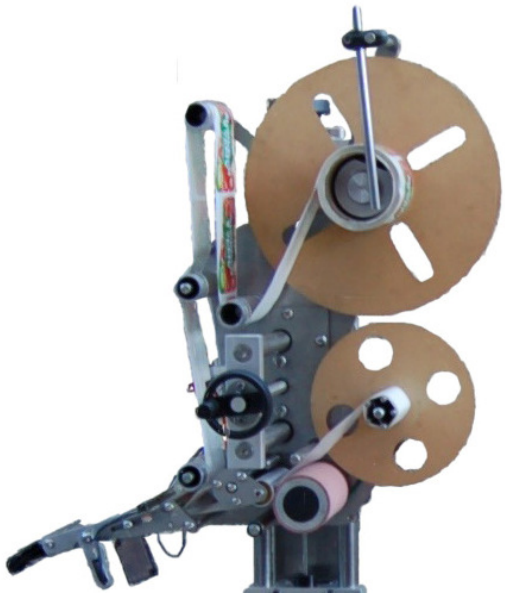


7. Hold the “Calibrate” button until the labeller stops moving. The labeller should now be back to its original zero position.
8. Press “enter” to finish the calibration.

ANNEX C

INSTALLING LABEL REELS

Put the reels onto the special disks and have the label paper tape pass around the roles and between the fork of the label sensor following the route shown in figure below:



ANNEX D

SYNCHRONIZATION THEORY

Sequence 1

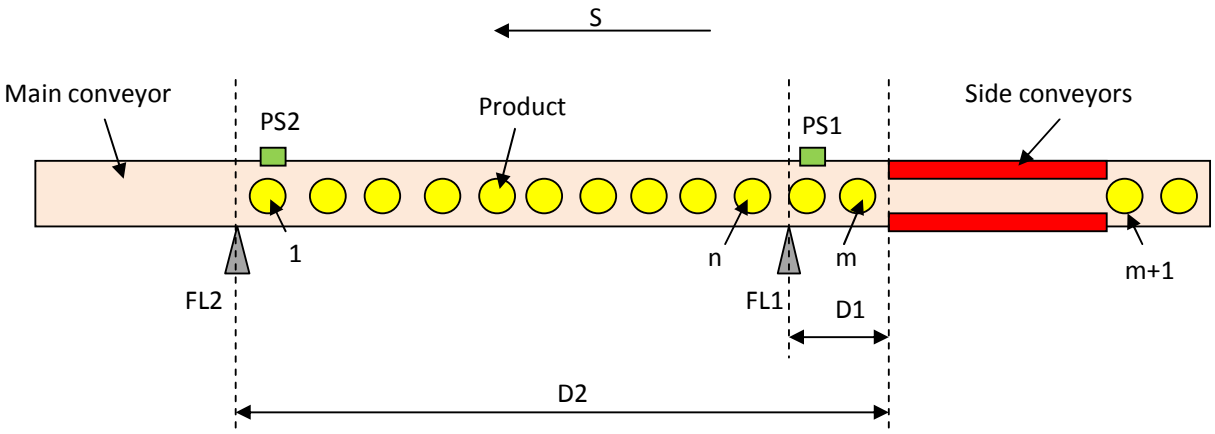


Figure 1.

S- Main conveyor speed
FL2- Front Labeller 2
PS2-Product Sensor 2
FL1-Front Labeller 1
PS1- Product Sensor 1
1,n,m,m+1- Products
D1- distance between FL1 and side conveyors
D2-Distance between FL2 and side conveyors

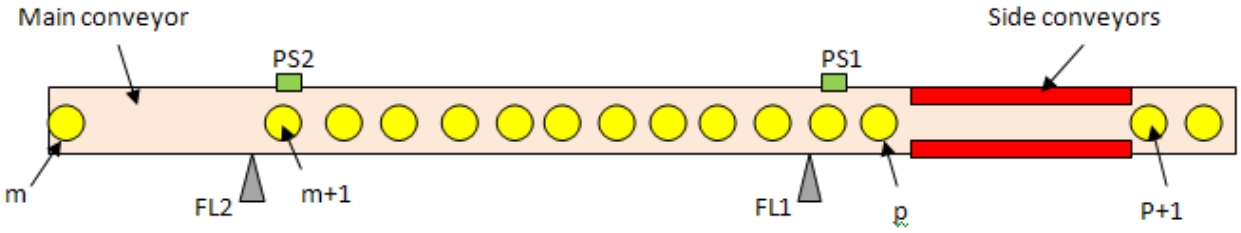
When synchronisation is used, set only Front Labeller 1 ON on the main screen. The second front labeller will turn on automatically when the first one stops.

On the Check screen set the synchronization parameters.

The theory of this synchronisation is:

- The Front Labeller 1 (FL1) applies the number of labels set in “Labels FL1”. After this number of labels is applied the side conveyors stop to put a gap between products. The product 1 to n have a label at this moment but the FL1 still needs to apply labels for products n+1 to m (the products between the FL1 and the side conveyors’ exit).
- After the side conveyors have stopped the FL1 continues to apply labels for the time set in FL1 Stop Delay.
- The side conveyors remain off for the time set in “Gap” and start again after that.
- After the time set in FL1 Stop Delay ends, FL1 stops. The products 1 to m now have a label and there is a gap between product m and product m+1.
- The second labeller remains off for the time set in “FL2 Start Delay”. This time should be long enough for the already labelled product (1 to m) to exit the machine and short enough to start labelling from product m+1.

Sequence 2



- After the time set in “FL2 Start Delay” has passed the FL2 turns on. The side conveyors are also on and the FL1 is OFF.
- FL2 applies the number of labels set in “Labels FL2”. When this number is reached the side conveyors stop for the time set in “GAP” to put a gap between products. The FL2 still needs to apply labels to products m+1 to p (Figure2).
- After the side conveyors have stopped the FL2 continues to apply labels for the time set in FL2 Stop Delay.
- When the time set in “Gap” has passed, the side conveyors turn on.
- When the time set in FL1 Start Delay has passed, FL1 turns on providing its counter has been reset.
- When the time set in FL2 Stop Delay has passed, FL2 stops.
- The FL2 is now OFF, the side conveyors and FL1 are ON and the cycle is repeated

The label counters turn red when the set numbers of labels are reached. In order for the Labellers to start again after one cycle their counter must be reset (after changing the label roll for example).

If both labellers are red the machine stops. To start it again, reset the counters, turn all devices OFF on the main screen, perform the visual check and confirm it by pressing the buttons of the “Check” screen and then turn on the machine by pressing the green button.

ANNEX E

SYNCHRONIZATION DELAYS

Apply the following formulas to calculate the delays:

FL1 Start Delay= (D1/S +GAP/2) x10

FL1 Stop Delay= (D1/S + GAP/2) x10

FL2 Start Delay= (D2/S+GAP/2) x10

FL2 Stop Delay= (D2/S+GAP/2) x10

Where:

D1- distance between FL1 and side conveyors in millimetres

GAP- time the side conveyors are stopped in seconds

D2- distance between FL2 and side conveyors in millimetres

S- Main conveyor speed in mm/sec

Sample of settings

Machine speed (%)	Main Conveyor Speed (mm/s)	D1 (mm)	D2 (mm)	Gap (sec)	Fl1 Start Delay (0.1 sec)	Fl1 Stop Delay (0.1 sec)	Fl2 Start Delay (0.1 sec)	Fl2 Stop Delay (0.1 sec)
80%	476	480	2112	5	35	35	69	69
50%	297.5	480	2112	5	41	41	96	96

The time for the gap and delays need to be input in 0.1 seconds.

For example if a gap of 5 seconds is needed, input 50 in the Gap window.

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ANNEX F

TROUBLESHOOTIG

ISSUE	POSSIBLE CAUSE
1. Labeler not triggered	- Zero trigger distance on screen Trigs - The counters on the Check screen have not been reset after reaching the set number of labels - The Driver's Scale is zero in the Protected Settings-4 - The labeler is Off either on the Main Screen or on OnOff Screen - The product sensor does not see the product: incorrect positioned in relation to the bottle size, to the main conveyor height etc.
2. Labeler does not stop after delivering one label	- Incorrect positioning of label in the label sensor - Label sensor not calibrated
3. The label is not completely released	- Incorrect product sensor height and distance - Maximum label length set in the protected Setting is less than the actual length of label
4. Devices do not work	- They are not set ON on both Main screen and OnOff screen
5. The second front labeler does not start	- If in synchronization mode: its Start Delay is zero - In individual mode: the synchronization button on the Check screen is on