TOSHIBA

TOSHIBA Bar Code Printer

B-EX4T1 Series

Supply Specification

First Edition: May 12, 2011

TOSHIBA TEC CORPORATION

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1. SCOPE

This manual describes the supplies for the B-EX4T1 series bar code printers.

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.   The approved paper must be used.

Use of any non-approval paper may cause problems.

2.2. Paper Size and Shape

Item			B-EX4T1								
Thermal head density			8dots/mm 203dpi					12dots/mm 305dpi			
Thermal head width			104.0mm					106.7mm Effective printing area 104mm			
						Cut					Cut
Contents	Issue type		Batch	Strip *Note2	Disc Cutter	Rotary Cutter Head up		Batch	Strip *Note2	Disc Cutter	Rotary Cutter Head up
						Yes	No				Yes / No
A: Paper Pitch	Label	Min.	10.0	25.4	25.4	3ips: 87.0 / 6ips: 99.0 / 10ips:- *Note1 / 12ips:- *Note1 / 14ips:- *Note1 / —	3ips: 38.0 / 6ips: 38.0 / 10ips:- *Note1 / 12ips:- *Note1 / 14ips:- *Note1 / —	10.0	25.4	25.4	3ips: 94.0 / 38.0; 5ips: 102.0 / 38.0; 8ips: 113.0 / 38.0; 10ips:- *Note1 / *Note1; 12ips:- *Note1 / *Note1; 14ips:- *Note1 / *Note1
		Max.	1500.0	256.0	1500.0			1500.0	256.0	1500.0	
	Tag	Min.	10.0		25.4	3ips: 30.0 / 6ips: 30.0 / 10ips: - *Note1 / 12ips: - *Note1 / 14ips: - *Note1 / —		10.0		25.4	3ips: 30.0 / 5ips: 30.0 / 8ips: 38.0 / 10ips: - *Note1 / 12ips: - *Note1 / 14ips: - *Note1
		Max.	1500.0		1500.0			1500.0		1500.0	
B: Paper length		Min.	8.0	23.4	23.4 (*5)	3ips:(*1) 81.0 / 6ips:(*3) 93.0	3ips: 25.0 / 6ips: 25.0	6.0	23.4	23.4 (*5)	3ips:(*1) 81.0 / 25.0; 5ips:(*2) 89.0 / 25.0; 8ips:(*4) 100.0 / 25.0
		Max.	1498.0		1494.0			1498.0		1494.0	
C: Tag width / Backing paper width		Min.	30.0	50.0	30.0			30.0	50.0	30.0	
		Max.	120.0					120.0			
D: Label width		Min.	27.0					27.0			
		Max.	117.0					117.0			
E: Label-to-label gap		Min.	2.0		6.0			2.0		6.0	
		Max.	20.0					20.0			
F: Black mark length		Min.	2.0					2.0			
		Max.	10.0					10.0			

Item		B-EX4T1									
Thermal head density		8dots/mm 203dpi					8dots/mm 203dpi				
Thermal head width		104.0mm					104.0mm				
Contents	Issue type	Batch	Strip *Note2	Cut			Batch	Strip *Note2	Cut		
				Disc Cutter	Rotary Cutter — Head up				Disc Cutter	Rotary Cutter — Head up	
					Yes	No				Yes	No
G: Max. effective print width	Max.	104.0 +-0.2					104.0 +-0.2				
H: Effective print length	Label — Min.	6.0	21.4	21.4	3ips: 79.0 / 6ips: 91.0 / 10ips:- *Note1 / 12ips:- *Note1 / 14ips:- *Note1 / —	3ips: 23.0 / 6ips: 23.0 / 10ips:- *Note1 / 12ips:- *Note1 / 14ips:- *Note1 / —	6.0	21.4	21.4	3ips: 79.0 / 5ips: 87.0 / 8ips: 98.0 / 10ips:- *Note1 / 12ips:- *Note1 / 14ips:- *Note1	3ips: 23.0 / 5ips: 23.0 / 8ips: 23.0 / 10ips:- *Note1 / 12ips:- *Note1 / 14ips:- *Note1
	Label — Max.	1496.0	252.0	1492.0			1496.0	252.0	1492.0		
	Tag — Min.	8.0		21.4	3ips: 28.0 / 6ips: 28.0 / 10ips: - *Note1 / 12ips: - *Note1 / — / —		8.0		21.4	3ips: 28.0 / 5ips: 28.0 / 8ips: 36.0 / 10ips: - *Note1 / 12ips: - *Note1 / —	
	Tag — Max.	1498.0		1498.0			1498.0		1498.0		
I: Slow-up and down area (Un-print area)		1.0					1.0				
		1.0 1.5(14ips only)					1.0 1.5(14ips only)				
Max. on-the-fly printing length		749.0					749.0				

*Note1: When using the rotary cutter at 10"/sec or more for 203dpi model, issue at 6"/sec.
When using the rotary cutter at 10"/sec or more for 305dpi model, issue at 8"/sec.
*Note2: When using the peel-off at 12"/sec or more for 203dpi model, issue at 10"/sec.
When using the peel-off at 10"/sec or more for 305dpi model, issue at 8"/sec.

(*1): When using the rotary cutter at 3"/sec., the label length must meet the following condition:
Label length 91.0mm - (Gap length/2).

(*2): When using the rotary cutter at 5"/sec., the label length must meet the following condition:
Label length 99.0mm - (Gap length/2).

(*3): When using the rotary cutter at 6"/sec., the label length must meet the following condition:
Label length 103.0mm - (Gap length/2).

(*4): When using the rotary cutter at 8"/sec., the label length must meet the following condition:
Label length 110.0mm - (Gap length/2).

(*5): When using the disk cutter, the label length must meet the following condition:
Label length 18.0mm - (Gap length/2).

NOTES:

1. *For label issues, set the head lever to position ①LABEL.*
2. *For tag issues, set the head lever to position ②TAG.*
3. *When tags of which the width is less than 50 mm are used, set the head lever to position ①LABEL.*
4. *The ratio of "Label length" to "Gap length" must be 3:1 or more.*
5. *The backing paper is approved together with label.*
6. *The paper width for the label includes its backing paper.*
7. *The backing paper to be used must be glassine paper (white or 7K) or equivalent, and must have a transmission factor of 22% or more.*
8. *A label showing "TEC", item code, and lot number must be attached to the paper core inside.*

For reference;
Relationship between Paper Roll Length and Paper Core Diameter
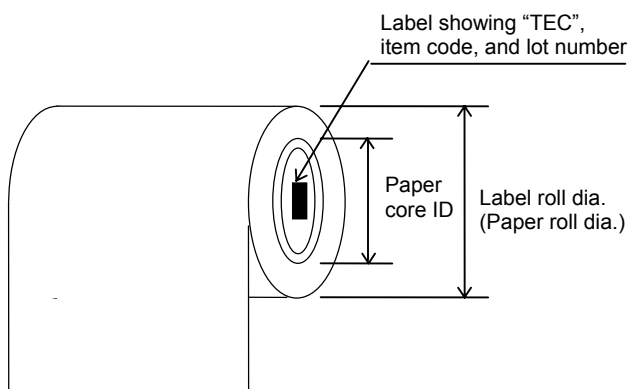
$$L = \frac{(D^2 - d^2)\,\pi}{4t}$$

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

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

Label showing "TEC", item code, and lot number

Paper core ID

Label roll dia. (Paper roll dia.)

9. *In the cut issue mode, the backing paper of labels (the gap between labels) can be cut. The label itself cannot be cut. When the perforated label is used, it is necessary to test and confirm the cutting performance beforehand.*

10. *In the cut issue mode, the gap length must be 6 mm or more, and the cut position must be adjusted so that the cutter cuts in the center of the gap.*

11. *When the stop position is not proper, the print stop position should be changed by the strip position fine adjustment.*

12. *When the gap between labels is 5 mm or more, the effective print length should be set to the maximum value (Label pitch minus 2 mm), then the print stop position should be changed by the strip position fine adjustment.*

13. *When the rotary cutter is used, a cut and issue should be performed with the head-up operation being activated by using ribbon save unit together.*

14. *When the head-up operation is activated, a notch of 20 mm in width by 50 mm in length should be provided at the center of the end of the paper.*

15. *If paper is jammed at the platen when cut issue is performed, enable the forward feed function ("FORWARD WAIT") in system mode.*

16. *When the paper thickness is more than 200 μm, the print head installation position may need to be changed.*

2.3. DETECTION AREA ON LABELS AND TAGS
2.3.1 Detection Area of Transmissive Sensor
The sensor is movable in the range from the center of the paper to the left end.

<Tags>

Detection of hole

Sensor position

Rectangular hole
(Round holes are
Unacceptable.)

Min. 2.0 mm

Min. 12 mm

Magnified view of detection area

Sensor

(Center of paper)

View from the
print side

Paper feed
direction

Rectangular
holes

The sensor is
movable within this
range.

<Labels>

Sensor position

Necessary
detection area

Label

Min. 2.0 mm
(Min.6.0mm
when the cutter
is used.)

Gap

Label

Min. 12 mm

Magnified view of detection area

Sensor

(Center of paper)

View from the
print side

Gap

Paper feed
direction

2.3.2 Detection Area of Reflective Sensor

1. The sensor is movable in the range from the center of the paper to the left end.
2. The reflectance of the black mark must be 10% or less with a waveform length of 950 nm.
3. The sensor detects at the center of the black mark.
4. The black marks, if necessary, must be printed on the labels in the gap areas. (See (5) in section 2.4.4.)
5. Rectangular holes can substitute the black marks, on the condition that nothing is printed on the back side.   Round holes cannot be detected by the reflective sensor.

Sensor

(Center of paper)

Perspective on the back side

View from the print surface

Sensor position
(Center of black mark)

Min. 2.0 mm

Min. 12 mm

Paper feed direction

The sensor is movable within this range.
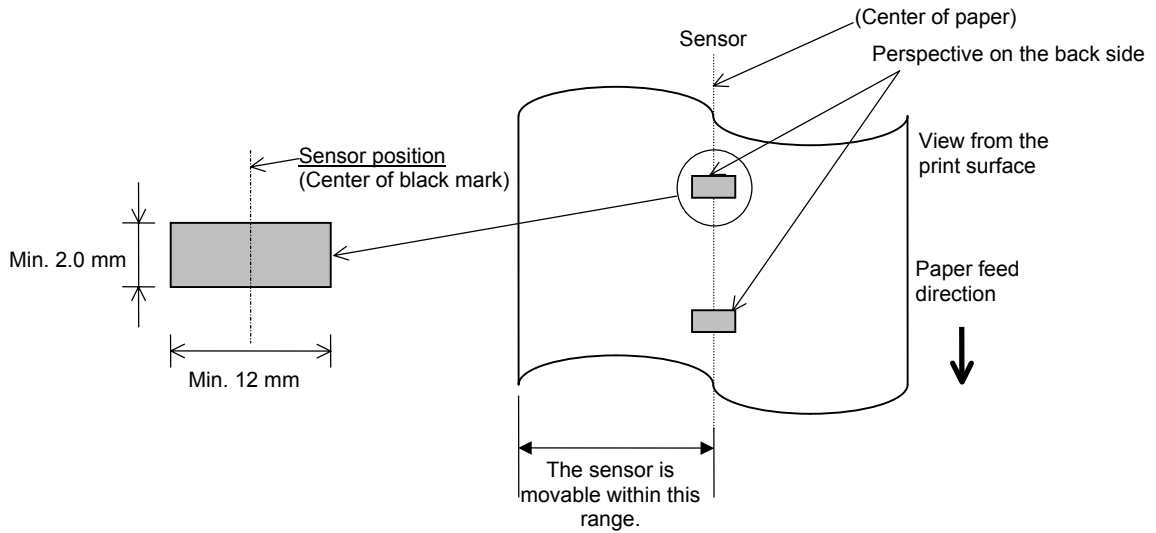
2.4. EFFECTIVE PRINT AREA OF PAPER

2.4.1 Relationship between Print Head Effective Print Width and Paper Width

Outside printing area

8 mm

104mm±0.2mm
(Effective print head width)

8 mm

Outside printing area

120mm
(Max. paper width)
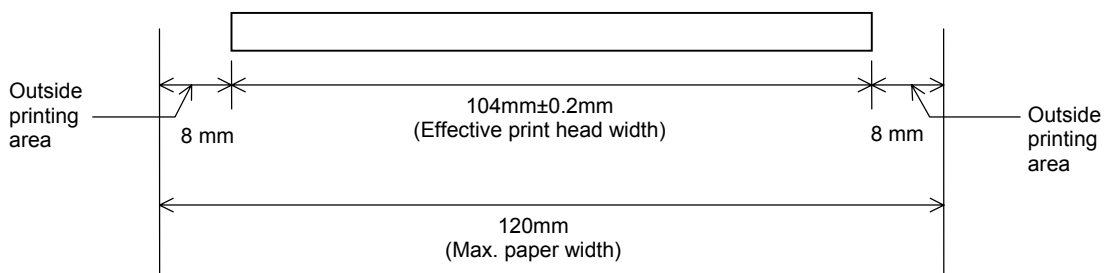
2.4.2 Effective Print Area of Tags and Labels
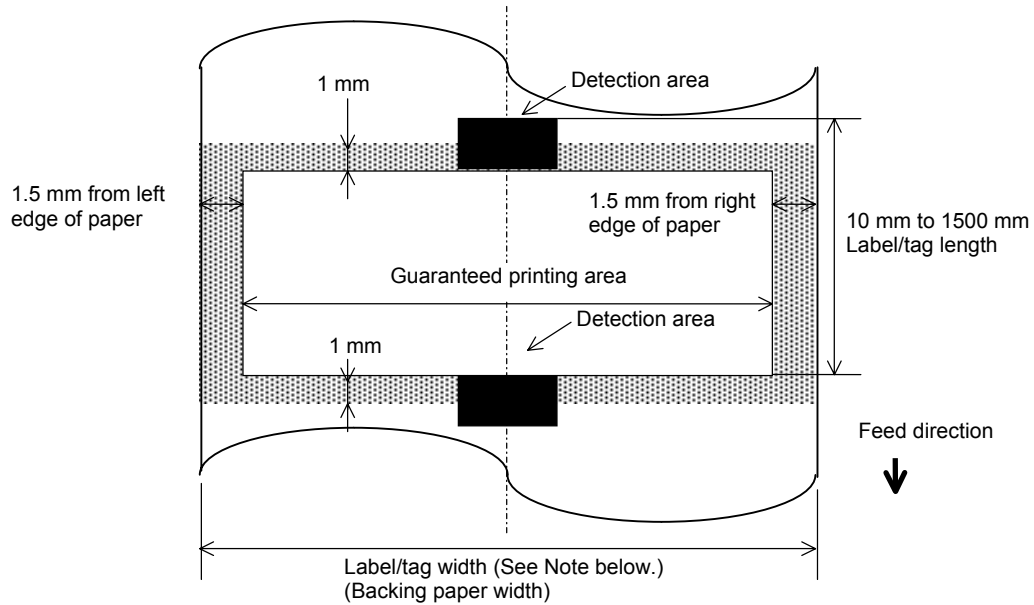
NOTES:

1. *Print quality in the shaded area is not guaranteed. For the label, printing in the 1-mm width area around the label is not guaranteed as well as the shaded area shown above.*
2. *The center of the paper (label and tag) is almost aligned with the center of the print head.*
3. *If printing is performed in the shaded area, the ribbon may wrinkle. This may affect the print quality of the guaranteed printing area.*
4. *The print quality at 14"/sec. is not guaranteed in the area 3 mm from the head stop position (including 1.5mm unprintable area for the slow-up and the slow-down).*

2.4.3 Print Position Misalignment

(1) Horizontal (Meandering)
Horizontal misalignment 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.

Printing area

Paper feed direction

A

− direction ←→ + direction
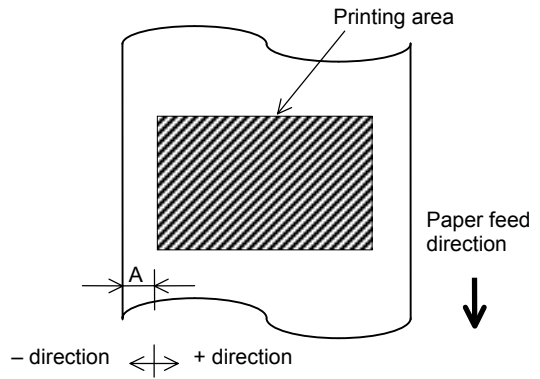
(2) Vertical (Feed Direction)
Vertical misalignment due to repetition: B
B = ±1.0 mm

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.

Printing area

−direction

B

+ direction

Paper feed direction
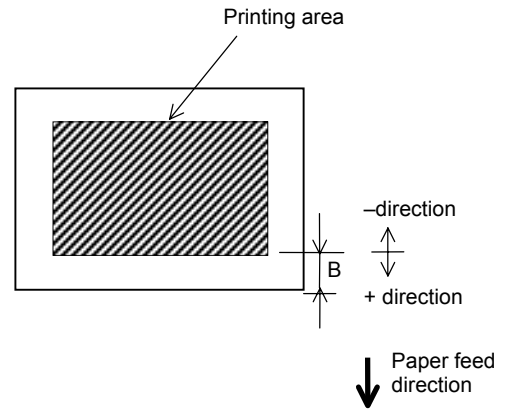
Precaution for Preprinting
Preprinting should be performed in the area at least 1.5 mm from the printing area, taking the print position variation into consideration.

(Example)

Min. 1.5 mm   Min. 1.5 mm

Label

Min. 1.5 mm

Printing area

Preprinted frame
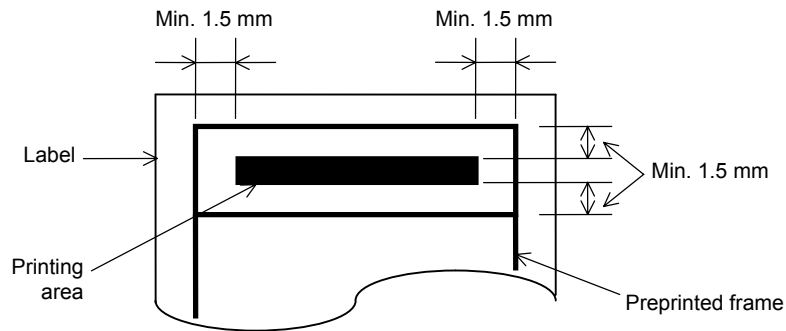
2.4.4 Suggestions for Designing Labels

(1) Multiple-piece Labels

To properly detect each label by the transmissive sensor, the necessary detecting area that is specified in section 2.3.1 should be provided. At the same time, the shaded area shown below must be non-transmissive, excluding the necessary detecting area.
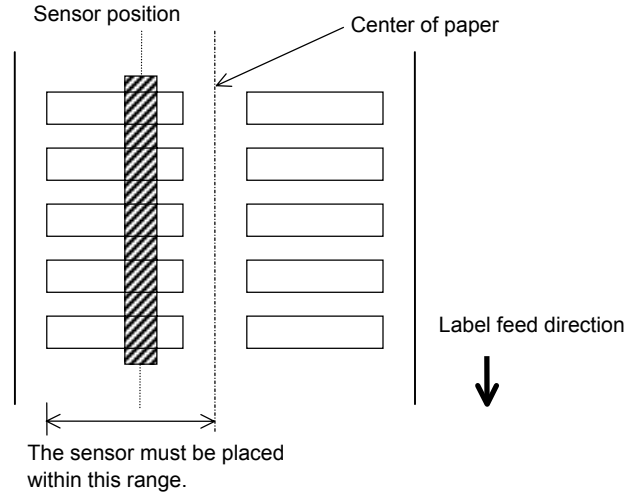
(2) Use a label of which silicon layer at the die-cut part is not damaged.
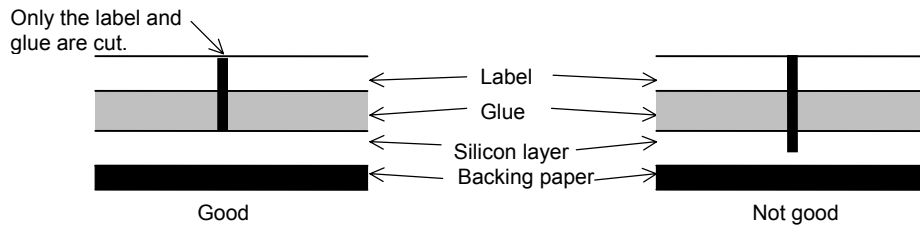
[Judgment Method]

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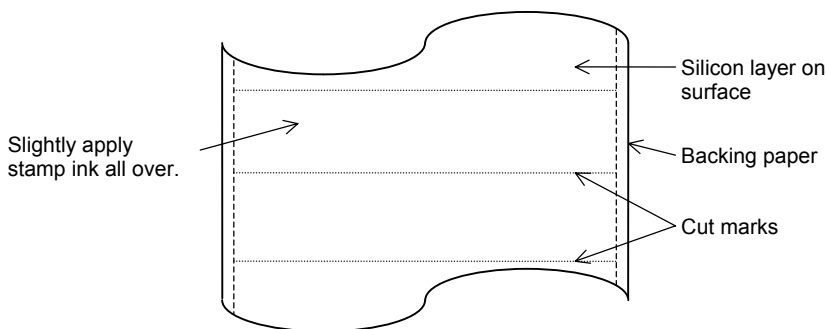
The stamp ink will enter into the cut marks, and label shapes will emerge.

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

② If the darkness of the cut marks is clearly uneven, the label is <u>unacceptable.</u>

③ If the entire cut marks look light, the label is <u>acceptable.</u>

(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.   Ink which do not contain materials of high hardness, such as, calcium carbonate and kaolin, should be used for preprinting.

(5) Printing Black Marks on the Label

The black marks should be printed on the back of the gaps.
The black marks should be positioned so that they come in contact with or partly overlap the previous label.   (See the figure below.)

(Example) Gap length: 10 mm
　　　　　　Black mark: 4 mm
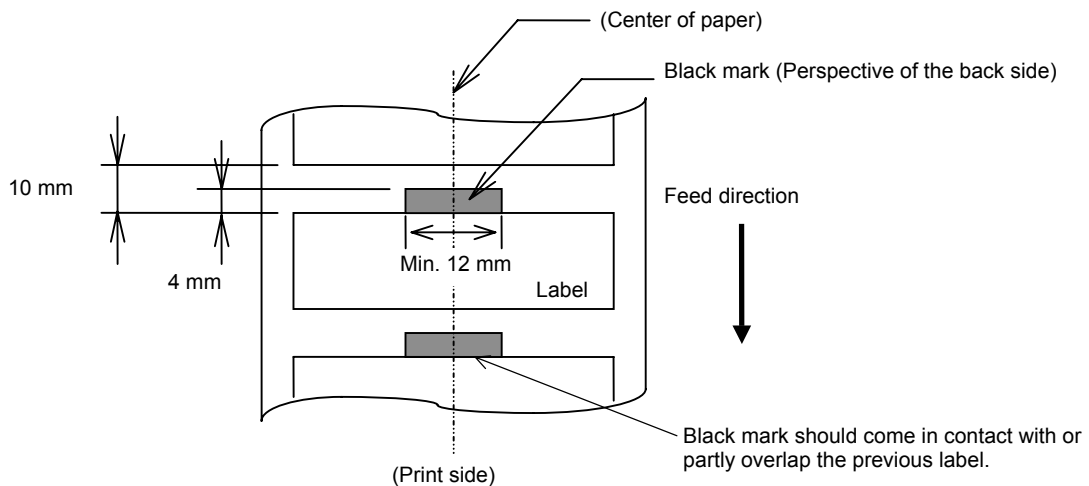
(6) If the surface of the paper is rough, performing the ribbon saving function may cause the paper to be smudged with ink.

2.5. APPROVED PAPER

Approved papers are shown in ATTACHMENT-1.   Use the approved paper that matches the approved ribbon.The manufacturer type number of approved papers must be handled carefully and must not be revealed.

3. RIBBON

3.1. RIBBON

The approved ribbon must be used.

Use of any non-approved ribbon may cause problems.

3.2. SHAPE AND SIZE OF RIBBON

No.	Item		Specification
1	Ribbon Shape		Spool type
2	Ribbon Width		68(40) ±1 mm to 112 mm
	Ribbon Winding Width		68(40) $^{+2}_{-1}$ mm to 112 mm
3	Max. Ribbon Length		600 m (Ø90 mm or less)
4	Max. Ribbon OD		Ø90 mm
5	Back Treatment		Coated
6	Ribbon Core	Material	Paper
		Shape	See Fig. 1.
7	Leader Tape		Polyester film (silver), 300 ± 5 mm long
8	End Tape		Polyester film (silver), 250 ± 5 mm long
9	Winding Method		The ribbon is wound outside. For the core and ribbon winding positions, see Fig. 2.

NOTES:
1. *The ribbon type number and the lot No. 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. *It is recommended that the ribbon is wider than the paper width 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.*
3. *The ribbon which is narrower than the paper width by 5 mm or more can be used, but the print area becomes narrower.*

Fig. 1:   Core Shape
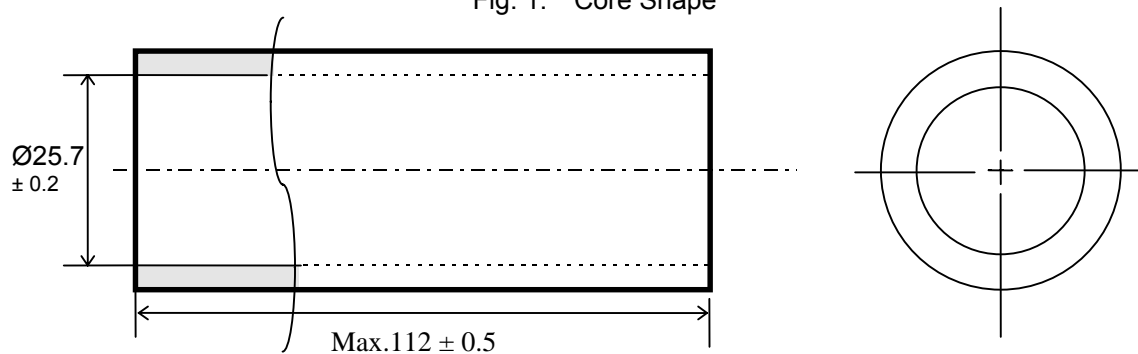
Fig. 2:   Positional Relationship between Core and Ribbon

The inked surface faces the outside.
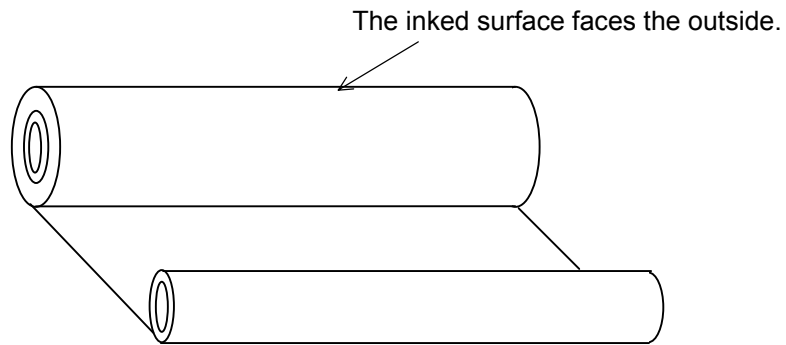
NOTE: Wind the ink ribbon so that the ribbon center aligns with the core center.

Fig. 3:   Connection between Leader Tape and Ribbon

Adhesive tape

Leader tape

Ink ribbon

Adhesive tape A

Adhesive tape

Inked side

Take-up core

Base   Treated back side
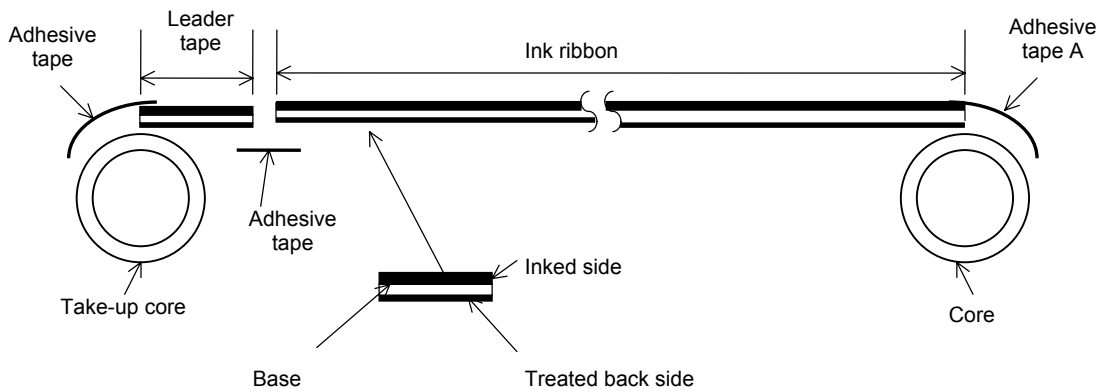
Core

NOTE: The ink ribbon must be wound at a right angle to the core.

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. Even if the ribbon is narrower than paper, printing can be performed. However, it results in the narrower print range.

B-EX4T Type1 series

Ribbon width	41mm	50mm	68mm	84	112
Appropriate paper width	30 to 36	36 to 45 mm	45 to 63 mm	63 to 79 mm	79 to 120

The ribbon tension adjustment may be further required according to the ribbon width. In the case a narrower width of the ribbon is used, if the ribbon tension is strong, the ribbon will wrinkle. According to the print patterns, fine adjustment of the ribbon take-up motor voltage is required. As a guide, regardless of the print speed, it should be set to "-3" (FW) and "-1" (BK) for 68-mm wide ribbon, and "-4" (FW) and "-2" (BK) for 50-mm wide or less ribbon, respectively.

When non-printing area is detected than follows, the ribbon save issue is performed.

4inch 203dpi model

Print speed	3ips	6ips	10ips	12ips	14ips
Length of ribbon loss	20mm	20mm	35mm	60mm	75mm

4inch 305dpi model

Print speed	3ips	5ips	8ips	10ips	12ips	14ips
Length of ribbon loss	20mm	20mm	25mm	35mm	60mm	75mm

NOTE: *Energization time of head-up solenoid is limited. There may be cases where the print head is lowered even in non-printing area, causing the ribbon not to be saved. For details, refer to the External Equipment Interface Specification (EAA-03046).*

3.4. APPROVED RIBBON

The approved ribbons are shown in ATTACHMENT-2.
The manufacturer ink names must be handled carefully and must not be revealed.

3.5. NOTES

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

```
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
ABCDEF          ABCDEF          ABCDEF
```

Feed direction ↓

✕   ✕   ✕

```
ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF ABCDEF
```

Feed direction ↓

◯
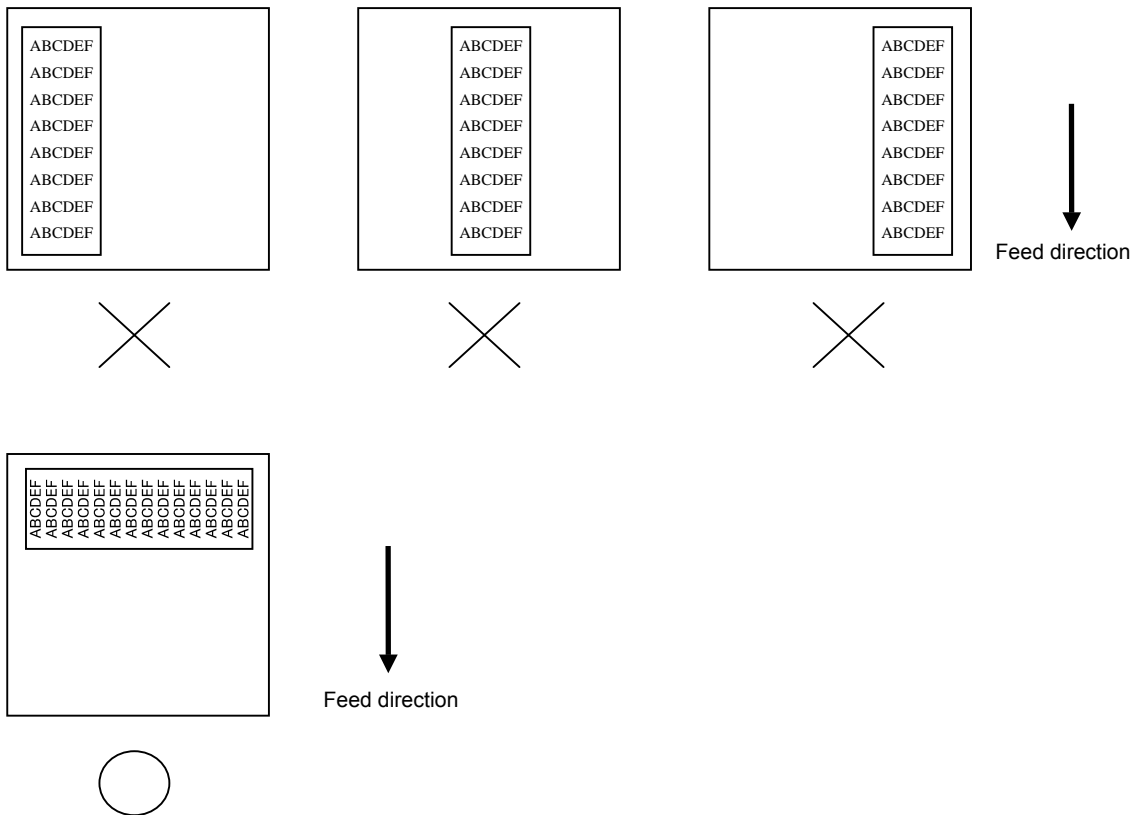
3.5.2 When a ribbon error occurs, the ribbon tension value for the ribbon feed motor should be adjusted in the negative (−) direction. For details regarding the fine adjustment of the ribbon motor drive voltage, refer to the Key Operation Specification (EAA-03184).

4. PRINT CONDITIONS

4.1. PRINT QUALITY OF BAR CODE

Bar code	Head Resolution	Speed	NB	NS	WB	WS	CS	Criteria
Parallel	203dpi	3"/sec	2	2	5	5	2	Grade B
		6"/sec	2	2	5	5	2	Grade B
		10"/sec	2	2	5	5	2	Grade C
		12"/sec	2	2	5	5	2	Grade C
		14"/sec	2	2	5	5	2	Grade C
	305dpi	3"/sec	3	3	8	8	3	Grade B
		5"/sec	3	3	8	8	3	Grade B
		8"/sec	3	3	8	8	3	Grade C
		10"/sec	3	3	8	8	3	Grade C
		12"/sec	3	3	8	8	3	Grade C
		14"/sec	3	3	8	8	3	Grade C
Serial	203dpi	3"/sec	2	4	5	7	4	Grade C
		6"/sec	2	5	6	10	5	Grade C
		10"/sec	2	5	6	10	5	Readable
		12"/sec	2	5	6	10	5	Readable
		14"/sec	2	5	6	10	5	Readable
	305dpi	3"/sec	2	5	6	9	5	Grade C
		5"/sec	2	5	6	10	5	Grade C
		8"/sec	2	6	6	11	6	Readable
		10"/sec	2	6	6	11	6	Readable
		12"/sec	2	6	6	11	6	Readable
		14"/sec	2	6	6	11	6	Readable

NB: Narrow bar width, NS: Narrow space width, WB: Wide bar width, WS: Wide space width,
CS: Space between characters, Bar code type: CODE39

NOTES:

1. 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. The spaces (NS, WS) should be increased, or the print density should be turned down.

2. 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) In case of printing labels, set the effective print length to the max. value (label pitch minus 2 mm) so that the print head stops on the gap.

   2) In case of printing tags in the cut mode, set the effective print length to the max. value (tag pitch minus 2 mm) so that the tag will be cut at the stop position.

   3) In case of printing perforated tags, change the stop position by the fine adjustment so that it is just on the perforations.

   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 QUALITY OF QR CODE

Head Resolution	Speed	1 cell	Criteria
203dpi	3"/sec	3 dots or more	Grade D
	6"/sec	4 dots or more	Grade D
	10"/sec	4 dots or more	Readable
	12"/sec	4 dots or more	Readable
	14"/sec	4 dots or more	Readable
305dpi	3"/sec	3 dots or more	Grade D
	5"/sec	4 dots or more	Grade D
	8"/sec	4 dots or more	Readable
	10"/sec	4 dots or more	Readable
	12"/sec	4 dots or more	Readable
	14"/sec	4 dots or more	Readable

Model: Model 1, Error correction level: Q

Note: JIS X 05109 (2-D code symbol QR code Basic Specification)

1) QR codes may not be readable depending on the print formats, supplies used or print density fine adjustment, even if the above conditions are satisfied. The number of dot per 1cell should be increased, or the print density should be turned down.

4.3. LINE PRINTING

Lines of 3 or more dots are guaranteed. Although 1 or 2 dots can be designated, avoid printing them.

4.4. PRINT TONE

The print density should be adjusted according to print data and supplies used, with reference to ATTACHMENT-3. When the serial bar code is regarded as important, turn down the print density (adjust in the negative (-) direction), and when the horizontal line is regarded as important, turn up the print density (adjust in the positive (+) direction). If voids occur, turn up the print density, and if reverse thermal transfer or ribbon wrinkle occurs, turn down the print density.

4.5. DURABILITY

If the printout is used in an environment where its surface may be rubbed, confirm the durability of the printout before it is used. Basically rubbing the printout surface deteriorates the quality. The supply that is suitable for that particular environment should be used.

4.6. OTHER CAUTIONS

(1) The thermal paper used for direct thermal printing must not have specifications that 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. In addition, there is the case that a pressure welding trace (smudge) of the ribbon occurs at the time of a printing start and the end by a kind of the ribbon.

ATACHMENT-1 APPROVED PAPER

Type		Item Code	Manufacturer Type No.	Paper Thickness (μm)	Manufacturer	Remarks
Label	Direct thermal type		150LA-1P	82	RICOH	
			150LHB-150	79	RICOH	
			V8NS		OSAKA SEALING PRINTING	
			Multitherm Plus		Fasson/Avery	
	Thermal transfer type		C6NS	66	OSAKA SEALING PRINTING	
			VES-85(Yupo)	85	OSAKA SEALING PRINTING	
		FR1412-50	White PET	50	LINTEC	
		FR1510-50	Silver sand mat	50	LINTEC	
		FR1615-50	Silver chemical mat	50	LINTEC	
			Vellum (Uncoated)		Raflatac	
			Transfer Matt		Raflatac	
			Transtherm 1C (Coated, gloss)		Fasson	
			Transtherm 2C (Coated, gloss)		Fasson	
			7860E		3M	
Tag	Direct thermal type		130LAB-1-150	150	RICOH	
			130LHB-150	150	RICOH	
	Thermal transfer type	IS50	I-BEST S	164	OSAKA SEALING PRINTING	
		IS53	I-BEST W	263	OSAKA SEALING PRINTING	

NOTE:
 1. The print head life varies depending on the print pattern (printing ratio).

ATACHMENT-2 APPROVED RIBBONS

Type:　 R: Resin　　 SR: Semi-resin

Item Code	Manufacturer Ink Name	Ink Thickness	Base Thickness (µm)	Manufacturer	Type	Remarks
BX7*****AG2	APR-600　(Black)		4.5	ARMOR	SR	
BX7*****AG4	APR-650　(Black)			ARMOR	SR	
BX7*****AS1	AXR600		4.5	ARMOR	R	
BX7*****RG2	B120EX	$3.1 g/m^2$	4.5	RICOH	SR	
BX7*****RS	B120EC(　)	$2.1 g/m^2$	4.5	RICOH	R	
BX7*****FG2	TTM-78(Black)	$3.3 g/m^2$	4.5	Fuji Copian	SR	
BX7*****SG2	(TR-4500) RK-28(Black)	$(1.2 g/m^2$	4.8	Dai Nippon Printing	SR	

ATACHMENT-3 | PRINT TONE FINE ADJUSTMENT VALUES BY SUPPLIES

For 203dpi model

Print Mode	Ribbon	Paper	Print tone fine adjustment values(*1)					Print energy type(*2)	Remarks
			3"/s	6"/s	10"/s	12"/s	14"/s		
Thermal transfer type	BX7*****AG2	C6NS	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG2	Vellum	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG2	Transtherm 1C	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG2	I-BEST S	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	C6NS	0	0	0	0	0	Semi-resin1	
	BX7*****AG4	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	I-BEST S	0	0	0	0	0	Semi-resin1	
	BX7*****AG4	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****RG2	C6NS	0	0	0	0	0	Semi-resin2	
	BX7*****RG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	I-BEST S	0	0	0	0	0	Semi-resin2	
	BX7*****RG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	C6NS	0	0	0	0	0	Semi-resin2	
	BX7*****FG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	I-BEST S	0	0	0	0	0	Semi-resin2	
	BX7*****FG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	

For 203dpi model

Print Mode	Ribbon	Paper	Print tone fine adjustment values(*1)					Print energy type(*2)	Remarks
			3"/s	6"/s	10"/s	12"/s	14"/s		
Thermal transfer type	BX7*****SG2	C6NS	+2	+2	+2	+2	+2	Semi-resin2	
	BX7*****SG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	I-BEST S	+2	+2	+2	+2	+2	Semi-resin2	
	BX7*****SG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****AS1	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin1	
	BX7*****AS1	FR1412-50	0	0	---	---	---	Resin1	Unusable at 10ips or more.
	BX7*****AS1	FR1510-50	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin1	
	BX7*****AS1	FR1615-50	0	0	---	---	---	Resin1	Unusable at 10ips or more.
	BX7*****AS1	7860E	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin1	
	BX7*****RS	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin2	
	BX7*****RS	FR1412-50	0	0	---	---	---	Resin2	Unusable at 10ips or more.
	BX7*****RS	FR1510-50	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin2	
	BX7*****RS	FR1615-50	0	0	---	---	---	Resin2	Unusable at 10ips or more.
	BX7*****RS	7860E	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin2	
Direct thermal type		150LA-1P	0	0	---	---	---	Standard	Unusable at 10ips or more.
		150LHB-150	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		V8NS	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		Multitherm Plus	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		130LAB-1-150	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		130LHB-150	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	

NOTES:

*1: Since the print tones provided in the above table are the recommended values, the variance should be taken into consideration when in use.

*2: The print energy type must be set the above table by all means. For setting method of the print energy type, refer to the Key Operation Specification (EAA-03184).

*3: When using the resin ribbon (BX7*****AS1/RS1) at the print speed of 6"/sec. or more, printing may blur when the print head temperature becomes high. Usually this can be solved by the print tone fine adjustment, however, there may be a case that blurred print cannot be improved by the print tone fine adjustment depending on the combination of the ribbon and paper. In that case, set the print speed to 3"/sec.

4: It limits print tone fine adjustment for the protection of thermal head by the rating of the maximum supply energy of thermal head. The tone of printing do not thicken even if it is set print tone fine adjustment value more than the value of the list shown below.

Print energy type	Print tone fine adjustment limit				
	3"/s	6"/s	10"/s	12"/s	14"/s
Standard	+10	+10	+0	-3	-6
Semi-resin1	+10	+10	+10	+9	+5
Semi-resin2	+10	+10	+10	+6	+4
Resin1	+10	+10	+2	-2	-5
Resin2	+10	+10	+1	-3	-6

For 305dpi model

Print Mode	Ribbon	Paper	Print tone fine adjustment values(*1)						Print energy type(*2)	Remarks
			3"/s	5"/s	8"/s	10"/s	12"/s	14"/s		
Thermal transfer type	BX7*****AG2	C6NS	0	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG2	Vellum	0	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG2	Transtherm 1C	0	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG2	I-BEST S	0	0	0	0	0	0	Semi-resin1	
	BX7*****AG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	C6NS	0	0	0	0	0	0	Semi-resin1	
	BX7*****AG4	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****AG4	I-BEST S	0	0	0	0	0	0	Semi-resin1	
	BX7*****AG4	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin1	
	BX7*****RG2	C6NS	0	0	0	0	0	0	Semi-resin2	
	BX7*****RG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****RG2	I-BEST S	0	0	0	0	0	0	Semi-resin2	
	BX7*****RG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	C6NS	0	0	0	0	0	0	Semi-resin2	
	BX7*****FG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****FG2	I-BEST S	0	0	0	0	0	0	Semi-resin2	
	BX7*****FG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	

For 305dpi model

Print Mode	Ribbon	Paper	Print tone fine adjustment values(*1)						Print energy type(*2)	Remarks
			3"/s	5"/s	8"/s	10"/s	12"/s	14"/s		
Thermal transfer type	BX7*****SG2	C6NS	+2	+2	+2	+2	+2	+2	Semi-resin2	
	BX7*****SG2	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Vellum	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Transfer Matt	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Transtherm 1C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	Transtherm 2C	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****SG2	I-BEST S	+2	+2	+2	+2	+2	+2	Semi-resin2	
	BX7*****SG2	I-BEST W	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Semi-resin2	
	BX7*****AS1	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin1	
	BX7*****AS1	FR1412-50	0	0	0	0	---	---	Resin1	Unusable at 12ips or more.
	BX7*****AS1	FR1510-50	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin1	
	BX7*****AS1	FR1615-50	0	0	0	0	---	---	Resin1	Unusable at 12ips or more.
	BX7*****AS1	7860E	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin1	
	BX7*****RS	VES-85	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin2	
	BX7*****RS	FR1412-50	0	0	0	0	---	---	Resin2	Unusable at 12ips or more.
	BX7*****RS	FR1510-50	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin2	
	BX7*****RS	FR1615-50	0	0	0	0	---	---	Resin2	Unusable at 12ips or more.
	BX7*****RS	7860E	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Resin2	
Direct thermal type		150LA-1P	0	0	0	0	---	---	Standard	Unusable at 12ips or more.
		150LHB-150	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		V8NS	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		Multitherm Plus	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		130LAB-1-150	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	
		130LHB-150	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	T.B.D.	Standard	

NOTES:

*1: Since the print tones provided in the above table are the recommended values, the variance should be taken into consideration when in use.

*2: The print energy type must be set the above table by all means. For setting method of the print energy type, refer to the Key Operation Specification (EAA-03184).

*3: When using the resin ribbon (BX7*****AS1/RS1) at the print speed of 5"/sec. or more, printing may blur when the print head temperature becomes high. Usually this can be solved by the print tone fine adjustment, however, there may be a case that blurred print cannot be improved by the print tone fine adjustment depending on the combination of the ribbon and paper. In that case, set the print speed to 3"/sec.

*4: It limits print tone fine adjustment for the protection of thermal head by the rating of the maximum supply

energy of thermal head. The tone of printing do not thicken even if it is set print tone fine adjustment value more than the value of the list shown below.

Print energy type	Print tone fine adjustment limit					
	3"/s	5"/s	8"/s	10"/s	12"/s	14"/s
Standard	+10	+10	+9	+4	-6	-7
Semi-resin1	+10	+10	+10	+10	+7	+6
Semi-resin2	+10	+10	+10	+10	+3	+3
Resin1	+10	+10	+10	+9	-3	-7
Resin2	+10	+10	+10	+10	-2	-5