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THERMAL TRANSFER TECHNOLOGY

Some key definitions

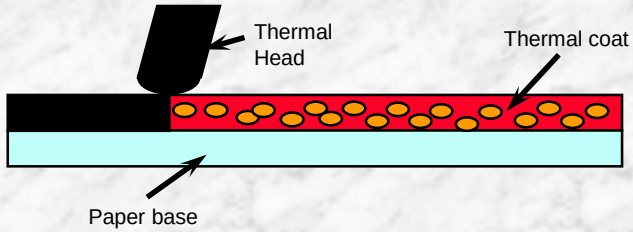
Provided by Toshiba Printing

Direct Thermal Technology => no ribbon is required

This technology requires heat-sensitive (thermal) paper.

A direct thermal printer produces a printed image by selectively heating coated thermal paper when the paper passes over the thermal print head. The coating turns black

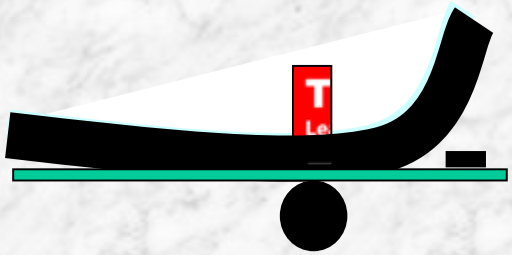
in the areas where it is heated, producing an image.



Thermal Transfer Technology => using a ribbon (foil)

This technology requires heat-sensitive ribbon.

As the label and ribbon are driven beneath the print head together, tiny pixels across the width of the print head are heated to melt and transfer the "ink" off the ribbon and onto the label. This process happens very quickly and accounts for the fast speed of the printers.



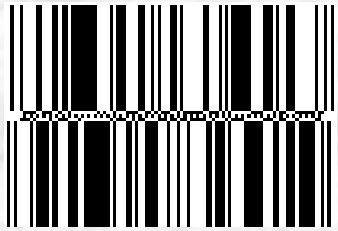
Direct Thermal Technology => no ribbon is required

- Budget friendlier as you don't need to purchase ribbon
- Easy in use => no ribbon replacement required
- Thermal paper is required

Thermal Transfer Technology => Using a ribbon

- Wider range of materials to print on (textile, films,..)
- The print head lasts longer
- Labels last longer, scratch & chemical resistance possible
- Low cost per label thanks to the Toshiba ribbon save module
- Excellent readability of the barcode
- Higher printing speeds possible

ADVANTAGES FOR DIRECT THERMAL

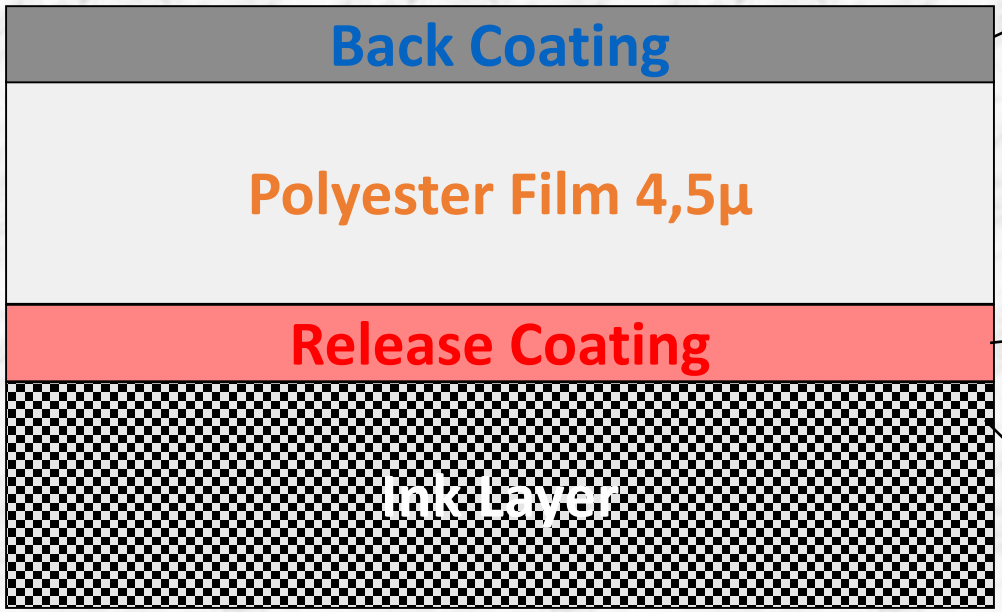


- Single consumable (paper/substrate)
- Easy to handle for single colour printing
- Perfect solution for industrial demands with simple application, suitable for (GS1) barcode printing
- Acceptable print speed in industrial environment
- Reduced downtime
- Low total cost solution
  - Thermo eco
  - Thermo top

WHY RIBBON

- ✓ Heat resistance
- ✓ Saves print head life
- ✓ … and even more so with ribbon save
- ✓ Long label shelf lifetime
- ✓ Diversity of labels
- ✓ Chemical resistance
- ✓ Colour printing
- ✓ Print speed
- ✓ Bar code readability
- ✓ ...

WAX & WAX/RESIN RIBBON COMPONENTS



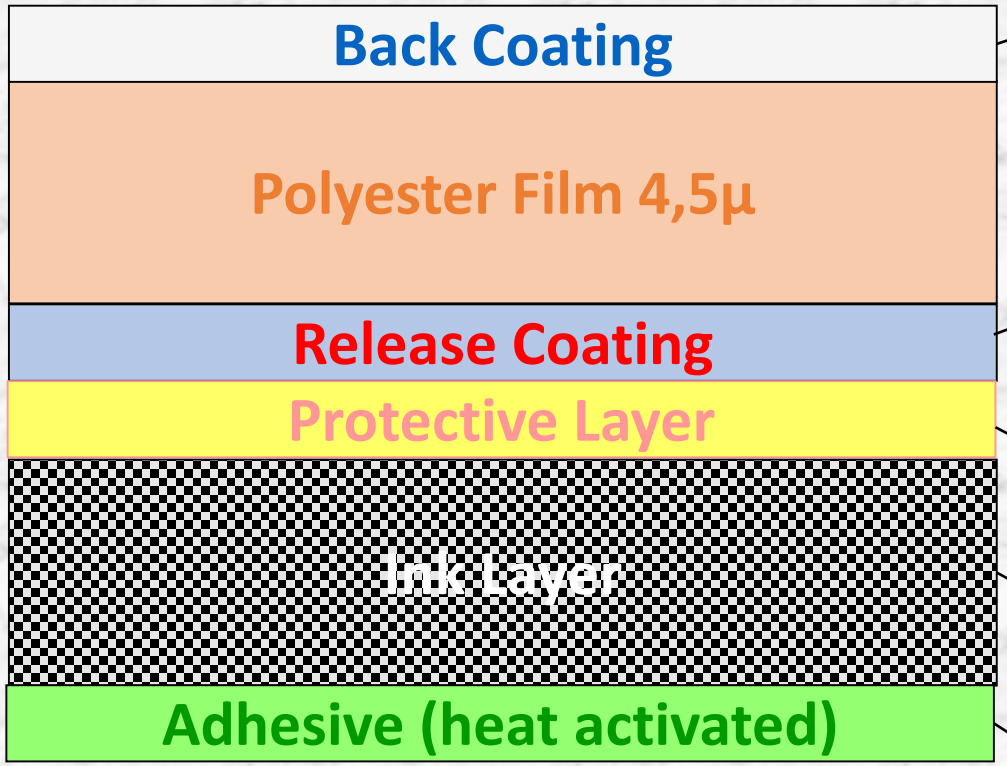
- Anti-static
- Protects against temperature
- Protects the print head

- Enables the transfer
- Anti-static
- Gives the aspect glossy/mat

Carbone black dispersed in wax matrix

- Works on lower temperatures
- Higher black/white contrast

RESIN RIBBON COMPONENTS



- Anti-static
- Protects against temperature
- Protects the print head

- Anti-static
- Enables the transfer
- Gives the aspect glossy/mat

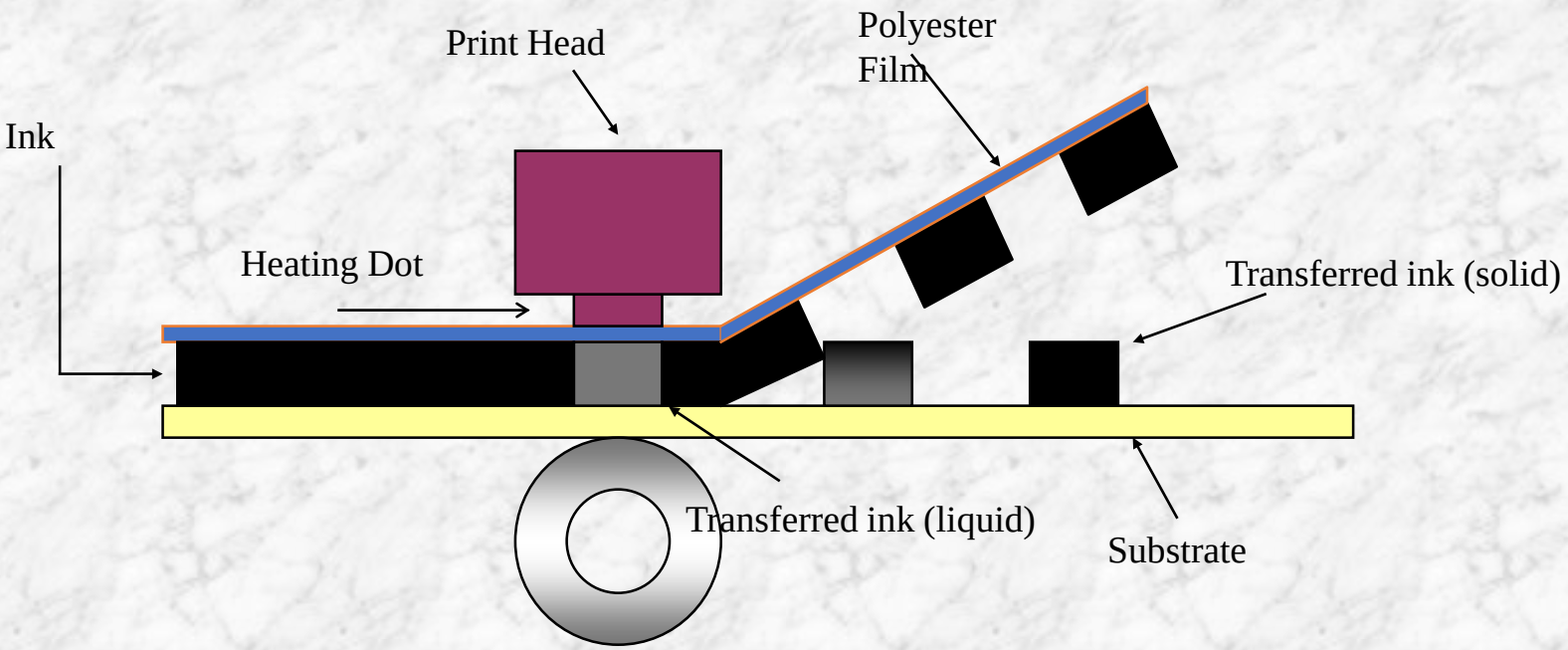
Optional

Carbone black dispersed in resin matrix

Heat activated

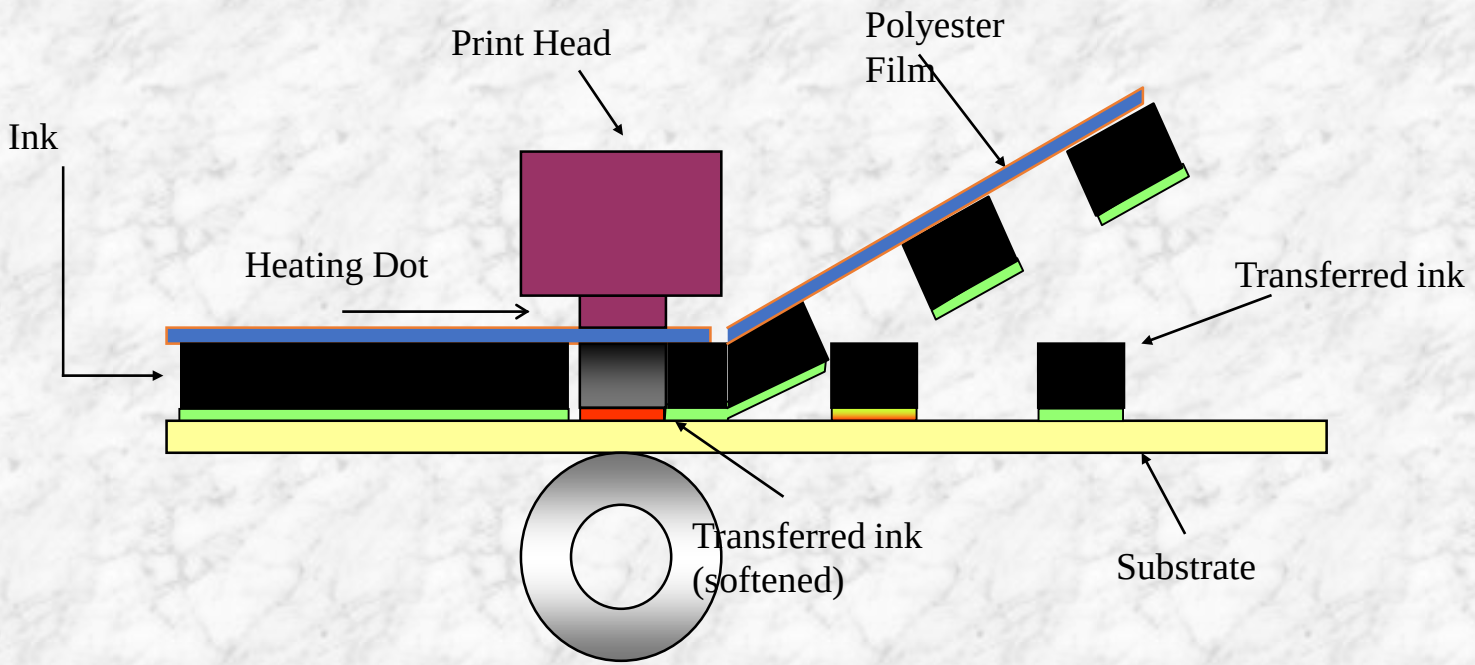
- Works on higher temperature, because adhesive needs to melt
- Lower black/white contrast

WAX



– The ink « really » melts (70-85°C) during the printing

RESIN



- The ink is just softened by the heat
- But the heat-seal adhesive actually melts

ADVANTAGES FOR THERMAL TRANSFER

- ✓ Reliability (and resistance to heat, UV)
- ✓ Lifetime of the label & printed label shelf life
- ✓ Increased speed and productivity up to 14”/s and more
- ✓ Typical for industry (while direct thermal is popular in retail)
- ✓ Compatibility with different media and substrates (uncoated, coated papers, films, textile, tags,...)
- ✓ Low printer maintenance costs
- ✓ Readability of the bar code
- ✓ Printhead life

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ADVANTAGES WITH TOSHIBA TEC PRINTER TECHNOLOGY

- ✓ Possible ribbon save (low cost per label and strong ROI)
- ✓ Wide, transparent product range (200dpi, 300dpi & 600dpi) to print readable barcodes
- ✓ Printers are completely modular with range of options
- ✓ Expanded ribbon product range
  - Useable on both paper & synthetics
  - Excellent chemical resistance
  - Extreme heat resistance
  - Back coating is Toshiba specific : longer head life
- ✓ User friendly and safe design casing
- ✓ Both Flathead and high speed NearEdge
- ✓ Standard USB and LAN
- ✓ RFID-ready NearEdge B-SX & B-EX4T1

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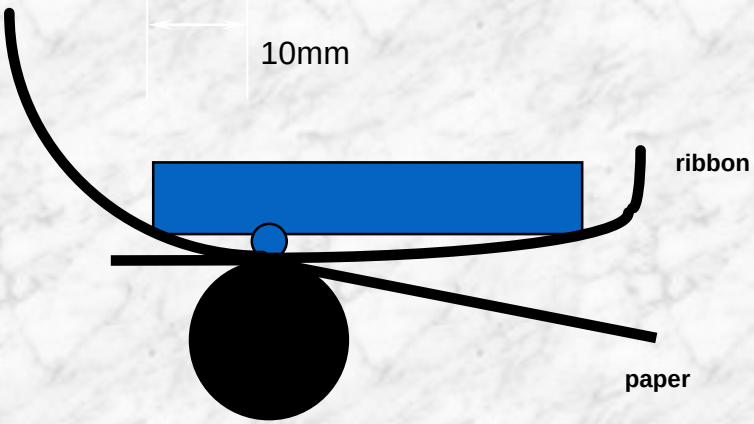
TOSHIBA TEChnology

Unique Toshiba features

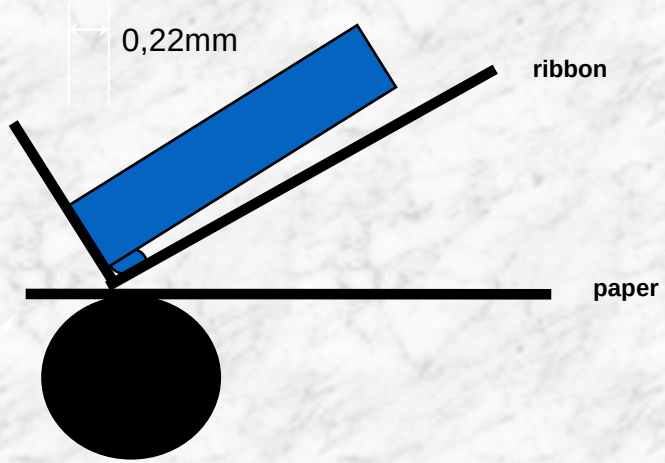
Thermal Head Technology

Flat Thermal Head



- Heating element in centre of print head
- Horizontal print head
- Ribbon and paper contact over 10mm

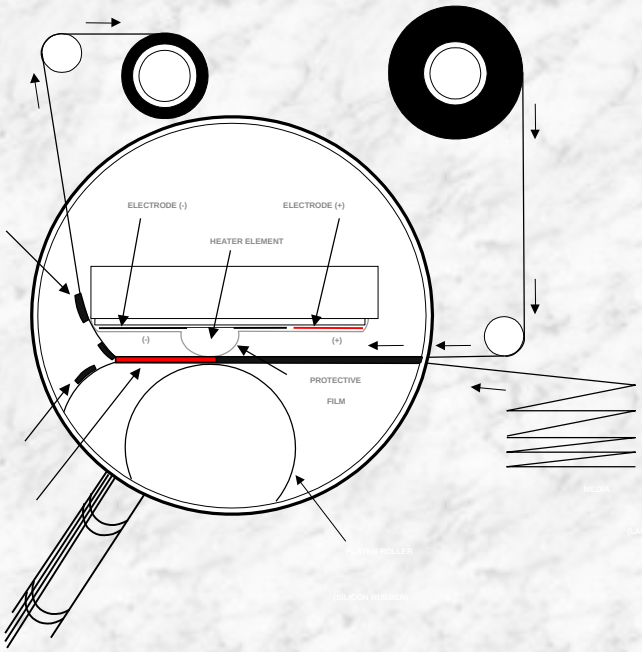
Near Edge, floating Thermal Head



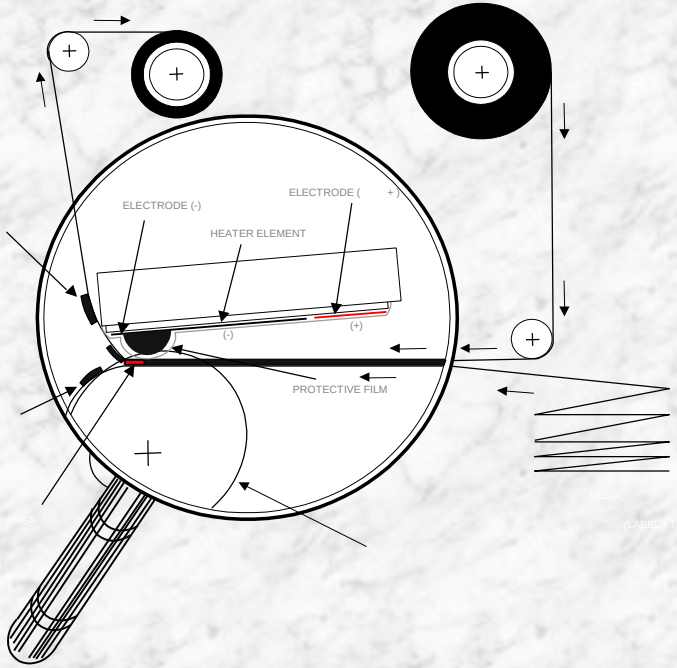
- Heating element near edge of print head
- print head in 45° angle
- Ribbon and paper contact over only 0,22mm
- Print head lives longer
- Faster and consistent printing possible
- Wider range of media can be used such as thicker materials like tags, tickets, cards,... thanks to the “floating” head (adjusting automatically to the thickness of the paper)

Different print head types

Flat head type



Near edge type



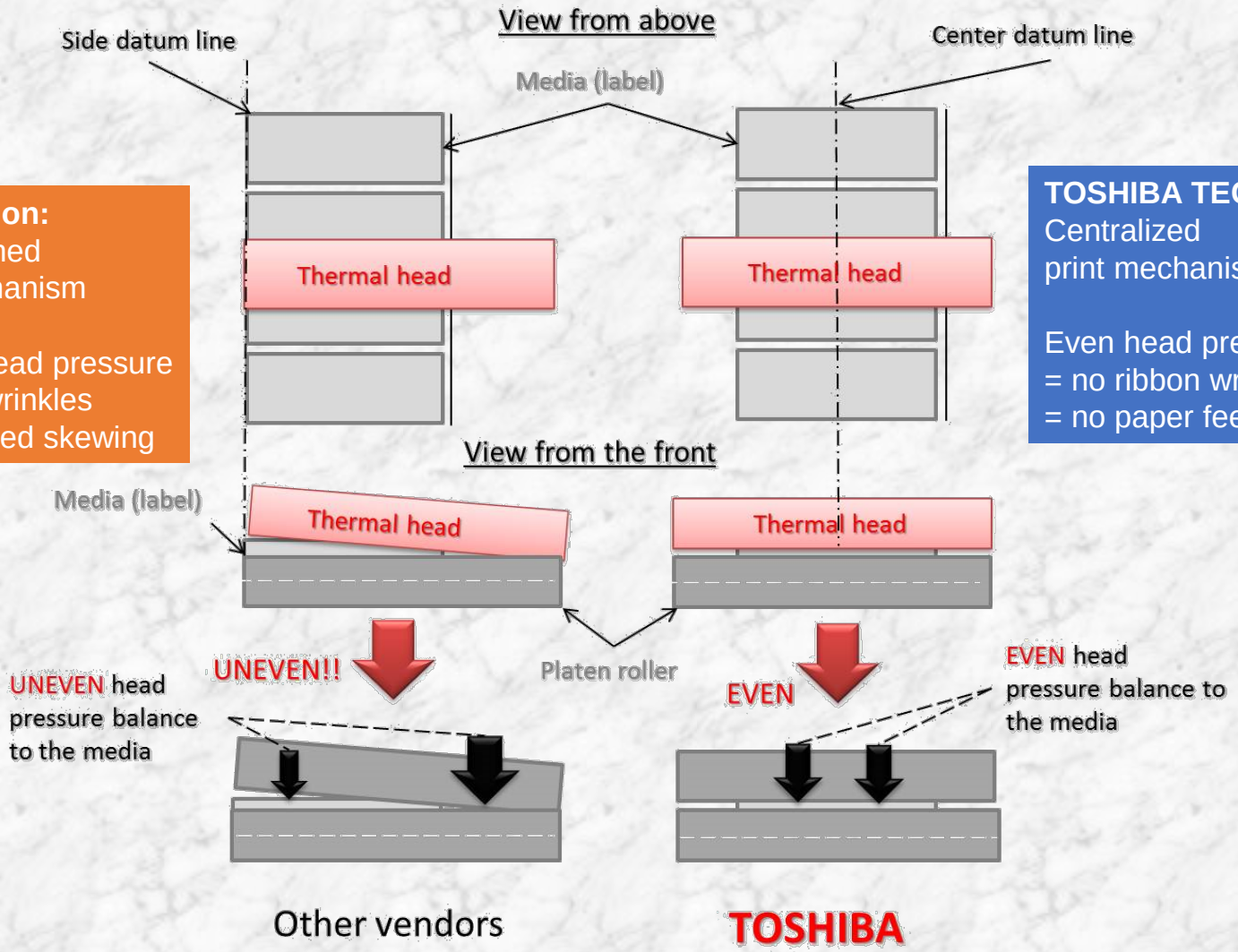
Centralized print mechanism

Competition:
Edge-aligned
print mechanism

Uneven head pressure
= ribbon wrinkles
= paper feed skewing

TOSHIBA TEC:
Centralized
print mechanism

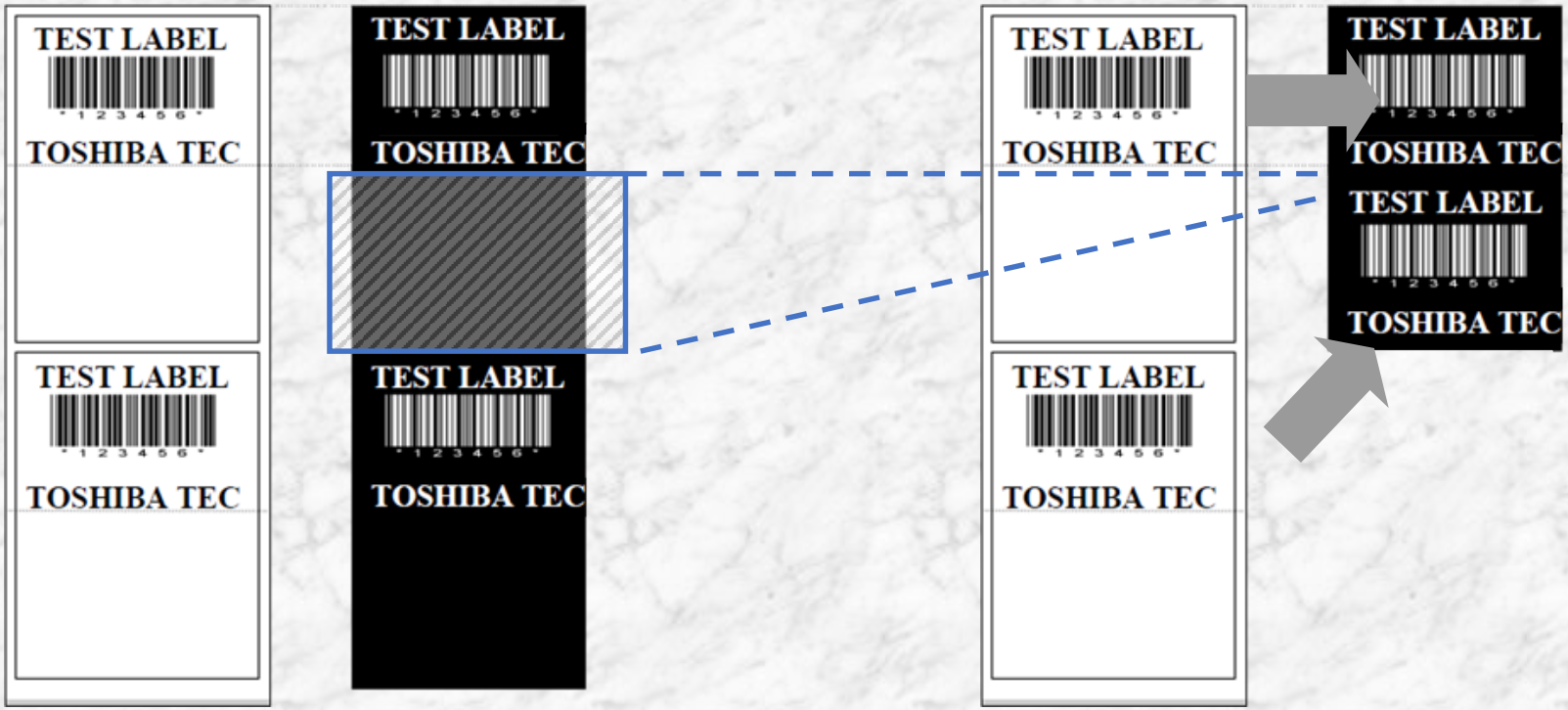
Even head pressure
= no ribbon wrinkles
= no paper feed skewing



Ribbon save function

Normal Ribbon Control

With Ribbon saving



With ribbon save : loss only +/- 2cm per print : 1cm before, and 1 after printed text

The current B-EX type printers detect wide blank spaces themselves and will activate the function When needed

Ribbon save funtion

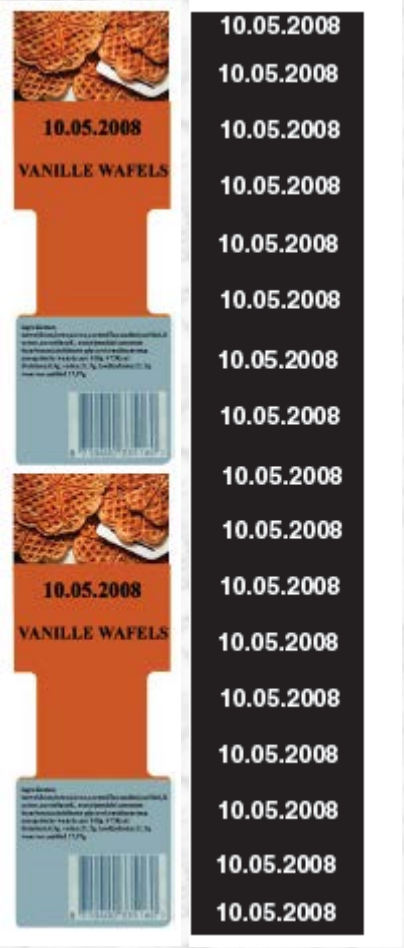
Normal Ribbon Control

Pre-printed label that needs to be completed by a “best-before” date only.

15cm of ribbon is used

25mm of ribbon is used => saving of 84%

With Ribbon saving



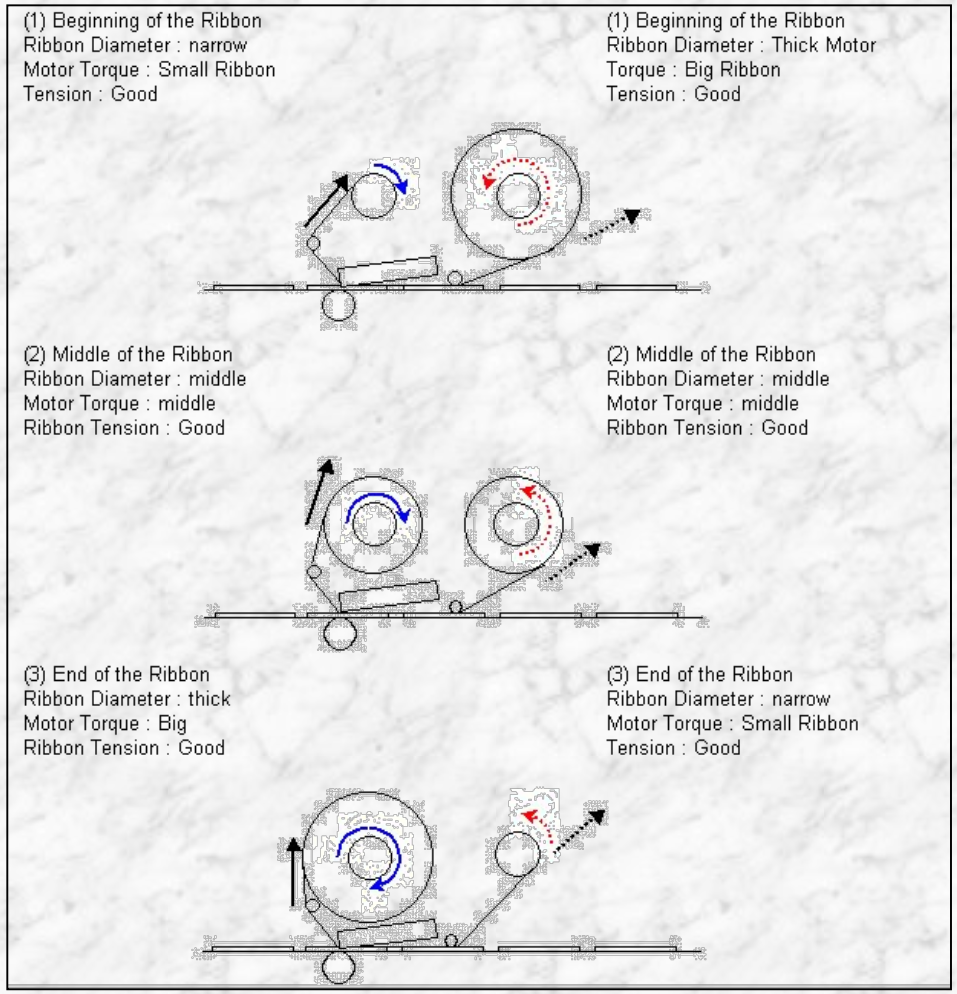
Wrinkle free ribbon design

Toshiba double motor control

Competition:
Single motor control

Strong tension at the beginning of the ribbon, loose tension at the end of the ribbon

= ribbon wrinkles
= tension adjustments required



Wrinkle free ribbon design

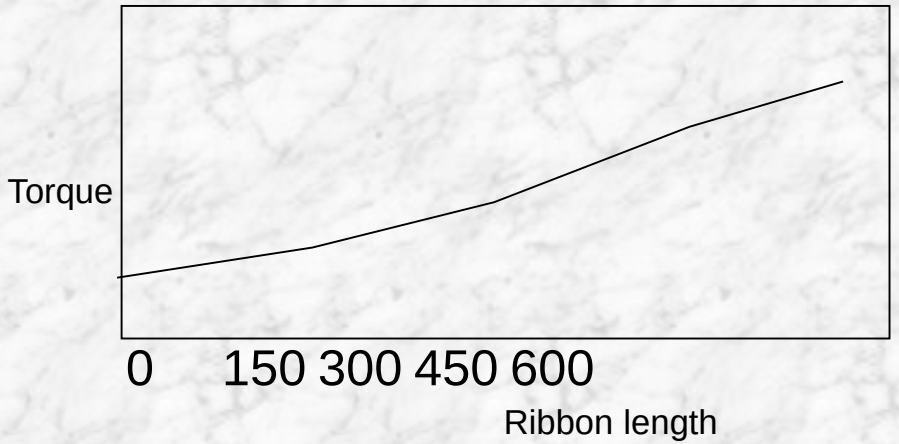
Linear torque control

Conventional method:
Torque updated in stages

= some ribbon wrinkles

TEC B-SX method:
Torque updated linearly

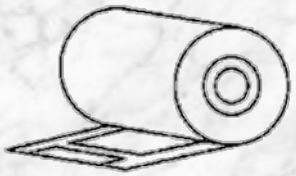
= no ribbon wrinkles



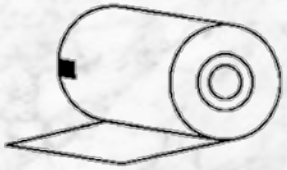
Sensors – detection systems

- To be able to stamp in the exact document position, printers use a few detection sensors that determine where to start and where to end each label or ticket.
- Detection types:

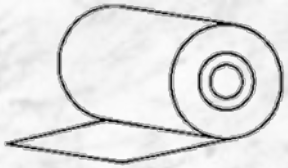
  - Transmissive or transmission: Spacing is detected between labels by sensor tags transparency.



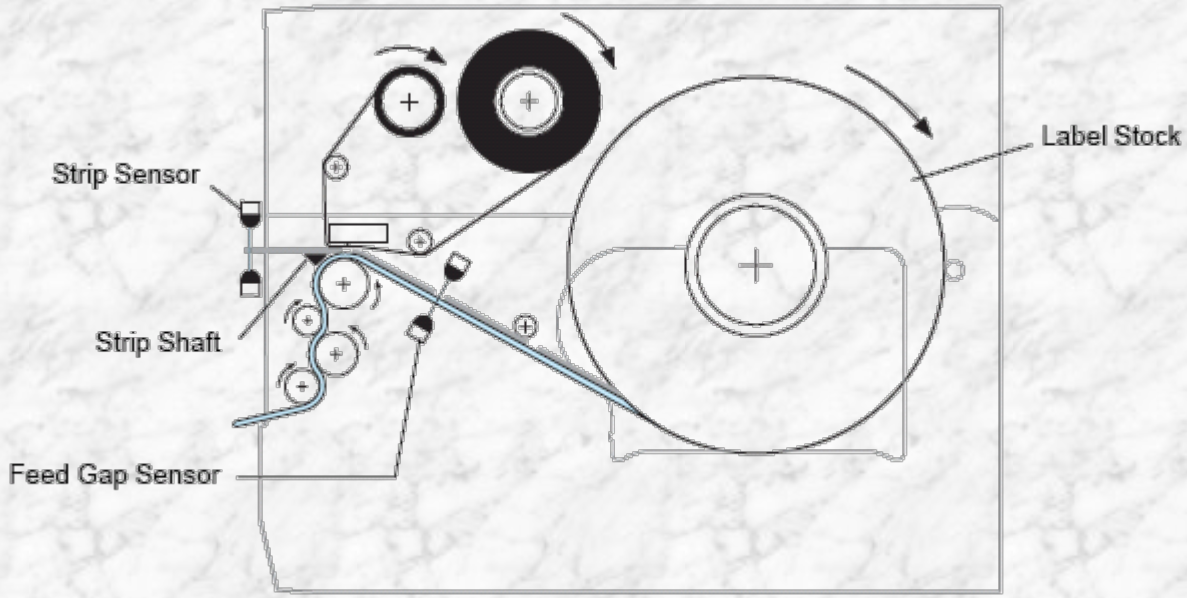
  - Reflective: Detect printed black mark or hole, usually on the opposite side to the printing by reflection sensor.



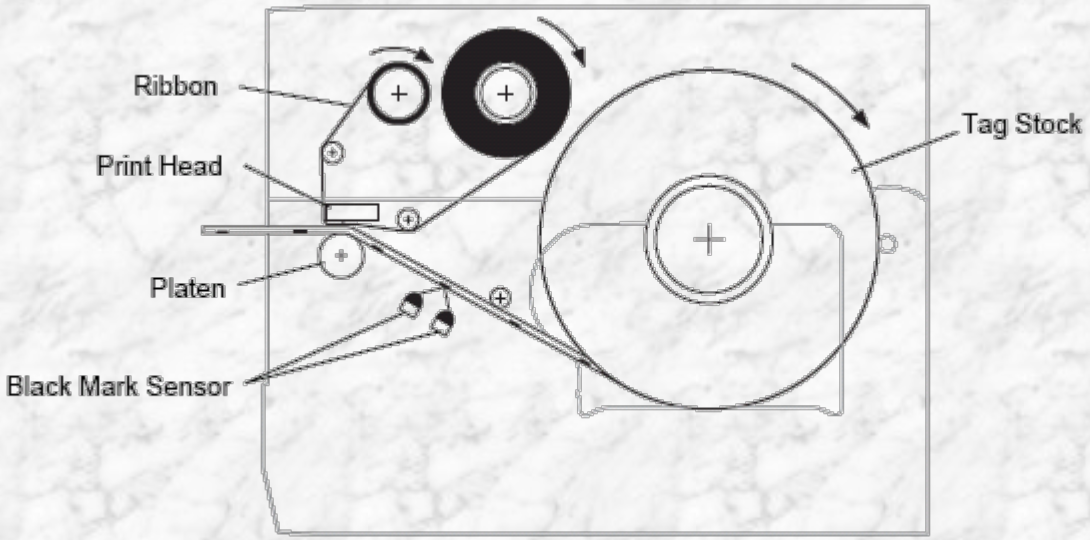
  - No sensor: Distance to be programmed in the size command.



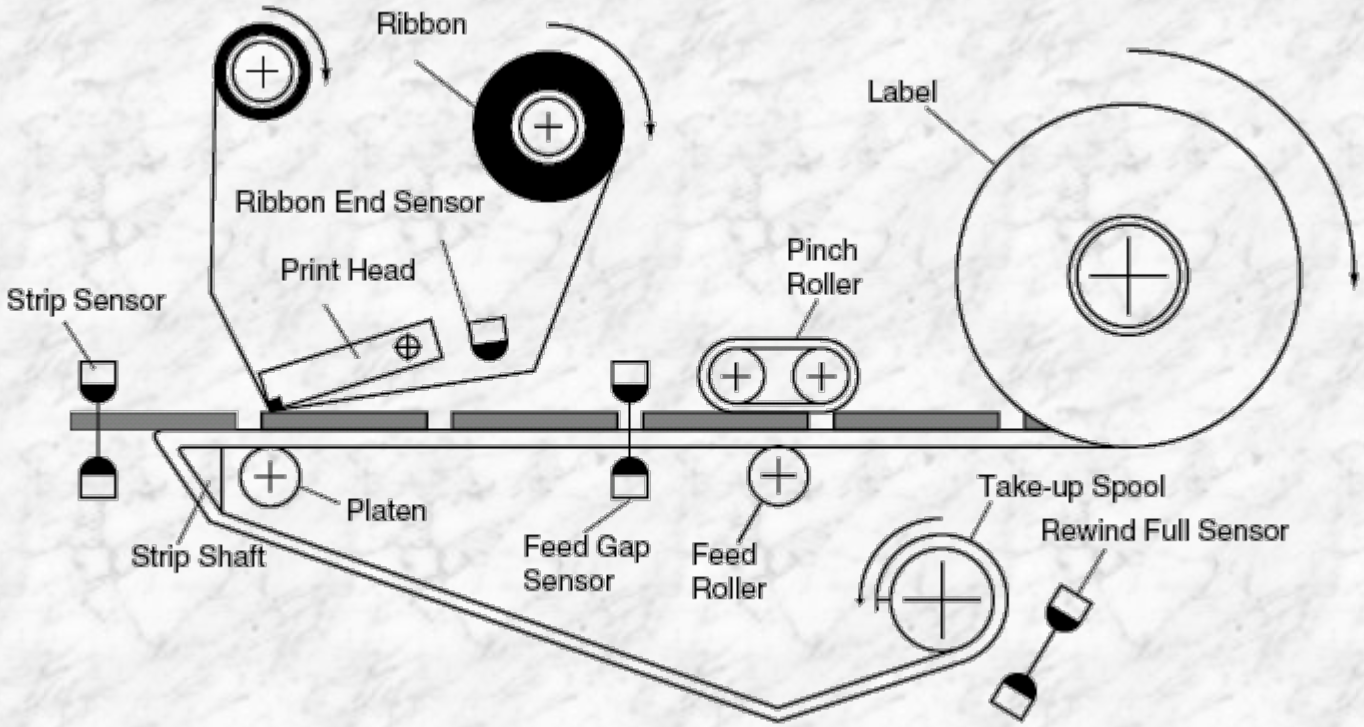
Transmissive sensor



Reflective sensor

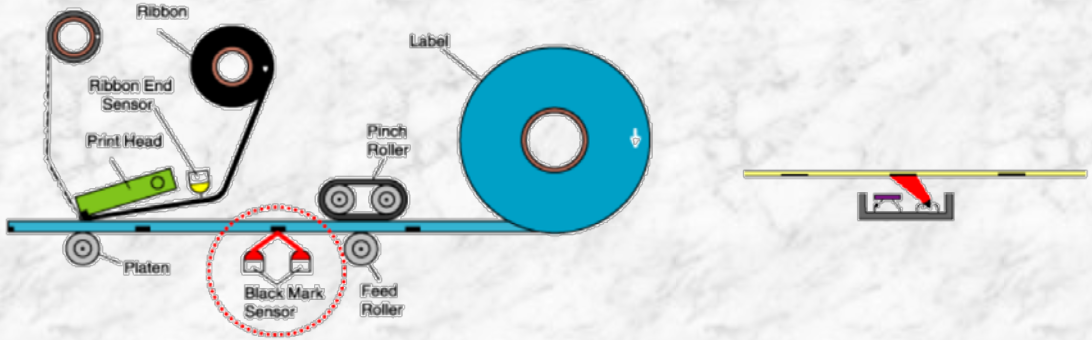


Peel-Off mechanism (Strip mode)

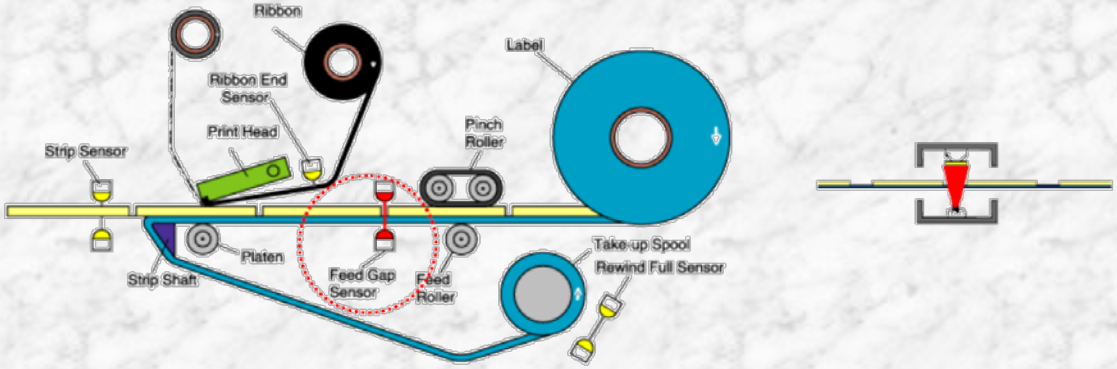


Sensors – detection systems

- Reflective



- Transmissive



Provided by Toshiba Printing