TOSHIBA

TOSHIBA Bar Code Printer

B-EV4 Series

Supply Specification

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TOSHIBA TEC CORPORATION

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1. SCOPE

This manual describes the supplies for use on the following bar code printers.

B-EV4D-GS14-QM-R
B-EV4D-TS14-QM-R
B-EV4T-GS14-QM-R
B-EV4T-TS14-QM-R

2. PAPER

2.1 TYPES OF PAPER

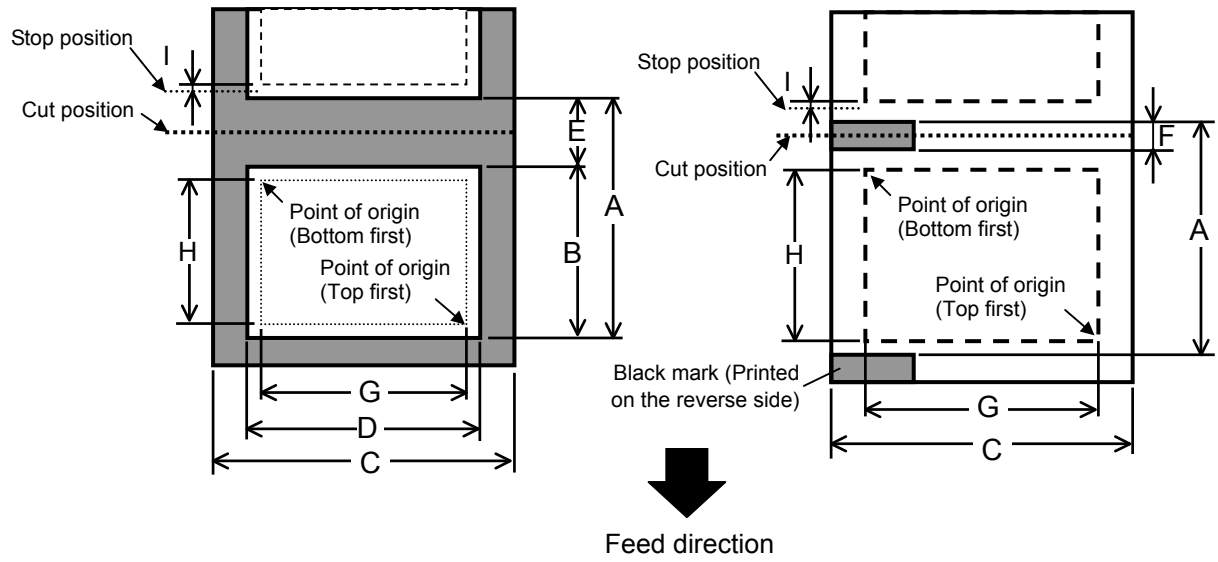
Two types of paper are available, labels and tags, each being further divided into the direct thermal type and thermal transfer type.

Approved paper must be used.

Use of non-approved paper may cause a print failure.

The special media used for wristbands are described in **Section 5**.

2.2 PAPER SIZE AND SHAPE

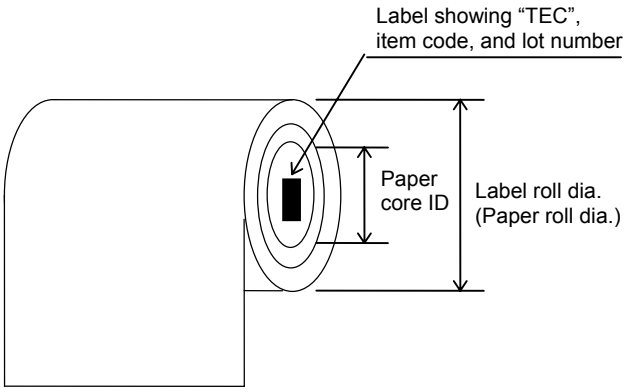


[mm]

Item \ Model	Issue mode		203 dpi model (GS14-QM-R)			300 dpi model (TS14-QM-R)		
			Batch	Strip	Cutter	Batch	Strip	Cutter
Thermal head dot density			8 dots/mm (203 dpi)			11.8 dots/mm (300 dpi)		
Thermal head width			108			105.7		
A: Label/tag pitch	Label	Min.	10	25.4	25.4	10	25.4	25.4
		Max.	999	152.4	999	457.2	152.4	457.2
	Tag	Min.	10	---	25.4	10	---	25.4
		Max.	999	---	999	457.2	---	457.2
B: Label length		Min.	8	23.4	19.4	8	23.4	19.4
		Max.	997	150.4	993	455.2	150.4	451.2
C: Backing paper width/ Tag width		Min.	25.4					
		Max.	112					
D: Label width		Min.	22.4					
		Max.	109					
E: Label-to-label gap length		Min.	2.0		6.0	2.0		6.0
		Max.	10.0					
F: Black mark length		Min.	2.0		6.0	2.0		6.0
		Max.	10.0					
G: Effective print width			108			105.7		
H: Effective print length	Label	Min.	6	21.4	17.4	6	21.4	17.4
		Max.	995	148.2	991	453.2	148.2	449.2
	Tag	Min.	8	---	25.4	10	---	25.4
		Max.	997	---	997	455.2	---	455.2
I: Slow up/ down interval	Slow –up		1.0					
	Slow-down		1.0					
J: Thickness			60µm to 190µm *Approved media only					
K: Max. roll diameter			Ø127 (label roll in printer) Ø214 (When an optional external roll holder is used.) * Ø212 (When using paper with inside core diameter of 42 mm)					
L: Roll direction	Label		Outside only (Inside wound is not allowed.)					
	Tag		Outside (Standard) / Inside					
M. Inside core diameter			Ø25.4 mm (1”), Ø38.1 mm (1.5”), Ø42mm Ø76.2 mm (3”): When an optional external roll holder is used.					

NOTES:

- *The ratio “label length” to “gap length” must be 3:1 or more.*
- *The backing paper is approved together with label.*
- *Label stocks must have a 1.5 mm or more vertical gap on both sides of a label.*
- *The backing paper to be used must be glassine paper (7K or 8K, white) or equivalent, and must have a transmission factor of 22% or more.*
- *A label showing “TEC”, item code, and lot number must be attached inside the paper core.*



(For reference)

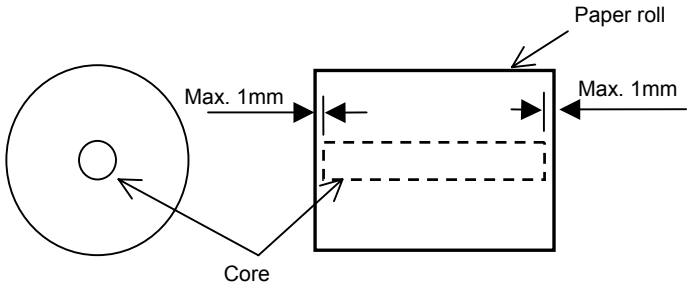
Relation between Paper Roll Length and Paper Core Diameter

$$L = \frac{(D^2 - d^2)\,\pi}{4t}$$

L: Paper length
D: Paper roll diameter
d: Paper core outside diameter
t: Paper thickness

In calculation, the same unit of measure must be used for each factor.

- *Difference between the media width and the paper core width must be 1 mm or less.*
  In the case of the inner core diameter of ø 38.1-mm or ø 42-mm, it tends to drop off the media holder easily.



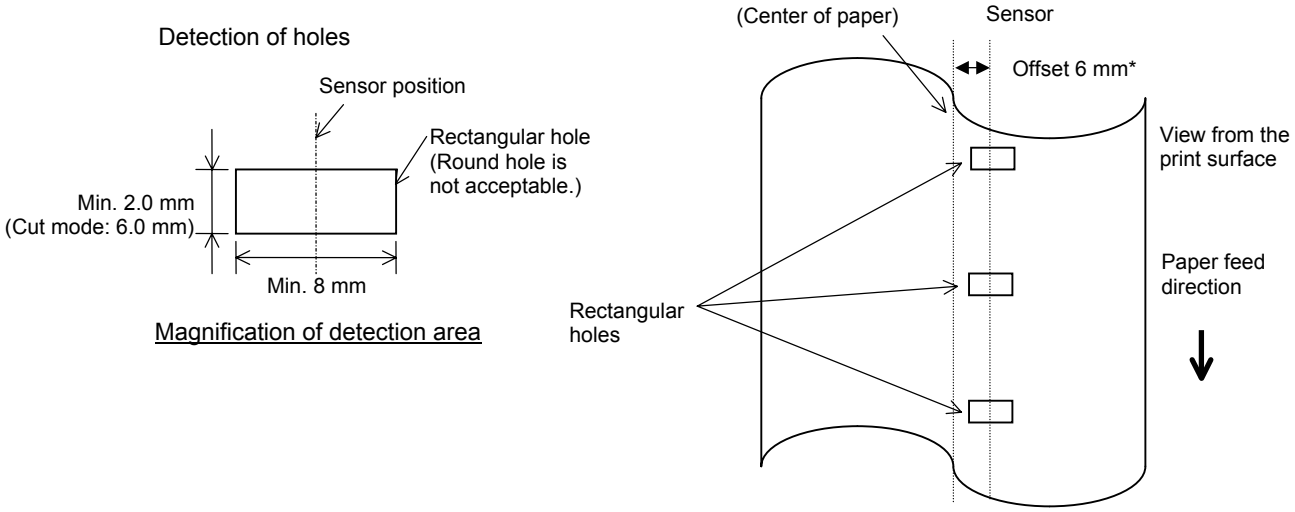
- *The adhesive power of the label glue must be equivalent to that of C6NS, otherwise a test is required to be conducted. (Adhesive power: JIS Z 0237)*
- *When performing peel-off issue, the relative humidity must be 75% or less.*
- *To cut labels at a desired position, make a cut position fine adjustment.*
- *If the paper is wound onto the platen during cut operation, enable the “FORWARD WAIT” function by using the parameter setting tool.*
- *Do not cut label areas (label + backing paper), as doing this may stain the cutter blade with the glue and shorten the cutter life. Be sure to cut the backing paper areas (gaps). In the case of perforated media, a test is required to be conducted.*
- *To issue labels in the cut mode, the label should be provided with at least of 6 mm long gap. And the center of the gap must be cut.*
- *To facilitate tearing off a label, enable the “FORWARD WATI” function. After printing the last label of a print job, the printer feeds the label until the following gap reaches the front edge of the strip shaft. If, however, the next label starts to be issued without tearing off the current one, the current label is peeled during a reverse feed, which may cause a printer problem.*
- *When using media with the width of 25.4mm to 50mm, the platen could be abraded faster than usual.*
- *Only labels with full adhesive coating are acceptable.*
- *No re-adherable labels are acceptable.*
- *If a print head stop position is improper, fine adjust it by the strip position fine adjustment feature.*
- *When a gap length is 6 mm or more, set the effective print length to the maximum (label pitch minus 6 mm), then fine adjust the print head stop position by the strip position fine adjustment feature.*

2.3 DETECTION AREA OF LABEL AND TAG

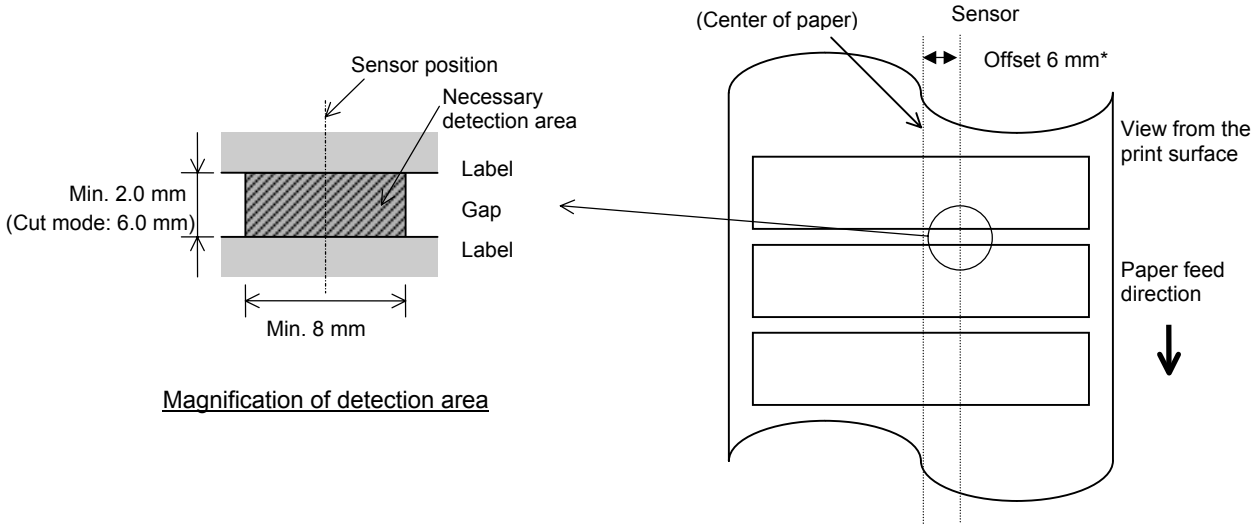
2.3.1 Transmissive Sensor's Detection Area

When rectangular holes are to be detected, conduct a test in advance.
* The transmissive sensor is located at 6-mm right side of the media center.

<In the case of tag with rectangular holes>

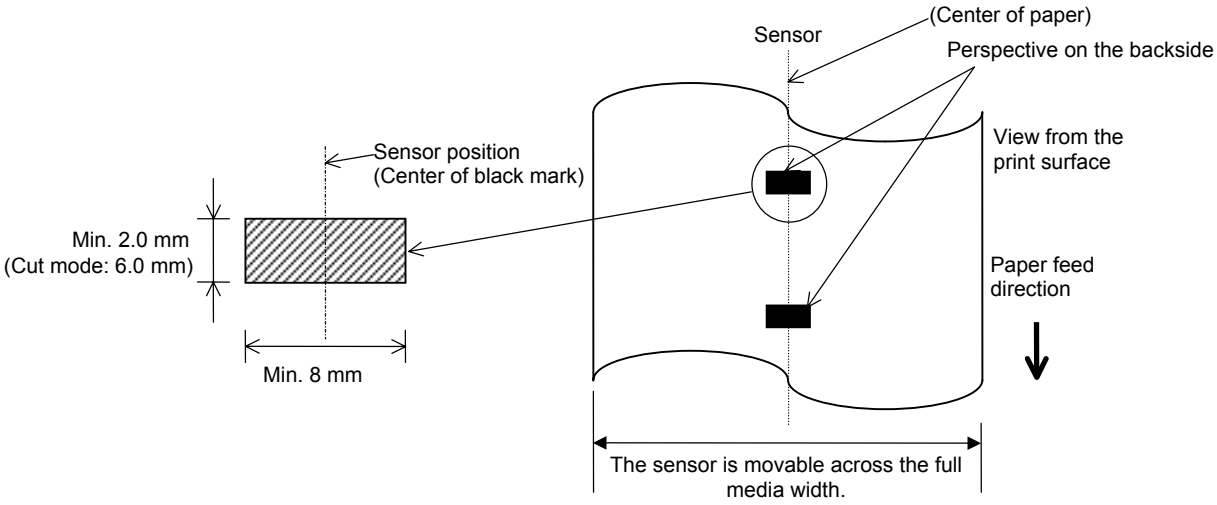


<In the case of labels>



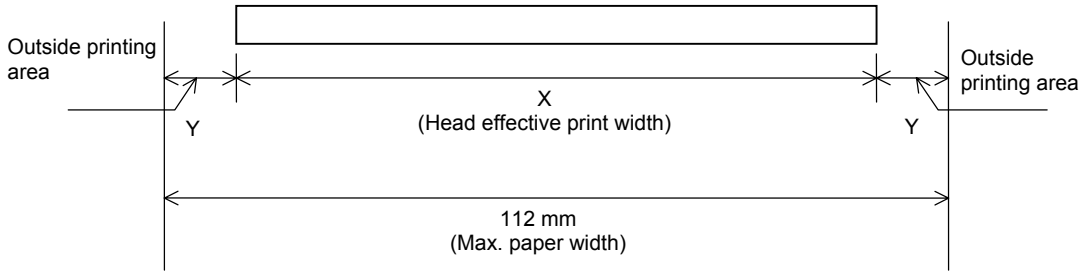
2.3.2 Reflective Sensor's Detection Area

- The sensor is movable across the full media width.
- The reflection factor of the black mark must be less than 10% with a waveform length of 950 nm.
- The sensor should detect black marks at their center.
- When black marks are printed on labels, they must be printed on the gaps of the labels. (See (5) in Section 2.4.4.)
- Rectangular holes cannot be detected by the reflective sensor.



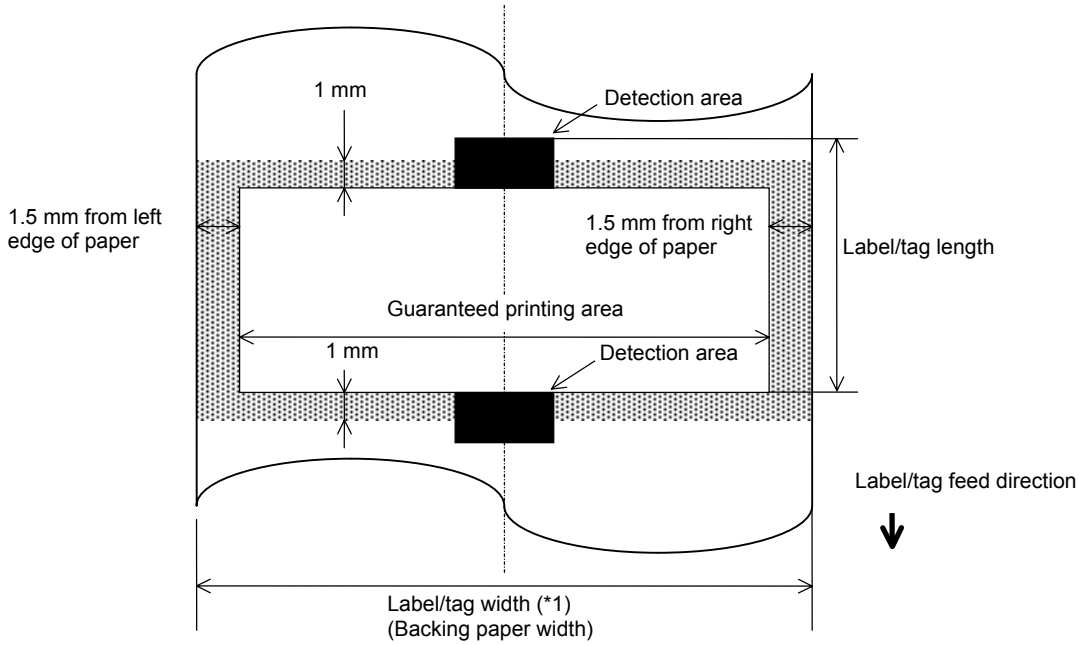
2.4 EFFECTIVE PRINTING AREA ON PAPER

2.4.1 Relationship between Head Effective Print Width and Paper Width



Resolution (Model)	203 dpi (GS14)	300 dpi (TS14)
X	108±0.2 mm	105.7±0.2 mm
Y	2 mm	3.15 mm

2.4.2 Effective Printing Area on Tags and Labels



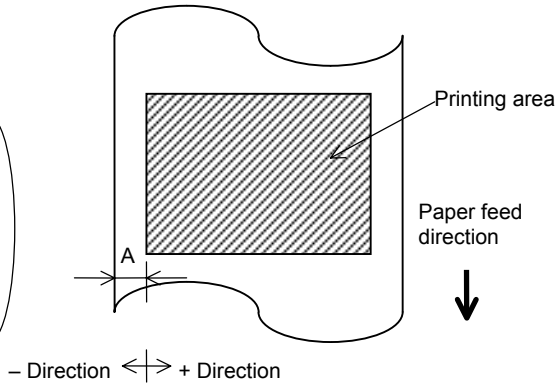
NOTE:
- *Avoid printing in the shaded area as the print quality is not guaranteed. Additionally, in the case of labels, print position accuracy in the 1-mm wide area of the label inner perimeter is not guaranteed.*
- *The center of media is positioned almost at the center of the thermal head.*
- *If printing is performed in the shaded area using a ribbon, the ribbon may wrinkle. This may affect the print quality of the guaranteed area.*
- *The print quality of 3 mm from the head stop position (including 1-mm unprintable area for the slow-up) is not guaranteed.*

2.4.3 Print Position Accuracy

(1) Horizontal (Meandering)

Horizontal variations due to repetition: A
A = ±1.0 mm

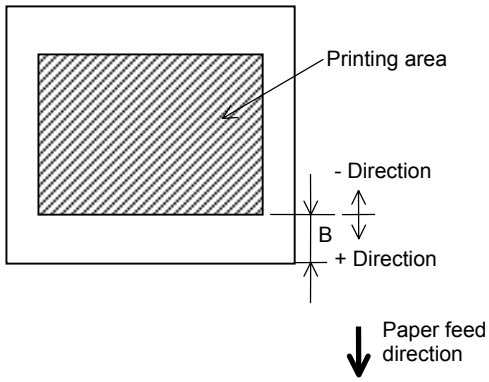
To determine the reference value for A, make a print test 10 times or more using the specified label or tag, and adjust the print position using the average value of the variations to the programmed print position.



(2) Vertical (Feed Direction)

Vertical variations due to repetition: B
B = ±1.0 mm

To determine the reference value for B, make a print test 10 times or more using the specified label or tag, and adjust the print position using the average value of the variations to the programmed print position. B has a ±3% variation to the programmed value.



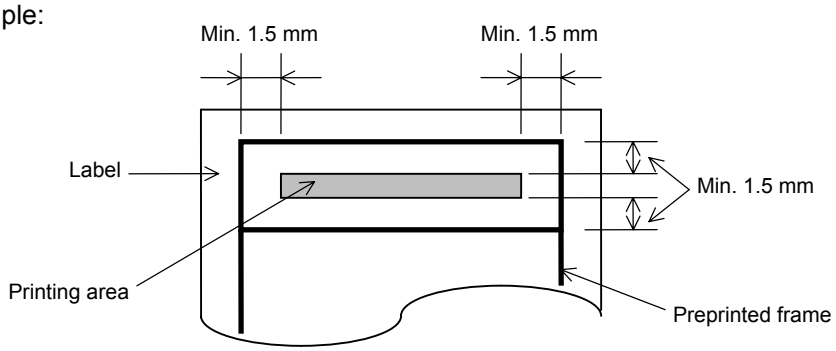
(3) Variation among machines

Variation among machines is ±1.0 mm in both horizontal and vertical directions, which can be adjusted by print position fine adjustment and X-coordinate fine adjustment (X ADJUST). For details, refer to the B-EV4 Series External Equipment Interface Specification.

Notes of Preprinting

Preprint should be avoided within at least 1.5 mm from a printing area, with consideration for print position variations.

Example:

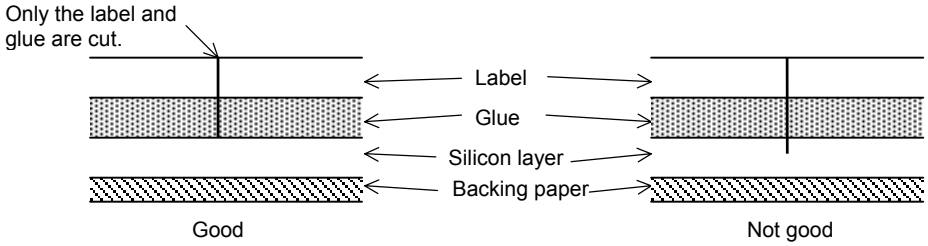


2.4.4 Precautions for Designing Labels

(1) Multiple-piece Labels

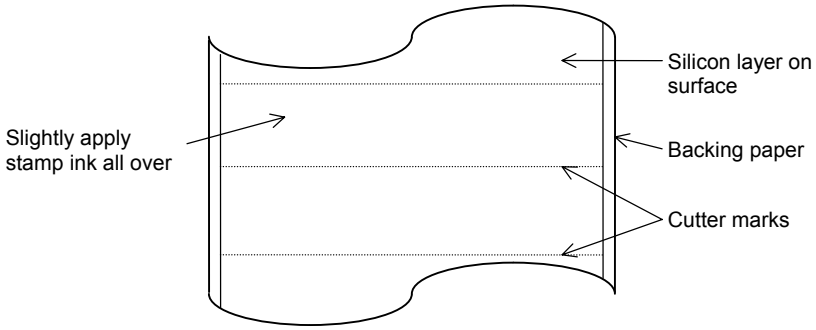
Multiple-piece labels Unusable with the transmissive sensor.

(2) Use a label of which silicon layer at the die-cut part is not damaged.



[Judging Method]

Remove some labels from the backing paper, slightly apply stamp ink all over the backing paper surface. Judge the cut condition by observing the darkness of the ink.



The stamp ink will enter into the cut marks, and label shapes will emerge.

① If the back of the backing paper is saturated with ink, this means the silicon layer is damaged. The label is unacceptable

② If the darkness of the cut marks is clearly uneven, the label is unacceptable.

③ If the entire cut marks look light, the label is acceptable.

(3) Perforation

Labels and tags must always be perforated from the printing side.

(4) Preprinting

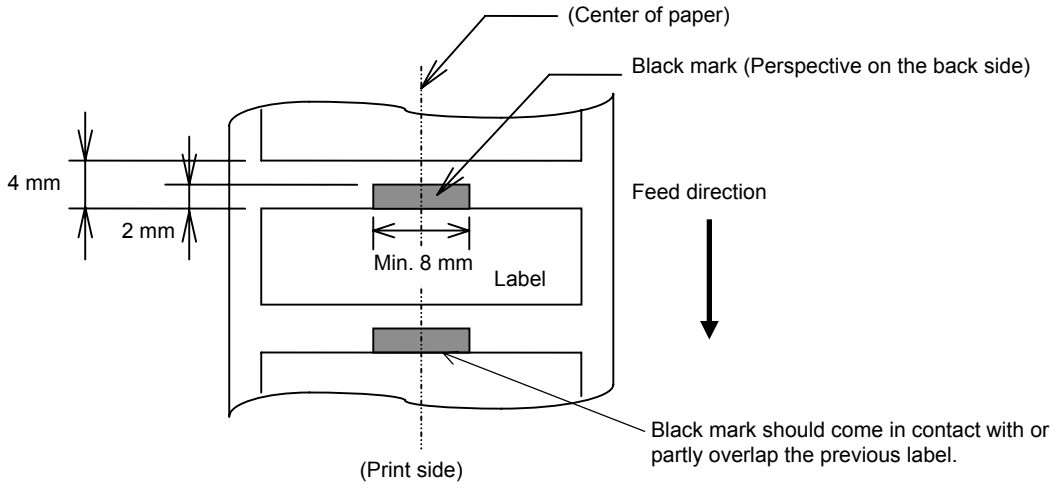
The print head may be abnormally worn depending on the ink to be used for preprinting. For preprinting, use inks that do not contain substances with high hardness including calcium carbonate and kaolin.

Depending on the color of preprint, the media sensor may not be able to detect a print position correctly, causing an error. Conduct a print test in advance, and decide the color of preprints.

(5) Printing Black Marks on the Label

Black marks should be printed on the backside of the gaps.
The black mark should come in contact with or partly overlap the previous label. (See the figure below.)

(Example) Gap length: 4 mm
Black mark: 2 mm



2.5 APPROVED PAPER

Refer to TABLE 1 for approved paper types. Use approved paper that is suitable for each approved ribbon.
The manufacturer's type numbers must be handled carefully and must not be revealed.

3. RIBBON

3.1 RIBBON

The approved ribbons must be used.

Use of non-approved ribbons may cause a print failure.

3.2 SHAPE AND SIZE OF RIBBON

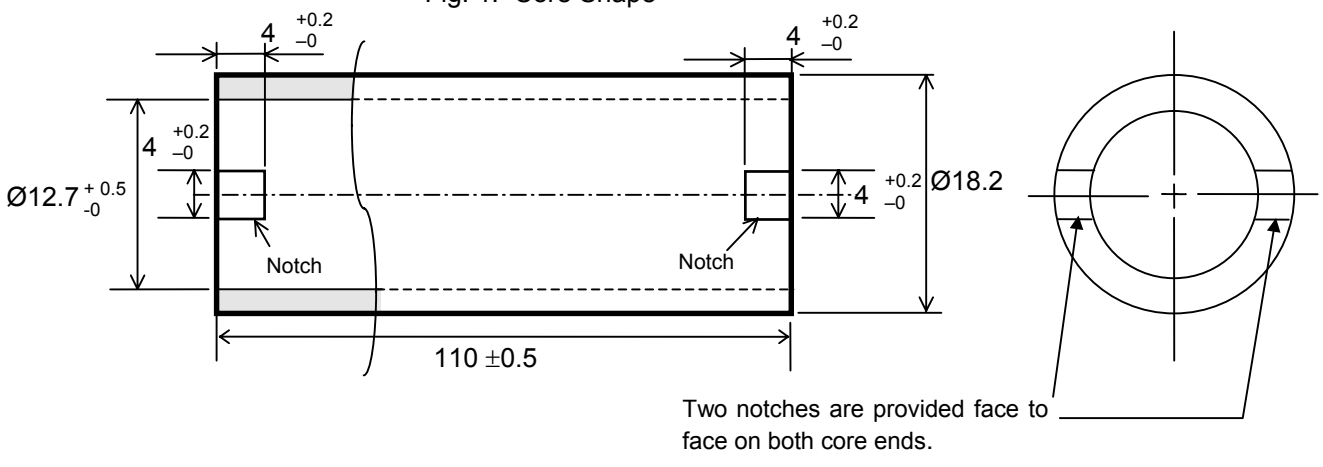
No.	Item		Specification
1	Ribbon Shape		Spool type
2	Ribbon Width		40 mm to 110 mm (TTEC standard: 55 mm and 110 mm)
	Tolerance		±1 mm
	Ribbon Winding Width		Ribbon width ±1 mm
3	Max. Ribbon Length		110 m (Outside diameter must not exceed Ø40 m).
4	Max. Ribbon OD		Ø 40 mm
5	Back treatment		Coated
6	Ribbon core	Material	Paper
		Shape	See Fig. 1.
7	Leader Tape		Polyester film (opaque), 300 mm long
8	End Tape		None
9	Winding Method		The ink surface faces outside. For the core and ribbon winding positions, see Fig. 2.

NOTES: *1. The type number and the lot number of ribbon should be marked on the ribbon core end with black indelible ink. (If doing this is impossible, separately specify the location where the type number and the lot number are stamped.)*

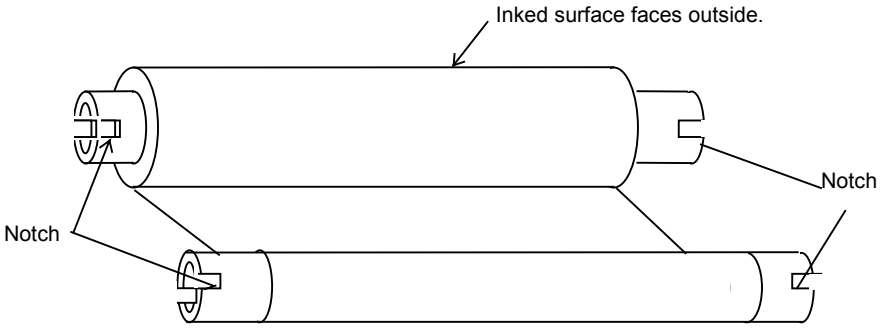
2. The ribbon must be wider than the paper by 5 mm or more.

- *When the difference between the ribbon width and the paper width is too large, the ribbon may wrinkle.*
- *Be careful of the upper limit of the ribbon width. For details, refer to* ***Section 3.3. NOTES ON USING RIBBON****.*

<Fig. 1: Core Shape>

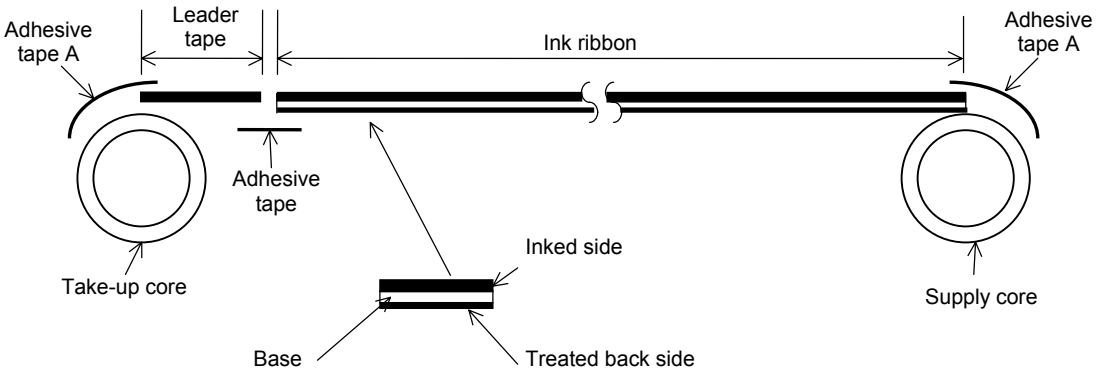


<Fig. 2: Positional Relationship between Core and Ribbon>



Wind the ink ribbon so that the ribbon center aligns with the core center to a tolerance of ±1 mm.

<Fig. 3: Connection of Leader Tape and Ribbon>



NOTES:
1. *The ink ribbon must be wound at a right angle to the core. The ribbon type number and the lot No. should be stamped with a black indelible ink on the leader tape*
2. *The ribbon must be attached to the supply core by two points, and removable from the core with tensile strength of 200g or less.*
3. *The length of the adhesive tape A should be 20 mm or less. Also, the length of adhesive tape A in contact with the core should be 10 mm or less.*
4. *Instead of using the adhesive tape A, other materials such as double-sided adhesive tape can be used between the ink ribbon and the core as long as above-mentioned tensile strength is satisfied.*
5. *If it is hard to produce ribbons in accordance with Fig. 2, notify the design and specification of your ribbon in advance.*

3.3 NOTES ON USING RIBBON

If the difference between the ribbon width and the paper width is too large, the ribbon may wrinkle. Refer to the table below and choose the paper appropriate to the ribbon width. Be sure to use a ribbon which is wider than the paper to be used. Paper width here means the width of tags or label (not backing paper).

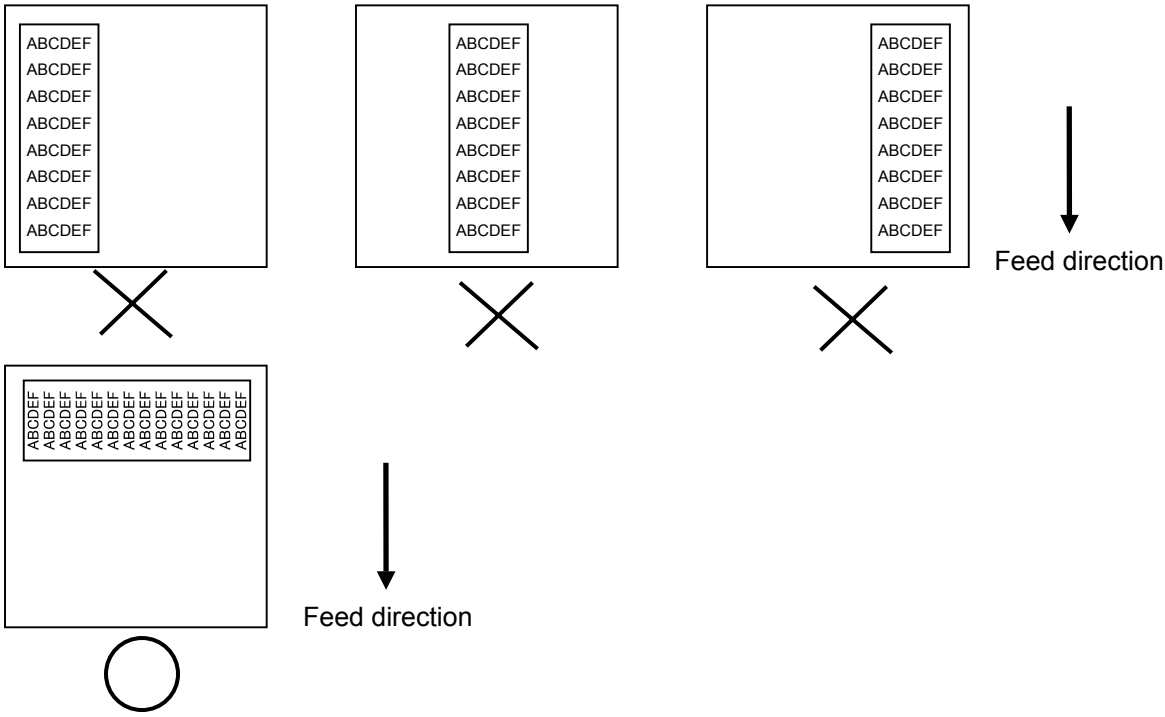
Ribbon width	55 mm	110 mm	
Appropriate paper width	25 – 50 mm	51 – 105 mm	

3.4 APPROVED RIBBONS

Please use the approved ribbons that are listed in TABLE 2. The manufacturer ink name of the ribbon must not be revealed, and handled carefully.

3.5 PRECAUTIONS

3.5.1 If printing is performed using only a narrow part of the ribbon as shown below, the ribbon may wrinkle.



4. PRINT CONDITIONS

4.1 PRINTING QUALITY OF BAR CODE

Resolution	Bar code	Speed	NB	NS	WB	WS	CS	Judgment	
B-EV4∗-G∗∗∗-∗∗ (203 dpi)	Parallel	2”/s	2	2	5	5	2	IN SPEC	Grade C or greater
		3”/s	2	2	5	5	2	IN SPEC	Grade C or greater
		4”/s	2	2	5	5	2	IN SPEC	Grade C or greater
		5”/s	2	2	5	5	2	IN SPEC	Grade C or greater
	Serial	2”/s	2	2	5	5	2	Readable	Grade F or greater
		3”/s	2	2	5	5	2	Readable	Grade F or greater
		4”/s	2	2	5	5	2	Readable	Grade F or greater
		5”/s	2	2	5	5	2	Readable	Grade F or greater
B-EV4∗-T∗∗∗-∗∗ (300 dpi)	Parallel	2”/s	3	3	8	8	3	IN SPEC	Grade C or greater
		3”/s	3	3	8	8	3	IN SPEC	Grade C or greater
		4”/s	3	3	8	8	3	IN SPEC	Grade C or greater
	Serial	2”/s (TT)	2	4	7	9	4	Readable	Grade F or greater
		2”/s (DT)	3	3	8	8	3	Readable	Grade F or greater
		3”/s (TT)	2	4	7	9	4	Readable	Grade F or greater
		3”/s (DT)	3	3	8	8	3	Readable	Grade F or greater
		4”/s (TT)	2	4	7	9	4	Readable	Grade F or greater
		4”/s (DT)	3	3	8	8	3	Readable	Grade F or greater

NB: Narrow bar width NS: Narrow space width WB: Wide bar width WS: Wide space width
CS: Space between characters, Bar code type: Code 39, Number of digits: 9
TT: Thermal transfer, DT: Direct thermal

NOTES:

1. *Judgment criteria complies with ANSI (X3.182) grade.*
2. *Serial bar codes may not be readable depending on the number of bar code digits, supplies used or print density fine adjustment, even if the above conditions are satisfied. When the number of digits exceeds 9, the spaces (NS, WS) should be increased or the print speed should be decreased to lower the density.*
3. *If print data of high printing ratio, like serial bar codes, continues, spots may be printed where the print head stops due to accumulated heat in the print head. In this case, take the following action.*
   1) *When using labels, set the effective print length to the max. value (label pitch minus 2 mm), so that the print head stops at the gap.*
   2) *When using tags in cut mode, set the effective print length to the max. value (tag pitch minus 6 mm), so that the tag will be cut at the stop position.*
   3) *To print perforated tags, fine adjust the stop position so that it is on the perforated line.*
   4) *If the problem cannot be eliminated by the above 1) to 3), lower the print speed, lower the print density using the fine adjustment, or change the print pattern.*

4.2 PRINT RATIO

The max. print ratio is 15% of the area of paper.

4.3 LINE PRINTING AND REVERSE PRINT

Recommended line width is 4 or more dots for the 203 dpi model and 3 or more dots for the 300 dpi model.

Printing lines or reversed characters at a high speed may cause poor printing. In such case, lower the print speed.

4.4 PRINT TONE

The print tone should be adjusted according to the print data and supply used, with reference to TABLE 5.
When serial bar codes are considered as important, turn down the print tone (adjust in negative direction), and when the horizontal lines are considered as important, turn up the print tone (adjust in positive direction).
If void printing occurs, turn up the print tone. In the case of reverse transfer or ribbon wrinkle by heat, turn down the print tone.

4.5 DURABILITY

If the printout will be used in an environment where its surface may be rubbed, confirm the durability of the printout before it is used. Rubbing the printout surface causes the loss of quality. The supply suitable for the particular environment should be used.

4.6 OTHER CAUTION

1. Thermal paper used for direct thermal printing must not have specifications which exceed Na^+ 800 ppm, K^+ 250 ppm and Cl^- 500 ppm.
2. Use of paper containing SiO^2 talc, which may cause abnormal abrasion of the print head protection layer, should be avoided.
3. If the paper and ribbon are left under pressure of the print head for a long period of time, the ribbon may stick to the paper, which causes a problem at a start of printing.
4. When perforated paper is issued in the cut mode, cut on the perforations or behind the perforations. Note that cutting on the perforations may produce paper particles.

TABLE 1 APPROVED PAPER

Type		Manufacturer's type number	Paper thickness (μm)	Total thickness (μm)	Remarks	Applicable model	
						G	T
Label	Direct thermal	V8NS	94	152		○	○
		NQNS	80	154	Synthetic thermal (Note 3)	○	○
		150LA-1	82	153		○	○
		150LHB	79	155		○	○
	Thermal transfer	C6NS	66	150		○	○
		FR-1412-50	50	157	White PET	---	○
		FR-1615-50	50	155	Silver PET (Chemical mat)	---	○
Tag	Direct thermal	130LAB-1-150		150		○	○
		130LHB-150		150		○	○
		FS600 1K		100		○	○
	Thermal transfer	TCW140		137		○	○
Special	Direct thermal	TCL-00-SA-0001			Duplicate thermal paper	○	---

Applicable model: G: GS/GH/GC T: TS/TH/TC

***NOTES**:*

1. *Print conditions may differ depending on the thermal paper used. See TABLE 3.*
2. *For the duplicate thermal paper, print conditions may differ depending on the ribbon used together. See TABLE 4.*
3. *Use of synthetic thermal paper shorten the print head life.*

TABLE 2 APPROVED RIBBON

Item Code	Manufacturer Ink Name	Ink Thickness	Base Thickness (μm)	Type	Remarks	Applicable model	
						G	T
BR-****W10N	AWR6	2.50g/m^2	4.5	W		○	○
BR-****A11	APR5		4.5	SR		○	○
BR-****A16	APR6		4.5	SR	Only for the global models	○	○
BR-****A21	AXR7+		4.5	R		---	○
BR-****	AWX-FH	4.0μm	4.5	W		○	○
BR-****	AWS	3.5μm	4.5	W		○	○
BR-****R1N	TI-1		4.5	W		○	○
BR-****R1	B110A		4.5	SR		○	○
BR-****F12	TTM-39	2.90g/m^2	4.5	W		○	○
BR-****F14	TTM-233	3.10g/m^2	4.5	SR		○	○
BR-****	TR4085D		4.5	W		○	---
BR-****	TR6080		4.5	SR		○	---

Type: W: Wax, SR: Semi-resin, R: Resin

Applicable model: G: GS/GH/GC T: TS/TH/TC

NOTE:

Print conditions and suitable paper may differ depending on the paper used together. See TABLE 4.

TABLE 3 PRINT CONDITIONS BY DIRECT THERMAL PRINTING SPEED

203 dpi Direct thermal papers

	Paper	2 ips	3 ips	4 ips	5 ips	Remarks
1	V8NS	OK				
2	NQNS	OK				
3	150LA-1	OK				
4	150LHB	OK				
5	130LAB-1-150	OK		Unusable.		Printing serial bar codes at 2 ips is not allowed.
6	130LHB-150	OK				
7	FS600 1K	OK				

NOTES:

1. *"OK" in the table above indicates "Approved".*
2. *Print quality of bar codes was determined by the bar code pattern of* ***Section 4.1****.*

300 dpi Direct thermal papers

	Paper	2 ips	3 ips	4 ips	Remarks
1	V8NS	OK			
2	NQNS	OK			
3	150LA-1	OK			
4	150LHB	OK			
5	130LAB-1-150	OK	Unusable.		
6	130LHB-150	OK			
7	FS600 1K	OK			

NOTES:

1. *"OK" in the table above indicates "Approved".*
2. *Print quality of bar codes was determined by the bar code pattern of* ***Section 4.1****.*

TABLE 4 PRINT CONDITIONS BY THERMAL TRANSFER PRINTING SPEED

203 dpi Combination of thermal transfer paper and ribbon

	Ribbon	Thermal Transfer Paper	2 ips	3 ips	4 ips	5 ips	Remarks
1	W10N (AWR6)	C6NS	OK				Printing serial bar codes at 5 ips is not allowed.
		TCW140	OK				Printing serial bar codes at 4 and 5 ips is not allowed.
2	R1N (TI-1)	C6NS	OK				Printing serial bar codes at 5 ips is not allowed.
		TCW140	OK				Printing serial bar codes at 3 ips is not allowed.
3	F12 (TTM-39)	C6NS	OK				Printing serial bar codes at 2 ips is not allowed.
		TCW140	OK				Printing serial bar codes at 2 ips is not allowed.
4	A11 (APR5)	C6NS	OK				
		TCW140	OK	Unusable			
5	R1 (B110A)	C6NS	OK				
		TCW140	OK				Printing serial bar codes at 5 ips is not allowed.
6	F14 (TTM-233)	C6NS	OK				Printing serial bar codes is not allowed.
		TCW140	OK				Printing serial bar codes is not allowed.
7	A16 (APR6)	C6NS	OK				Printing serial bar codes at 3, 4 and 5 ips is not allowed.
8	(TR4085D)	C6NS	OK				Printing serial bar codes at 5 ips is not allowed.
9	(TR6080)	C6NS	OK				Printing serial bar codes at 2 and 3 ips is not allowed.
10	(AWX-FH)	C6NS	OK				
11	(AWS)	C6NS	OK				Printing serial bar codes at 2, 3 and 4 ips is not allowed.

NOTES:

1. *"OK" in the table above indicates "Approved".*
2. *Print quality of bar codes was determined by the bar code pattern of* ***Section 4.1****.*

300 dpi Combination of thermal transfer paper and ribbon

	Ribbon	Thermal Transfer Paper	2 ips	3 ips	4 ips	Remarks
1	W10N (AWR6)	C6NS	OK			
2	R1N (TI-1)	C6NS	OK			
3	F12 (TTM-39)	C6NS	OK			
4	A11 (APR5)	C6NS	OK			
		TCW140	OK			Note 3.
5	R1 (B110A)	C6NS	OK			
6	F14 (TTM-233)	C6NS	OK			
7	A21 (AXR7+)	FR-1412-50	OK			
		FR-1615-50	OK			Printing serial bar codes at 2 ips is not allowed.
8	A16 (APR6)	C6NS	OK			
9	(AWX-FH)	C6NS	OK			
10	(AWS)	C6NS	OK			

NOTES:

1. *"OK" in the table above indicates "Approved".*
2. *Printing serial bar codes is not permitted. (Determined by the bar code pattern of **Section 4.1**.)*
3. *An evaluation test was conducted using APX-FH ribbon (successor ribbon to A11.)*

TABLE 5 PRINT TONE FINE ADJUSTMENT VALUES ACCORDING TO SUPPLIES

Direct thermal paper

203 dpi

	Paper	2 ips	3 ips	4 ips	5 ips	Remarks
1	V8NS	-1	-2	-1	1	
2	NQNS	+3	+3	+5	+6	
3	150LA-1	+3	0	+1	+1	
4	150LHB	+4	+3	+4	+4	
5	130LAB-1-150	+10	+7	Unusable	Unusable	
6	130LHB-150	+3	+4	+6	+4	
7	FS600 1K	+2	-3	+3	+4	

300 dpi

	Paper	2 ips	3 ips	4 ips	Remarks
1	V8NS	+2	+6	+6	
2	NQNS	+6	+8	+10	
3	150LA-1	+3	+4	+5	
4	150LHB	+4	+6	+8	
5	130LAB-1-150	+8	Unusable	Unusable	
6	130LHB-150	+4	+7	+8	
7	FS600 1K	0	+4	+8	

Thermal transfer paper

203 dpi

	Ribbon	Paper	2 ips	3 ips	4 ips	5 ips	Remarks
1	W10N (AWR6)	C6NS	-8	-6	-2	+2	
		TCW140	-10	-10	-5	-3	
2	R1N (TI-1)	C6NS	-5	-4	-2	+4	
		TCW140	-9	-7	-6	-4	
3	F12 (TTM-39)	C6NS	-2	-6	-4	-2	
		TCW140	-10	-10	-6	-6	
4	A11 (APR5)	C6NS	-2	-1	+3	+4	
		TCW140	-4	Unusable	Unusable	Unusable	
5	R1 (B110A)	C6NS	-5	-4	-4	-2	
		TCW140	-9	-10	-6	-2	
6	F14 (TTM-233)	C6NS	-2	-1	0	+2	
		TCW140	-6	-7	-3	-2	
7	A16 (APR6)	C6NS	-8	-5	-1	+2	
8	(TR4085D)	C6NS	-8	-8	-4	0	
9	(TR6080)	C6NS	-6	-6	-6	-4	
10	(AWX-FH)	C6NS	5°C: -2 20°C: -8 40°C: -8	5°C: -2 20°C: -6 40°C: -6	5°C: 0 20°C: -4 40°C: -6	5°C: +2 20°C: -2 40°C: -4	Print tone needs to be fine adjusted according to the operating temperature.
11	(AWS)	C6NS	5°C: -6 20°C: -6 40°C: -8	5°C: -4 20°C: -4 40°C: -8	5°C: 0 20°C: 0 40°C: -4	5°C: +2 20°C: 0 40°C: -4	

300 dpi

	Ribbon	Paper	2 ips	3 ips	4 ips	Remarks
1	W10N (AWR6)	C6NS	-1	+4	+6	
2	R1N (TI-1)	C6NS	+3	+7	+9	
3	F12 (TTM-39)	C6NS	0	+4	+8	
4	A11 (APR5)	C6NS	+8	+8	+10	
		TCW140	-4	-1	+1	See Note below.
5	R1 (B110A)	C6NS	+2	+5	+9	
6	F14 (TTM-233)	C6NS	+4	+8	+9	
7	A21 (AXR7+)	FR-1412-50	-1	+4	+7	
		FR-1615-50	+7	+4	+6	
8	A16 (APR6)	C6NS	+3	+5	+7	
9	(AWX-FH)	C6NS	5°C: +4 20°C: +2 40°C: -4	5°C: +6 20°C: +6 40°C: 0	5°C: +6 20°C: +6 40°C: +4	Print tone needs to be fine adjusted according to the operating temperature.
10	(AWS)	C6NS	5°C: +2 20°C: +2 40°C: -2	5°C: +4 20°C: +4 40°C: +2	+6	When using 2 ips or 3 ips, print tone needs to be fine adjusted according to the operating temperature.

***NOTE**: An evaluation test was conducted using APX-FH ribbon (successor ribbon to A11.)*

TABLE 6 PEEL-OFF SPECIFICATION

1	Temperature	5 to 40°C
2	Relative humidity	75 %
3	Print speed	203 dpi: 2 ips or 3 ips 300 dpi: 2 ips
4	Inner core diameter (mm)	Ø25.4mm, Ø 38.1mm, Ø 42mm
5	Roll direction	Outside only (Inside wound is not allowed.)
6	Paper type	Approved labels Peel-off operation of synthetic paper is not permitted. FR-1412-50 (White PET), FR-1615-50 (Silver chemical mat PET), VES85 (Yupo), NQNS (Yupo thermal)
7	Backing paper	7K or equivalent

5. WRISTBAND

5.1 WRISTBAND (THERMAL DIRECT TYPE)

5.1.1 Specification

Printer	B-EV4D-Txxx (300 DPI model only)	
Media	Manufacturer	PDC
	Product name	7024S-11-PDH 7043S-11-PDH
	Dimension	7024S-11-PDH Total length: 292 mm Print area: 85 mm (W) x 19 mm (H) Thickness: 0.23 mm (Measured value) 7043S-11-PDH Total length: 292 mm Print area: 114 mm (W) x 29 mm (H) Thickness: 0.23 mm (Measured value)

***NOTE**: As long as the following requirements are satisfied, wristbands of the other sizes than above can be used.*

- *Same material, thickness and surface condition*
- *The printer can detect a media position at the center of media.*

5.1.2 Print Quality (Reference value)

Bar code	Print speed	Judgment
Parallel	2 and 3 ips	Grade C or greater
Serial	2 and 3 ips	Grade F or greater

***NOTE**: A bar code quality evaluation was conducted using the following bar codes. This judgment result is just a reference.*

Parallel bar code (CODE39): Number of digits: 3, Narrow: 3 dots, Wide: 8 dots, Bar height: 80 dots

Serial bar code (EAN128): Number of digits: 19, 1 module: 3 dots, Bar height: 110 dots

5.1.3 Print Tone Fine Adjustment Value (Reference value)

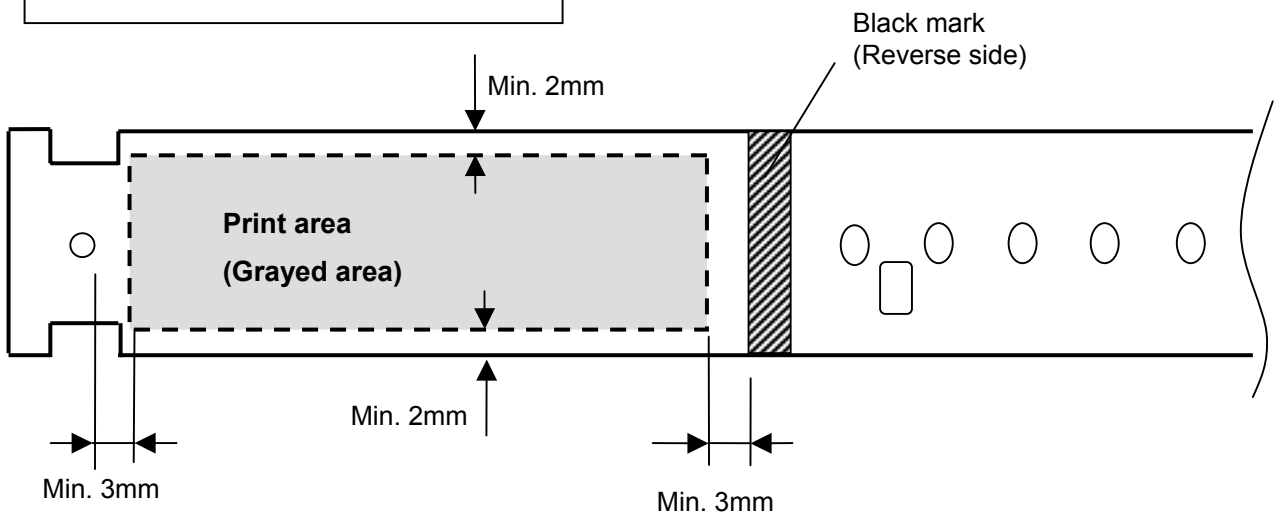
	Print speed		
Media	2 ips	3 ips	4 ips
7024S-11-PDH	+2	+5	Unusable
7043S-11-PDH	+2	+5	Unusable

***NOTE**: Optimum print tone differs depending on the ambient temperature and humidity. Use the above fine adjustment value as a guide, and adjust the print tone while checking the actual printouts.*

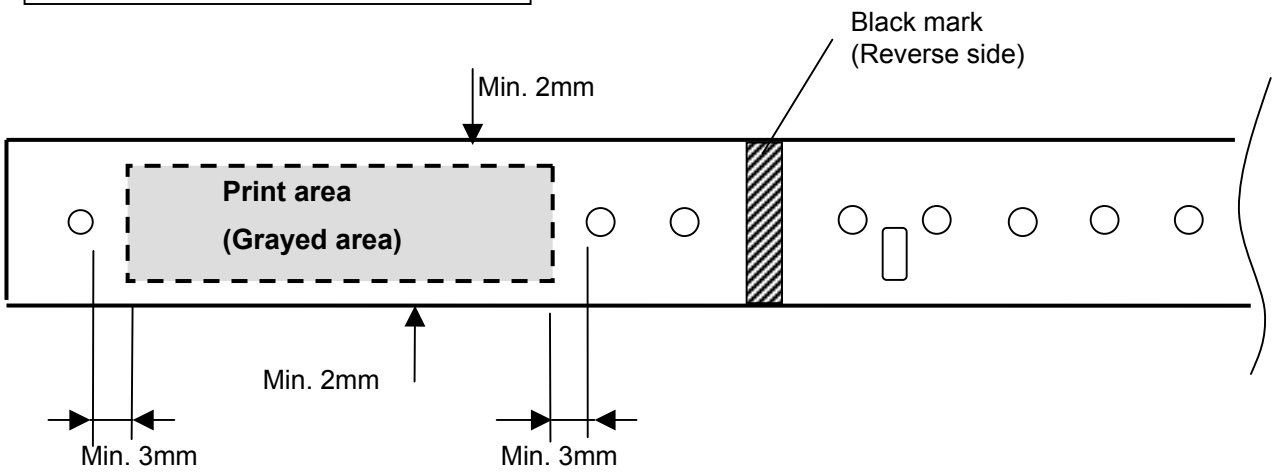
5.1.4 Print Area

The following print area shall be secured.

7043S: As viewed from the print side

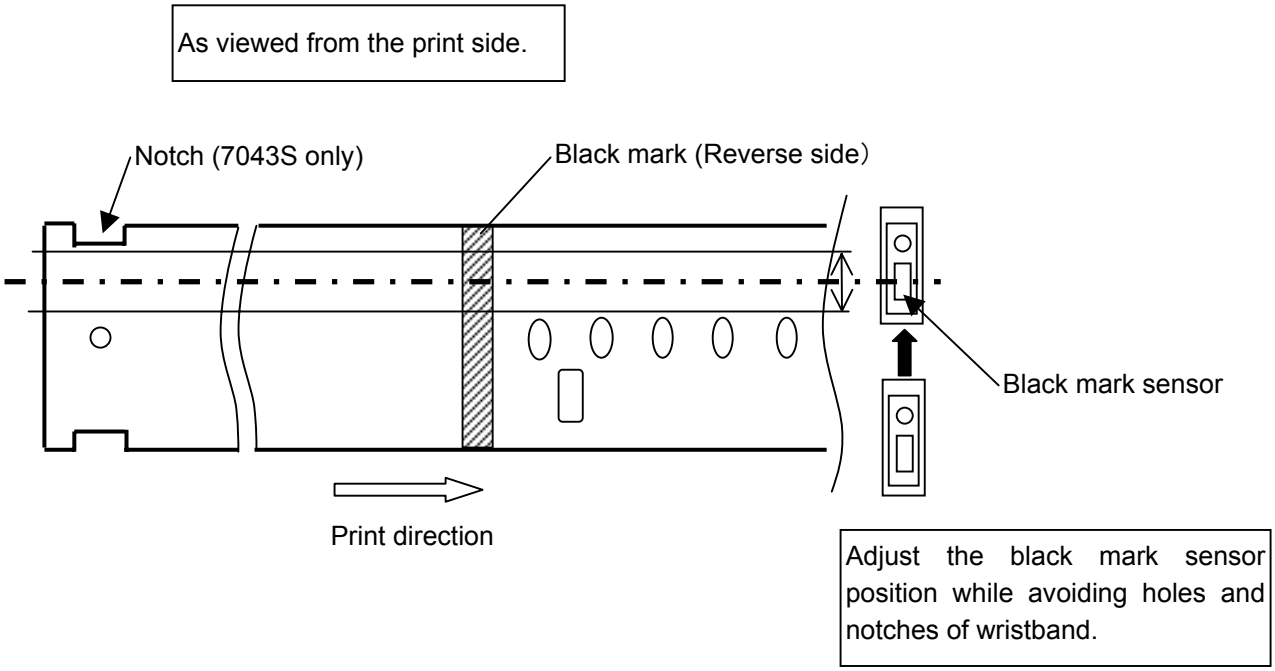


7024S: As viewed from the print side



5.1.5 Sensor Position

Adjust the black mark sensor position as shown below since black marks cannot be detected by the black mark sensor placed at the factory default position.



5.1.6 Winding Specification

(1) Max. roll diameter: Ø127 mm

***NOTES**:*

1. *If the inner core diameter of the media used is other than the standard size, the acceptable max. roll diameter becomes smaller. (Reference: When the inner core diameter is Ø42 mm, the max. roll diameter is Ø122 mm.)*
2. *Before using media of which inner core diameter is other than the standard size, check if the media roll can be firmly held by the media holders of the printer.*

(2) Inner core diameter: Standard diameter: Ø 25.4 mm or Ø 38.1 mm

(3) Roll direction: Outside

5.1.7 Others

- Do not use the cutter unit for cutting media. Doing so causes a media jam.
- Do not use the optional external roll holder. (Doing so causes the media to slide off the core.)