

Machine Operation

A comprehensive guide for the safe and effective operation of the [REDACTED] and [REDACTED] systems

Table of Contents

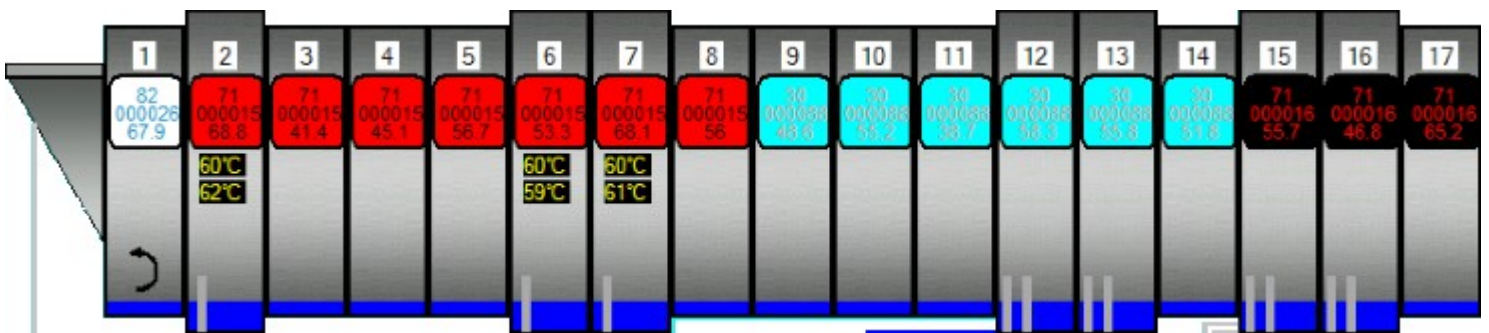
- [REDACTED].....2
- Tunnel Washer.....2
- Press.....2
- Intermediate Storage Conveyor Belts.....3
- Shuttle.....3
- Dryers/Bypass.....3
- Unloading Conveyor Belts.....4
- Alarms/Errors/Maintenance.....4
 - Safety Warnings:.....4
 - Manual Control:.....5
 - Quality Assurance:.....5
 - Common Errors:.....6
- [REDACTED] (Kan).....7
- Kan Tunnel Washers.....7
- Kan Press.....7
 - Safety Warnings:.....8
 - Common Errors:.....8
- Kan Intermediate Conveyors and Shuttle.....9
- Kan Dryers.....10
 - Safety Warnings:.....10
 - Common Errors:.....10
- Kan Unloading Conveyor Belt.....11

[REDACTED]

The pre-rail [REDACTED] system is comprised of the following:

- 1 Tunnel washer
- 1 Press
- 9 intermediate storage conveyor belts
- 1 shuttle
- 8 dryers
- 7 unloading conveyor belts

Tunnel Washer



Tunnel 3

Before entering the tunnel, batches are inputted from the washline terminal, identifying the



category ID (linen type)
customer ID
and weight (kg)

(see customer list for category and customer ID information)

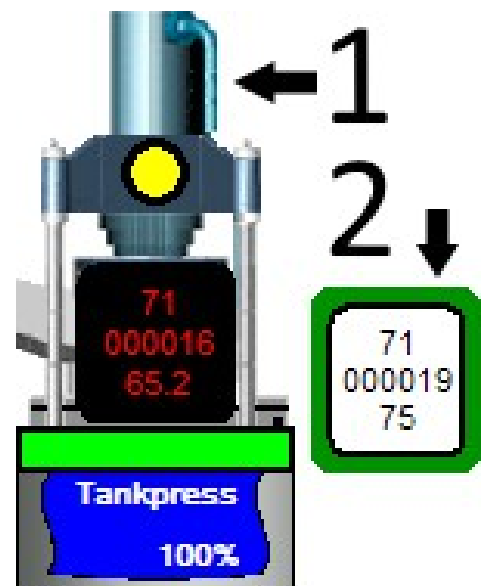
Then, they enter the tunnel and are washed with specific formulae to ensure they are properly cleaned.

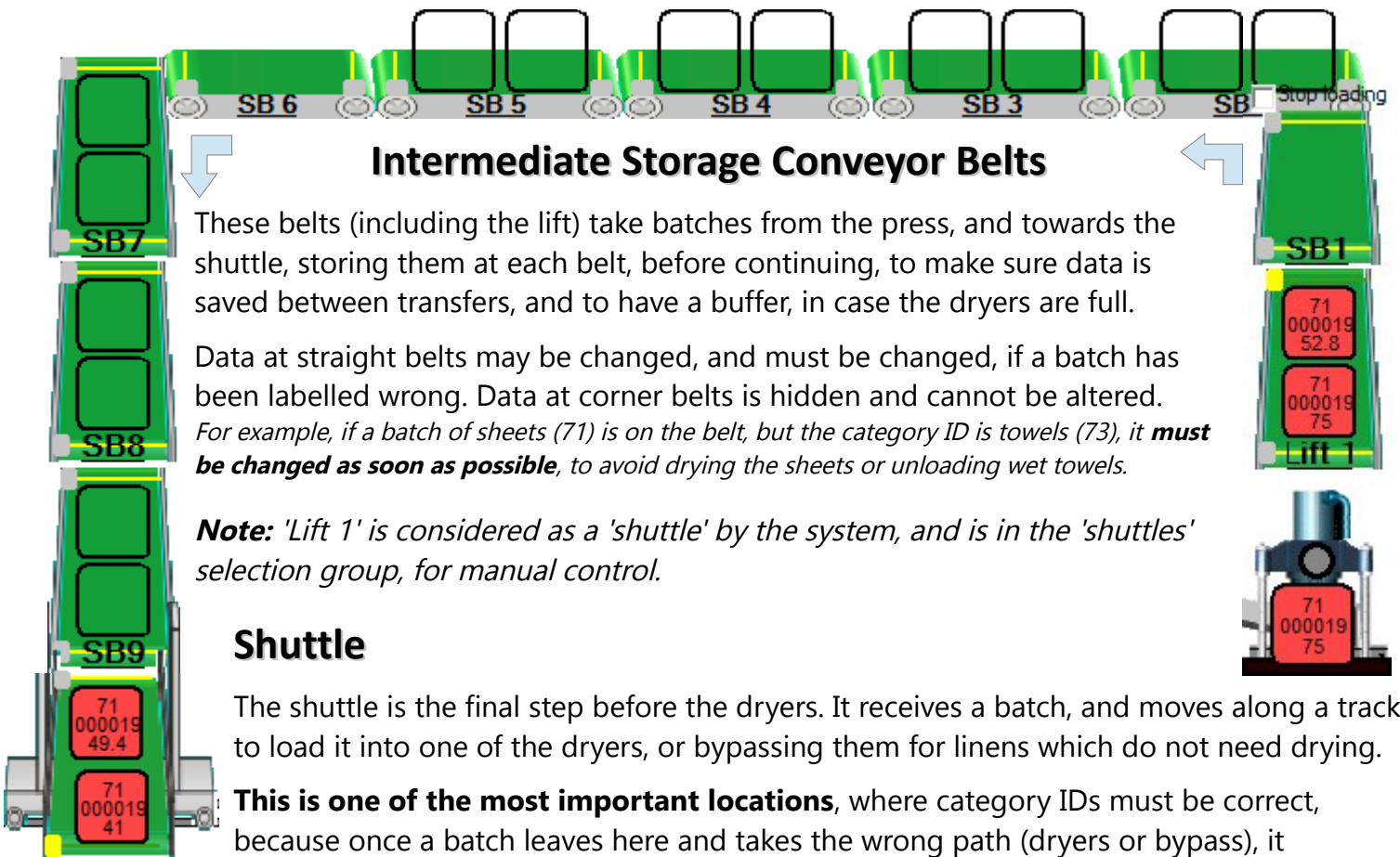
Press

After the linens pass through the tunnel, the excess water must be removed using the press, to make sure they are not too wet for the ironers, and so the water is reused. Linen exiting the press is called a "cake".

The press shows two batches:

1. what is currently inside the press (left)
2. what the press had previously released (right)





Intermediate Storage Conveyor Belts

These belts (including the lift) take batches from the press, and towards the shuttle, storing them at each belt, before continuing, to make sure data is saved between transfers, and to have a buffer, in case the dryers are full.

Data at straight belts may be changed, and must be changed, if a batch has been labelled wrong. Data at corner belts is hidden and cannot be altered. For example, if a batch of sheets (71) is on the belt, but the category ID is towels (73), it **must be changed as soon as possible**, to avoid drying the sheets or unloading wet towels.

Note: 'Lift 1' is considered as a 'shuttle' by the system, and is in the 'shuttles' selection group, for manual control.

Shuttle

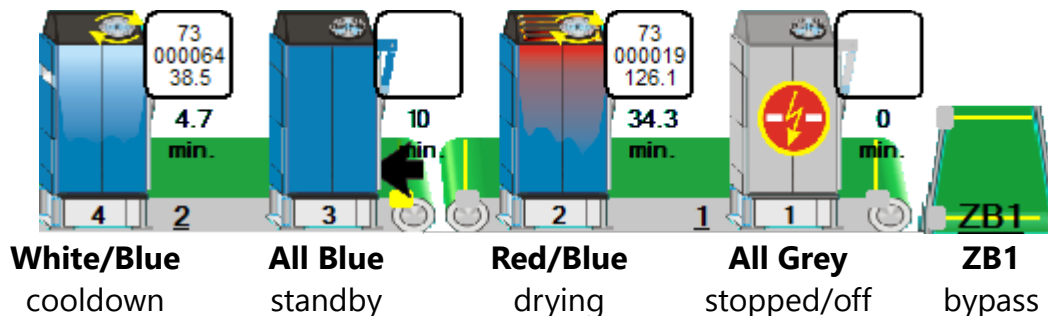
The shuttle is the final step before the dryers. It receives a batch, and moves along a track, to load it into one of the dryers, or bypassing them for linens which do not need drying.

This is one of the most important locations, where category IDs must be correct, because once a batch leaves here and takes the wrong path (dryers or bypass), it effectively cannot be returned.

Note: the shuttle recognizes batch data only from the rear slot; if the rear slot is empty, the shuttle will display a missing data error, regardless of the data in the front slot.

Dryers/Bypass

The dryers and bypass are the second-last step, before batches are loaded onto the rail. They display the customer inside, as well as four different colours based on their status:



Notes:

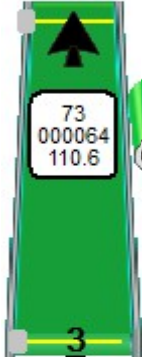
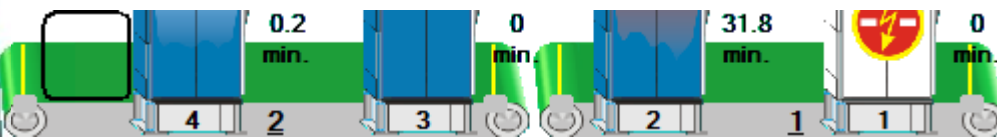
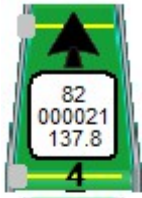
- **The drying cycle must complete** to fully dry the linen and prevent wrinkles from forming
- **The cooldown is required** to fluff the linen, to avoid wrinkles from forming when linen cools; the only exception to this is when linen will be processed right away, after unloading
- If a dryer is grey with a red circle, the power has been shut off; call maintenance with the green button to either enable it or find out what's wrong

Unloading Conveyor Belts



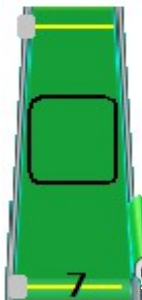
These belts take loads from the dryers and bypass to transfer them to the rail system. Each group of belts can store one batch; the groups are the following:

Group	Belt Numbers in Group
1	1, 2
2	5, 6
3	3, 4, 7, 8



While belts 3, 4, and 7 appear to have three slots, they are actually one, and the same batch data is copied across all three areas.

Note: the system recognizes only the data on belt 4, so if a batch is there, but there is no data in that slot, the system will show an error.



Belt 8 is no longer used, as it is not connected to the rail system.

Alarms/Errors/Maintenance

There are many sensors which the system uses to monitor various different things. If anything goes wrong and is detected, the system will display an error; many of these errors will stop a machine, and some completely stop the entire system.

Safety Warnings:

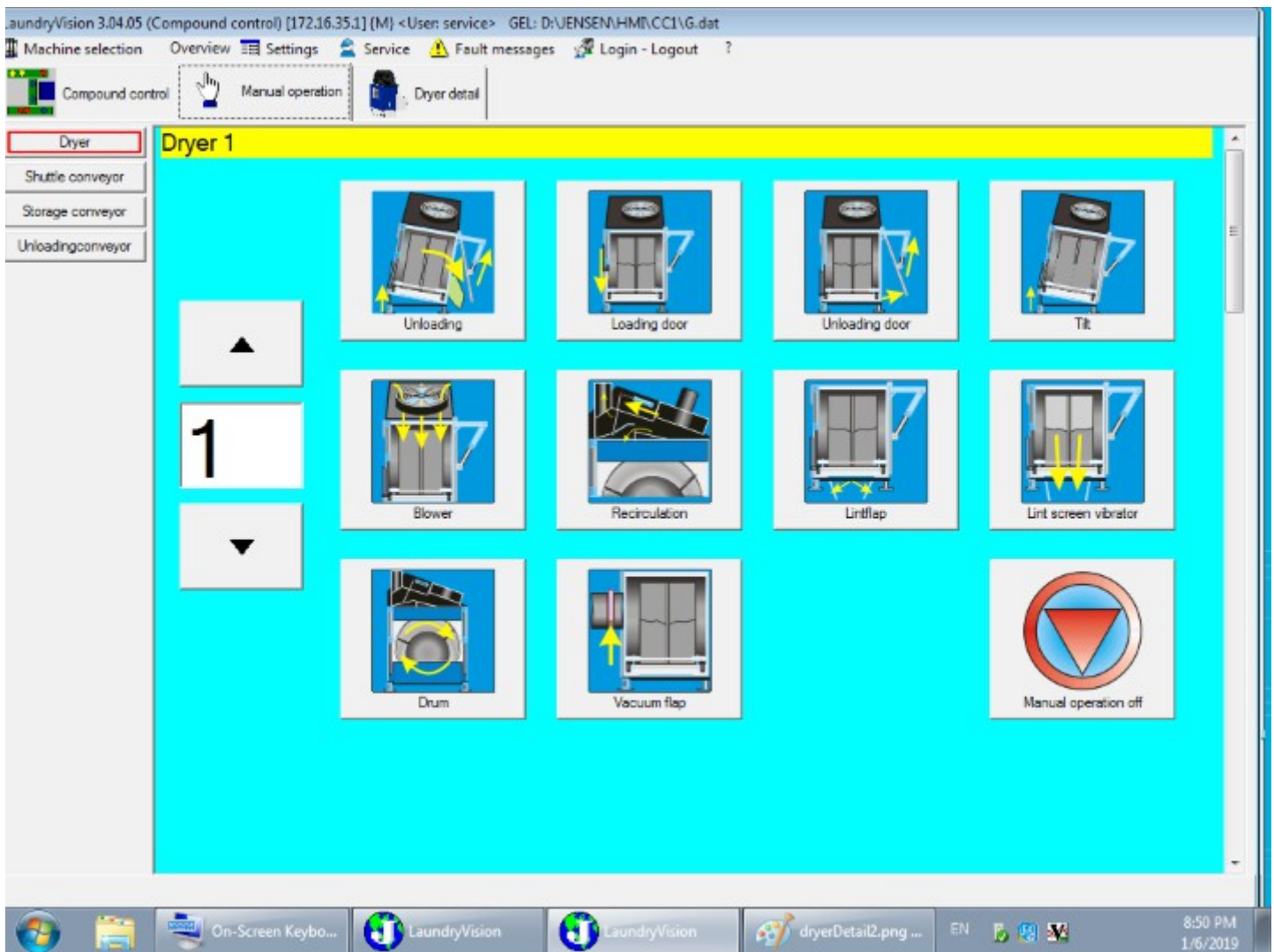
When fixing any errors,

1. **Make sure to stop all machines** that might affect you or catch you off guard
2. **Always look around for dangers;** machines may move at any time, and surprise you.
 - There are multiple places to control the system, and anyone can start machines suddenly

3. **Use the entrance gate** beside [REDACTED] dryer 1, to disable the shuttle and physically cut its power
4. **Beware of active dryers**, as they may tilt at any time and crush anyone or anything in their path

Manual Control:

The [REDACTED] system can be controlled, to an extent, with most of the controls being self-explanatory. Most of the control menus can be found under "Overview" or "Settings", and while there are many controls for the various machines, only the basic ones will be covered, here.



Manual Control: Dryers

As of January 11th, 2019, many [REDACTED] dryers' auto lint cleaning is nonfunctional, and lint must be cleaned manually

Quality Assurance:

When fixing any problems, it is best to

Avoid	Because	Instead
Modifying data without the right skills	The systems are complex, and serious problems may be caused	Ask a more experienced person about what a change will do
Climbing/jumping on or over anything	Dust and dirt will get on things, and obvious safety concerns	Walk around the obstacles, and keep shoes off conveyor belts
Banging on lint screens	Lint screens are very weak, because of temperature changes	Gently tap lint screen, and peel away lint from edges/corners

Common Errors:

Errors are displayed in the following format:

Index	Error no.	Error text	Error start	Disturbance time
#	(error id)	(location: description of error)	(start date & time)	(length of time before fixed)

Below are common errors which can be fixed without needing to call maintenance (*alphabetical*).

Error no.	Error text	Solution
19	Dryer 04: Lint screen pressure is too high!	Stop dryer, clean lint, start dryer
262	Lint removal 01: Pressure too low! <i>(lint vacuum has low suction; lint bag is full, or pipe is loose)</i>	Empty lint bag, or find and secure loose pipe
152	Shuttle 01: Batch without program <i>(linen is blocking shuttle sensor)</i>	If small piece exists, remove it from shuttle <i>(Warning: shuttle will move automatically, after the sensor is clear, unless it is disabled)</i> If cake exists, identify and input proper category id
213	Unloading conveyor 04: Destination is not ready for pick-up! <i>(lift is not in bottom position)</i>	Notify rail operator to set storage line for batch at MLA_3
202	Unloading conveyor 04: not free! <i>(linen on belt, but no data)</i>	If small piece exists, remove it from belt If large pile exists, identify, and notify rail operator to add batch data

[REDACTED] (Kan)

The Kan systems are comprised of the following:

- 2 tunnel washers
- 2 presses
- 1 intermediate conveyor belt
- 1 shuttle
- 7 dryers
- 1 unloading conveyor belt

Kan Tunnel Washers

Batches going through the tunnels end up in different locations, based on which tunnel they entered. The display from top to bottom shows the

- location (tunnel chamber # / press)
- category ID
- customer ID
- weight (kg)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	73	73	82	82	76	0	0	83	82	73	76	73	73	76	73
64	47	47	47	51	50	0	0	50	50	46	46	46	46	45	45
99	138	133	148	94	176	0	0	88	99	134	154	137	132	154	132

P	<-Station
17	<-Program
48	<-Cust.
100	<-Weight

Tunnel 1 is the only Kan tunnel leading to the Kan dryers, so **all dried batches** (if labelled correctly), will come from here. Wet batches may come from here, passing directly through an empty dryer, if many wet loads have been received, and need to be processed quickly.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
0	71	71	71	71	71	71	71	71	71	71	71	71	71	71	71
0	51	32	32	30	32	30	32	30	32	30	32	32	28	28	37
0	109	67	157	101	155	157	160	156	160	155	155	157	165	160	165

P	<-Station
0	<-Program
0	<-Cust.
0	<-Weight

Tunnel 2 leads directly to the press, which means **only wet batches** should come from here, and no towels, robes, or dried linen of any kind should be washed here.

Kan Press

Both [REDACTED] presses use relatively the same mechanical systems and software, making it easy to operate both using the same methods.



Press 1 (before Kan dryers)



Press 2 (no dryers)

The press is where a wet batch from the tunnel has excess water removed and reused to wash a future batch. Then, the partially-dried batch goes to the dryers or directly to the rail system.

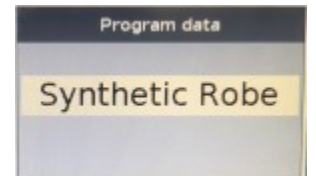
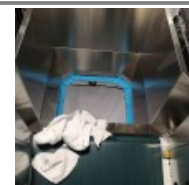
Safety Warnings:

- Understand machines may suddenly start anytime
- Never go into danger zones, without disabling the machines
 - **Danger zones:** shuttle path, MLAs, rotating parts, conveyors, etc

Common Errors:

Below are errors which can be fixed without needing maintenance (alphabetical).

Error no.	Error text	Solution
510.1	Sensor belt end occupied	Manual > conveyor forward until data clear > automatic
510.2	Movement unloading belt	
305.3	Loading chute occupied	Use rod to clear linen hanging on chute, or wipe water off chute sensor
108.4	Function check required	ESC to main menu > service > function test
	Waiting for unloading release (>10s)	Check ahead of press for any stoppage



Category type

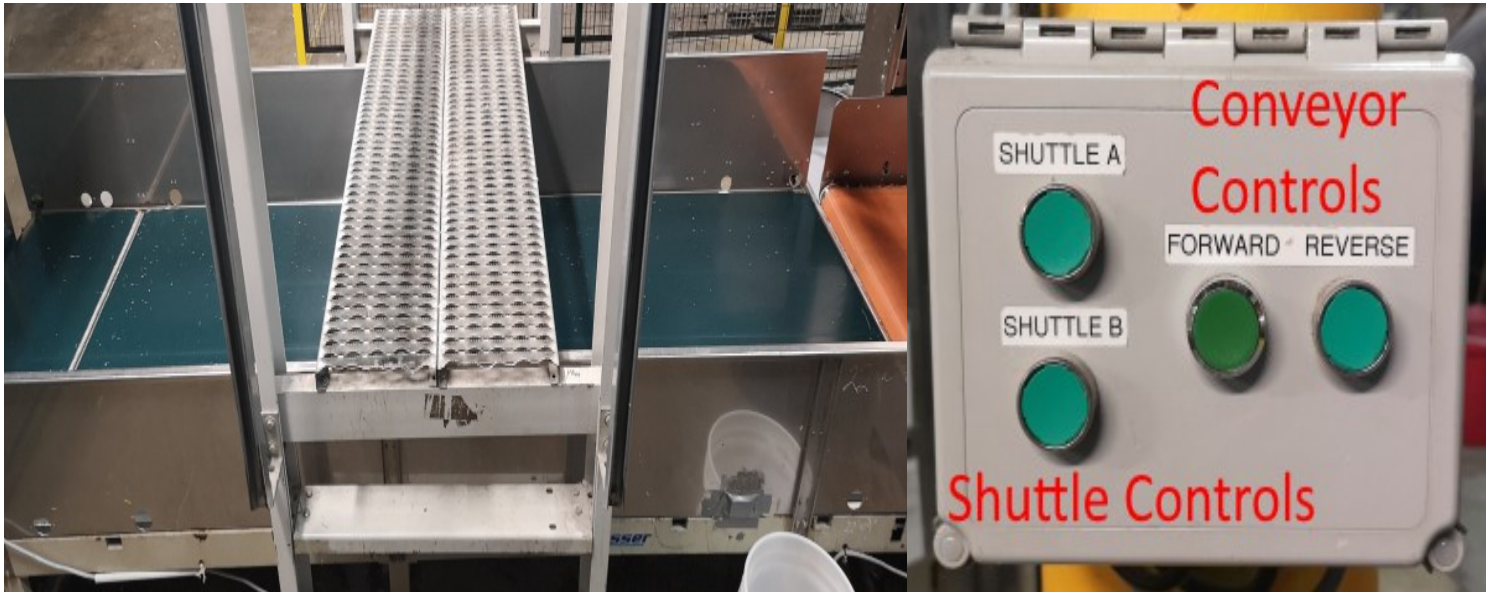


Automatic mode



Manual mode

Kan Intermediate Conveyors and Shuttle



After a batch has finished being pressed, it continues to the intermediate conveyor belt, which stores data for two batches in order, before being loaded onto the shuttle.

The shuttle has two levels which store the same customer and category. Only one customer or category should be on the shuttle at any time!

If different customers or categories are loaded onto the shuttle, or something else went wrong, stop the shuttle. Batch data must be corrected, and different batches must be separated, before starting the shuttle or conveyor belts, to avoid mixing customers/linens.



Kan Shuttle



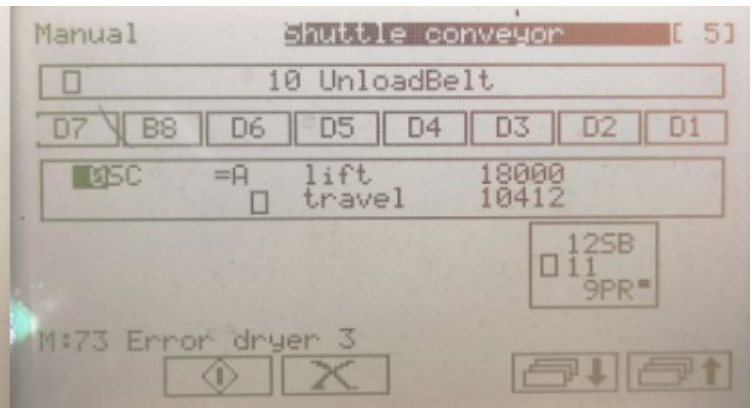
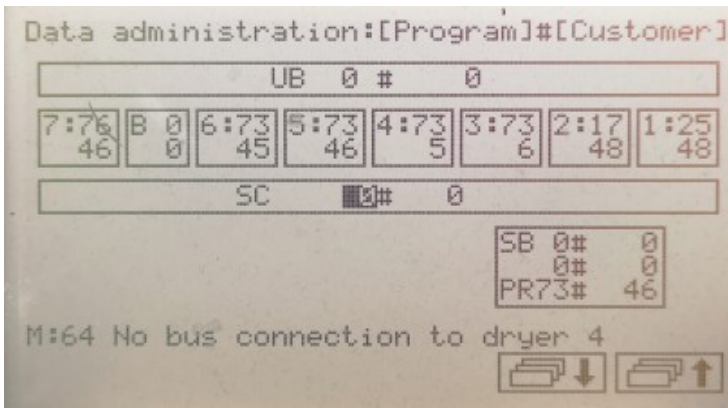
Kan Shuttle Controls

To stop the shuttle and conveyor belt, on the shuttle control panel, the power off button may be pressed, as well as F5 to switch to manual control.

The shuttle has 3 modes:

Automatic	Semi-Automatic	Manual
Minimal data displayed; fully automatic	Customer/category data displayed; automatic	Minimal data displayed; manual only

F5 and F6 rotate through modes, cycling through the menus.



Semi-automatic

Manual

Kan Dryers





After the shuttle has loaded a batch into one of the dryers, the batch gets dried and/or unloaded according to the category code.

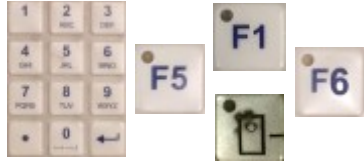
For example, sheets (71) unload as soon as possible, and towels (73) dry for 30min.

Safety Warnings:

- Beware of dryers, as they may suddenly tilt, pinching and crushing anything in the way
- Disable the shuttle, as it may crush anything in its path

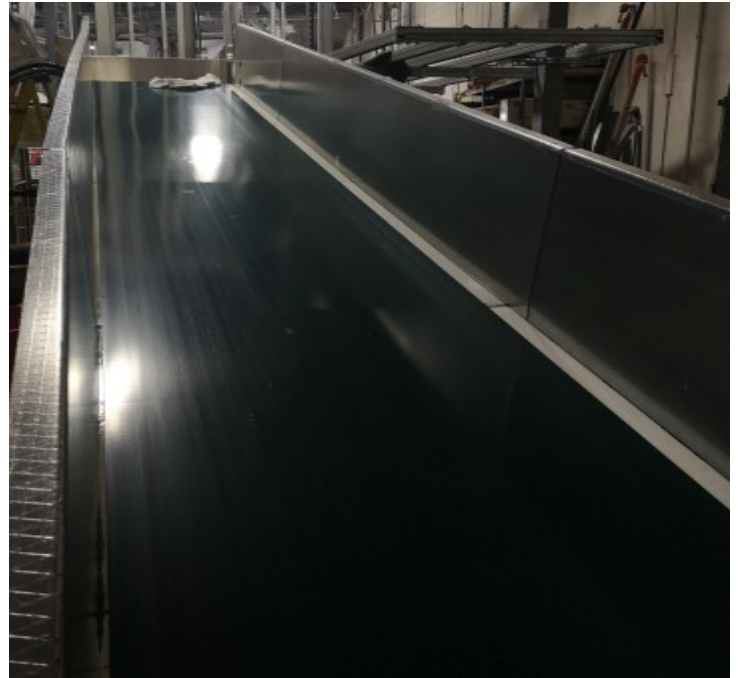
Common Errors:

Fault	Cause	Fix
Drum standstill	Inner drum fails to spin	1. Clear fault (F1) 2. If fault reappears, call maintenance 
Lint screen/temperature /airflow	Too much lint	1. Select affected dryer 2. Disable dryer (F2) 3. Disable shuttle (off/manual) 4. Clean lint screen 5. Enable dryer and shuttle 

Fault	Cause	Fix
Unloading door not closed	Linen stuck in doorway	<ol style="list-style-type: none"> 1. Select affected dryer 2. Switch to manual control (F5) 3. Quickly clear fault and unload 4. Return to automatic mode 

If you're unable to fix a fault, ask anyone experienced with the system, or call maintenance.

Kan Unloading Conveyor Belt



The one [REDACTED] conveyor belt merges with the [REDACTED] system at MLA1, and is a source of data transfer problems; because of this, the belt should be checked, whenever tunnel 1 production stops.

Usually, one of two problems occurs, here:

1. Leftover linen is stuck at the end of the belt, preventing dryers from unloading
 - o **Fix:** Step on the orange foot pedal, until blockage is clear
2. Either batch is detected with no data, or data is present with no batch detected
 - o **Fix:** Consult rail/tunnel operator to correct batch-data mismatch

