



TS-1800 Arc Configuration User Guide

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1 Introduction

1.1 About the TS-1800

Twine's TS-1800 is a unique and revolutionary textile coloring solution offering on-demand Digital Thread Dyeing capabilities. You can set the TS-1800 to dye a single color, multiple colors, or gradient colors, as needed for your particular coloring job. The TS-1800 supports multiple types of raw or standard white polyester thread for the sewing, knitting, embroidery and other sectors of the textile industry.



Figure 1 The TS-1800 thread dyeing machine

1.2 Contacting Twine Support

In case of any technical question or problem, contact your Twine representative.

For contact details, see <https://twine-s.com/contact/contact-us/>.

1.3 System Specifications

The following are the System Specifications for the TS-1800:

Parameter	Specification
Definition	Digital Thread Dyeing System
Dye Technology	DST™
Ink	Twine Digital Ink™ (TDI)
Certification	OEKO-TEX and Intertek
Pre & Post Treatment	Integrated
Yarn Loading System	Automatic loading system
Yarn Winding System	Integrated winder
Yarn Fiber Type	Polyester
Operator Interfaces	Industrial grade touch screen
Network	Wi-Fi
Remote Support	Secured connection

1.4 Terms and Abbreviations

The following terms and abbreviations are used throughout this document:

Term / Abbreviation	Definition
BIT	Built-In Test
Color space	System for defining colors
EMO	Emergency off button
GUI	Graphical User Interface
LAB	The "CIELAB" color space
N/A	Not Applicable
PPC	Panel PC
RFID	Radio Frequency Identification
RGB	The "Red, Green, Blue" color model
RML	Recommended Media List
TGU	Thread Guiding Unit
Job Factor	Percentage of thread added to a job to allow for a certain amount of spare thread
Color Proofing	Method of checking and approving colors by dyeing a small sample of each color before dyeing the whole job
Unit	The amount of thread needed to make one complete item

1.5 Supported Color Spaces

Use Twine's Digital dye-to-match technology to select from an almost unlimited color gamut. You can dye a solid color or color gradients in single or multiple segments. The TS-1800 enables you to easily program thread length, sequence, and more.

TS-1800 currently supports colors from the following color spaces:

- Twine
- Coats
- LAB
- RGB

1.6 Supported Ink

The TS-1800 supports Twine's proprietary TDI™ ink cartridges only. It automatically checks that the ink cartridge inserted is authentic. If the cartridge is not authentic, it will not proceed with the dyeing process.

NOTICE

Use only Twine TDI™ ink cartridges. Attempting to use a non-Twine TDI™ ink cartridge might cause damage to the machine and could result in degraded performance.

1.7 Supported Thread Types

Since the TS-1800 supports many types of threads and thread thicknesses, it can be used to dye thread for sewing, embroidery, and knitting applications. A list of supported threads can be found in the Recommended Media List (RML).

1.8 TS-1800 Parts Overview

The following tables describe the different parts of the TS-1800, as shown in the diagrams.



Figure 2 TS-1800 parts front view

Part	Description
1	PPC
2	Dryer Cover
3	Cartridge Cover
4	Thread Feeding Unit
5	Front Service Cover
6	Electrical cabinet Cover
7	Thread Winding Unit
8	Emergency Button
9	Thread Groove
10	TS-1800 operating panel (Power / Thread jogging / Thread loading / USB port)
11	Operating Panel Cover



Figure 3 TS-1800 parts rear view

Part	Description
12	AC Power socket
13	AC Power Switch
14	AC Power cable with Plug

1.9 Safety Considerations

⚠ CAUTION

Do not start using the TS-1800 or attempt to perform any service or maintenance action before carefully reading through this section.

1.9.1 Disclaimer

It is the customer's responsibility:

- To ensure that the TS-1800 is used for the purpose it was intended (see section 1.9.2 "Designated Purpose")
- To ensure that all Twine instructions and guides are carefully and accurately followed

Twine assumes no responsibility:

- If the TS-1800 is used for any purpose other than that for which it is intended
- If Twine instructions and guidelines are not carefully and accurately followed

1.9.2 Designated Purpose

The TS-1800 is deemed to be used for its designated purpose if it is used in accordance with its product documentation and within its performance limits.






It is essential that only trained personnel be allowed to use this system because of the technical skills and fair level of English comprehension required.

1.9.3 Regulations

To prevent accidents while operating the system, observe all applicable local and national safety rules and regulations.

1.9.4 Safety Notice Definitions

The following table describes the safety labels used throughout the TS-1800 documentation.

Notice	Definition
	Indicates a hazardous situation which will result in death or serious injury.
	Indicates a hazardous situation which might result in death or serious injury.
	Indicates a hazardous situation which can result in minor or moderate injury.
	Indicates a situation where incorrect operation of the system can result in damage to the product. The label ATTENTION is used synonymously.
	Indicates information related to proper use of the system.

Note

A description of specific product hazards can be found in Appendix A -Safety .

2 Operating the TS-1800

Operating the TS-1800 and preparing it for dyeing involves the following main steps:

1. Powering it up and down. (Section 2.2.1 “Powering Up and Down”)
2. Loading ink. (Section 2.3 “Loading the TS-1800 with Ink or Lubricant”).
3. Handling the Waste. (Section 2.4 “Handling Waste”)
4. Loading the thread. (Section 2.5 “Thread Loading ”)
5. Replacing a cone (Section 2.6 “Inserting a New Collecting Cone”)

2.1 TS-1800 Operating Panel Button Definition and Functionality

2.1.1 Definition

The TS-1800 panel buttons are defined in the following figure.



Figure 4 TS-1800 panel buttons

2.1.2 Functionality

The functionality of each of the TS-1800 panel buttons is summarized in the following tables:

2.1.2.1 Power Button

Function	Description	Method	Button Light Indication
Power up	Powering up the system	Short press	Blue
Power down	Safe powering down sequence	Long press (5 seconds)	No light
Standby	Switch to standby mode	N/A	Blinking Blue
Wake up from standby	Switch to normal system operation	Short press	Blue

2.1.2.2 Thread Jogging Button

Function	Description	Method	Button Light Indication
Thread Jog	Thread is Jogging	Press and hold	Blinking Blue
Thread jog locked	Thread is Jogging without pressing the button	Long Press (5 sec)	Blinking Blue
Jog function disabled	Function is disabled when system is running	Button is disabled while job is running	Off

2.2 Powering Up and Down

2.2.1 Powering Up

To power up the TS-1800:

1. Make sure that the power cable is connected to the machine power inlet and to the wall outlet.
2. On the machine panel, press the **Power** button.

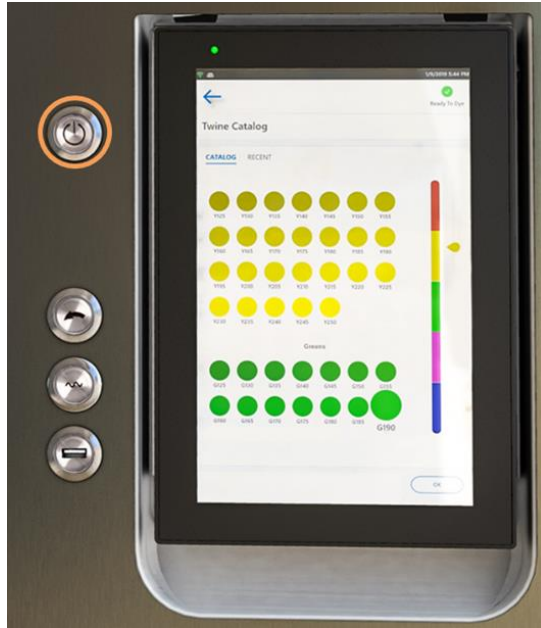


Figure 5 Power button

The TS-1800 powers up and performs its startup procedures.

When it has completed its startup procedure successfully, the **green** ready to dye icon will appear on the upper right side of the PPC screen.

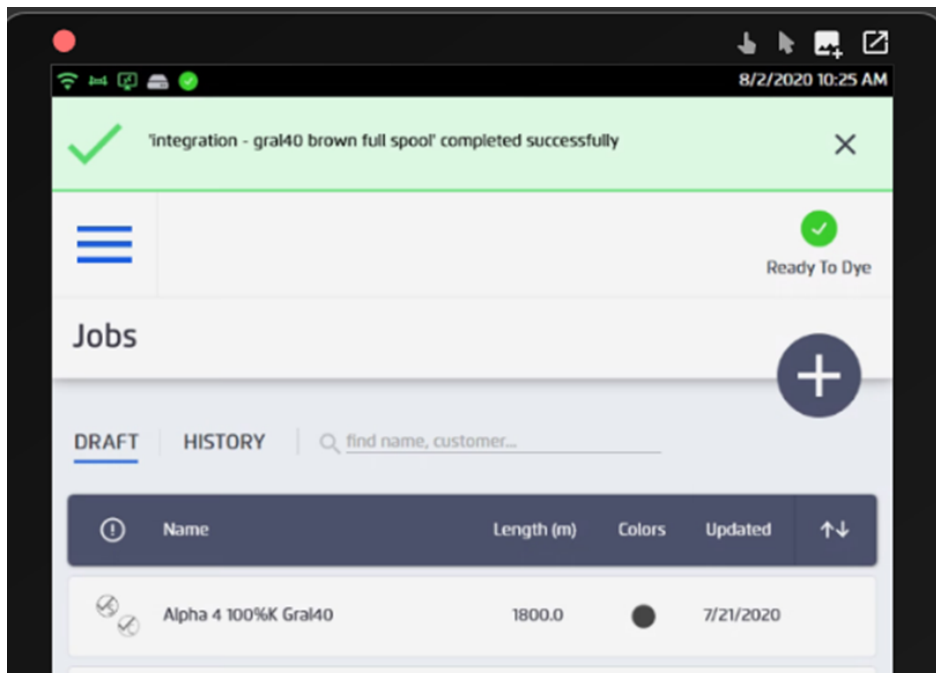


Figure 6 Ready to dye

2.2.2 Powering Down

During normal operation there is no need to power down the system. The TS-1800 enters standby mode when not in use. However, it is necessary to power down the system during routine maintenance in order to replace or clean parts.

CAUTION

Note that after powering down the system, it can take up to 30 minutes for the machine to cool down to a temperature suitable for working on the machine.

There are several ways to power down the TS-1800.

- **From the front panel**

Press the **Power** button (see Figure 5)and hold for approximately five seconds until the blue light turns off.

- **From the main menu of the PPC**

Tap the **Power** button at the bottom of the main menu and select **Turn Off** to power down.

This process takes approximately 45 minutes.

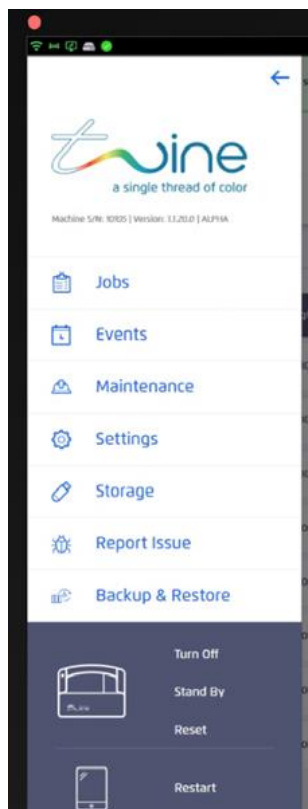


Figure 7 Turning off the machine from the PPC

i Selecting Restart from the PPC screen will restart the PPC only. You cannot restart the system from the PPC.

■ The Emergency Button (EMO)

The EMO button is a safety mechanism used to shut off the machine in an emergency situation when it cannot be shut down in the usual manner. It is not safe to use for routine shutdown.

⚠ CAUTION

Do not use the EMO button for routine power down. Only use the EMO button in an emergency situation.

2.3 Loading the TS-1800 with Ink or Lubricant

Note

Although “Lubricant” is not an ink color, it is loaded in the same way as ink and is therefore included in this section.

You can load the following TDI™ ink cartridges:

- Cyan (C)
- Magenta (M)
- Yellow (Y)
- Black (K)
- Transparent Ink (TI)
- Lubricant (L)
- Cleaner (CL)

Load ink in the following situations:

- Before using the TS-1800 for the first time.
- When the PPC displays a low ink level.

The procedure for loading ink cartridges is the same for all of the above-mentioned cartridges.

⚠ WARNING

Handle cartridges with care and avoid situations that can damage them!

2.3.1 Preliminary Steps

1. To determine if the machine needs ink, check the PPC. If the following message is displayed at the top of the PPC, load the indicated ink color:

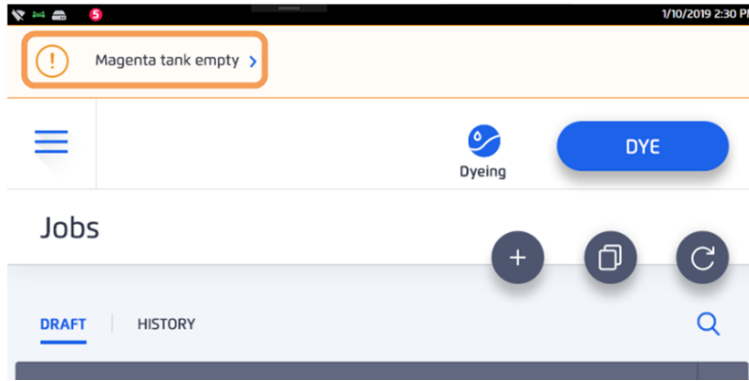


Figure 8 Low ink message

Note

You can also check the status of the ink level in the maintenance/diagnostics screen on the PPC.

NOTICE

If the TS-1800 is currently in operation, you must make sure that waste emptying is not in process. If the TS-1800 is not currently operating, skip to Step 2.3.2 below.

2. Determine if waste emptying is in process by checking the PPC. If the first message below is shown, wait until the second message appears.

Waste Emptying in Process
Do not open cartridge cover.

Waste Emptying Completed.
Replace with empty cartridge.

⚠ CAUTION

Never open the cartridge cover while waste emptying is in process!

2.3.2 Loading an Ink Cartridge

To load an ink cartridge, do the following:

1. Open the Cartridge cover.

The following message displays:

Cartridge Cover Open

2. If there is an ink cartridge in the slot, remove it.

If there is an empty waste cartridge slot available, you can insert the empty ink cartridge you removed into the waste cartridge slot. To do so, see step 6 below.

3. Insert a full ink cartridge into the upper ink loading cartridge slot as shown.

NOTICE

The cartridge must be oriented correctly to be inserted. Do not force the cartridge into the slot. This might damage the cartridge.



Figure 9 Loading an ink cartridge

Make sure that the cartridge locks into place. You will hear a click as the latch locks.

When properly inserted, the LED indicator to the left of the ink cartridge will be on and steady.



Figure 10 Ink cartridge loaded

4. Close the cartridge cover.

The TS-1800 automatically checks that you have inserted the correct cartridge.

Ink loading begins automatically and a progress bar appears on the PPC screen.

The ink filling process takes up to 10 minutes; lubricant filling takes up to 1.5 hours.

When the process is complete the LED indicator will blink very fast. This indicates that the cartridge is now empty and can be removed. The following message is displayed:

Ink Loading Complete

Remove Empty Ink Cartridge

5. Open the cartridge cover and remove the empty ink cartridge.

The LED indicator turns **off**.

6. Remove the stopper from the waste filling opening on the underside of the empty ink cartridge, as shown.



Figure 11 Stopper location



Figure 12 Removing the stopper

7. On top of the ink cartridge, cut through the perforated stopper hole cover, as shown.



Figure 13 Removing the paper stopper hole cover

8. Insert the stopper into its allocated position at the top of the empty ink cartridge, as shown.



Figure 14 Inserting the stopper in the hole



Figure 15 Stopper in position

Note

The *Waste* slot must remain empty until you receive a pop up a message saying to insert *Waste* cartridge

The **Waste** icon on the **Current Status** section of the Maintenance screen should show a dotted gray outline when there is no waste cartridge inserted (Figure 16).

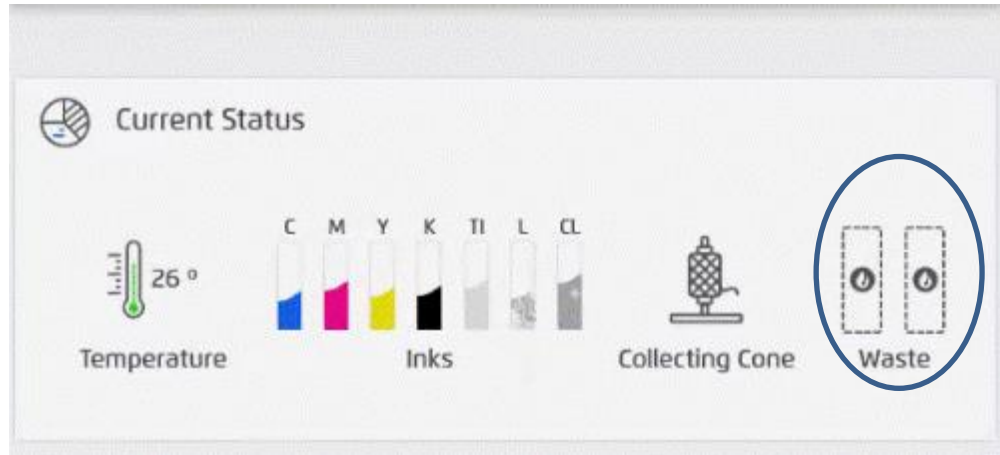


Figure 16 Waste Cartridge icon

9. When the message appears saying to insert the *Waste* cartridge, insert the cartridge into an available slot. If no empty slot is available, store the empty ink cartridge in the allocated cabinet.

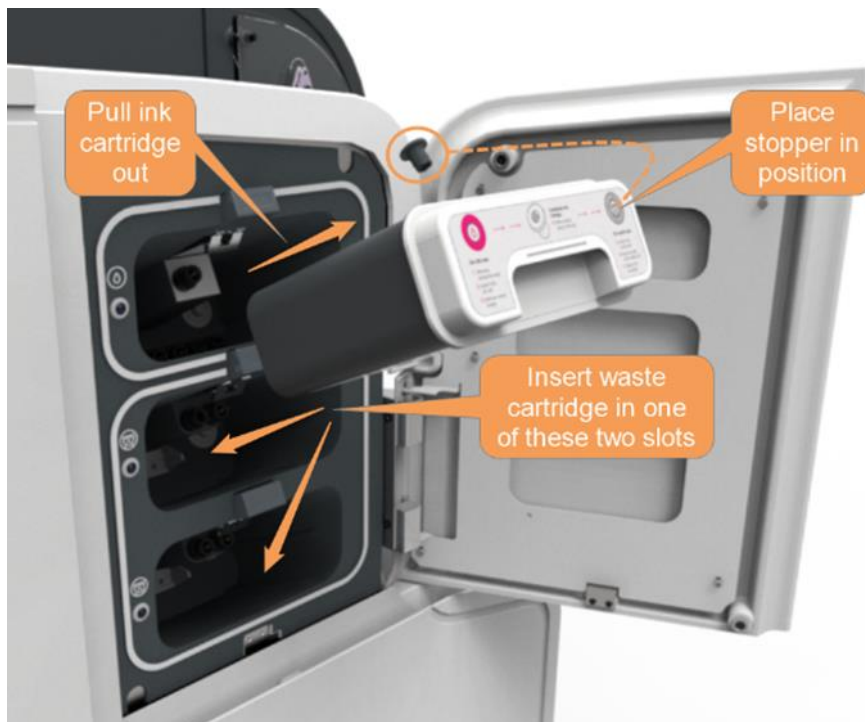


Figure 17 Empty ink cartridge moved to a waste cartridge slot



Figure 18 Slide waste cartridge into slot



Figure 19 Empty waste cartridge inserted. Blue LED is ON.

10. Close the cartridge cover.

⚠ CAUTION

The ink is hazardous to humans. Follow the MSDS and local disposal regulations carefully when disposing of ink.

2.4 Handling Waste

Byproducts of the dyeing process are automatically pumped into the empty ink cartridges in the waste cartridge slots. When these cartridges are full, remove them and replace them with empty ink cartridges.

⚠ CAUTION

The waste includes hazardous materials. Follow the MSDS and local disposal regulations carefully when disposing of the waste cartridges.

2.4.1 Removing a Waste Cartridge

To remove a waste cartridge:

1. Check the PPC. If the first message below is shown, wait until the second message appears:

Filling waste cartridges. Wait until completed.

Filling completed.

⚠ WARNING

Never open the cartridge cover while waste emptying is in process!

2. Open the cartridge cover.

The following message displays:

Cartridge cover open.

3. Check the LED indicators on the left-hand side of the waste cartridges.



Figure 20 Check LED status

The LED indicator turns off when a waste cartridge is full.

4. Remove the full waste cartridge.
5. Insert an empty ink cartridge.

The LED indicator turns on and the following message is displayed:

New waste cartridge present.



Figure 21 Empty waste cartridge inserted

6. Close the cartridge cover.

The following message is displayed:

Waste cartridge successfully replaced.

2.5 Thread Loading steps

The initial thread loading procedure is performed when:

- Thread is stuck or torn inside the machine
- There is no thread in the machine

All other times follow the procedure in section 2.7 “Replacing the Thread”.

Preliminary steps:

1. From the tablet menu, select **Maintenance** then tap **Thread Loading Wizard**.

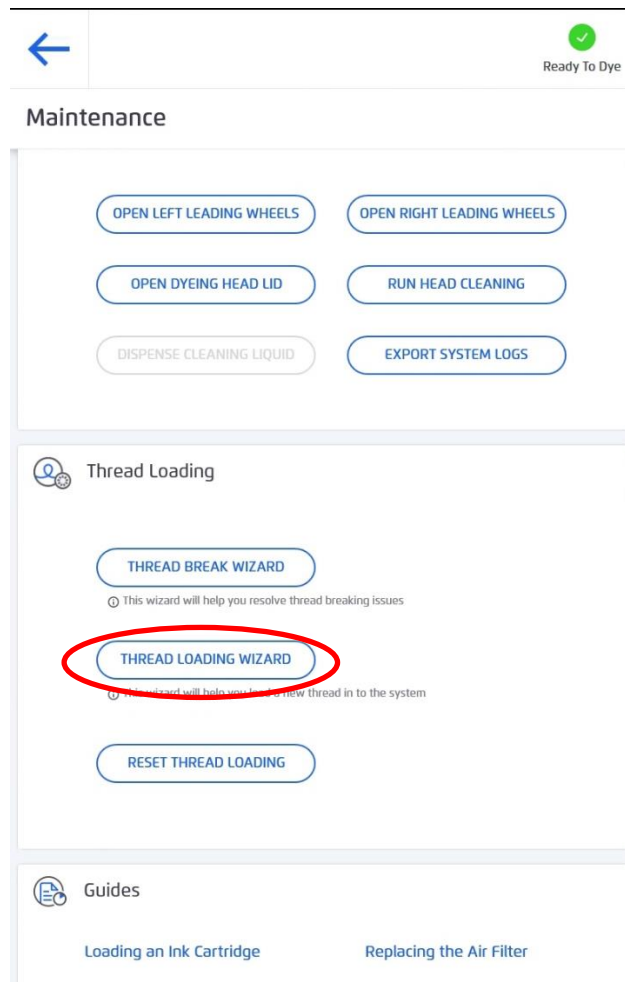


Figure 22 Thread Loading Wizard

2. Follow the Thread Loading Wizard instructions on the machine PPC.

Note

Make sure to remove all thread residue from the inner thread path before pressing the loading button.

3. If the process fails to complete successfully, press the **Reset Thread Loading** button and wait for the process to end.

The blue light on the **Load** button flashes slowly while the TS-1800 performs internal processes to prepare for thread loading.

Note

This process can take up to a few minutes to complete.

When these processes are complete, the following message appears:

Ready for Thread Insert

The blue light on the **Load** button stops flashing and remains *ON*.

Note

If anything goes wrong with regard to the thread path, (the thread gets stuck, tears, or any other thread issue) refer to the troubleshooting section of the *Thread Break Wizard* and follow the instructions there.

Procedure

1. Place a full cone of undyed thread in the thread guiding unit (TGU).



Figure 23 Undyed thread in the TGU

To feed the thread through the TGU path, follow the corresponding numbered steps in the image and in the procedure below.



The step numbers used in the image and the procedure correspond to the numbers printed on the TS-1800.

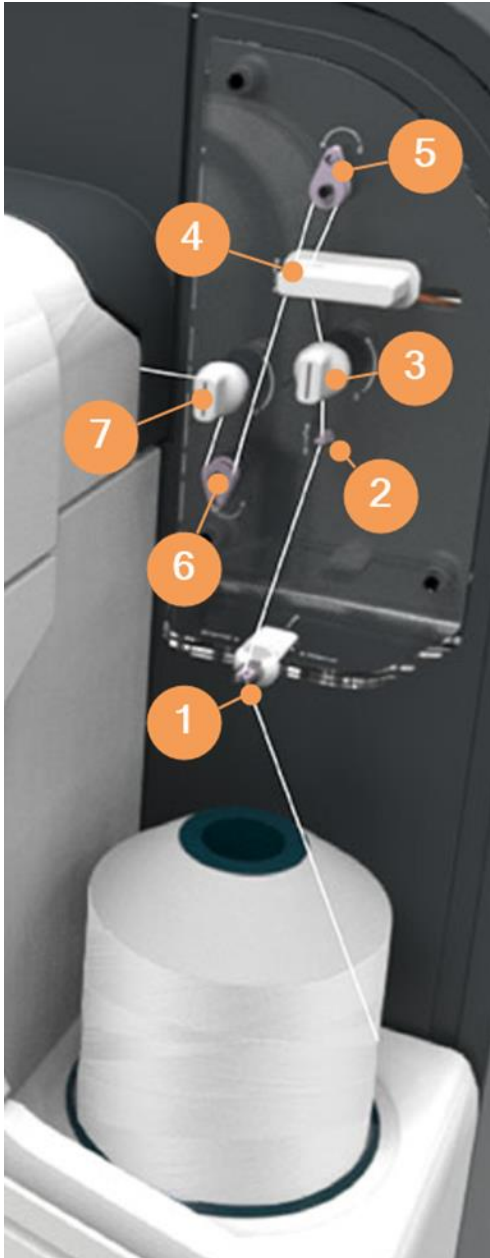


Figure 24 Wind the thread as shown

2. Clip the thread into the first thread guide lock.
3. Clip the thread into the second thread guide lock.
4. To feed the thread through the first tensioner, separate the two discs by pulling them apart and guiding the thread in between the discs. Then release the discs.

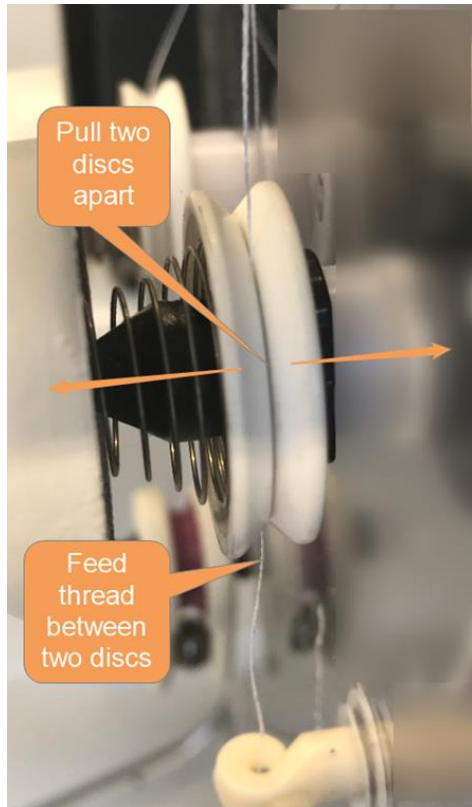


Figure 25 Feed the thread as shown

5. Feed the thread through the support block.
6. Feed the thread through the first pulley by pushing it past the small retaining ball.
7. Feed the thread through the second pulley by pushing it past the small retaining ball.
8. To feed the thread through the second tensioner:
 - a. Separate the two discs by pulling the outer disc away from the inner disc.
 - b. Pull the outer disc away far enough so that you can feed the thread underneath the "hook".

- c. Feed the thread under the plastic “hook”.
- d. Release the discs.

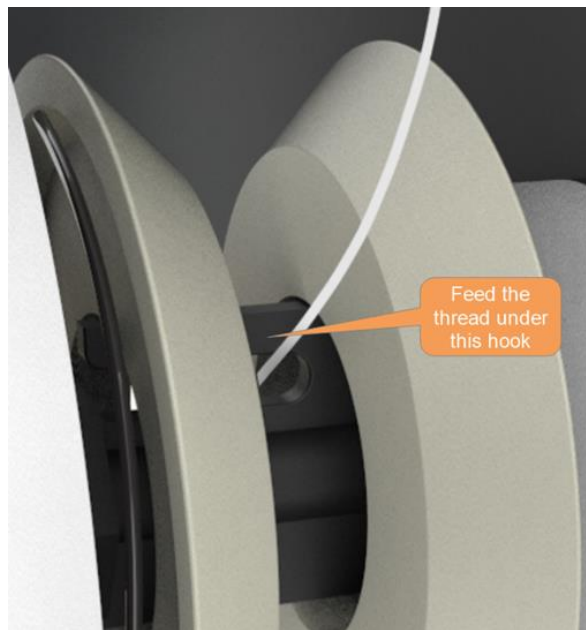


Figure 26 Feed the thread under the hook

- 9. Open the top two covers:



Figure 27 Opening the two top covers:

10. Open the Arc Cover and the Drying tunnel:



Figure 28 Arc Dying Head

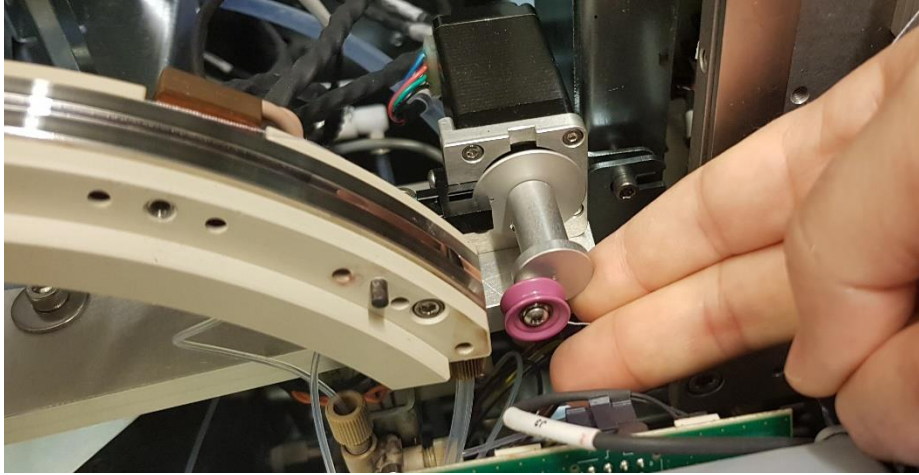
11. With the upper door of the dryer open and the Thread feeding wheels lifted up, insert the thread along the dyeing head.



Figure 29 Open upper door of dryer

Note

Make sure the thread is situated below the cleaning roller



The completed thread guiding path at the TGU is as shown below.



Figure 30 Completed thread guiding path

- At the thread winding side of the machine, feed the thread through the first thread guide lock. Note that this position is number “8” on the TS-1800.



Figure 31 First thread guide lock

- Insert an empty collecting cone into the machine.

For instructions on how to do this, refer to section 2.6: “Inserting a New Collecting Cone”.

- Press the **Load** button on the machine panel.

The TS-1800 performs automatic thread loading. When it has completed the process, it is ready to start a new job and the following message displays:

Thread loading completed successfully

IMPORTANT!

The automatic thread loading process can take a few minutes. The blue Load button flashes slowly during the process and you can hear the machine performing mechanical actions inside the machine. **DO NOT** press any buttons while this is happening. Wait until the Load button blue light is ON and has stopped flashing.

To check that you have set up everything correctly, press the **Jog** button for a few seconds to confirm that the thread is winding correctly onto the winding cone.

2.6 Inserting a New Collecting Cone

A new collecting cone should be inserted when:

- Loading thread for the first time
- The collecting cone fills up
- You want to start a new color on a new cone
- The thread has just been replaced

To insert a new collecting cone:

1. Starting at the larger end of a new collecting cone, feed the thread through the inside of the cone.



Figure 32 Feeding the thread through the large end of the cone

2. Allow a short piece of thread to protrude through the small end of the cone.
3. Push the winding arm all the way back.
4. Holding the cone in your left hand, pull the cone support arm all the way out with your right hand.

Make sure that the thread remains inside the cone.

5. Place the cone into its position in the winder.
6. Release the cone support arm, making sure that it seats correctly into the end of the cone.

Make sure that the end of the thread is protruding from the small end of the cone.

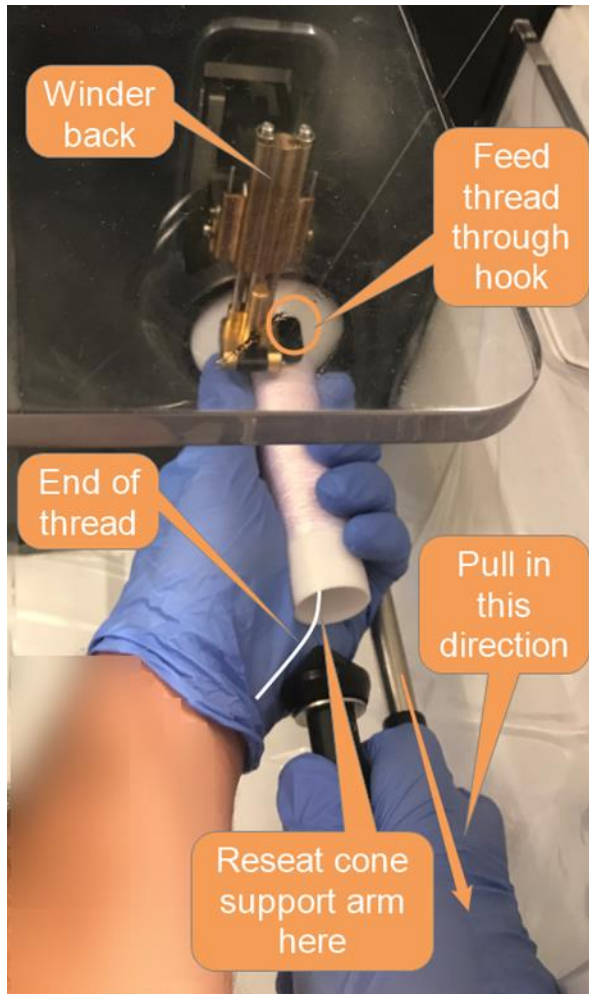


Figure 33 Inserting the cone into the winder

7. Feed the thread through the hook on the winding arm.
8. Cut off the end of the thread protruding from the small end of the cone.
9. To take up any slack in the thread, rotate the cone in a clockwise direction as far as you can.

The thread winding unit is now ready to continue the **Automatic Tread Loading** process.

10. Continue the automatic thread loading sequence by selecting the current thread type and pressing **Continue** on the tablet message.

2.7 Replacing the Thread

When a new job requires a different thread to the one already loaded, tie a new thread to the existing one.

Procedure

1. Create extra slack in the thread by manually unwinding some of the thread from the feeding cone.
2. Using a pair of scissors, cut the existing thread just after the feeding cone.

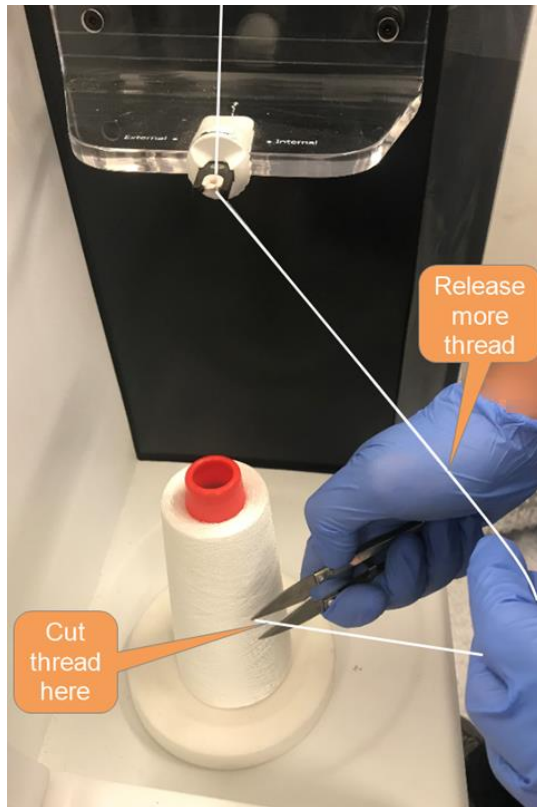


Figure 34 Cutting the thread at the feeding cone

3. Remove the current feeding cone.
4. Place a full feeding cone into the thread feeding unit.
5. Unwind a portion of the thread from the new feeding cone.

6. Tie a simple knot between the existing thread and the new thread by following the next seven (7) steps closely.

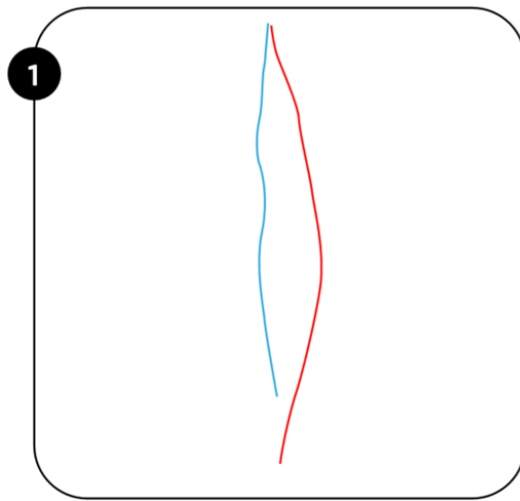


Figure 35 Place the ends of the two threads next to each other

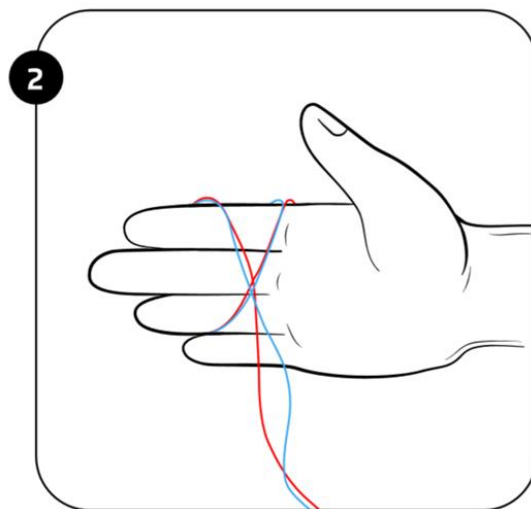


Figure 36 Hold the threads together and wrap them around your hand

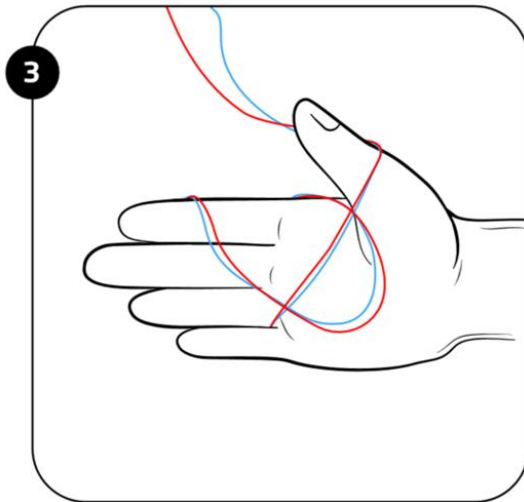


Figure 37 Pass the two ends through the inside of the loop

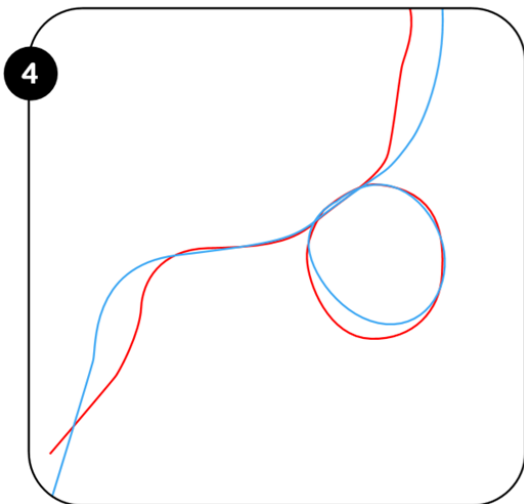


Figure 38 Remove your hand

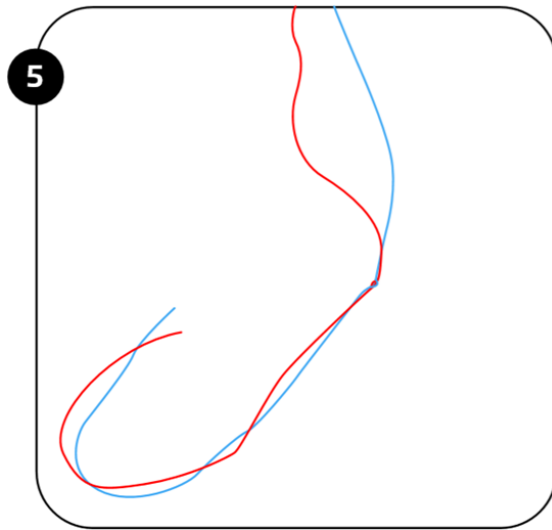


Figure 39 Pull on each side to form a small knot

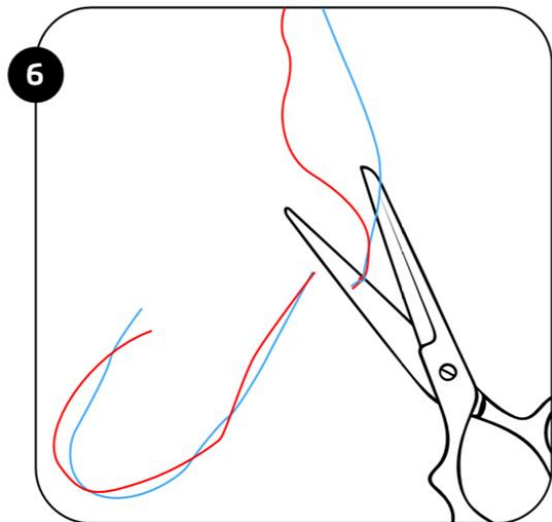


Figure 40 Cut the excess thread after the knot

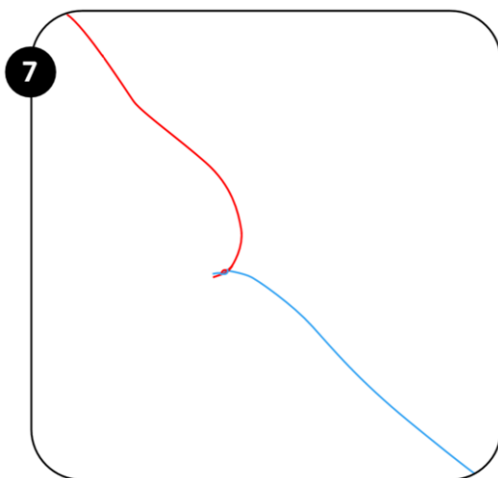


Figure 41 Pull on the two ends to make sure that the knot is strong

You can now proceed with the remaining steps of the procedure.

7. Manually wind excess thread back onto the feeding cone.
8. Ensure that the thread is clipped into the first guide lock, as shown.

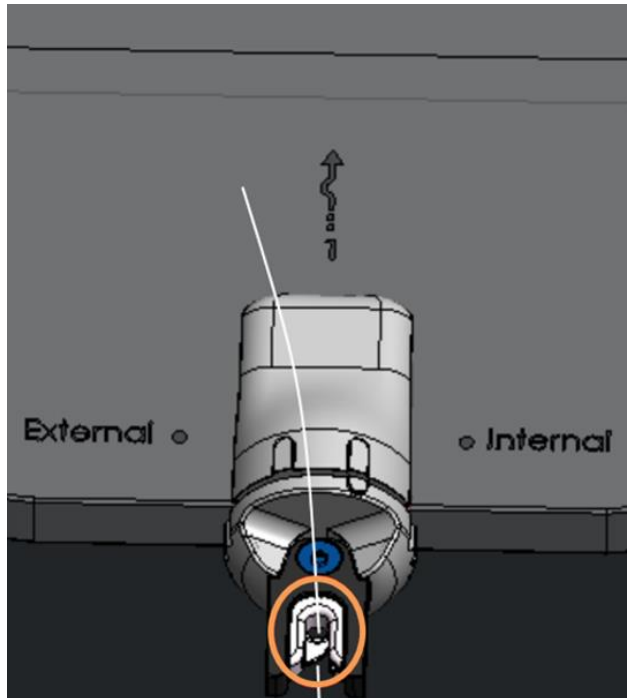


Figure 42 Thread correctly located in first guide lock

9. On the panel, press and hold the **Jog** button until the knot appears at the collecting cone.

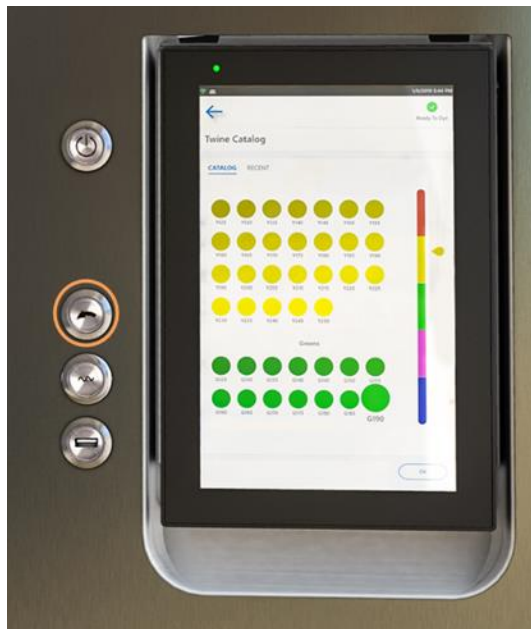


Figure 43 Thread jog button

10. Cut the thread past the knot, near the winder.

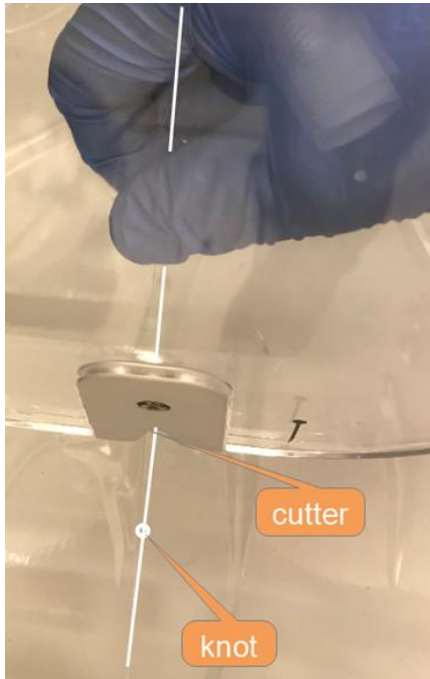


Figure 44 Cutting the thread at the winder

11. To release the current collecting cone, refer to section 2.8 “Releasing the Current Collecting Cone”
12. To insert a new collecting cone refer to section 2.6 “Inserting a New Collecting Cone”.

2.8 Releasing the Current Collecting Cone

To release the existing collecting cone:

1. Unwind some of the thread on the collecting cone to create some slack in the thread.
2. To release the collecting cone, hold the cone with your left hand and, using your right hand, firmly pull the spring-loaded cone support arm in the direction shown in Figure 45.

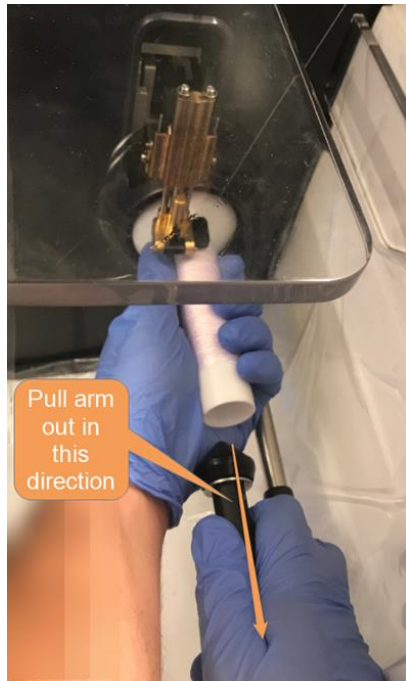


Figure 45 Releasing the cone

3. Release the cone support arm, allowing it to spring back to an unloaded position.
4. Release more thread from the cone so that thread can reach the built-in thread cutter.

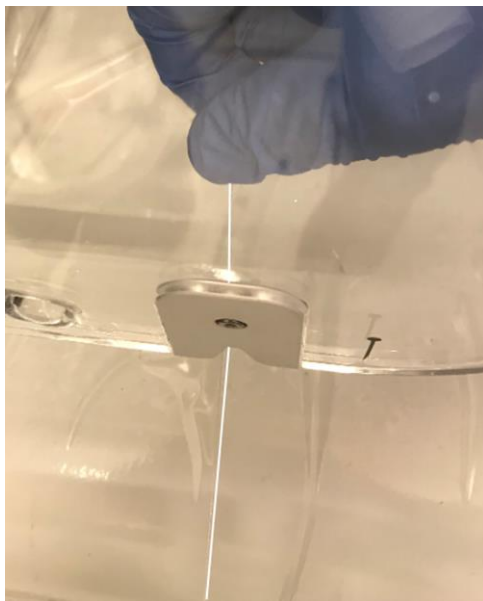


Figure 46 Cutting the thread at the winder

5. Cut the thread.
6. Remove the current collecting cone.
7. Store or reuse the current collecting cone.

To insert an empty or a new collecting cone, refer to section 2.6: “Inserting a New Collecting Cone”.

3 Managing Jobs

3.1 Home Screen

3.1.1 Using the Home Screen

The home screen of the PPC shows a list of previously created jobs. The list includes the job status, job name, customer name, length of thread required for the job, which colors are used, and when it was last updated.

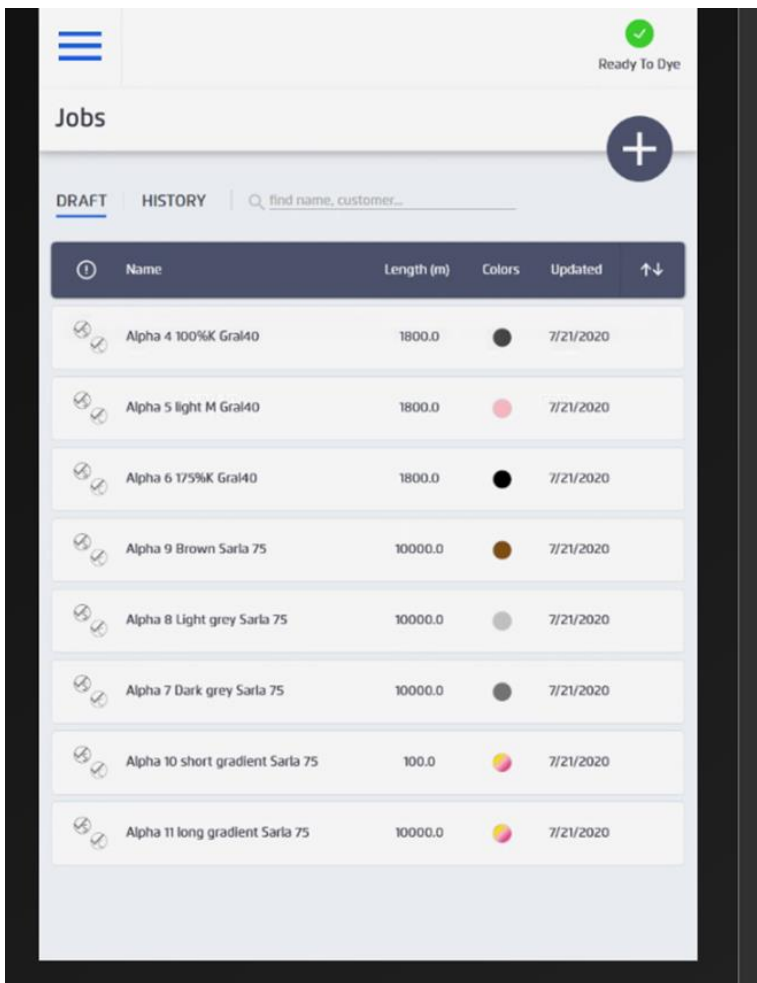


Figure 47 Job list

The “TS-1800 status” icon is shown on the top right side of the screen. It indicates the TS-1800’s current condition, which can be any of the following:

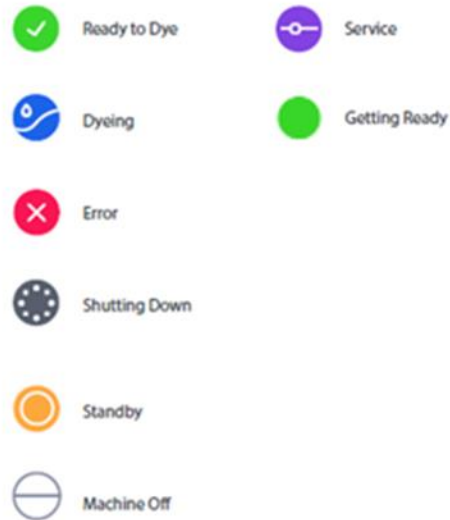




Figure 48 TS-1800 statuses

3.1.2 Managing the Job List

From the list of jobs in the Home screen, you can search, select, edit, run or add new jobs.

- Tap the **DRAFT** tab for jobs that are not yet complete.
- Tap the **HISTORY** tab for a list of previously run jobs.
- To sort the list by name, customer, length of thread needed, color or date updated, tap the appropriate heading.
- To search for a specific job, enter the name of the job or customer on the search line above the list. 
- To select one or more jobs to delete, copy, or dye, tap and hold . New icons appear with more options as shown.

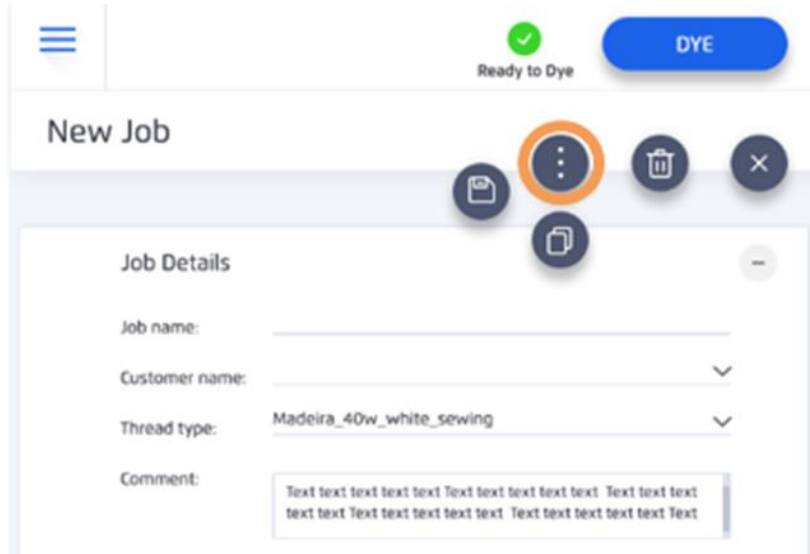


Figure 49 Options for managing jobs

- To open a job for editing or dyeing, tap the job. A “*Job details*” screen appears with the following options to run or edit the job.

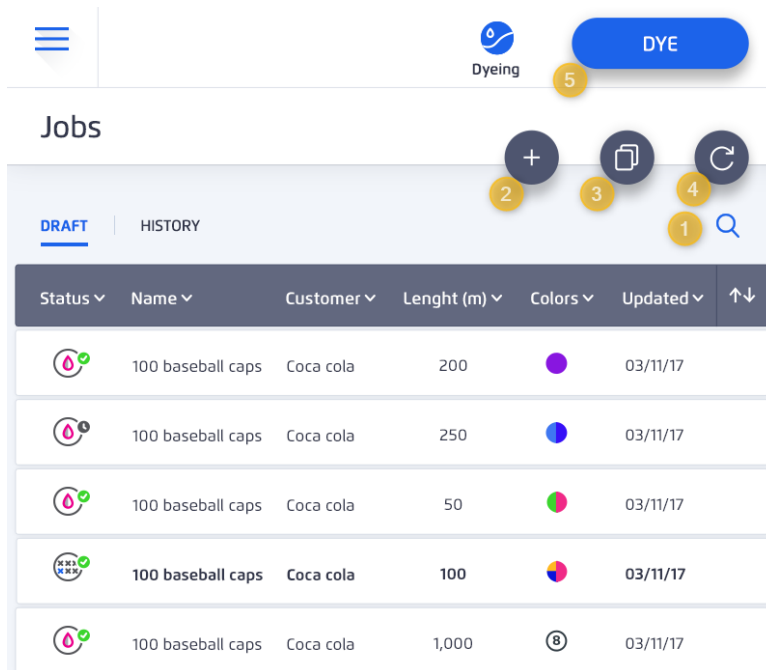


Figure 50 Options for managing selected jobs

Element	Description
1	Tap and enter text to search for a job by name or customer.
2	Tap to create a new job.

Element	Description
3	Tap to copy a job.
4	Tap to undo or the previous action.
5	Tap to start dyeing the selected job.

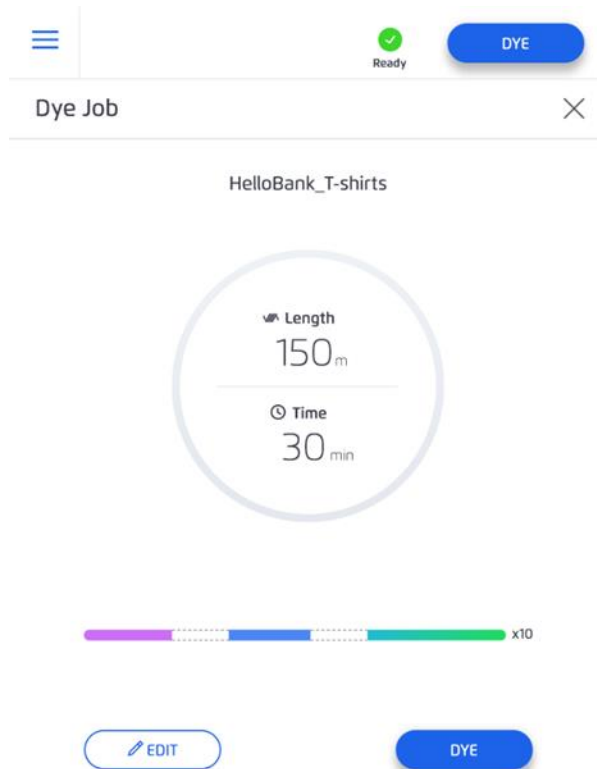



Figure 51 Job Summary displayed when opening job

3.1.3 Main Menu

To open the main menu, in the top left corner of the home screen, tap the  icon. The main menu contains the following options:

- Jobs
- Events
- Settings
- Storage
- Update
- Maintenance

3.2 Creating a new Job

A “job” is a sequence or unit of work set up to be run by the TS-1800. It consists of feeding white thread into the machine and dyeing it the specified color (or colors). You define the colors and other parameters of the job through the PPC.



Prepare the TS-1800 for Dyeing before running a job. For more information, see Section 2 “Operating the TS-1800”.

Creating a new job consists of the following steps:

1. Defining the job (name and thread type) (See section 3.2.1 “Defining the Job”).
2. Specifying colors (See section 3.2.2 “Adding colors”).
3. Defining other dyeing parameters (See section 3.2.3 “Defining the Dyeing Parameters”).

3.2.1 Defining the Job

1. In the upper-right corner of the main window, tap the icon.

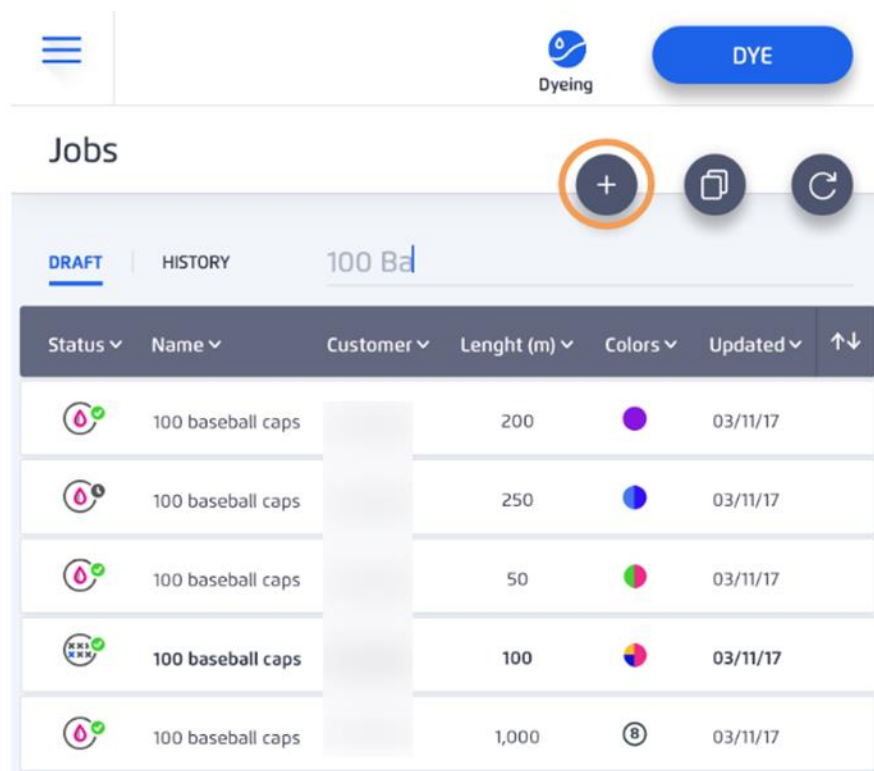


Figure 52 Defining a Job

The *New Job* screen appears.

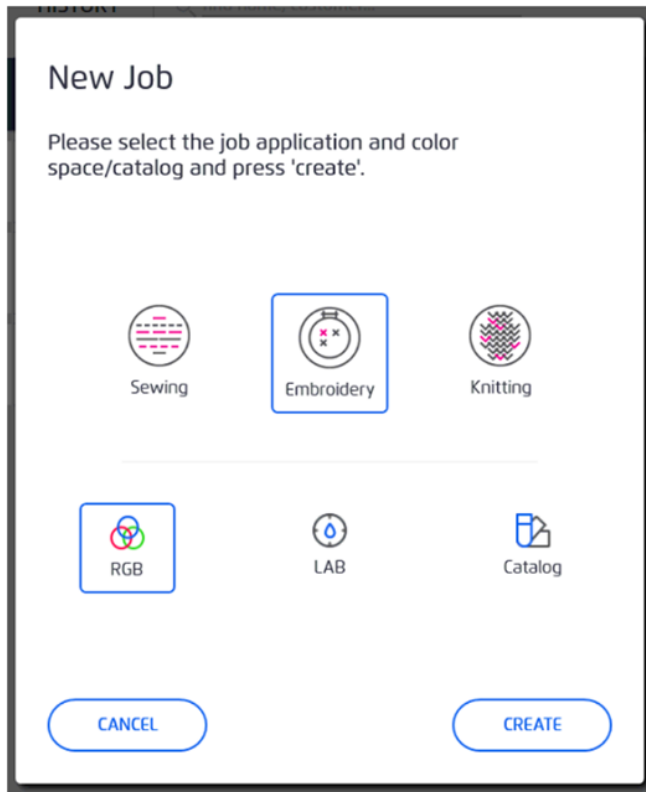


Figure 53 Selecting an industry sector and color space

2. Select the relevant Industry sector:
 - Sewing
 - Embroidery
 - Knitting
3. Select a color space/catalog for the job. This is the method you will use to define the colors.
 - RGB
 - Lab (The “CIELAB” color space)
 - Coats Catalog
 - Twine color catalog





Once you choose an industry sector and color space/catalog for a job it cannot be changed for that job.

If you generally use the same job type and/or color space/catalog for each job, you can set the default preferences so you do not have to select it each time. See Job Settings for more information.

4. Tap **Create**.

A new job definition page appears. This page has the following sections:

- Job Details
- Color and Length
- Output
- Job Summary
- Additional Tools

You can expand or reduce these sections to see more or less information by tapping the  or  buttons next to each section.

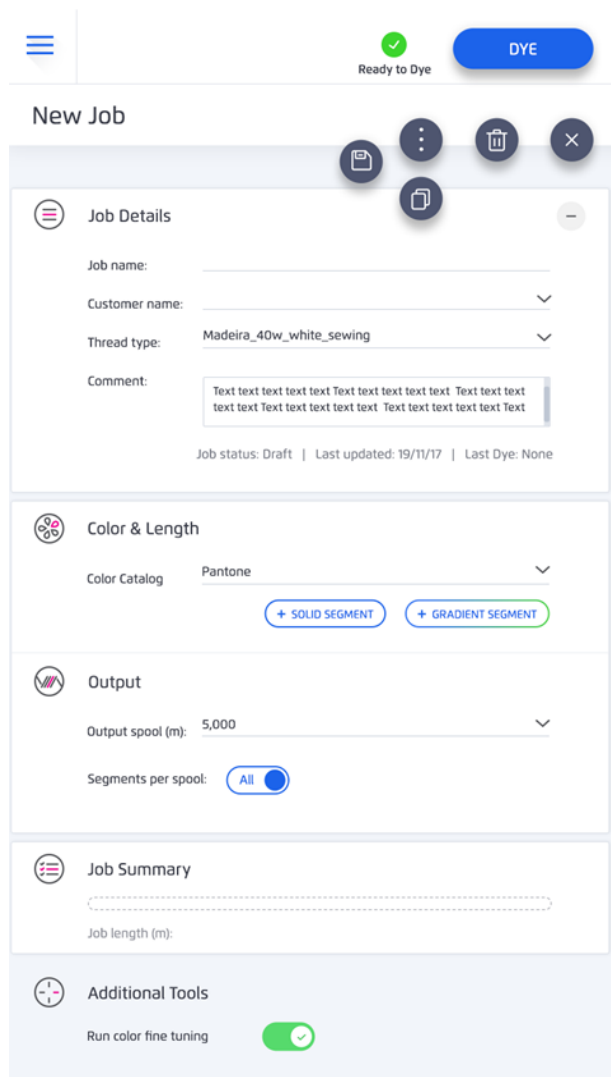


Figure 54 Defining a new job

5. In the *Job Details* section enter:

- Job Name (required)
- Customer Name (optional)

- Thread Type (required). You will be asked to choose from a list of supported types depending on industry sector.
- Comments (optional)

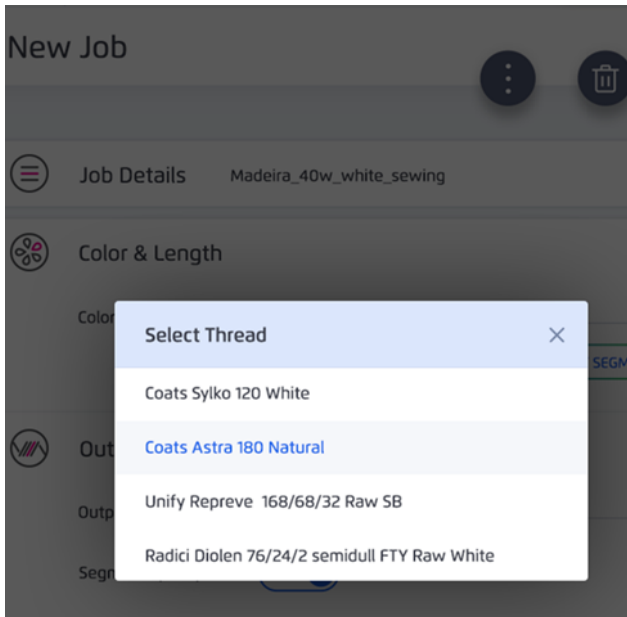


Figure 55 Job details - thread type

6. In the *Color and Length* section define the colors and lengths of the segments you want to dye.

For Embroidery jobs enter the number of units and heads.

You are now ready to define the colors.

3.2.2 Adding colors

You define the colors in the *Color and Length* section of the Job Screen. You can add solid color segments or gradient segments where the thread gradually transitions from one color to another.

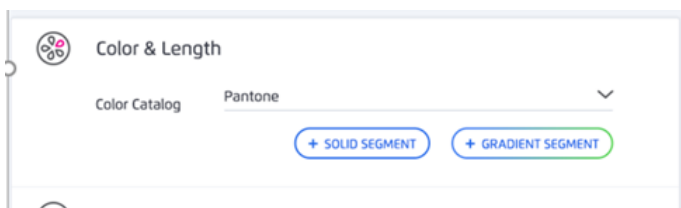




Figure 56 Defining color and length of thread

3.2.2.1 To add a solid color:

1. Tap **+ Solid Segment**. 
2. Enter the color coordinates or choose catalog sample depending on the color space/catalog you defined when creating the job. Tap the palette to see the catalog samples.
3. Enter the length of thread in meters.
4. Repeat this process as many times as necessary to add as many color segments as you need for your job (Figure 57).

3.2.2.2 To add a color gradient:

1. Tap **+ Gradient Segment**. 
2. Enter the total length of the segment in meters.
3. Tap **Add Color** and enter the color coordinates or catalog number.
4. At *“Position”*, enter the point (in meters) along the gradient that color should appear.
5. Repeat this process as many times as necessary to add as many colors as you need for the segment. The last color is at the end of the segment and therefore its position will automatically be set to the total segment length.

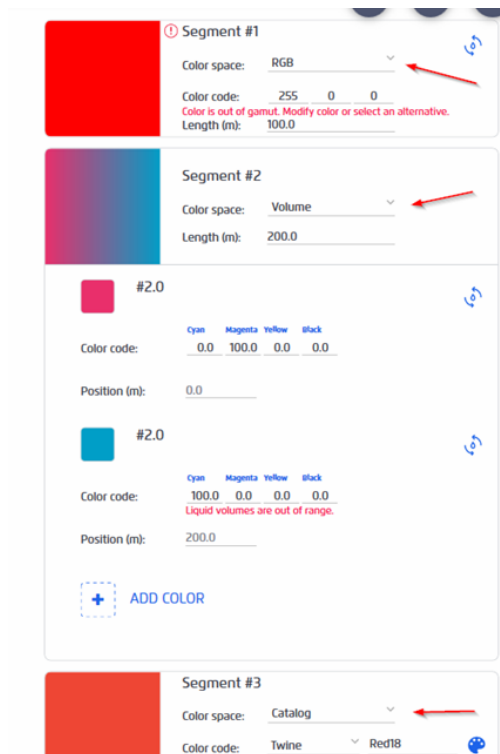


Figure 57 Adding Solid Colors and Gradients



Gradients must contain at least two colors. There is no maximum number of colors.

Note

Notice that each color segment has its own color space selection so that each color can be in a different color space.

3.2.2.3 Multi Segment Job Loading

When a job consists of more than one segment each segment can be input manually as described in sections 3.2.2.1 and 3.2.2.2 or they can be imported from a CSV file. Importing a CSV file is recommended for jobs with more than five segments.

To load a job from a CSV file:

1. Open the Excel file template Job Creation Template.xlsx

The template contains columns for segment color space, length, and up to two segment stops for gradients. It also contains columns for editing each component of each color space (RGB, LAB, Volume, and Catalog).

2. Edit the file with the desired color segment values.

The maximum number of segments (lines) in the file is 200.

For example, the following file contains three color segments:

- ◆ 100m solid RGB
- ◆ 150m gradient Volume
- ◆ 400m solid LAB

	Color Space	Length (m)	Expected color	Catalog Name 1	Catalog Item 1	RGB			LAB			Volume				Expected color	Catalog Name 2	Catalog Item 2	R 2	G 2	B 2	L 2	A 2	B 2	C 2	M 2	Y 2	K 2
						R1	G 1	B 1	L 1	A 1	B 1	C 1	M 1	Y 1	K 1													
1	RGB	100				25	5	0	0																			
2	Volume	150										2	3	4	5													
3	Lab	400								8	1	1	0	6	0													

3. Save the file (Sheet 1) as a CSV.

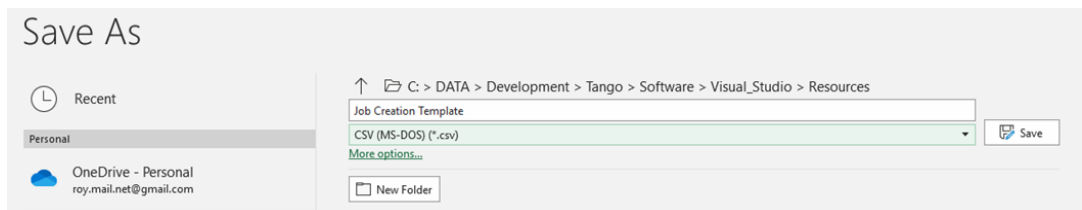


Figure 58 Save as CSV

4. Copy the CSV to a removable drive (DOK) and insert the drive on the TS-1800 tablet.
5. Browse for and select the CSV using the file storage module.



Figure 59 Select CSV

6. Enter the job name and thread type at the prompts.

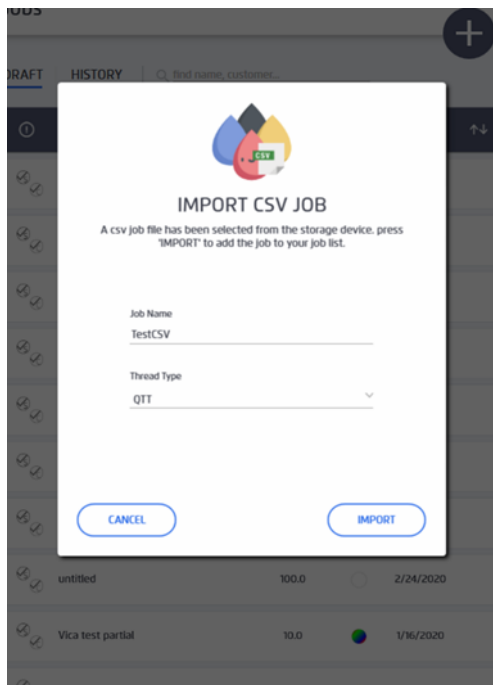


Figure 60 Job Name and Thread Type

7. Click Import.

3.2.2.4 Unsupported Colors

Occasionally, when selecting a color, a message might appear indicating that the selected color is not supported.

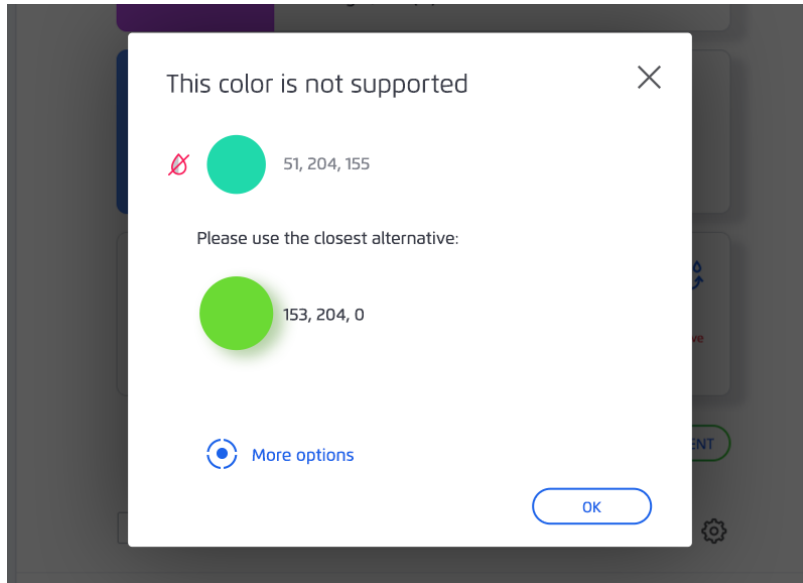


Figure 61 Unsupported color

If this happens, you have three options:

- Tap **OK** to select the suggested alternative color.
- Tap **More options** to select a color from the color palette.
- Close the window and select a new color using the color code/catalog.

3.2.2.5 Managing the Color Segments List

You can rearrange the order of colors in the gradients, and delete or rearrange the order in which the color segments are dyed.

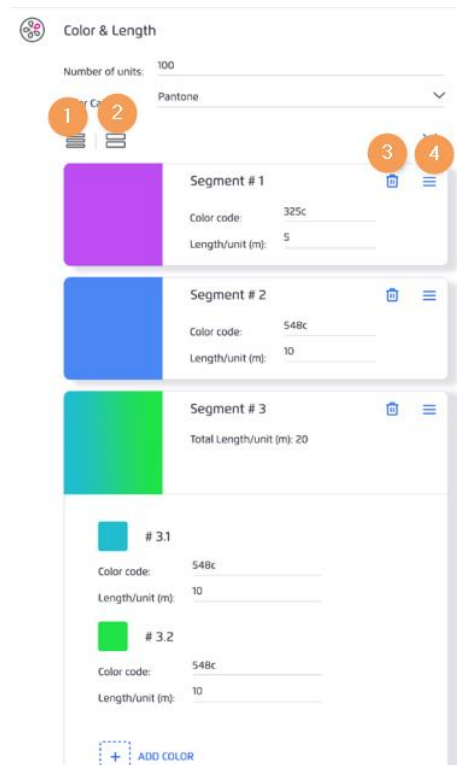


Figure 62 Deleting and rearranging color segments

Element	Description
1	Tap for a less detailed description of the segments
2	Tap for a more detailed description of the segments
3	Tap to delete this segment
4	Hold and drag to rearrange the order of the segments

3.2.3 Defining the Dying Parameters

Now that you have specified the color(s), there are a few more details that need to be defined before you can begin to dye the thread.

3.2.3.1 White Spacing

When dyeing more than one segment on a spool, you have the option of leaving some white space in between the colored segments. To do this, check **Include white spacing between segments** and enter how many meters of space you want in between each segment.

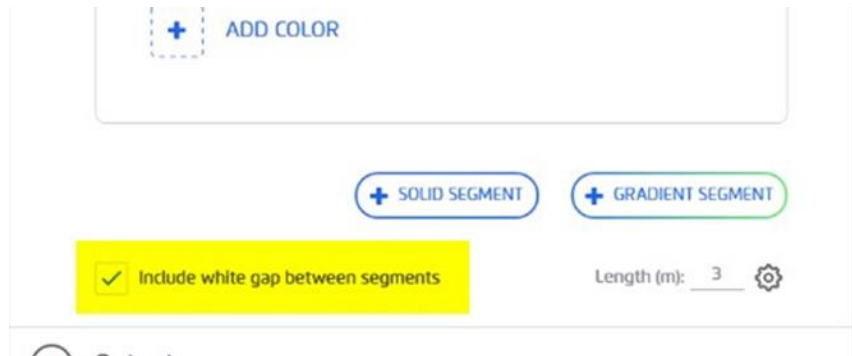


Figure 63 Adding white spaces

3.2.3.2 Spools

In the *Output* section, slide the **Segments per spool** slider right or left to choose if you want to dye all segments on the same cone or each segment on a different cone:

- **All:** Dye all color segments on the same cone.
- **One:** Dye each color segment on a separate cone.

Selecting **One** causes the TS-1800 to pause between each segment for you to load a new cone.

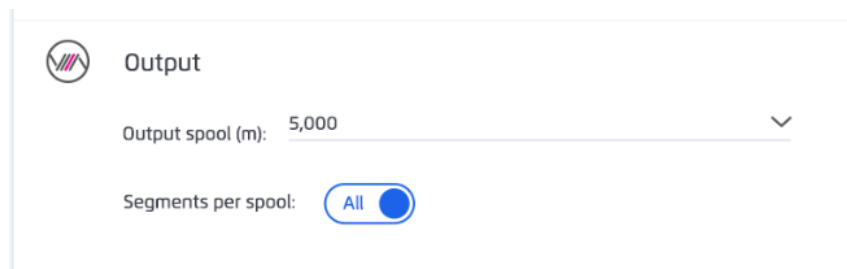


Figure 64 Setting the output to All or One

3.2.3.3 Job Summary

The *Job Summary* section provides a graphic overview of the job you created. You can enter a job factor here that will automatically be added to the length of thread in a job. The color and length of each segment is shown as well as the total length of thread used for the job, including the job factor.



The *job factor* is a pre-set percentage that will automatically be added to the length of thread in a job. This enables you to take some amount of spare thread into account when defining how much thread to dye.

From the *Job Summary* section you can:

- Tap **Dye** to start dyeing the job.
- Continue to *Additional Tools* where you can fine-tune the colors and/or color proof them before dyeing the whole job.

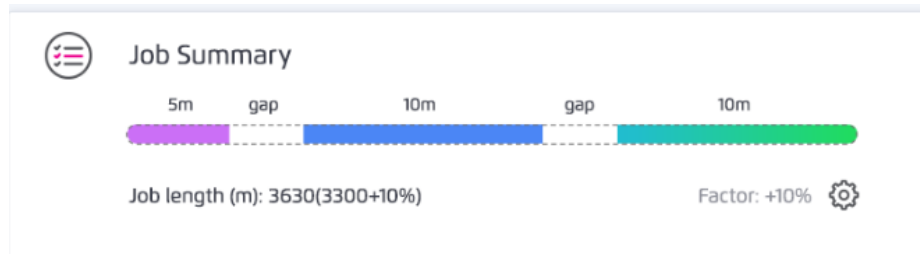


Figure 65 Job Summary and Job Factor

3.3 Managing and Editing an existing Job


The icons on the top of the *Job Details* screen enable you to save, delete, or edit an existing job.



Figure 66 Job details

Element	Description
1	Tap to run the job.
2	Tap to close the job window.
3	Tap to delete the job.
4	Tap to get more options

Element	Description
5	Tap to save the job
6	Tap to copy the job

When a job is running, the status icon on top of the PPC changes to *Dyeing*  and the following window appears on the PPC showing progress and how much time is left to complete the job:

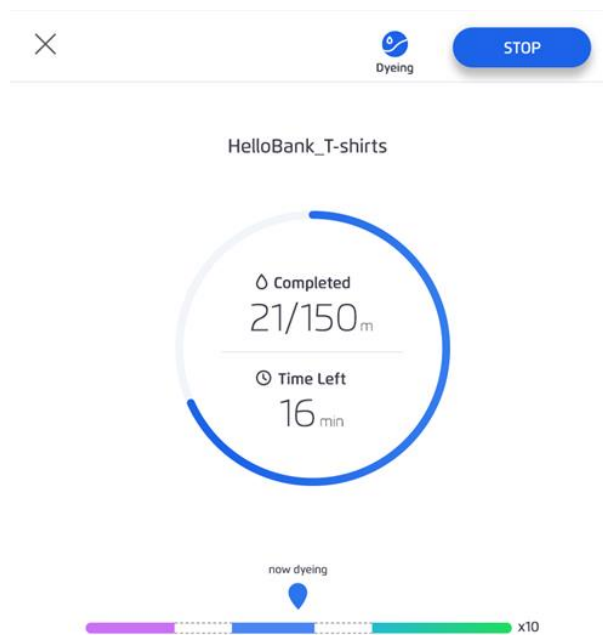


Figure 67 Job Progress Window - Full Screen

You can close this window and continue editing other jobs. The job progress will still be shown on top of the PPC.

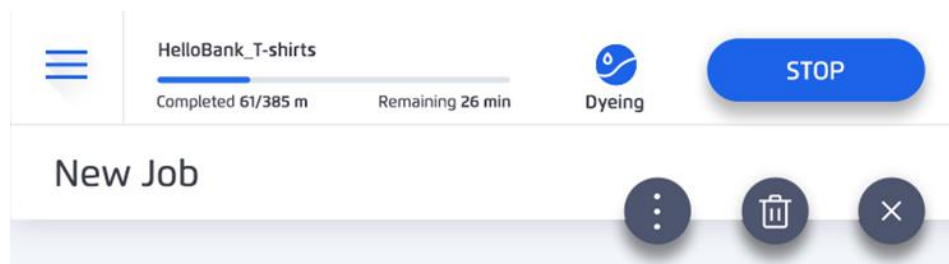
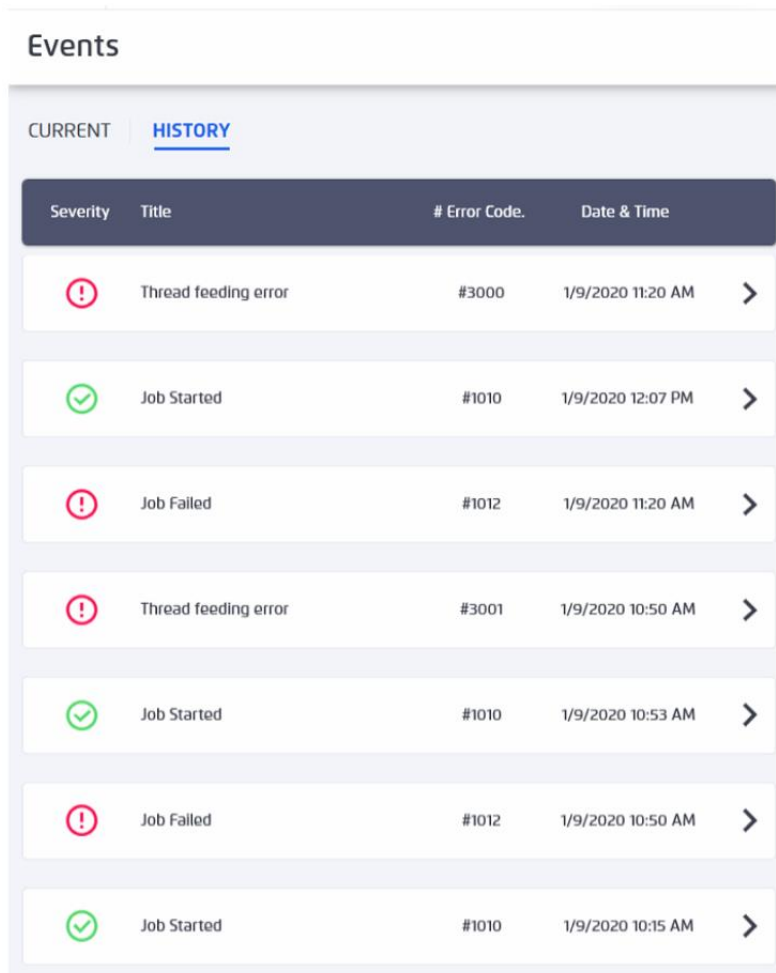


Figure 68 Job progress window in PPC notification line

3.4 Events

The event log is a detailed record of all warnings and errors that occurred while running jobs. Even when a job runs successfully, warnings might be logged that could be helpful in tracking, diagnosing, or preventing problems.

From the Main Menu, tap **Events** to display the events log of all errors and warnings.



The screenshot shows the 'Events' screen with a 'CURRENT' tab and a 'HISTORY' tab. Below the tabs is a table with the following columns: Severity, Title, # Error Code., and Date & Time. The table contains eight rows of event data, each with a severity icon (red exclamation mark, green checkmark, or orange exclamation mark) and a right-pointing arrow.

Severity	Title	# Error Code.	Date & Time
!	Thread feeding error	#3000	1/9/2020 11:20 AM
✓	Job Started	#1010	1/9/2020 12:07 PM
!	Job Failed	#1012	1/9/2020 11:20 AM
!	Thread feeding error	#3001	1/9/2020 10:50 AM
✓	Job Started	#1010	1/9/2020 10:53 AM
!	Job Failed	#1012	1/9/2020 10:50 AM
✓	Job Started	#1010	1/9/2020 10:15 AM

Figure 69 The events list

The events are color coded into three categories of severity:

- Red – critical safety issue
- Orange – error
- Green - warning

Events that are currently relevant and have not been fixed are displayed. Tap the **History** tab to see a list of past events that have been resolved.

For more details and instructions about an event, tap >.

The screenshot shows a mobile application interface with a top navigation bar. On the left is a hamburger menu icon. In the center is a 'Standby' status indicator with a yellow circle. On the right is a blue 'DYE' button. Below the navigation bar is the 'Events List (7)' header with a refresh icon. The main content area is titled 'CURRENT (7)' and contains a table of events. The first event is expanded, showing a green checkmark icon, the title 'Handling the Waste Cartridges', error number '#30', and date '21/02/18 08:08:33'. The expanded view includes a list of steps: '1. Open the cartridge cover', '2. Remove the full waste cartridge', '3. Insert an empty ink cartridge into the slot', and '3. Close the cartridge cover'. An optional instruction states: 'Optional: if the second waste cartridge is also full, repeat Steps 2 and 3'. An image of the printer's cartridge compartment is shown on the right. Below this are several other event rows with various severity icons (warning, error, success) and titles like 'Machines front door is int...', 'No media detected', and 'Cartridge is empty'. At the bottom, there is a 'HISTORY' section.

Severity	Title	# Error No.	Date & Time
✓	Handling the Waste Cartridges	#30	21/02/18 08:08:33
<p>Handling the Waste Cartridges</p> <ol style="list-style-type: none"> 1. Open the cartridge cover 2. Remove the full waste cartridge 3. Insert an empty ink cartridge into the slot <p>Optional: if the second waste cartridge is also full, repeat Steps 2 and 3</p> <ol style="list-style-type: none"> 3. Close the cartridge cover 			
!	Machines front door is int...	#123	21/02/18 08:08:33
!	No media detected	#45	21/02/18 08:08:33
✓	Cartridge is empty	#2	21/02/18 08:08:33
!	Cartridge is empty	#2	21/02/18 08:08:33
✓	Cartridge is empty	#2	21/02/18 08:08:33
!	Cartridge is empty	#2	21/02/18 08:08:33

HISTORY

Figure 70 Detailed event window

Events also appear in real-time on the notification bar on the top line of the home screen.

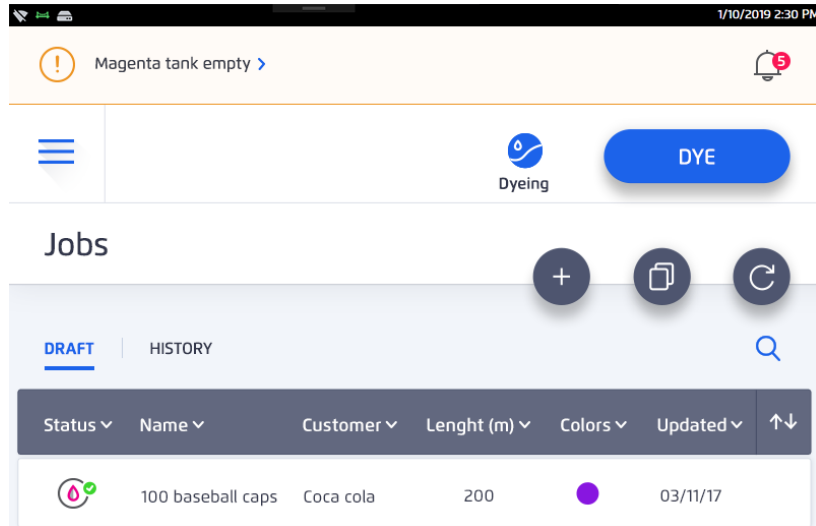


Figure 71 Main Menu - Event notification

The number next to the alarm bell on the top line shows how many events have occurred. To see all the events, pull down on the notification bar.

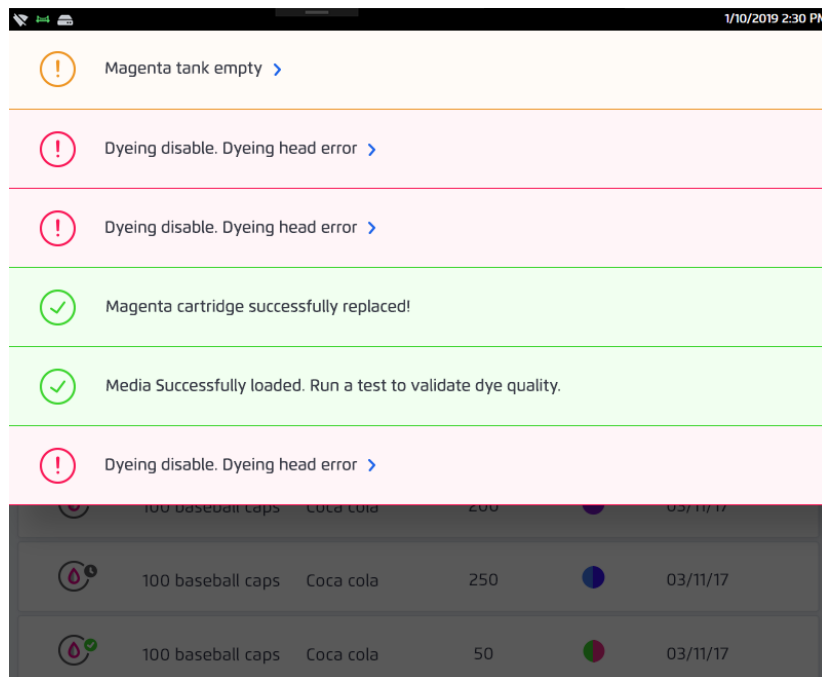


Figure 72 Main Menu - Event notification bar open

3.5 Settings

The Settings page enables you to set certain internet connectivity and job settings preferences.

3.5.1 Connectivity

The Connectivity section shows available Wi-Fi connections and enables you to create a Wi-Fi hot spot.

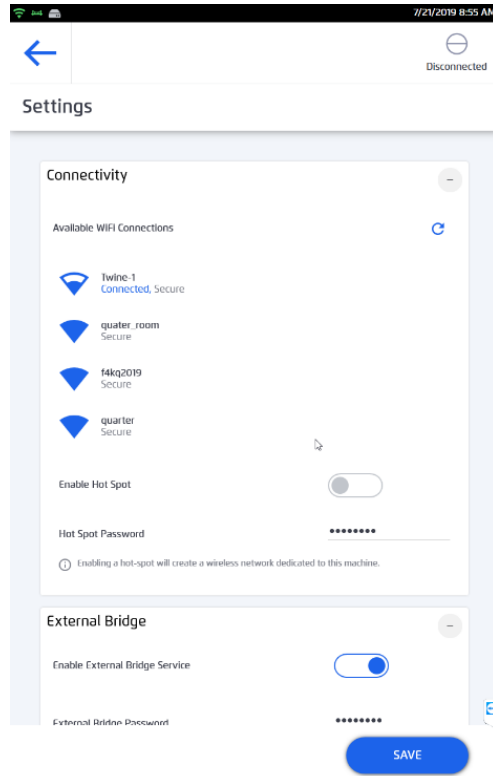


Figure 73 Settings

- To connect to Wi-Fi tap the required Wi-Fi connection and enter the password, if necessary.
- To create a hot-spot, slide the slider to the *On* position and enter the password. To disable a hot-spot, slide the slider to the *Off* position.

3.5.2 Job Settings

In the Jobs settings section, you can select default preferences for the job settings you use most often. They can be edited manually for any specific job. You can set default values for any of the following:

- Supported Job Types (Sewing, Embroidery, or Knitting)
- Supported Color Space/Catalog
- Default Thread Type
- Default Segment Length
- Lubricant Level

There are five levels of lubricant that can be selected for the machine to apply to the thread from the PPC Settings screen. Changing the amount of lubricant can improve the dyeing quality.

To change the default job settings:

1. Tap on the 3 horizontal blue lines in the top left corner of the screen to open the Main Menu.

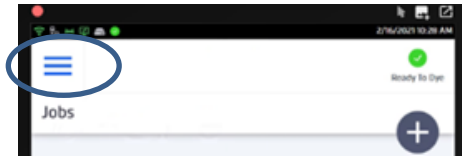


Figure 74 Main Menu

2. Select **Settings**.

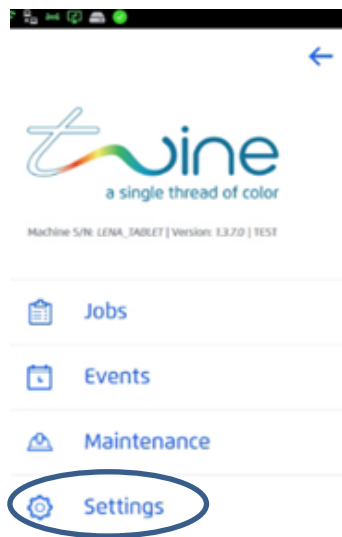


Figure 75 Changing Default Settings

3. Scroll down to the *JOBS* section to set the default settings for Job type, color space, thread type, and/or segment length.

To set the lubricant level scroll down to the *Lubrication Levels* section and select one of the five options from **None** to **Very High**.

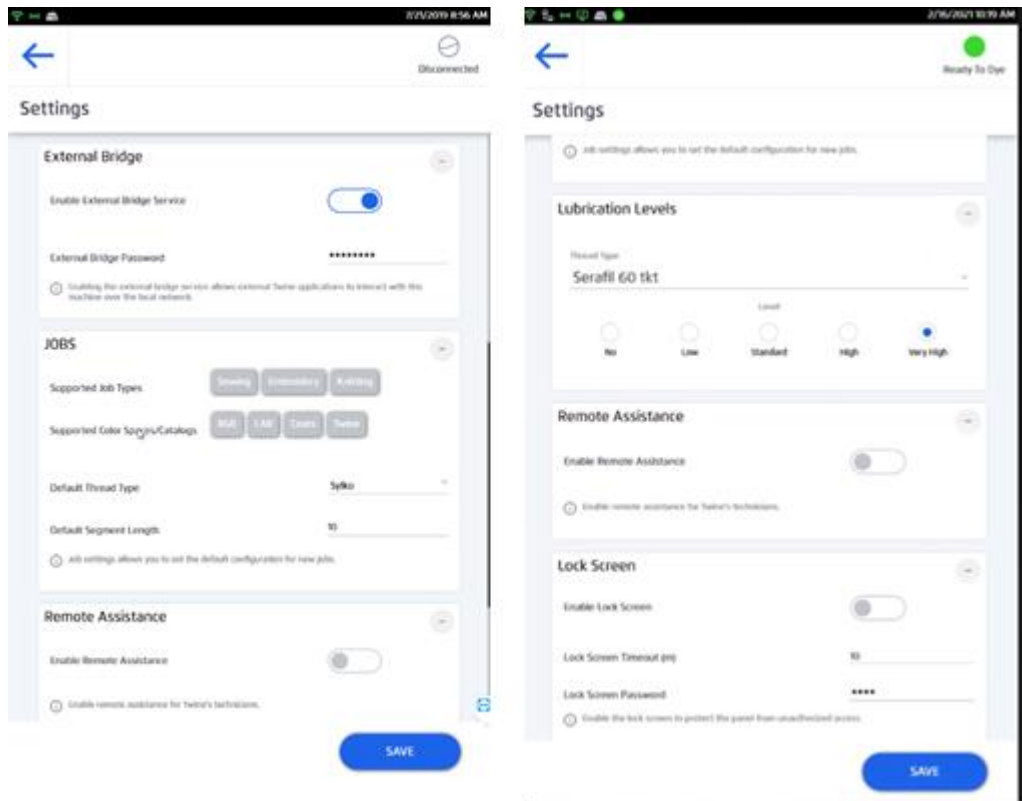


Figure 76 Selecting Default Job Values and Lubrication Level

8. Click Save.

Note

If a lubrication value other than **Standard** is selected there will be a notification under the Thread Type in the Job Details description. This notification will not appear when standard lubrication levels are selected.

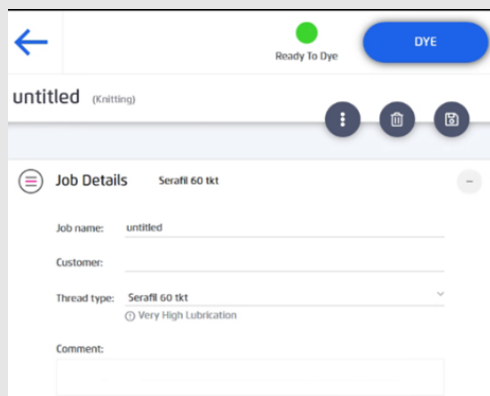


Figure 77 Lubrication Level Notification

3.5.3 Remote Assistance

When calling Customer Service, it might sometimes be necessary for the service provider to access and control the PPC. This can only be done with the user's permission. To enable

Twine Customer Service to access the PPC for providing support, slide the **Enable Remote Assistance** slider to the *On* position.

3.5.4 Lock Screen

Lock screen setting enables the user to lock the PPC for predefined amount of time (in minutes) in order to prevent non-authorized users from accessing the TS-1800.

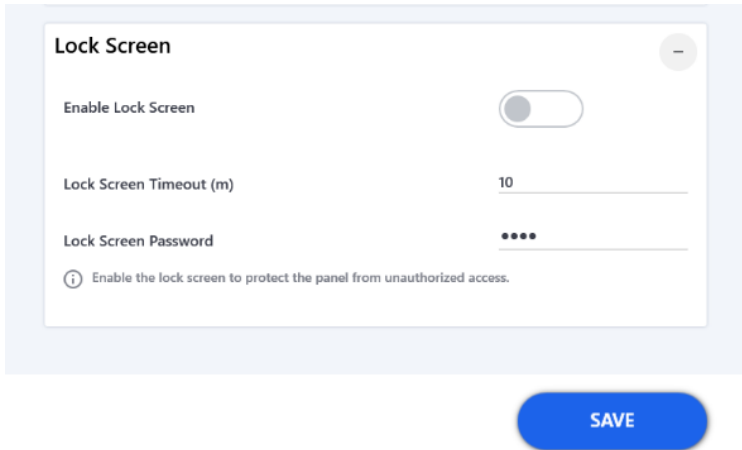


Figure 78 Lock screen password setting

3.6 Storage

Storage enables you to save the jobs onto an external Flash drive.



Figure 79 Saving a job on an external drive

4 Update

It is important that the PPC remains updated with the latest software versions. A notification appears when updates are available. Follow the on-screen prompts to install the updates.



Version **1.0.34.0** is available

Updating your machine can improve the following:


- ✓ Support for new media
- ✓ Refined color conversion and calibration algorithms
- ✓ Software fixes and improvements
- ✓ Firmware upgrade

Tap 'UPDATE' to start updating now.

UPDATE

Figure 80 Software Update Screen

5 Maintenance

Maintaining your TS-1800 is important for best performance and long life of the machine. The maintenance procedures are done by the operator through the *Maintenance* menu. To access the maintenance menu, tap on the  tab at the right side of the screen and then on **Maintenance**.

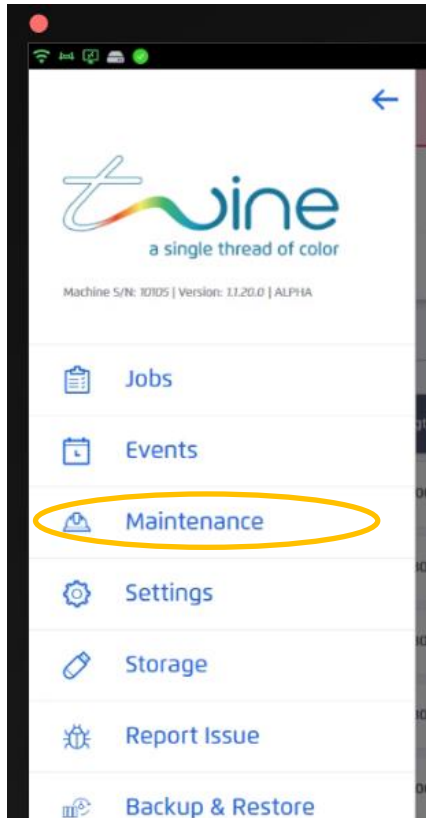


Figure 81 Accessing the maintenance menu from the PPC

The *Maintenance* page contains the following sections:

- Current status: Contains information about the current status of the machine
 - ◆ Temperature
 - ◆ Ink levels
 - ◆ Cone status
- Actions: Performs the following maintenance procedures:
 - ◆ Open left or right leading wheels
 - ◆ Open dyeing head lid
 - ◆ Run head cleaning procedure
 - ◆ Reset thread loading
 - ◆ Export system logs

- Guides: Step by step instructions for:
 - ◆ Loading an ink cartridge
 - ◆ Replacing a carbon air filter
 - ◆ Replacing the thread
 - ◆ Handling the waste cartridge
 - ◆ Loading new thread
- Dyeing counters showing:
 - ◆ Total Dye Time
 - ◆ Total Dye Meters

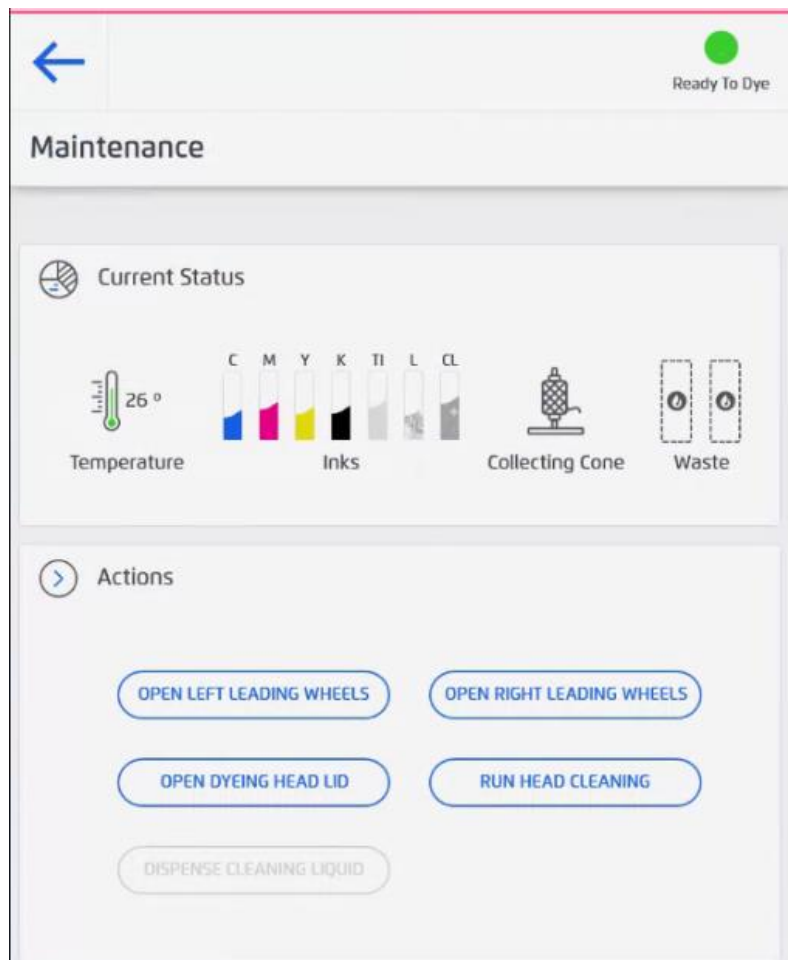


Figure 82 Maintenance menu

5.1 Replacing the Feeding Wheels:

For best dyeing quality, the feeding wheels need to be replaced periodically. Information regarding when to replace the feeding wheels will be provided by your service provider engineer. When it is time to replace a feeding wheel do the following:

1. Remove the two upper covers.
 - a. The white cover
 - b. The gray cover



Figure 83 Opening covers to replace feeding wheels

2. At the maintenance menu, tap **Open left leading wheels**.
The left thread elastic feeding wheels will rise up.



Figure 84 Raised feeding wheel

3. Using a 2.5 standard Halen key, remove the locking screw located behind the feeding wheels.
4. Remove old feeding wheels and screw in the new feeding wheels.

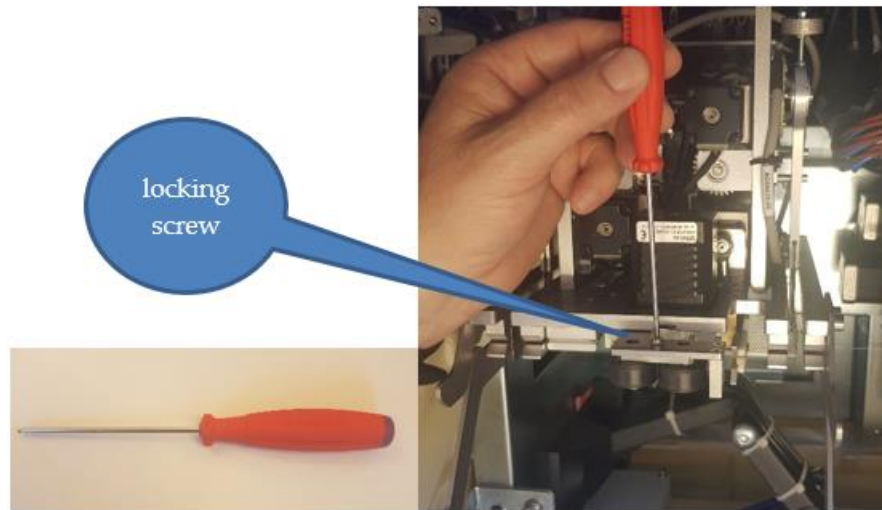


Figure 85 Replacing the feeding wheels

5. At the maintenance menu, tap **Open Right leading wheels**
6. Repeat steps 3 and 4 for the right feeding wheels.
7. Return the machine covers.

Note

The procedure is the same for replacing both the right and left wheels

5.2 Cleaning the Dyeing Head V Groove:

For best dyeing quality, clean the V groove periodically as follows:

1. Remove the two upper covers.
 - a. The white cover
 - b. The gray cover



Figure 86 Opening covers to replace feeding wheels

2. Manually Open the Arc Dying head cover.

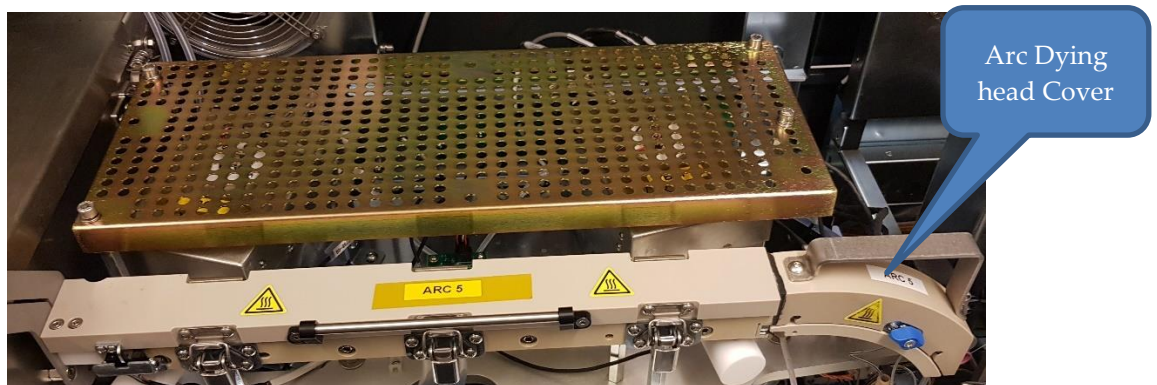


Figure 87 Open dyeing head

3. Put on safety gear including goggles and gloves.

⚠ WARNING

Safety equipment **must** be worn when cleaning the dye head.

4. From the **Actions** section of the PPC Maintenance menu select **Dispense Cleaning Liquid**.

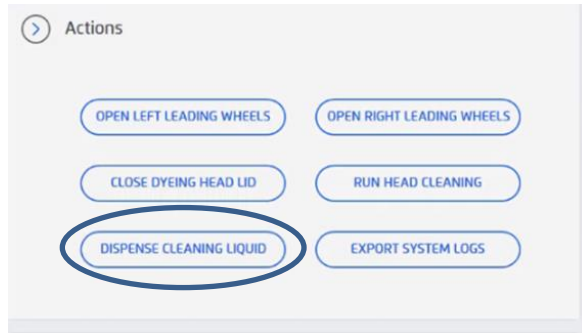


Figure 88 Dispensing V Groove Cleaning Liquid

5. At the popup window click **Start**.

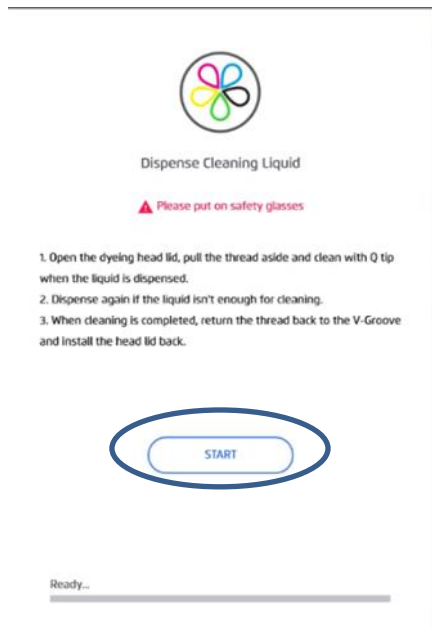


Figure 89 Start Dispensing Cleaning Liquid

The machine will dispense a predetermined amount of cleaning liquid.

6. Clean the dyeing head with the stick as shown in Figure 90.

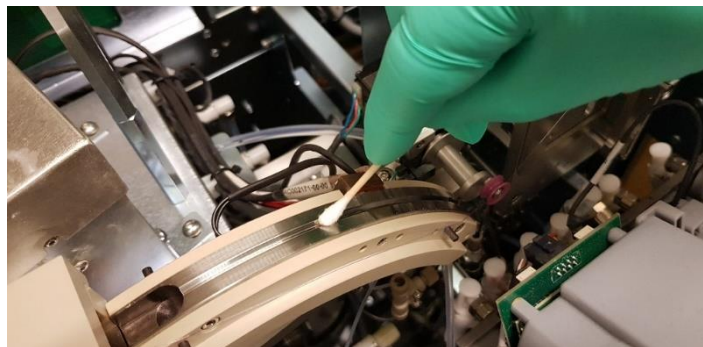


Figure 90 Cleaning the dyeing head

7. Return the machine covers.

5.3 Cleaning the Dyeing Head

From the maintenance menu, tap “**Run Head Cleaning**”. This is an Automatic procedure that will clean the dyeing head. The process can take up to 5 minutes.

5.4 Resetting Thread Loading

Reset Thread Loading is recommended before stating Automatic thread loading. It is an automatic procedure that can take up to 5 minutes.

5.5 Operators Guides and Machine Counters

The *Maintenance* menu provides links to operator guides which offer step by step instructions on performing basic operator procedures. To access the guides tap on the procedure you want to perform.

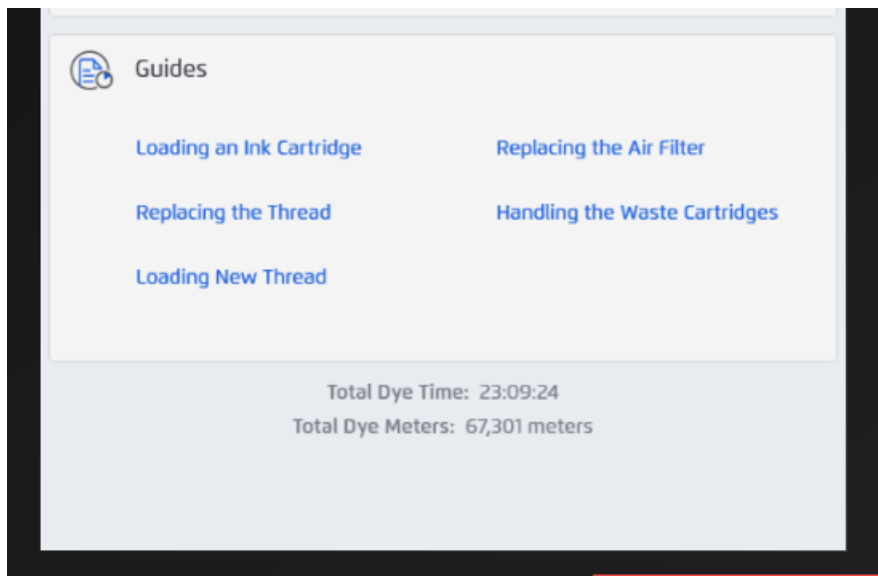


Figure 91 Operator guides and machine counters in Maintenance Menu

5.6 Replacing Carbon filter:

The carbon air filter ensures that the air quality in the dyeing room remains at the correct level.

As part of the machine’s routine maintenance, the filter needs to be replaced every six (6) months. A new filter will be supplied by your local service provider.

Replace the filter as follows:

1. Remove the used carbon filter:
 - a. Open the lower front cover by hand



Figure 92 Opening the lower front cover

- b. Open the Waste Handling System front door by hand.



Figure 93 Opening the WHS door

- c. Lift the Filter handle



Figure 94 Filter handle raised

- d. Pull out the filter



Figure 95 Pulling out the filter

- 2. Install the new carbon filter
 - a. Remove the filter from the box
 - b. Make sure the filter handle is up



Figure 96 Filter handle raised

- c. Push the new filter into place, and lower the handle.



Figure 97 Installing the carbon filter

- d. Close the Waste Handling System front door.
- e. Close the lower front cover.

5.7 Collecting Cone Not in Place Error

A red alarm on the Collecting Cone icon indicates that the collecting cone is out of place on the winder. To correct this error, make sure the collecting cone is attached to winder shaft properly.

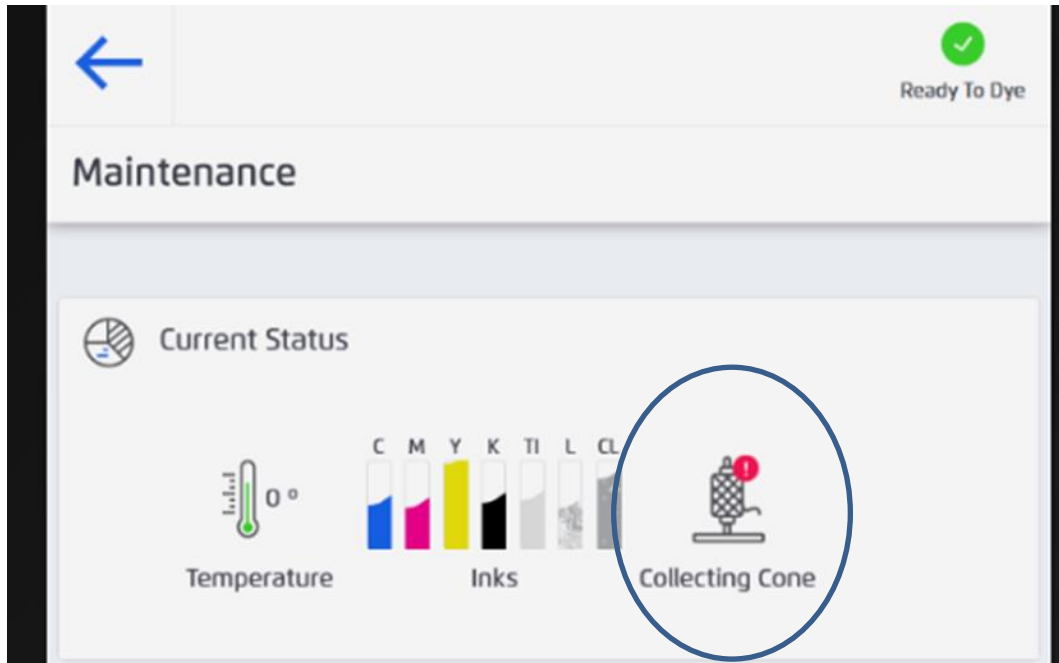


Figure 98 Collecting Cone Out of place

5.8 Cleaning the TS-1800

All parts of the TS-1800 can be cleaned using one of the following materials:

- ISO PROPYL ALCOHOL TECH
- ETHANOL 99.9% TECH

⚠ WARNING

When cleaning the system, the user must wear the safety gloves and goggles that were supplied with the system.

6 Appendix A –Safety Issues

6.1 Electrical Specifications:

- Equipment Rating:
200-240 V~ (W+N+PE), 50/60 Hz, 15 A
208 V~ (2W+PE), 50/60 Hz, 15 A, single phase
- Short circuit current : 5 kA
- MAINS supply voltage fluctuations: -10%, +10%

6.2 Inputs and out Outputs



- 1 Electrical Power Socket as described at 4.1
- 1 network LAN connection
- Wi-Fi connection





6.3 System environmental conditions:

- Operating temperature: 5° C to 40° C
- relative humidity: 20 – 60 %
- indoor use
- altitude up to 3000 m
- OVERVOLTAGE CATEGORY II
- POLLUTION DEGREE 2
- Maximum sound level: 65 dB

6.4 Safety Hazards

The following table indicates the specific safety hazards that you might encounter during the operation of the TS-1800 system.

Notice	Description
 	<p>Bypassing, removing, or deactivating protective equipment.</p> <p>It is strictly prohibited to operate the system if any of the protective equipment or safety guards are dismantled or are not operating properly.</p> <p>Repairing and maintaining the system must only be done by qualified personnel.</p>

<p>⚠ DANGER</p>  <p>Electric Shock Hazard</p>	<p>This product contains components connected to hazardous voltage levels. Touching these components will cause electric shock that could be fatal.</p> <p style="text-align: center;">Removing Covers</p> <p>Before removing the electric cabinet cover and opening the electric cabinet door:</p> <ol style="list-style-type: none"> 1. Power down the TS-1800 by pressing and holding the power button on the panel. 2. Turn-off the main power switch at the wall socket . 3. Disconnect the plug from the wall socket. <p style="text-align: center;">Charged Capacitors</p> <p>Beware of charged capacitors; wait few moments after the power is disconnected to allow all capacitors to discharge.</p> <p style="text-align: center;">Powering Up</p> <ol style="list-style-type: none"> 1. Insert the wall plug. 2. Make sure all doors are closed and covers are in place. 3. Turn on the main switch.
<p>⚠ WARNING</p>  <p>Hot Surfaces</p>	<p>Certain parts of the TS-1800 reach high temperatures during operation.</p> <p>Do not touch any surface marked with a “Hot Surfaces” warning without wearing safety gloves. It is recommended to wait until you see the temperature on the PPC display go below 40°C before touching.</p>
<p>⚠ CAUTION</p>  <p>Hand Crush hazard</p>	<p>Beware of moving parts that are automatically operated by the system. They could move at any time deliberately or due to faulty operation. These parts are generally protected by doors or covers that provide protection against inadvertent contact.</p> <p>Proceed with caution when operating this product.</p> <p>Do not put your hand or fingers behind covers.</p> <p>Do not put your hand in front of moving parts.</p>
<p>⚠ CAUTION</p>  <p>Hands, fingers, hair, and clothes entanglement hazard</p>	<p>The system contains some rotating parts such as shafts. There is a risk of injury if you touch these parts or if you are snagged by these parts.</p> <p>Caution must be taken when moving around these parts while the TS-1800 is operating.</p> <p>Follow all safety instruction for each specific rotating part.</p> <p>Find out where the Emergency power button (EMO) is located.</p> <p>It is strictly prohibited to put your hands near any rotating part while it is operating.</p> <p>If it is necessary to clean, maintain, or repair these parts, turn off the TS-1800 and unplug it first.</p> <p>When working with the TS-1800:</p> <ul style="list-style-type: none"> • Wear tight-fitting clothes. • Roll up your sleeves. • Do not wear loosely hanging pieces of clothing, like long belts, ties, scarves, or pullovers . • Secure loose, hanging hair using a hair net, a hat or a cap. • Do not wear jewelry, watches or other similar objects .

<p>CAUTION</p>  <p>Heavy load hazard</p>	<p>The air filter weighs in excess of 11 kg. Do not attempt to lift the air filter if you have any back-related medical issues.</p>
<p>CAUTION</p>  <p>Foot Crush hazard</p>	<p>Wear safety shoes while unpacking, transporting and installing the TS-1800.</p>
<p>CAUTION</p>  <p>Sharp cutting blade</p>	<p>Exercise care when handling the cutter at the winder.</p>
<p>CAUTION</p>  <p>Inhalation hazard</p>	<p>When handling ink spilled from a cracked or dropped cartridge, avoid inhaling ink.</p>
<p>CAUTION</p>  <p>Skin Irritation</p>	<p>When handling spilled ink from a cracked or dropped cartridge, wear proper clothing, gloves, and safety goggles to avoid contact with skin.</p>