

TOSHIBA

TOSHIBA Barcode Printer

BX410T Series

Supply Specification

00.0 Edition: August, 2024

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1. SCOPE

This specification applies to the following models.

JP models

BX410T-TS02-S	305 dpi (standard + RTC + ribbon saving kit)
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Other than JP models

BX410T-GS02-QM-S	203dpi (standard)
BX410T-TS02-QM-S	305dpi (standard)
BX410T-GS02-CN-S	203dpi (standard) (for China)
BX410T-GS06-CN-S	203 dpi (standard + UHF RFID + ribbon saving kit) (for China)
BX410T-TS02-CN-S	305dpi (standard) (for China)
BX410T-TS06-CN-S	305dpi (standard UHF) dpi (standard + UHF RFID + ribbon saving kit) (for China)

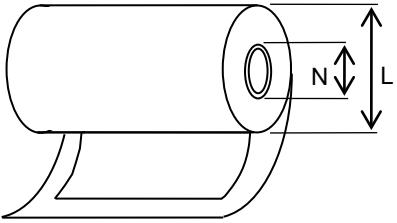
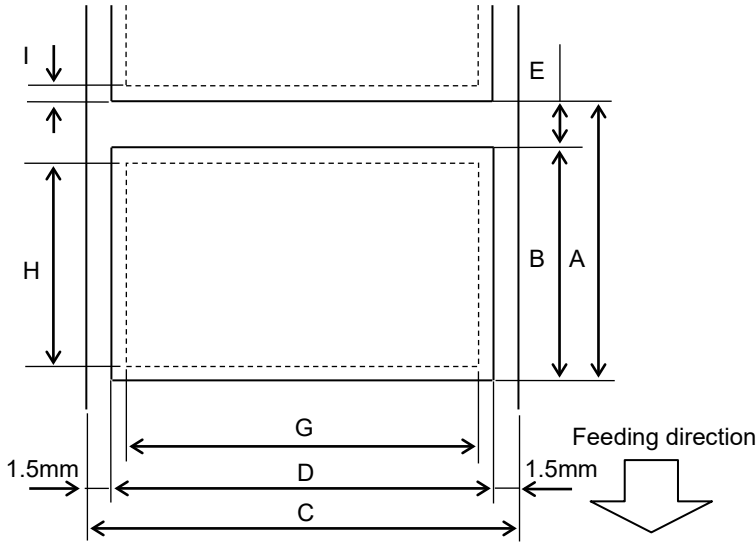
2. MEDIA

2.1 Media Type

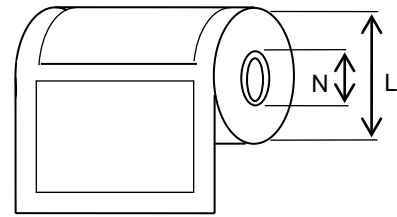
- There are two types of media: labels and tags, and there are direct thermal types and thermal transfer types.
- RFID tags and RFID labels are supported as a special specification media.
- The contents of this specification are based on the assumption that the media has been certified and evaluated by Toshiba Tec.
- If any media other than that approved and evaluated by Toshiba Tec is used, the warranty does not apply to the transportation, cutting, peeling, life span, etc., including print quality.

2.2 Media Size and Shape

<Label>

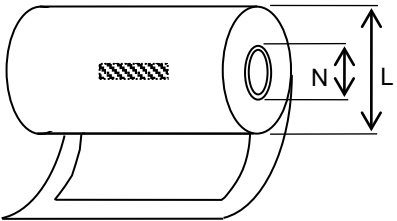
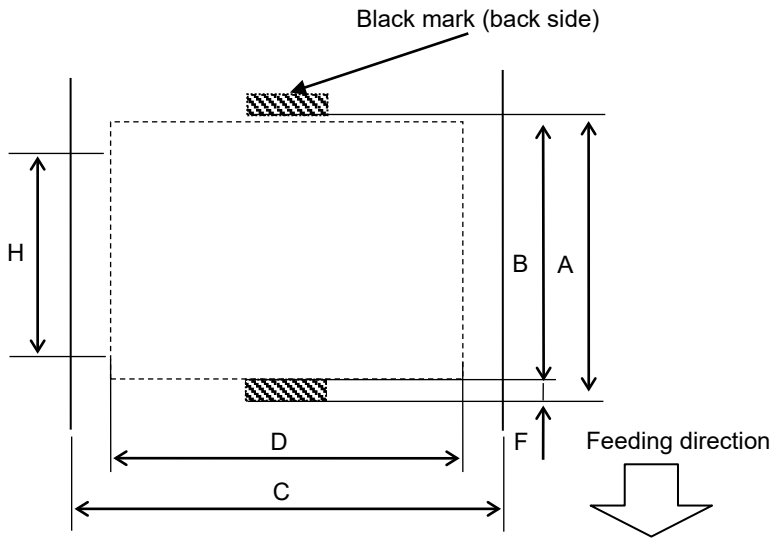


Winding direction:
Printed on the inside of the label.

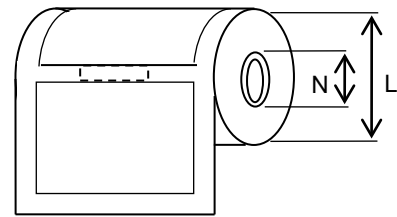


Winding direction:
Printed on the outside of the label.

<Label liner side> * with a black mark

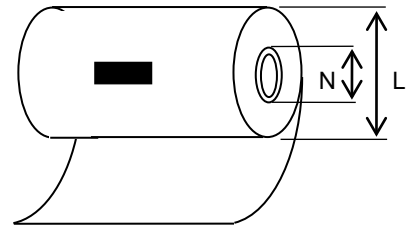
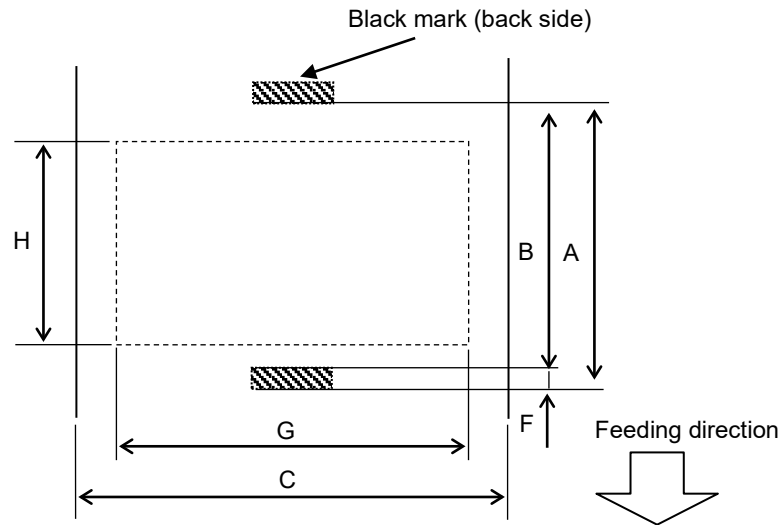


Winding direction (inward):
Printed on the inside of the label.

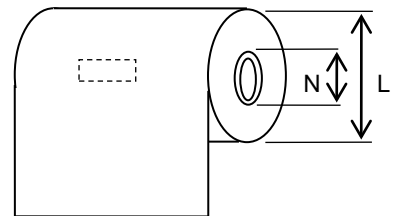


Winding direction (outward):
Printed on the outside of the label.

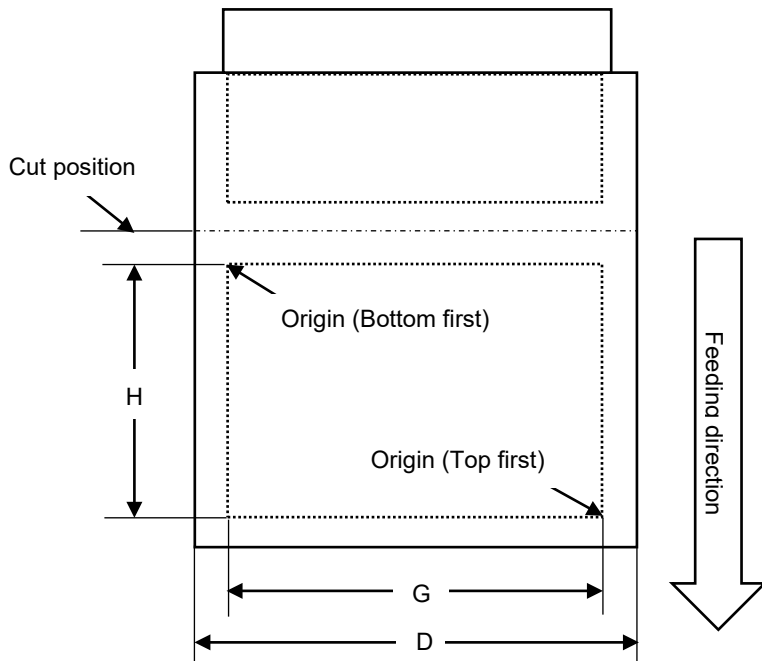
<Tag>



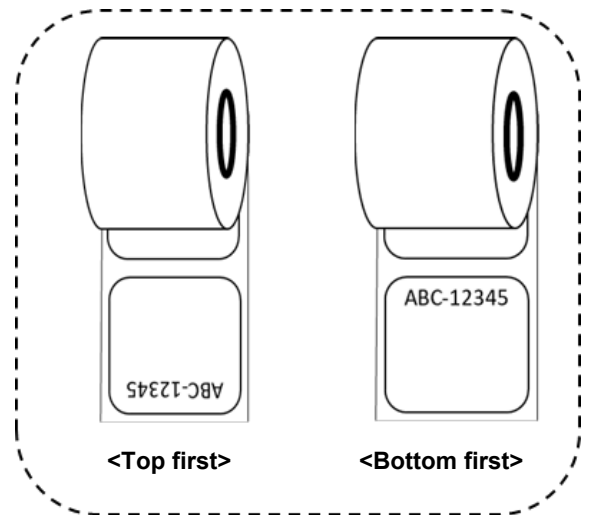
Winding direction:
Printed on the inside of the label.



Winding direction:
Printed on the outside of the label.



[No sensor]



(Unit: mm)

Model			203 dpi (GS model)					305 dpi (TS model)					
Issue mode Item			Batch	Peel-off	Cut		Batch	Peel-off	Cut				
					Disc cutter	Rotary cutter			Disc cutter	Rotary cutter			
						Head-up				Head-up			
						Yes				No	Yes	No	
A Pitch (*2)	Label	Min.	10.0	17.0 (Except pre-peeling-off)	26.0	3 ips: 87.0	3 ips: 38.0	10.0	17.0 (Except pre-peeling-off)	26.0	3 ips: 87.0	3 ips: 38.0	
						6 ips: 99.0	6 ips: 38.0				5 ips: 102.0	5 ips: 38.0	
						10 ips: Note 1	10 ips: Note 1				8 ips: 113.0	8 ips: 38.0	
						12 ips: Note 1	12 ips: Note 1				10 ips: Note 1	10 ips: Note 1	
						14 ips: Note 1	14 ips: Note 1				12 ips: Note 1	12 ips: Note 1	
											14 ips: Note 1	14 ips: Note 1	
	Max.	1500.0	1500.0	1500.0		1500.0	1500.0	1500.0	1500.0	1500.0			
	Tag	Min.	10.0	---	25.0	3 ips: 30.0		10.0	---	25.0	3 ips: 30.0		
						6 ips: 30.0					5 ips: 30.0		
						10 ips: Note 1					8 ips: Note 1		
						12 ips: Note 1					10 ips: Note 1		
						14 ips: Note 1					12 ips: Note 1		
						14 ips: Note 1							
Max.	1500.0	---	1500.0		1500.0	---	1500.0	1500.0	1500.0				
B Label/tag length		Min.	8.0	15.0	23.0	3 ips: 81.0	3 ips: 25.0	6.0	15.0	23.0	3 ips: 81.0	3 ips: 25.0	
						6 ips: 93.0	6 ips: 25.0				5 ips: 89.0	5 ips: 25.0	
											8 ips: 100.0	8 ips: 25.0	
		Max.	1498.0	1498.0	1494.0		1498.0	1498.0	1494.0	1494.0	1494.0		
C Liner/tag width		Min.	30.0	50.0	30.0		30.0	50.0	30.0	30.0	30.0	30.0	
		Max.	Direct thermal: 120.0, Thermal transfer: 107.0								Direct thermal: 120.0, Thermal transfer: 107.0		
D Label width		Min.	22.0									22.0	
		Max.	Direct thermal: 117.0, Thermal transfer: 104.0									Direct thermal: 117.0, Thermal transfer: 104.0	
E Gap length		Min.	2.0		3.0	6.0		2.0		3.0	6.0		
		Max.	20.0									20.0	
F Black mark length		Min.	2.0									2.0	
		Max.	10.0									10.0	
G Effective print width		Max.	104.0									104.0	
H Effective print length	Label	Min.	6.0	21.4	21.4	3 ips: 79.0	3 ips: 23.0	6.0	21.4	21.4	3 ips: 79.0	3 ips: 23.0	
						6 ips: 91.0	6 ips: 23.0				5 ips: 87.0	5 ips: 23.0	
						10 ips: Note 1	10 ips: Note 1				8 ips: 98.0	8 ips: 23.0	
						12 ips: Note 1	12 ips: Note 1				10 ips: Note 1	10 ips: Note 1	
						14 ips: Note 1	14 ips: Note 1				12 ips: Note 1	12 ips: Note 1	
											14 ips: Note 1	14 ips: Note 1	
						Max.	1496.0				1496.0	1492.0	

	Tag	Min.	8.0	---	21.4	3 ips: 28.0		8.0	---	21.4	3 ips: 28.0			
						6 ips: 28.0					5 ips: 28.0			
						10 ips:					8 ips: 36.0			
						12 ips:					10 ips:			
						14 ips:					12 ips:			
											14 ips:			
			Max.	1498.0	---	1498.0		1498.0	---	1498.0	1498.0			
I Slow-up section	Slow-up		1.0											
	Slow-down		1.0 (1.5 for 14 ips only)											
K Max. on-the-fly print length			749.0											
Thickness	Min.		0.13		0.08		0.13		0.13		0.08		0.13	
	Max.		0.17				0.17		0.17				0.17	
					0.263 (30 to 50 mm width)		0.263 (30 to 50 mm width)							
L Max. media roll O.D.			Ø200 (media core I.D.: Ø76.2) Ø180 (when using an external rewinder)											
N Media core I.D.			Ø76.2 ± 0.3											
M Winding direction			Inside wound (standard) / Outside wound											

- *1: When an outside wound roll media is used for the cut mode, the leading edge of the paper may hit the cutter blade due to the curing. Therefore, it is recommended that the width of the paper be 110 mm or less.
- *2: When an inside wound roll media is used for the label cut mode, a wider label gap may cause a paper jam. Therefore, it is recommended that the label gap should be 3 mm.

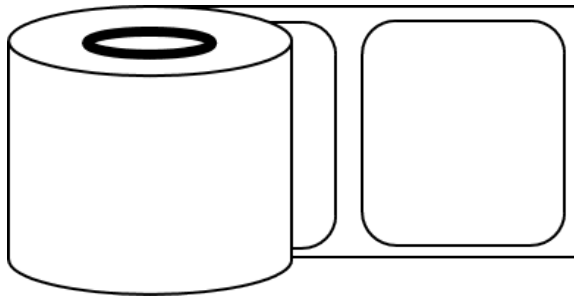
Notes:

- When using a rotary cutter
 - When a value larger than 10 ips is set for 203 dpi models: Printing is performed in 6 ips.
 - When a value larger than 10 ips is set for 305 dpi models: Printing is performed in 8 ips.
- When printing in the peel-off mode
 - When a value larger than 12 ips is set for 203 dpi models: Printing is performed in 10 ips.
 - When a value larger than 10 ips is set for 305 dpi models: Printing is performed in 8 ips.
- Label length (B) in the cut mode using a rotter cutter
 - When 3 ips is set: The label length should be 91.0 mm - (gap length/2).
 - When 5 ips is set: The label length should be 99.0 mm - (gap length/2).
 - When 6 ips is set: The label length should be 103 mm - (gap length/2).
 - When 8 ips is set: The label length should be 110 mm - (gap length/2).
- Label length (B) in the cut mode using a disc cutter
 - The label length should be 18.0 mm - (gap length/2).
- The width of the liner must be wider than that for the label.

Issuing method definition

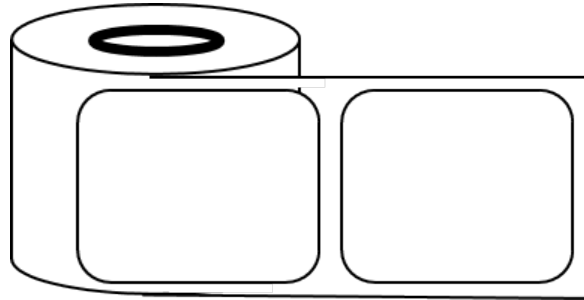
Batch	Performs issuing in batch. Cutting including manual cutting is not performed. In the case of issuing labels, peeling off is not performed.
Batch (manual cutting)	Performs issuing in batch with carrying out manual cutting only.
Peel-off	Performs a peeling-off operation when using labels in the printer with an optional peeling-off device installed.
Cut	Performs cutting in the printer with a cutter installed.

Winding direction



Inside wound

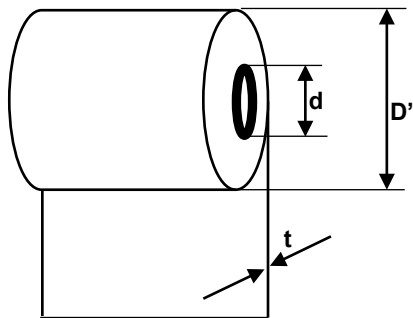
* The printing side is inside.



Outside wound

* The printing side is outside.

(Reference) How to find the media length



$$L' = \frac{(D'^2 - d^2)\pi}{4t}$$

- L' : Media length (1 roll length)
- D' : Media roll diameter (roll outer diameter)
- d : Media core outer diameter (Dimension obtained by adding twice the wall thickness of the media core to its inner diameter)
- t : Paper thickness

<Precautions for setting and operating the media>

[Media type]

- The head lock lever should be positioned to [●LABEL] when printing on labels and receipts.
- The head lock lever should be positioned to [●TAG] when printing on tags.
- The head lock lever should be positioned to [●LABEL] when printing on labels whose width is less than 50 mm.
- When the thickness of the media exceeds 200 µm, it is sometimes required to change the head installation position. (A service technician will take care of this adjustment.)

[Media size]

- The ratio of the label and tag and the continuous label to the detection gap or black mark must be 3:1 or more.
E.g.: When the gap length of the label is 3 mm, a 9 mm or longer label length is required. (To maintain the detection accuracy of the sensor.)
- When creating labels, be sure to provide a 1.5 mm or wider gap on each side of the label.
The meaning of “gap” in this case is a liner on each side of the label.
If a gap wider than this one is attempted to be provided, be sure to check whether there is no skew or meander beforehand. Moreover, a label must be placed on the center of the width of the liner.
- When "Batch (manual cutting)" is used, the size should be 3 or greater; this is obtained by dividing the media width (liner, tag, label width) by the pitch (label, tag pitch).
E.g.: When the label pitch is 10 mm:
Manual cutting is possible for a label width of 30 mm, but is not possible for one of 35 mm.

[Cutting operation]

- Do not cut the labels. Cutting must be performed between the labels.
In addition, if there are perforations in gaps area or on the tag, be sure to cut behind the perforations.
- When cutting labels, the amount of the gap should be at least 6 mm and its center should be cut.
- If the gap length is 6 mm or more, change the printing stop position by the cut position fine adjustment after the maximum value (label pitch of minus 6 mm) is set for the effective print length.
- When using a rotary cutter, use a ribbon saving unit together and select the head-up cut mode.
- When selecting the head-up cut mode, make a notch with a 20-mm width and 50-mm length to the center of the media end.
- When a label media is used, an area with a liner only of at least 20 mm from the last label to the end of the media should be provided. In such a case, the printing is finished with a paper feeding error at the end of the media.
- If a media is jammed in a platen during the cut mode, change [ON] to “FORWARD WAIT” in the system mode.

<Optional cutter outline specifications>

Cutter module

For JP models BX204-S

For other than JP models BX204-QM-S

Method	Disc cutting
Purpose	Cuts the entire width of the media.
Behavior	Stops media feeding during cutting.

Rotary cutter module

For JP models BX204-R-S

For other than JP models BX204-R-QM-S

Method	Rotary cutting
Purpose	Cuts the entire width of the media.
Behavior	Cuts the media without stopping the feeding media during cutting.

Care label cutter

Exclusive cutter for care labels (Only for other than JP models)

For other than JP models BX204-C-QM-S

Method	Swing cutting
Purpose	Cuts the entire width of the media.
Behavior	Stops media feeding during cutting.

[Peeling-off operation]

- Labels with perforations cannot be utilized for this operation. Peeling-off with this type of label can cause perforation breakage or jams.
If the stop position is not proper, change the printing stop position by the peeling-off fine adjustment.
- If the gap between the labels is 5 mm or more, set the effective print length to the maximum value (label pitch of minus 2 mm) and change the printing stop position by the peeling-off position fine adjustment.

[Labels with glue]

- Labels that have been processed to be partially devoid of glue cannot be used.
- For certified labels, if the adhesive material of the label is different, it should first be verified by testing.

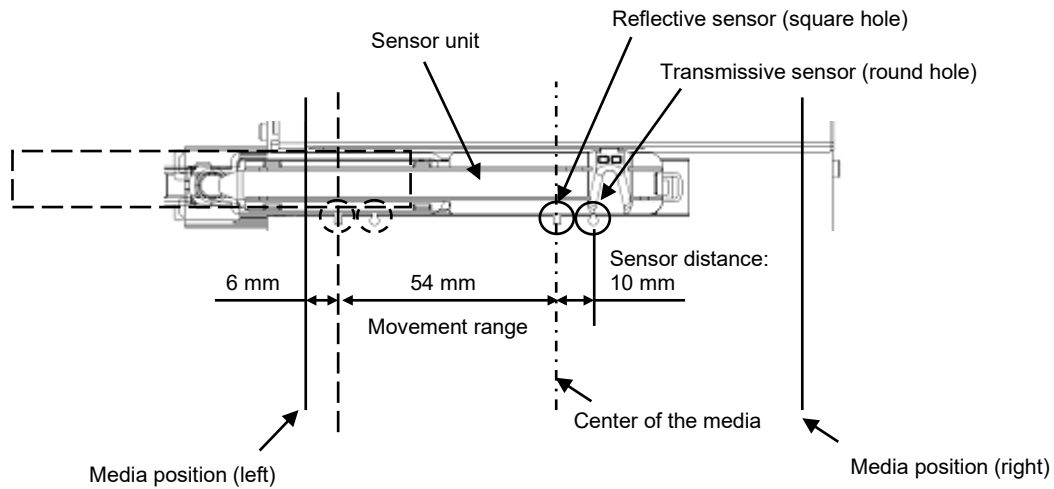
[Others]

- If "Enable" is set for "Forward Wait" to facilitate cutting labels by hand, the label gap in the media is fed to the top of the media outlet to complete the issue after the last label is issued.
However, if the next issue is performed without cutting the label by hand, it may be peeled off during backward feeding, which would cause a defect in the printer.
- The liner has been certified in pairs with a label. Labels for which only the liner or only the label is certified are not warranted.
- The liner should be 7K or 8K (white or blue) glassine paper or equivalent. Transmission of infrared rays of 930 to 950 nm wavelength should be at least 22%. (Visible light transmittance: 22% or more)

2.3 Sensor Position

The sensor is movable and can be shifted from the center to left edges of the media.

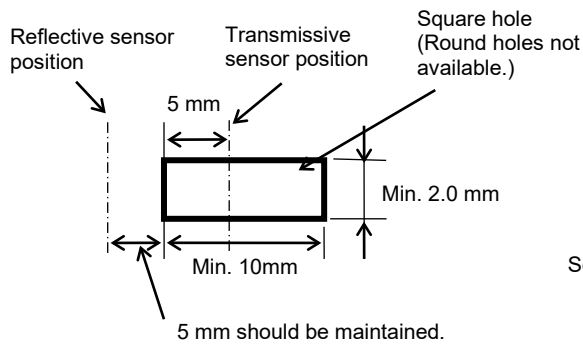
The transmissive sensor and the reflective sensor are moved to the left and the right together with the sensor unit.



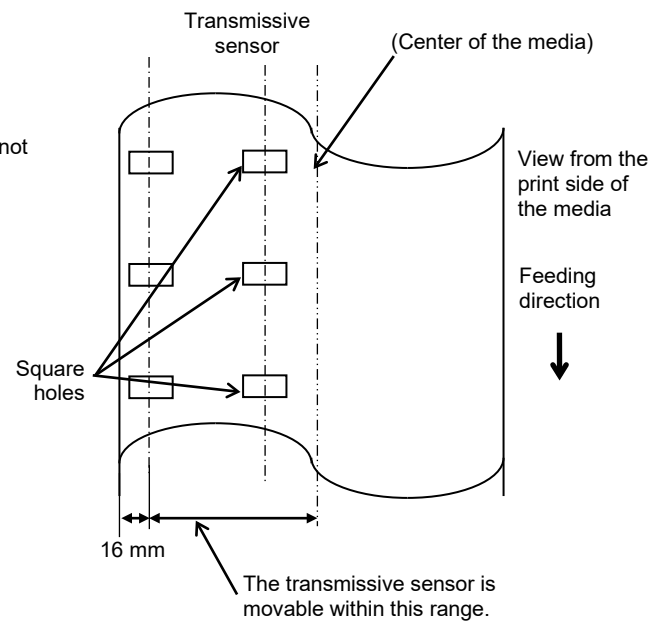
2.3.1 Transmissive sensor

<Tag>

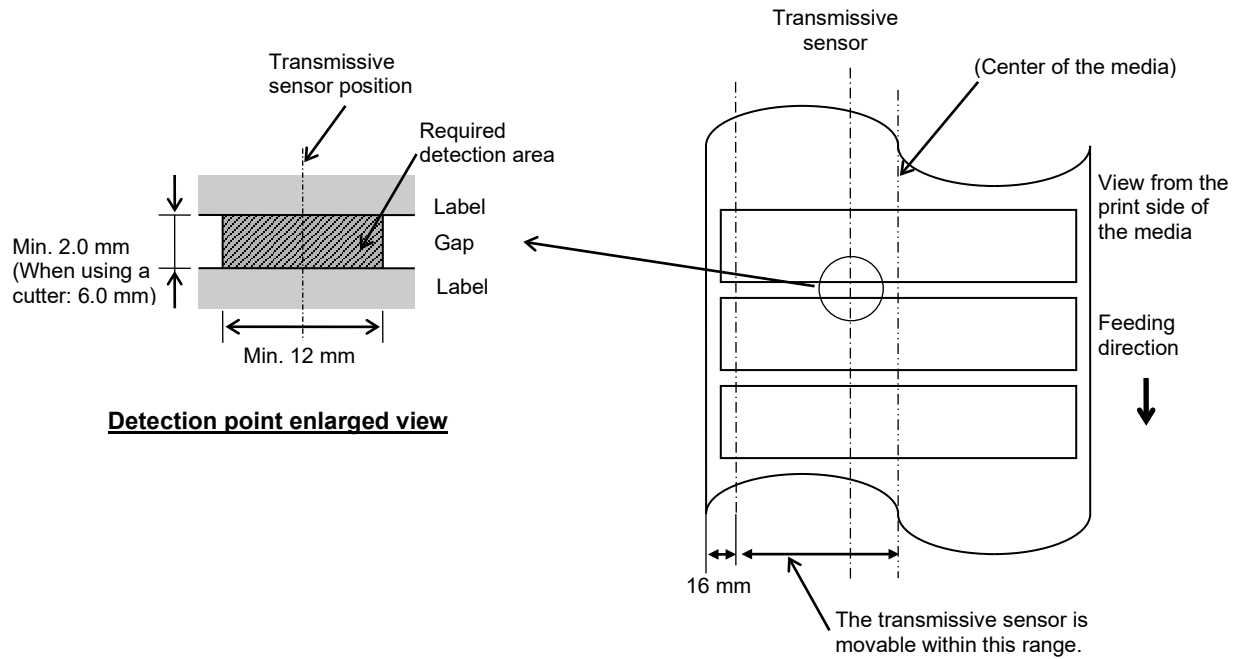
Hole detection



Detection area enlarged view

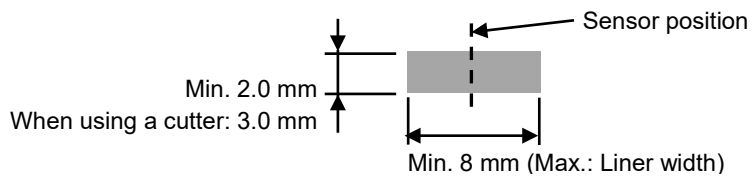


<Label>

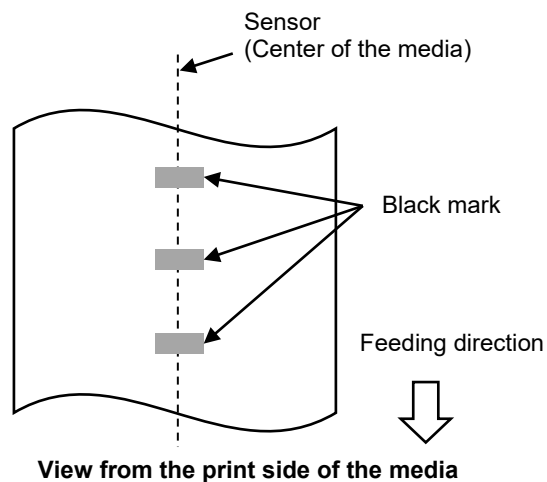


2.3.2 Reflective sensor detection position

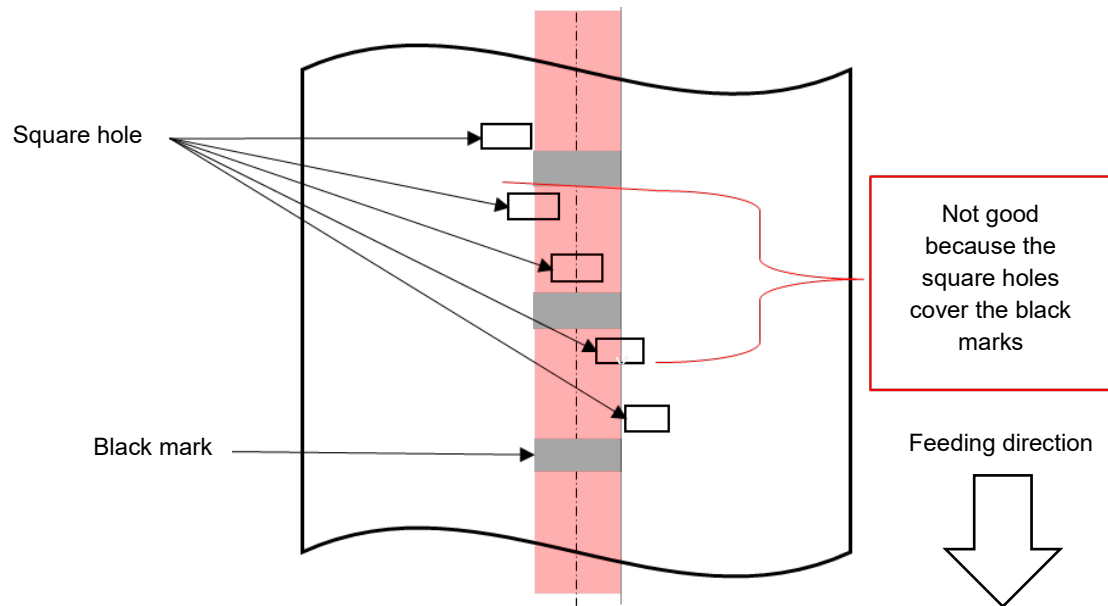
- The sensor is movable and can be shifted from the center to left edges of the media.
- The reflection of the black mark part should be 10% or less at a wavelength of 950 nm.
- The reflective sensor detects the black mark at its center position.
- When black marks are printed on a label, print them on the gap area.
- Square holes are available instead of black marks. Only when nothing is printed on the back side.



Detection point enlarged view



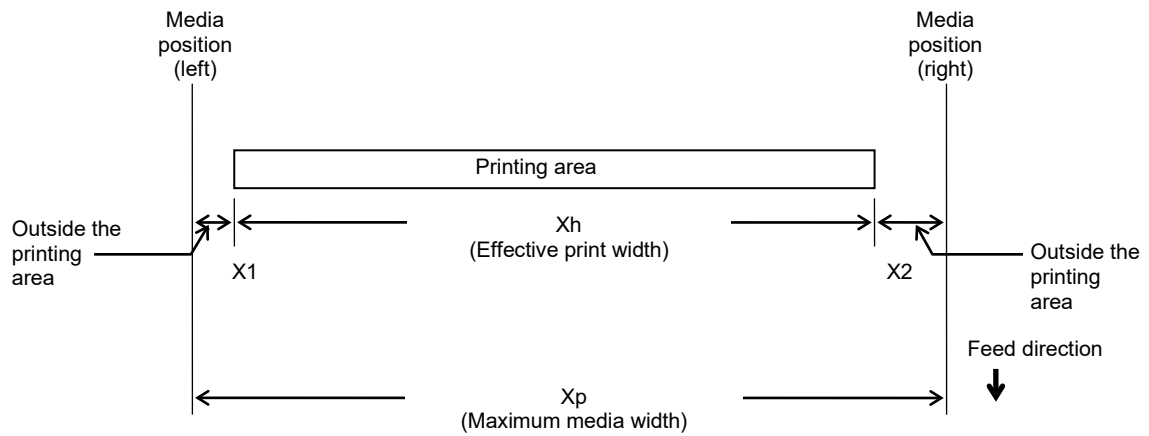
Reference) Location of square holes relative to the reflective sensor path (black mark position)
Placing square holes in a position that covers the detection path of the reflective sensor will cause errors.



2.4 Effective Print Area

2.4.1 Relationship between the effective print width and the media width

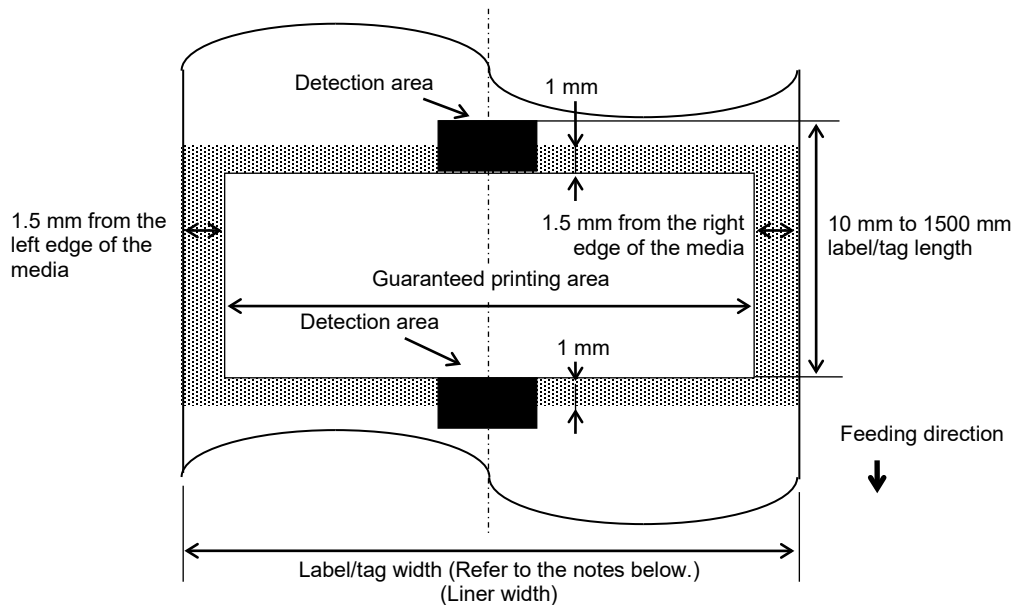
The label and tag widths must be within the effective print width of the label and tag.



(Unit: mm)

	Direct thermal		Thermal transfer	
	GS (203 dpi)	TS (305 dpi)	GS (203 dpi)	TS (305 dpi)
Xp	120.0	120.0	107.0	107.0
Xh	104.0 ±0.2	106.6 ±0.2	104.0 ±0.2	106.6 ±0.2
X1	8.0 ±0.1	6.7 ±0.1	1.5 ±0.1	0.2 ±0.1
X2	8.0 ±0.1	6.7 ±0.1	1.5 ±0.1	0.2 ±0.1

2.4.2 Effective print area of tags and labels



Notes:

Print quality in a slant area is not guaranteed.

Moreover, in the case of labels, in addition to the above areas, a 1-mm width does not guarantee printing accuracy in the label range.

The media sensor is located almost at the center of the thermal head.

When printing is made in the slanted area, wrinkling will occur in a ribbon and thus the print quality in the guaranteed printing area may be deteriorated.

For 14 ips, the print quality between the thermal head stop position and the feeding by 3 mm (including 1.5 mm of the non-printable area for slow-up and slow-down) is not guaranteed.

- * Slow-up: Distance from the start of the media transport until its speed stabilizes.
- * Slow-down: Distance it takes to gradually slow down the media transport speed until it stops.
- * This should be within the effective print width of the head.

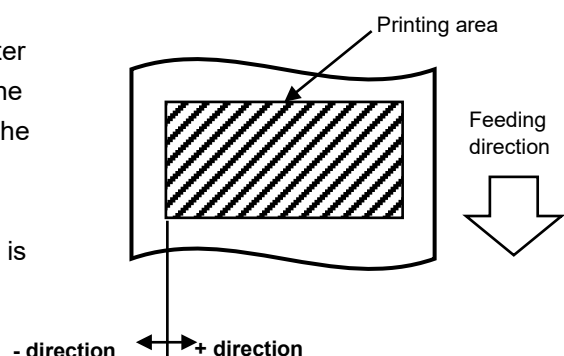
2.4.3 Print position accuracy

(1) Horizontal direction (meandering)

Variation in the horizontal direction is ± 1.0 mm.

The print position should be the reference position after test printing is carried out more than 10 times using the specified label or tag and correction is performed by the average value of the deviation from the print setting position.

- * Variation in the horizontal direction due to repetition is the result of 4 sheets being printed and 3 sheets excluding the first sheet.

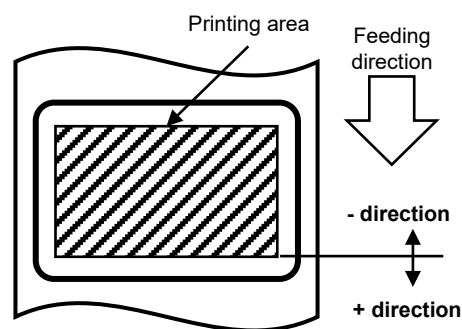


(2) Vertical direction (feeding direction)

Variation in the vertical direction is ± 1.0 mm.

The print position should be the reference position after test printing is carried out more than 10 times using the specified label or tag and correction is performed by the average value of the deviation from the print setting position. This reference position is offset by $\pm 3\%$ of the feeding amount with respect to the set value.

* Variation in the vertical direction due to repetition is the result of 4 sheets being printed and 3 sheets excluding the first sheet.



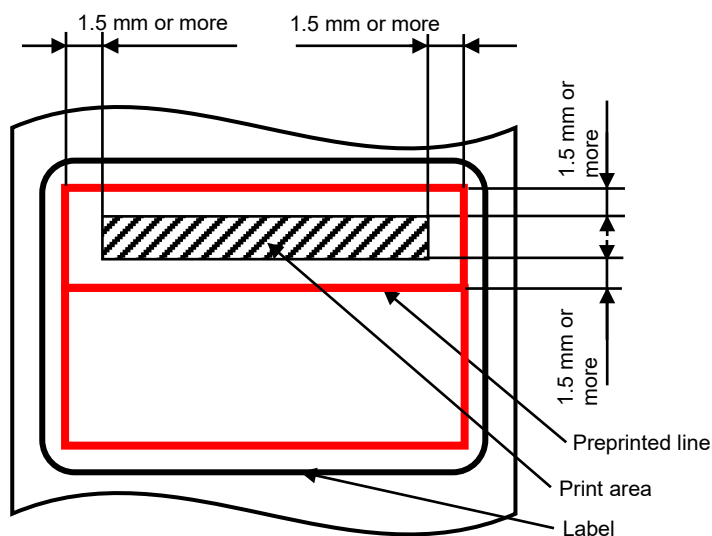
(3) Variation between printers

Variation between printers is ± 1 mm for both the horizontal and vertical directions. This can be adjusted by the print position fine adjustment. For details, refer to the External Equipment Interface Specification for BX400/BX600.

(4) Precautions when printing is performed on the preprinted media

Preprinting should be printed on an area which is at least 1.5 mm away from the print area with consideration given to variations of the print position.

* Preprinting: Printed matter such as a log or a format done by a printer beforehand



Depending on the color of the preprint, the media feed sensor may falsely detect.

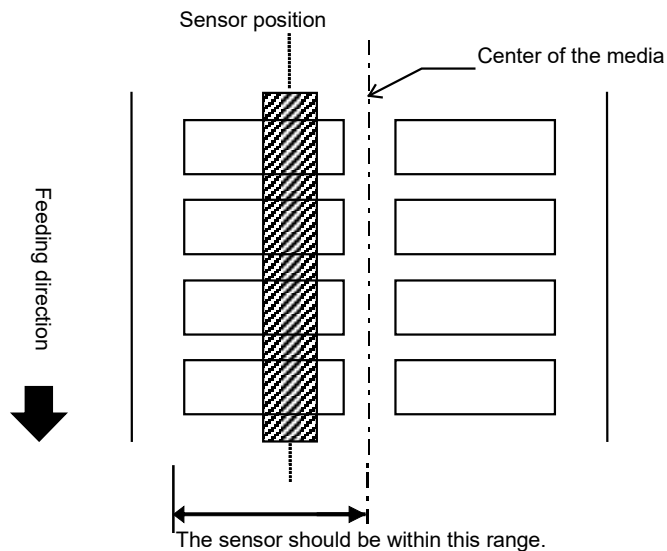
Therefore, if there are preprinting data on the sensor path, check in advance before deciding on the preprint color tone.

Misdetetection may be improved by performing the automatic threshold setting or by manually adjusting the sensor sensitivity or changing the threshold.

2.4.4 Precautions for processing labels

(1) Precautions when using media with multiple rows of labels in one sheet

When media with multiple rows of labels (e.g.: two rows in the figure below), is used, adjust the sensor so that it passes above any of one row within the movement range.



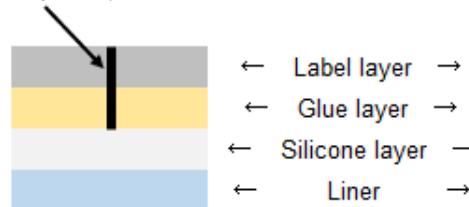
(2) Precautions for die cutting

[1] Do not cut and process to the silicone layer.

Damage to the silicone layer can lead to the following defects.

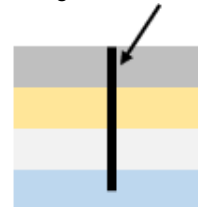
- Peeling failure (labels do not peel off from liner.)
- Defects in transport due to adhesion of glue to the transport-related rollers.

Only the label and glue layers are cut.



OK

Cutting has reached to the silicone layer.



Not good

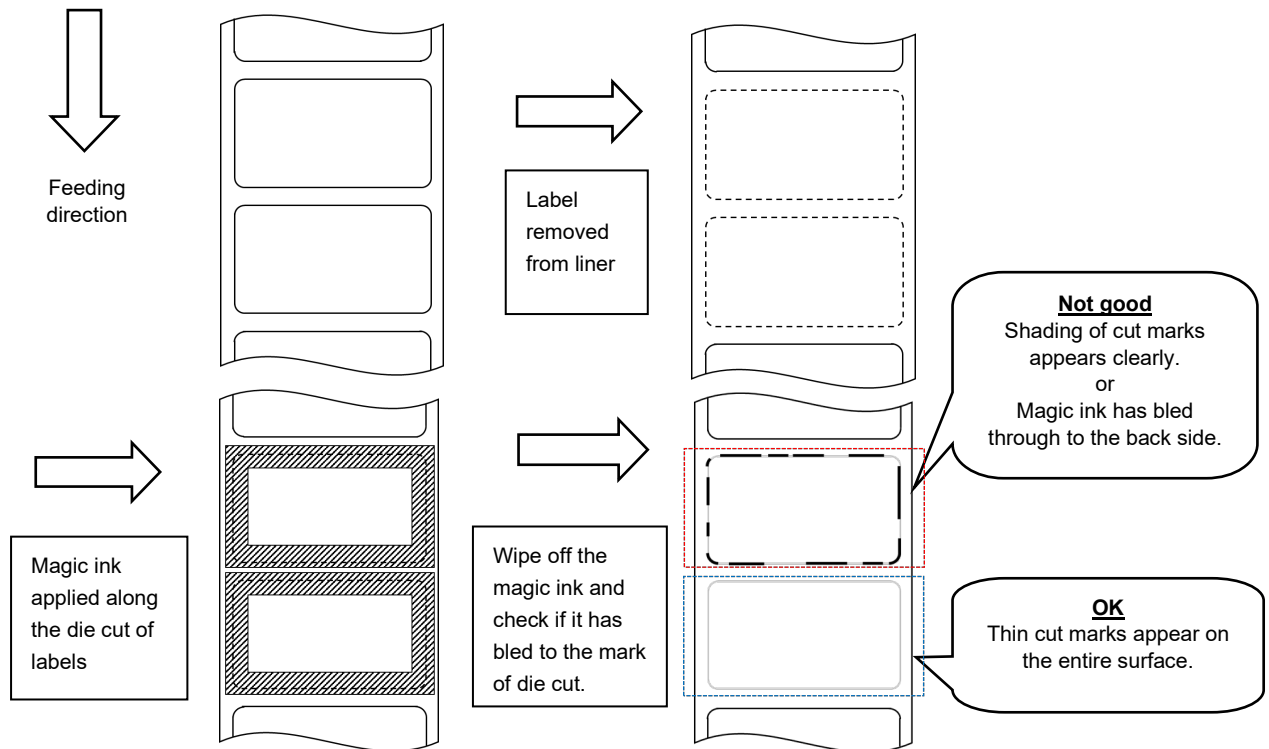
[Checking method]

Peel off the label from the liner and apply magic ink along the die cut.
Check the cut state by ink shading at that time.

[Criteria]

Magic ink gets into the mark of the die cut and a label size mark appears.

- 1) If ink bleeds through to the back side, the silicone layer is cut. In this case, it is judged as defective.
- 2) If the shading of cut marks appears clearly, it is judged as defective.
- 3) If thin cut marks appear on the entire surface, the silicone layer is not cut. In this case, it is judged as OK.



[2] No glue sticking out around labels.

Sticking out of glue can lead to the following defects.

- Direct thermal: Head damage or poor printing due to glue adhesion to the thermal head
- Thermal transfer: Adhesion of ink ribbon scraps around the labels

(3) Precautions for processing perforations

When creating labels and tags, be sure to cut out the perforation from the print side to the back side.

Cutting out from the back side can lead to the following defects.

- Damage to the thermal head due to burrs on the print side
- Poor printing due to paper dust on the print side having been generated during processing
- * Since paper dust is generated even when the cutting out is carried out from the print side, periodic cleaning inside the printer must be performed regardless of the direction of the cutting out.

(4) Precautions for preprinting

Depending on the type of ink, the head may be abnormally worn.

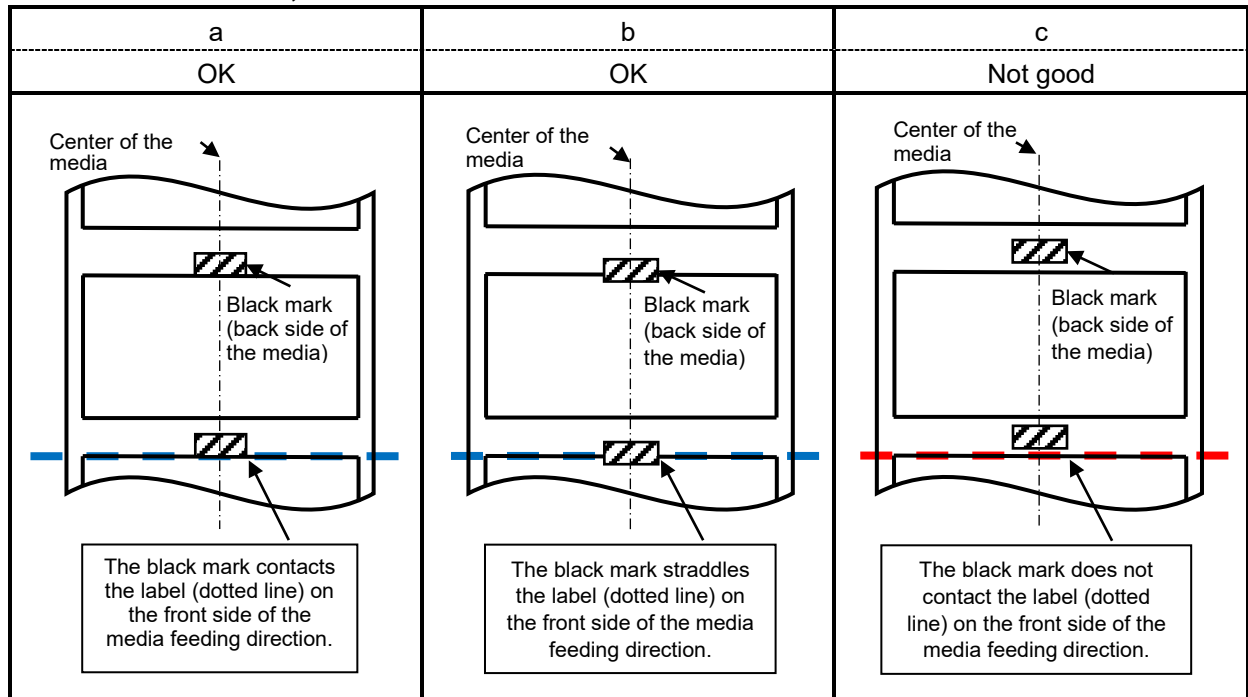
For preprinting, an ink which does not contain highly hardened substances, such as calcium carbonate or kaolin, should be used.

Depending on the color of the preprint, the media feed sensor may falsely detect. Therefore, check in advance before deciding on the preprint color tone.

(5) Precautions when printing black marks on labels

Black marks should be placed on the back side of the gap. The media feeding direction position of the black marks should be in contact with or straddle the label on the front side of the media feeding direction in the gap part.

If the black marks do not contact the label on the front side of the media feeding direction as shown in “c” below, media detection fails and an error will occur.



Reference) Excerpting from "2.3.2 Reflective sensor detection position"

- The reflection of the black mark part should be less than 10% at a wavelength of 950 nm.

- (6) If the condition of the media surface is not smooth or depending on the treatment method of the media surface, smudge stains of the ink ribbon may adhere to the media. In particular, it is required to check this for the ribbon saving mode.

2.5 Approved Media

Appendix 1 shows the approved media.

Do not disclose the media manufacturer model number and handle it carefully.

Thermal transfer media should be certified as a set with a certified ink ribbon. Using with ink ribbons that are not included in the combination is not guaranteed.

3. RIBBON

3.1 Ribbon Type

- Use approved ribbon only.
- If any non-approved ribbon is used, print quality cannot be guaranteed.
- Printing conditions and media to be used vary depending on the ribbons.

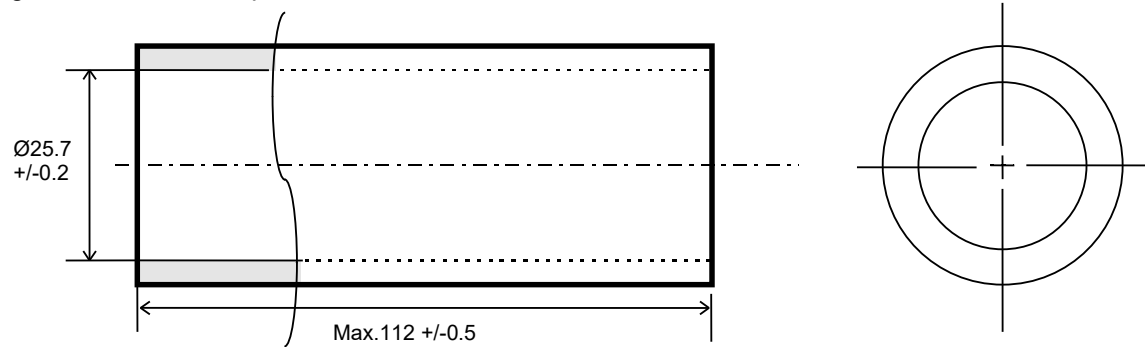
3.2 Ribbon Shape

No.	Item		Specification
1	Shape		Spool type (roll type)
2	Width		68 (40) +/-1 mm to 112 mm
	Winding width		68 (40) +2/-1 mm to 112 mm
3	Max. length		800 m (φ90 mm or less) The ribbon O.D. takes priority.
4	Max. O.D.		φ90 mm
5	Back processing		Coating
6	Core	Material	Paper
		I.D.	φ25.7 mm +/-0.2mm
		Shape	Refer to Fig. 1.
7	Leader tape		Polyester film (silver), 300 +/-5 mm length
8	End tape		Polyester film (silver), 250 +/-5 mm length
9	Winding direction		The ink side is wound outward. For the core and the winding position, refer to Fig. 2.

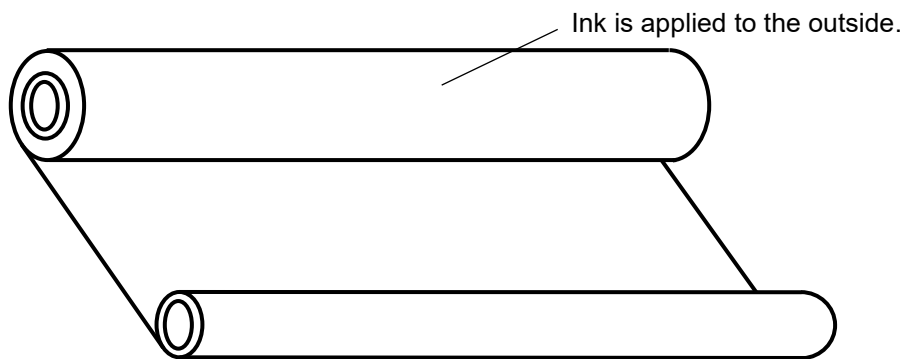
Notes:

1. The ribbon model number and the lot number should be stamped on the end surface of the media core with black permanent ink.
If it is not possible to apply the stamp on the end surface of the media core, other positions or the leader tape are available to be stamped.
2. The ribbon width should be at least 5 mm wider than the media width (liner width).
If the difference of the width between the ribbon and the media (liner) is too large, wrinkles may occur.
Use caution because there is an upper limit to the ribbon width. For details, see "3.3 Notes on Using the Ribbon".

<Fig. 1: Media core shape>



<Fig. 2: Position relationship between the media core and the ribbon>



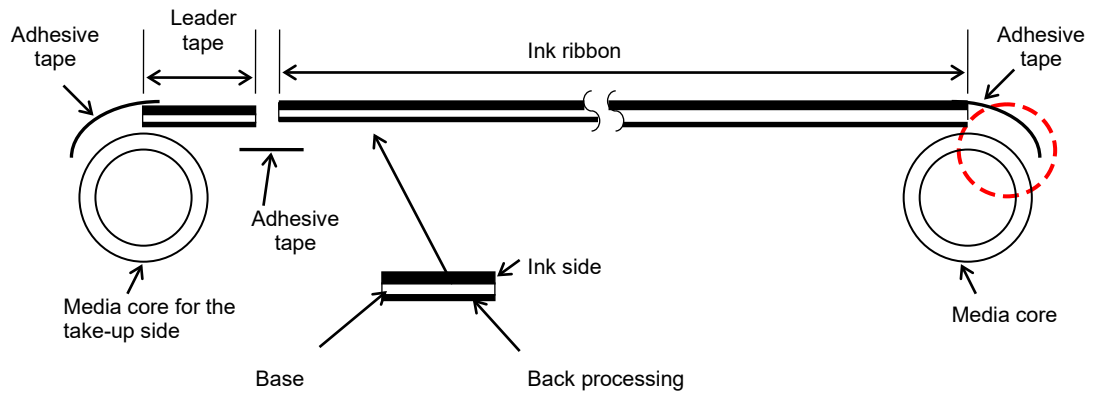
Notes:

Wind the ink ribbon so that its center is aligned to that for the media core.

The misalignment between the center of the ribbon and media core should be within ± 1 mm.

The media core can be used even if there is a notch.

<Fig. 3: Connection of the leader tape and the ribbon>



Notes:

The ink ribbon should be wound at right angles to the media core.

Reference) Precautions for the adhesive tape

The adhesive part of adhesive tape A and the media core (red dotted line in Fig. 3) should be made of a material that can be peeled off from the media core by natural force and which does not peel off the surface of the media core.

3.3 Notes on Using the Ribbon

3.3.1 Setting by the ribbon width

If the difference of the width between the ribbon and the media is too large, ribbon wrinkles may occur. So, use the labels with the following width for each ribbon width. Ribbons that are narrower than the media width are not allowed. The media width referred to here refers to the tag width or the liner width.

In the case of the standard ribbon width

(Unit: mm)

Media width	$30 \leq W < 36$	$36 \leq W < 50$	$50 \leq W < 63$	$63 \leq W < 79$	$79 \leq W < 97$	$97 \leq W < 107$
Ribbon width	41	55	68	84	102	112
Ribbon torque	Low	Standard	Standard	Standard	Standard	Standard
Ribbon fine adjustment (Take-up side)	0	0	-1	0	0	0
Ribbon fine adjustment (Supply side)	0	0	0	0	0	0

*1 In the case of other than the standard ribbon width, the media width should be "ribbon width is greater than or equal to the media width +5mm".

*2 The minimum media width when using a wrist band is 15 mm.

Depending on the width of the ribbon, it is required to correct its tension.

When a narrow-width ribbon is used, wrinkling will occur in it if its winding is too strong. In such a case, it is required to finely adjust the voltage of the ribbon winding depending on the printing patterns.

In the ribbon saving mode, correction is carried out when a value larger than the non-printing area shown below is detected.

203 dpi model

Print speed	3 ips	6 ips	10 ips	12 ips	14 ips
Min. ribbon saving length	20 mm	20 mm	35 mm	60 mm	75 mm

305 dpi model

Print speed	3 ips	5 ips	8 ips	10 ips	12 ips	14 ips
Min. ribbon saving length	20 mm	20 mm	25 mm	35 mm	60 mm	75 mm

Notes:

There are restrictions in the time in which the head-up solenoid can be energized.

Ribbon saving is not performed as the ribbon is run with the head down in the non-printing area.

3.3.2 Selection of the ribbon type and print table

Notes:

1. The print density fine adjustment values indicated in the tables below are the recommended ones. Refer to them when they are used by considering the variation.
2. Follow the tables below for the energy type setting. For details about the energy type setting, refer to the Key Operation Specification.
3. To protect the thermal head from the rating of the maximum supplying energy, the print density fine adjustment is limited.

Even if a value larger than the one shown in the tables below is set for the print density fine adjustment, no more energy is applied. Therefore, the print quality may not be guaranteed.

203 dpi

Energy type	Print density fine adjustment limitation				
	3 ips	6 ips	10 ips	12 ips	14 ips
Standard	10	10	5	2	0
Semi resin 1	10	10	10	10	10
Semi resin 2	10	10	10	10	10
Resin 1	10	10	10	8	5
Resin 2	10	10	10	4	1

305 dpi

Energy type	Print density fine adjustment limitation					
	3 ips	5 ips	8 ips	10 ips	12 ips	14 ips
Standard	10	10	10	10	1	-2
Semi resin 1	10	10	10	10	10	10
Semi resin 2	10	10	10	10	10	10
Resin 1	10	10	8	3	-4	-7
Resin 2	10	10	10	10	3	0

3.4 Approved Ribbon

Appendix 2 shows the approved ribbons.

Notes:

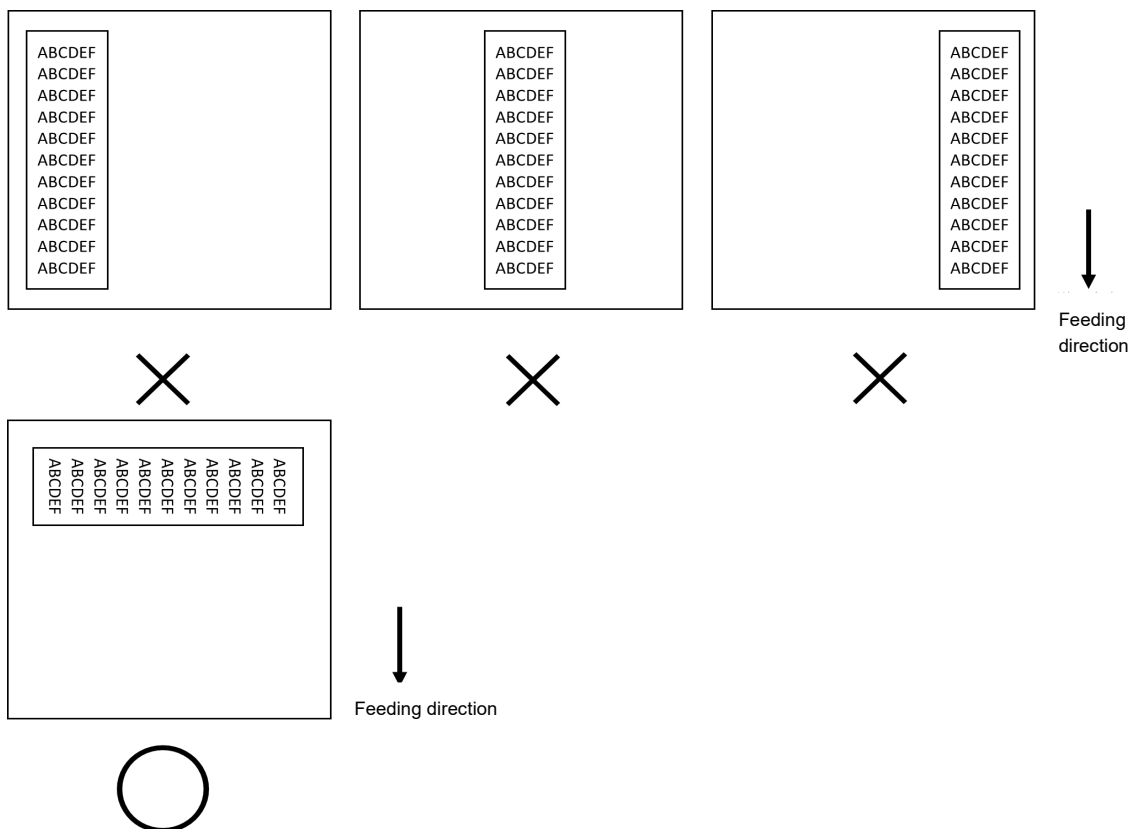
The approved media and ribbon information (Appendix 1 and 2) are confidential.

Therefore, when this document is shared with external parties, information such as the manufacturer, model number, ink name, etc. should be withheld and treated with care.

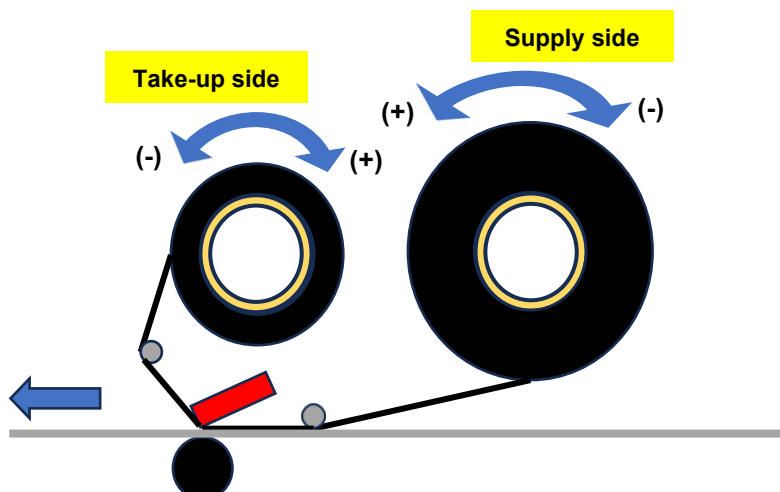
3.5 Precautions

3.5.1 One-sided printing

If printing is attempted in a one-sided manner relative to the width of the ribbon used, as shown in the figure below, wrinkles may occur in the ribbon.



When a ribbon error has occurred, adjust the ribbon tension at the feeding side to the minus direction. For details about the ribbon motor driving voltage fine adjustment command, refer to the Key Operation Specification.



Keep the ribbon and media in their packaging and store them at room temperature in a non-condensing location.

In addition, store them indoors and avoid direct sunlight. For other details, follow the storage conditions specified by each supply manufacturer.

4. PRINT CONDITIONS

4.1 Print Quality of Barcodes

Code128

Barcode	Resolution	Speed	Min. module width (dot)	Criteria
Serial	203 dpi	3 ips	3	C
		6 ips	3	C
		10 ips	4	F
		12 ips	4	F
		14 ips	4	F
	305 dpi	3 ips	4	C *1
		5 ips	4	C
		8 ips	5	C
		10 ips	5	F
		12 ips	5	F
		14 ips	5	F
Parallel	203 dpi	3 ips	2	B
		6 ips	2	B
		10 ips	2	C
		12 ips	2	C
		14 ips	2	C
	305 dpi	3 ips	3	B
		5 ips	3	B
		8 ips	3	C
		10 ips	3	C
		12 ips	3	C
		14 ips	3	C

*1: The criteria for the semi resin type is "D".

Code39

Barcode	Resolution	Energy type	Speed	NB (dot)	NS (dot)	WB (dot)	WS (dot)	CS (dot)	Criteria
Serial	203 dpi	Direct thermal Semi resin Resin	3 ips	2	4	5	7	4	C
			6 ips	2	5	6	10	5	C
			10 ips	2	5	6	10	5	F
			12 ips	2	5	6	10	5	F
			14 ips	2	5	6	10	5	F
	305 dpi (JP models)	Semi resin	3 ips	2	5	6	9	5	D
			5 ips	2	5	6	10	5	C
			8 ips	2	6	6	11	6	F
			10 ips	2	6	6	11	6	F
			12 ips	2	6	6	11	6	F
			14 ips	2	6	6	11	6	F
		Direct thermal Resin	3 ips	2	4	7	9	4	C
			5 ips	2	4	7	9	4	C
			8 ips	2	5	7	10	5	F
			10 ips	2	5	7	10	5	F
			12 ips	2	6	6	11	6	F
			14 ips	2	6	6	11	6	F
		Semi resin	3 ips	2	5	6	9	5	D
			5 ips	2	5	6	10	5	C
			8 ips	2	6	6	11	6	F
			10 ips	2	6	6	11	6	F
			12 ips	2	6	6	11	6	F
			14 ips	2	6	6	11	6	F
	305 dpi (Other than JP models)	Direct thermal Resin	3 ips	2	5	6	9	5	C
			5 ips	2	5	6	10	5	C
			8 ips	2	6	6	11	6	F
			10 ips	2	6	6	11	6	F
			12 ips	2	6	6	11	6	F
			14 ips	2	6	6	11	6	F
		Semi resin	3 ips	2	5	6	9	5	D
			5 ips	2	5	6	10	5	C
			8 ips	2	6	6	11	6	F
			10 ips	2	6	6	11	6	F
Parallel	203 dpi	Direct thermal Semi resin Resin	3 ips	2	2	5	5	2	B
			6 ips	2	2	5	5	2	B
			10 ips	2	2	5	5	2	C
			12 ips	2	2	5	5	2	C
			14 ips	2	2	5	5	2	C
	305 dpi (JP models)	Direct thermal Semi resin Resin	3 ips	3	3	8	8	3	B
			5 ips	3	3	8	8	3	B
			8 ips	3	3	8	8	3	C
			10 ips	3	3	8	8	3	C
			12 ips	3	3	8	8	3	C
			14 ips	3	3	8	8	3	C
	305 dpi (Other than JP models)	Direct thermal Semi resin Resin	3 ips	3	3	8	8	3	B
			5 ips	3	3	8	8	3	B
			8 ips	3	3	8	8	3	C
			10 ips	3	3	8	8	3	C
			12 ips	3	3	8	8	3	C
			14 ips	3	3	8	8	3	C

NB: Narrow bar width, NS: Narrow space width, WB: Wide bar width, WS: Wide space width,
CS: Space between characters

Notes:

1. In serial barcode printing, reading may not be possible even under the above conditions due to the number of digits of the barcode, supplies used, temperature environment, etc. Increase the space width (NS, WS) or decrease the density when printing.
2. When printing with a high print ratio is partially continuous with a serial barcode, etc., dirt is sometimes printed at the stopping position. In such a case, take the following actions.
 - (1) For labels: Set the effective print length to the maximum value (label pitch of minus 2 mm). (The cutting position is stopped between the gap.)
 - (2) For tags and with the cutter installed: Set the effective print length to the maximum value (tag pitch of minus 2 mm). (Cutting is performed at the stopping position.)
 - (3) For tags with perforations: Finely adjust the stopping position so that it comes above the perforations.
 - (4) If the problem still persists even if the above actions (1) to (3) have taken, reduce the printing speed, decrease the density by the print density fine adjustment and change the printing pattern.

QR code

Resolution	Speed	Min. module width (dot)	Criteria
203 dpi	3 ips	3	D
	6 ips	4	D
	10 ips	4	F
	12 ips	4	F
	14 ips	4	F
305 dpi (JP models)	3 ips	3 *1	D
	5 ips	4	D
	8 ips	4	F
	10 ips	4	F
	12 ips	5	F
305 dpi (Other than JP models)	3 ips	3 *1	D
	5 ips	4	D
	8 ips	4	F
	10 ips	4	F
	12 ips	5	F
	14 ips	5	F

*1: The minimum module width for the semi resin type is "4".

Model: Model 1

Error correction: Level Q

* JIS X 05109 (Refer to the 2D code symbol QR code Standard Specification.)

- 1) Reading may not be possible even under the above conditions due to the printing contents, supplies used, temperature environment, etc. Increase the number of the dots for one cell or decrease the density when printing.

Data Matrix

Resolution	Speed	Min. cell (dot)	Criteria
203 dpi	3 ips	3	D
	6 ips	4	D
	10 ips	4	F
	12 ips	4	F
	14 ips	4	F
305 dpi (JP models)	3 ips	3 *1	D
	5 ips	4	D
	8 ips	4	F
	10 ips	4	F
	12 ips	5	F
305 dpi (Other than JP models)	14 ips	5	F
	3 ips	3 *1	D
	5 ips	4	D
	8 ips	4	F
	10 ips	4	F
	12 ips	5	F
	14 ips	5	F

*1: The minimum module width for the semi resin type is "4".

Remarks:

1. The grade determination method shall be based on ISO15416.
2. For Code128, Code39, QR code and Data Matrix, the barcode reading guarantee is confirmed with a grade tester (manufactured by LVS).
Additional testing is required to confirm other barcode types and 2D codes with a grade tester.
3. The life of the thermal head varies depending on the print pattern (print ratio).
The durability of the thermal head, platen and cutter is a reference value verified by using a standard label.
4. At the time of factory shipment, the transmissive sensor and the reflective sensor are adjusted with the reference media.
If a media feeding error occurs, adjust the sensor for the media to be used.
5. When a printer is not used for a long time, leave the thermal head open.
Printing problems may occur due to deformation of the platen or the media (pressure contact mark).
6. Be careful when using long labels (length: 99.6 to 150.4 mm) because the peeled label may be made to hang forward due to its own weight and stick to the front of the printer and the floor.
7. If media with perforations is used, check it beforehand. Due to the influence of perforations, defective feeding (breakage, penetrating portion) or a sensor detection failure (optical axis disturbance at the penetrating portion) may occur.
Moreover, when using a cutter, cut the back of the perforations to prevent defective feeding. It is not possible to cut near perforations.
Avoid perforations and adjust the cutting position finely to a position where you can cut reliably.

4.2 Print Ratio

The maximum print ratio should be 20% of the media area.

4.3 Horizontal Lines and Inverted Character Printing

- (1) Although “1” and “2” are selectable for the dot for printing ruled lines, a value “3” or larger is guaranteed. Therefore, do not use “1” and “2”.
- (2) For the printing of horizontal ruled lines, depending on the combination of the ribbon and the media, sticking can occur, resulting in a blurred printing or be missing items.
If sticking has occurred, attempt the following:
 - Reduce the ruled lines.
 - Lower the energy by the energy fine adjustment of the thermal head.
 - Change the combination of the ribbon and the media.
- (3) When printing horizontal lines and inverted characters, the result may be blurred or squeezed due to wide variations. So, if there is a problem, adjust the speed or print density.

4.4 Print Density

The print density should be adjusted in accordance with the printing contents and supplies used while referring to the print density fine adjustment value in Appendix 3.

If priority is given to the serial barcode, adjust the value in the - (minus) direction. If priority is given to the horizontal lines, adjust the value in the + (plus) direction.

If a void is shown, adjust the value in the + (plus) direction. If reverse transfer or heat wrinkles are shown, adjust the value in the - (minus) direction.



Heat wrinkles: If an excessive heat is applied to the head, the ribbon shrinks as a consequence, resulting in wrinkled printing.

Reverse transfer: It tends to occur when the transfer performance deteriorates due to the combination of the ribbon and the media, resulting in blurred printing.

4.5 Robustness

When using the printed material in an environment where the printed surface is going to be rubbed in its usage, thoroughly check its robustness of the printed object before use.

Basically, if the printed surface is rubbed, its quality will deteriorate. Use a supply that suits the environment.

4.6 Other Precautions

- (1) When using direct thermal paper, use Na⁺800 ppm or less, K⁺250 ppm and Cl⁻500 ppm or less.
- (2) Avoid using media that contains SiO₂ talc, which causes abnormal abrasion of the thermal head heater protective layer.
- (3) If the ribbon is left under pressure for a long time while it is used, it may stick to the media and problems may occur at the start of printing.
Moreover, depending on the ribbon type, ribbon smudging may occur in the start or end of printing.
- (4) When narrow-width media is used, the thermal head heater protective layer may be sharpened at the edges of the media and the heater dot may be broken.
(White streaks are generated when wide-width media is used after dot broken.)

4.7 How to Fasten Media to Media Core at the End

- (1) If there is tape that secures the end of the media to the media core, the load of the media fluctuates at the moment when the tape peels off and uneven transportation may occur, which may affect printing.
In particular, there is a possibility that printed barcodes or two-dimensional codes may become unreadable at this time. So, be sure to check the labels you will be using in advance.
In the case of a label, adverse influence on the printing can be avoided by leaving 600 mm of the liner from the final label and affixing it to the media core.
However, after the final label printing, a media feeding error occurs instead of a no media error in the liner portion.
In the case of a label with a label pitch of 75.5 mm or less, it is possible to set a no-media error even if the liner is not left on the final label as described above. However, label printing at around 550 mm before the end of the liner may be affected by uneven transportation.
- (2) Depending on the condition of the tape at the end of the media, the peeled off tape may catch on the sensor, causing a media feeding error rather than a no media error.

Appendix 1: Approved media

Type		Manufacturer product number	Thickness (μm)	Total thickness (μm)	Manufacturer	Remarks	Supported models	
							G	T
Label	Direct thermal	150LA-1	82	153	RICOH	General purpose	★	★
	Thermal transfer	C6NS	66	150	OSP	General purpose coated	★	★
		FR-1412-50	50	160	Lintec	White PET	○	○
		VE-85 (FR5311-85)	85		OSP	Synthetic paper for thermal transfer (Yupo)	○	○
Tag	Direct thermal	130LHB-150	-	150	RICOH	High preservation DT tag	○	○
	Thermal transfer	IBEST-S160	-	165	OSP	TT Tag	○	○
Receipt	Direct thermal, Thermal transfer	PD190-R	-	75	OSP	Receipt	○	○

Notes:

The printing conditions may differ for each media.

1. The use of synthetic thermal paper shortens the head life.
2. When using a cutter, do not cut the labels which have glue.
3. The reference media (★) for the direct thermal is 150LA-1 and for the thermal transfer is C6NS, I-BEST S160 and FR1412.

For thermal transfer, the combination with the reference ribbon in Appendix 2 should be the reference.

Appendix 2: Approved ribbon (combination with the media)

Approved ribbon

Type	Model name for JP models	Model name for other than JP models	Manufacturer product name	Manufacturer	Applicable media	Supported models		
						G	T (JP models)	T (Other than JP models)
WAX/RESIN (SEMI RESIN)	A50	AG2	APR600(★)	ARMOR	C6NS(★)	○	○	○
					K8NS		○	
					TPNS		○	
					H01K03G03		○	
					Vellum	○		○
					Transtherm 2C	○		○
					I-BEST S(★)	○	○	○
					I-BEST W	○	○	○
	A55	AG4	APX650	ARMOR	C6NS	○	○	○
					Transtherm 2C	○		○
	-	AG6E	APR600LL	ARMOR	Vellum	○		○
					Transtherm 2C	○		○
	-	AG1E	APR400	ARMOR	Vellum	○		○
					Transtherm 2C	○		○
	R5 (R6)	RG2	B120EX(★)	RICOH	C6NS(★)	○	○	○
					I-BEST S(★)	○	○	○
					I-BEST W	○	○	○
					VES-85	○		○
	F5	FG2	TTM-78(★)	Fuji Copian	C6NS(★)	○	○	○
					I-BEST S(★)	○	○	○
					I-BEST W	○	○	○
					VES-85		○	
	S5P	SG2	TR4500	DNP	C6NS	○	○	○
RESIN	A7S (A8S)	AS1	AXR600(★)	ARMOR	VES-85	○	○	○
					FR1412-50(★)	○	○	○
					FR1615-50	○	○	○
	-	AS2	AXR800	ARMOR				
	R7S	RS1	B120EC(★)	RICOH	VES-85	○	○	○
					FR1412-50(★)	○	○	○
					FR1615-50	○	○	○
	F7S	-	B120EC	Fuji Copian		○	○	○
						○	○	○
						○	○	○
	F7NS (F8NS)	-	TTM-191	Fuji Copian	VES-85	-	○	-
					FR1412-50	-	○	-
					FR1615-50	-	○	-

Notes:

1. The printing conditions (applicable printing speed, fine adjustment value of print density) differ depending on the combination of the ribbon and media. Refer to Appendix 3.
2. Reference combination "★" (with the print density fine adjustment value of 0)

Appendix 3: Print speed and print density fine adjustment value by supplies

<203 dpi>

		Ribbon			Media name	Print density fine adjustment									
		Product number				3 ips	6 ips	10 ips	12 ips	14 ips	Energy type	Remarks			
		Other than JP models	JP models	Manufacturer											
NE	SR	AG2	A50	APR600	C6NS	0 [j]	0 [j]	0 [j]	0 [b]	0 [b]	Semi resin1	★ Semi resin1 reference media			
					K8NS										
					TPNS										
					H01K03G03										
					Vellum	TBD	TBD	TBD	TBD	TBD	Semi resin1				
					Transtherm 2C	TBD	TBD	TBD	TBD	TBD	Semi resin1				
					I-BEST S	0 [j]	0 [j]	0 [j]	0 [b]	0 [b]	Semi resin1	★ Semi resin1 reference media			
		I-BEST W	TBD	TBD	TBD	TBD	TBD	Semi resin1							
		AG4	A55	APX650	C6NS	TBD	TBD	TBD	TBD	TBD	Semi resin1				
					Transtherm 2C	TBD	TBD	TBD	TBD	TBD	Semi resin1				
		AG6E	-	APR600LL	Vellum	TBD	TBD	TBD	TBD	N/A	Semi resin1				
					Transtherm 2C	TBD	TBD	TBD	TBD	N/A	Semi resin1				
		AG1E	-	APR400	Vellum	TBD	TBD	TBD	TBD	N/A	Semi resin1				
					Transtherm 2C	TBD	TBD	TBD	TBD	N/A	Semi resin1				
		RG2	R5(R6)	B120EX	C6NS	2	0 [s]	2 [i][s]	2 [b][i]	2 [b][i]	Semi resin2	★ Semi resin2 reference media			
					I-BEST S	TBD	TBD	TBD	TBD	TBD	Semi resin2	★ Semi resin2 reference media			
					I-BEST W	TBD	TBD	TBD	TBD	TBD	Semi resin2				
					VES-85	-4	-4	-4 [i]	-4 [b][i]	-4 [b][i]	Semi resin2				
					FG2	F5	TTM-78	C6NS	TBD	TBD	TBD	TBD	TBD	Semi resin2	
								I-BEST S	TBD	TBD	TBD	TBD	TBD	Semi resin2	
								I-BEST W	TBD	TBD	TBD	TBD	TBD	Semi resin2	
		VES-85													
		SG2	S5P	TR4500	C6NS	TBD	TBD	TBD	TBD	TBD	Semi resin2				
	R	AS1	A7S(A8S)	AXR600	VES-85	TBD	TBD	TBD	TBD	TBD	Resin1				
					FR1412-50	0 [k][r]	0 [k][m][r]	N/A	N/A	N/A	Resin1	★ Resin1 reference media			
					FR1615-50	TBD	TBD	N/A	N/A	N/A	Resin1				
		RS1	R7S	B120EC	VES-85	2 [k][r]	2 [k][r]	N/A	N/A	N/A	Resin2				
					FR1412-50	TBD	TBD	N/A	N/A	N/A	Resin2	★ Resin2 reference media			
					FR1615-50	0	0	N/A	N/A	N/A	Resin2				
		-	F7NS(F8 NS)	TTM-191	VES-85										
					FR1412-50										
					FR1615-50										
Direct (TAG)	-	-			130LAB-1-150	TBD	TBD	TBD	TBD	TBD	Standard				
					130LHB-150	4	4	4	N/A	N/A	Standard				
					PD190-R	TBD	TBD	TBD	TBD	TBD	Standard				
Direct (Label)	-	-			150LA-1P-ST	0	0	0	N/A	N/A	Standard	★ Standard reference media			
					150LHB-P-ST	TBD	TBD	TBD	TBD	TBD	Standard				
					V8NS	TBD	TBD	TBD	TBD	TBD	Standard				
					D01K01P03										
					D01J01P03										
					Multitherm Plus	TBD	TBD	TBD	TBD	TBD	Standard				

<305 dpi> (JP models)

		Ribbon			Media name	Print density fine adjustment							
		Product number				3 ips	5 ips	8 ips	10 ips	12 ips	14 ips	Energy type	Remarks
		Other than JP models	JP models	Manufacturer									
NE	SR	AG2	A50	APR600	C6NS	5℃: 2 23℃: 0 35℃: 0	5℃: 2 [s] 23℃: 0 35℃: 0	0 [s]	0 [s]	0 [b]	0 [b]	Semi resin1	★ Semi resin1 reference media
					K8NS	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin1	
					TPNS	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin1	
					H01K03G03	TBD	TBD	TBD	TBD	TBD	N/A		
					Vellum								
					Transtherm 2C								
					I-BEST S	-2 [f][g]	0 [f][g][s]	0 [f][g][s]	0 [f][g][s]	2 [b][f][g]	0 [b][f][g]	Semi resin1	★ Semi resin1 reference media
		I-BEST W	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin1				
		AG4	A55	APX650	C6NS	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin1	
					Transtherm 2C								
		AG6E	-	APR600LL	Vellum								
					Transtherm 2C								
		AG1E	-	APR400	Vellum								
					Transtherm 2C								
		RG2	R5(R6)	B120EX	C6NS	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin2	
					I-BEST S	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	
					I-BEST W	N/A	N/A	N/A	N/A	N/A	N/A	Semi resin2	
					VES-85							Semi resin2	
		FG2	F5	TTM-78	C6NS	2 [l]	2 [l][s]	2 [l][s]	2 [l][s]	2 [b]	2 [b]	Semi resin2	★ Semi resin2 reference media
					I-BEST S	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	★ Semi resin2 reference media
					I-BEST W	N/A	N/A	N/A	N/A	N/A	N/A	Semi resin2	
					VES-85	-2	-4	-4	-4	-4	-4 [b]	Semi resin2	
		SG2	S5P	TR4500	C6NS	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	
	R	AS1	A7S(A8S)	AXR600	VES-85	TBD	TBD	TBD	N/A	N/A	N/A	Resin1	
					FR1412-50	0 [k][r]	0 [k][r]	N/A	N/A	N/A	N/A	Resin1	★ Resin1 reference media
					FR1615-50	TBD	TBD	TBD	N/A	N/A	N/A	Resin1	
		RS1	R7S	B120EC	VES-85	6 [k][r]	6 [k][r]	2	N/A	N/A	N/A	Resin2	
					FR1412-50	TBD	TBD	TBD	N/A	N/A	N/A	Resin2	★ Resin2 reference media
					FR1615-50	4	8	2	N/A	N/A	N/A	Resin2	
		-	F7NS(F8 NS)	TTM-191	VES-85	TBD	TBD	TBD	N/A	N/A	N/A	Resin2	
					FR1412-50	TBD	TBD	TBD	N/A	N/A	N/A	Resin2	
	FR1615-50	TBD			TBD	TBD	N/A	N/A	N/A	Resin2			
Direct (TAG)	-	-			130LAB-1-150	TBD	TBD	TBD	N/A	N/A	N/A	Standard	
					130LHB-150	4	8	4	4	6 [a]	N/A	Standard	
					PD190-R	TBD	TBD	TBD	N/A	N/A	N/A	Standard	
Direct (Label)	-	-			150LA-1P-ST	0	0	0	0	0	0	Standard	★ Standard reference media
					150LHB-P-ST	TBD	TBD	TBD	TBD	N/A	N/A	Standard	
					V8NS	TBD	TBD	TBD	TBD	N/A	N/A	Standard	
					D01K01P03	TBD	TBD	TBD	TBD	TBD	TBD	Standard	
					D01J01P03	TBD	TBD	TBD	TBD	TBD	TBD	Standard	
					Multitherm Plus								

<305 dpi> (Other than JP models)

		Ribbon			Media name	Print density fine adjustment										
		Product number				3 ips	5 ips	8 ips	10 ips	12 ips	14 ips	Energy type	Remarks			
		Other than JP models	JP models	Manufacturer												
NE	SR	AG2	A50	APR600	C6NS	-4	5℃: -2 [s] 23℃: -4 35℃: -4	5℃: 0 [s] 23℃: -2 35℃: -2	0 [i][s]	5℃: -2 [b][g][i] 23℃: 0 [i] 35℃: 0	5℃: -2 [b][g][i] 23℃: 0 [i] 35℃: 0	Semi resin 1	★ Semi resin1 reference media			
					K8NS											
					TPNS											
					H01K03G03											
					Vellum	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin 1				
					Transtherm 2C	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin 1				
					I-BEST S	-2	-2 [s]	0 [s]	0 [i][s]	5℃: 2 [b][g][i] 23℃: 2 [i] 35℃: 0	5℃: 2 [b][g][i] 23℃: 2 [i] 35℃: 0	Semi resin 1	★ Semi resin1 reference media			
		I-BEST W	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin 1							
		AG4	A55	APX650	C6NS	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin 1				
					Transtherm 2C	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin 1				
		AG6E	-	APR600LL	Vellum	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin 1				
					Transtherm 2C	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin 1				
		AG1E	-	APR400	Vellum	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin 1				
					Transtherm 2C	TBD	TBD	TBD	TBD	TBD	N/A	Semi resin 1				
		RG2	R5(R6)	B120EX	C6NS	0 [h]	0 [h][s]	2 [h][s]	2 [i][s]	5℃: 2 [b][g][i] 23℃: 0 [i] 35℃: 0	5℃: 2 [b][g][i] 23℃: 0 [i] 35℃: 0	Semi resin2	★ Semi resin2 reference media			
					I-BEST S	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	★ Semi resin2 reference media			
					I-BEST W	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2				
					VES-85	5℃: -4 23℃: -4 35℃: -8	5℃: -4 23℃: -4 35℃: -8	5℃: -4 23℃: -4 35℃: -8	5℃: -4 23℃: -4 35℃: -8	N/A	N/A	Semi resin2				
					FG2	F5	TTM-78	C6NS	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	
								I-BEST S	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	
								I-BEST W	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2	
		VES-85														
		SG2	S5P	TR4500	C6NS	TBD	TBD	TBD	TBD	TBD	TBD	Semi resin2				
	R	AS1	A7S(A8S)	AXR600	VES-85	TBD	TBD	TBD	TBD	TBD	TBD	Resin 1				
					FR1412-50	0 [k][r]	0 [k][r]	N/A	N/A	N/A	N/A	Resin1	★ Resin1 reference media			
					FR1615-50	TBD	TBD	TBD	TBD	N/A	N/A	Resin1				
		RS1	R7S	B120EC	VES-85	6 [h][k] [r][t]	6 [h][k] [r]	5℃: 6 [h] 23℃: 4 [h] 40℃: 4 [h]	N/A	N/A	N/A	Resin2				
					FR1412-50	TBD [t]	TBD	TBD	TBD	N/A	N/A	Resin2	★ Resin2 reference media			
					FR1615-50	5℃: 2 [t] 23℃: 2 [t] 40℃: 4 [t]	5℃: 6 23℃: 6 40℃: 4	5℃: 6 23℃: 6 40℃: 4	N/A	N/A	N/A	Resin2				
		-	F7NS(F8 NS)	TTM-191	VES-85											
					FR1412-50											
					FR1615-50											
	Direct (TAG)	-	-			130LAB-1-150	TBD	TBD	TBD	TBD	TBD	TBD	Standard			
130LHB-150						8	8	8	5℃: 4 23℃: 8 40℃: 8	N/A	N/A	Standard				

			PD190-R	TBD	TBD	TBD	TBD	TBD	TBD	Standard	
Direct (Label)	-	-	150LA-1P-ST	2	2	2	0	N/A	N/A	Standard	★ Standard reference media
			150LHB-P-ST	TBD	TBD	TBD	TBD	TBD	TBD	Standard	
			V8NS	TBD	TBD	TBD	TBD	TBD	TBD	Standard	
			D01K01P03								
			D01J01P03								
			Multitherm Plus	TBD	TBD	TBD	TBD	TBD	TBD	Standard	

The explanation about the alphabet letters in the table is as below.

- [a] Printing is not available under a high-temperature environment
- [b] Printing is not available under a low-temperature environment
- [c] Density adjustment in the plus direction is required under a high-temperature environment
- [d] Density adjustment in the plus direction is required under a low-temperature environment
- [e] Density adjustment in the minus direction is required under a high-temperature environment
- [f] Smudging may occur under a high-temperature environment.
- [g] Printing of a serial barcode is not possible [a][b]. Moreover, depending on the ribbon type, ribbon smudging may occur at the start or end of printing. Void may occur during solid black printing.
- [h] Density adjustment in the plus direction is required when a serial barcode is blurred.
- [i] Density adjustment by 2 to 4 in the plus direction is required when blurring has occurred.
- [j] Density adjustment in the minus direction is required when wrinkling has occurred.
- [k] Black solid printing is not available under a low-temperature environment
- [l] Printing with the peel-off mode is not available under a low-temperature environment
- [m] The criterion for the Code39 serial barcode under a low-temperature environment is "D".
- [n] The Code39 serial barcode rank is F.
- [o] Printing of Code39 serial barcodes is not available.
- [p] Printing of ruled lines is not available.
- [q] Density adjustment in the plus direction is required when blurring has occurred in the batch mode.
- [r] Density adjustment in the plus direction is required when blurring has occurred.
- [s] A reduction in the print speed or density adjustment in the plus direction is required when blurring has occurred under a low-temperature environment.
- [t] Code39 serial barcode rank D

Notes:

1. Depending on combination of the media and ribbon, when printing is attempted in a lower temperature environment below that for guaranteed operating, a restriction in the software is applied and thus the print may be squeezed even if the print density fine adjustment value is increased since the absolute energy rating value is exceeded.
In such a case, reduce the print speed.
2. Depending on the combination of the media and ribbon, smudging may occur in an area pressed by the heater element of the thermal head due to the characteristics of the ribbon ink in a high temperature environment (35 °C or higher). In such a case, use it in an environment below 35 °C.
3. Depending on the combination of the media and ribbon, stitching may occur due to printing conditions and conditions.
In such a case, performing the following items is recommended.
 - Reduce the number of dots to be printed at one time.
 - Change the print energy. (Finely adjust the print density to the minus direction.)
 - Change the print speed setting (make it faster).
4. "★" in the media field indicates the standard media.
5. "-": Not available

Precautions for approved supplies

Precautions for approved media

1. The life of the print head varies depending on the print pattern (print ratio).
2. At the time of factory shipment, the transmissive sensor and the reflective sensor are adjusted using the standard labels and tags for the inspection.

Therefore, it is sometimes required to adjust the sensors by the media used by users.

Moreover, if a media feeding error has occurred, adjust the sensors by using the media to be employed.

Precautions for approving ribbons

1. Printing conditions and media to be used may vary depending on the ribbons.

Precautions for the print density adjustment

1. The values for the print density adjustment in the above table are the recommended ones. Therefore, when using, be sure to first consider the variations of the printer.

2. Follow the above tables for the energy type setting.

For details about the energy type setting, refer to the Key Operation Specification.

3. When a resin ribbon (BX7*****AS1/RS1) is used at the print speed of “6 ips”, printing may be blurred if the temperature of the print head becomes high.

Normally, this can be improved by the print tone fine adjustment. However, blurred printing sometimes cannot be improved in such a manner. In such a case, set “3 ips” for the print speed.

4. To protect the thermal head from the rating of the maximum supplying energy, the print tone fine adjustment is limited.

Even if a value larger than the one described in the tables in Section 3.3.2 is set for the print tone fine adjustment, the print tone does not become darker.

Appendix 4: Peel-off

Temperature, humidity	5 to 40 °C Relative humidity: 75% or below
Print speed	203 dpi: 3 ips, 6 ips, 10 ips When the expansion I/O is used (TYPE1 (Standard mode)): 3 ips, 6 ips When the expansion I/O is used (TYPE2 (inline mode)): 3 ips, 6 ips, 10 ips, 12 ips, 14 ips 305 dpi: 2 ips, 3 ips, 4 ips When the expansion I/O is used (TYPE1 (Standard mode)): 3 ips, 5 ips When the expansion I/O is used (TYPE2 (inline mode)): 3 ips, 5 ips, 8 ips, 10 ips, 12 ips, 14 ips
Media core I.D.	φ76.2 mm
Winding direction	Outside wound, Inside wound
Media type	Approved media
Linters	7K, 8K or equivalent

Appendix 5: Fanfold media

Temperature, humidity	5 to 40 °C, 25 to 85%
Print speed	203 dpi: 3 ips, 6 ips, 10 ips, 12 ips, 14 ips 305 dpi: 3 ips, 5 ips, 8 ips, 10 ips, 12 ips, 14 ips
Reference media	PD-A (landscape) 50x85, PD-B (landscape) 60x92, PD-B (portrait) 92x60, PD-C (landscape) 80x115, PD-C (portrait) 115x80

Notes:

1. Fanfold media is a folded (bellows) finish rather than a roll.
2. Check in advance with the fanfold media before actually using.
3. The peel-off mode is not guaranteed. (Breaking at the perforations may occur.)

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