TOSHIBA

TOSHIBA Bar Code Printer

B-SX4T Series

Supply Specification

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TOSHIBA TEC CORPORATION

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1. SCOPE

This manual describes the supplies for the B-SX4T 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

[mm]

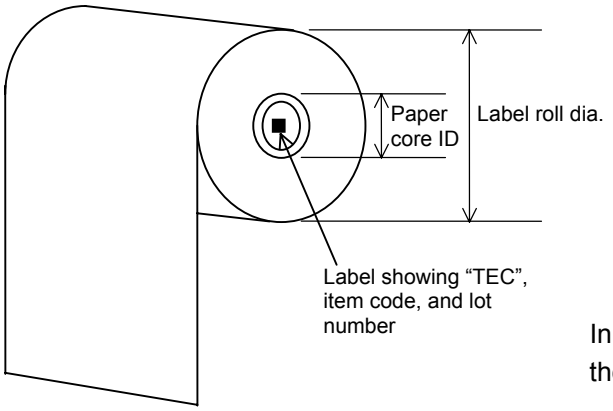
Item			Batch	Strip	Cut		
					Rotary cutter		Swing cutter
					Non head-up operation	Head-up operation	
A: Label pitch Tag pitch	Label	Min.	10.0	25.4	3"/sec: 87.0	3"/sec: 38.0	38.0
					6"/sec: 99.0	6"/sec: 38.0	
		Max.	1500.0				
	Tag	Min.	10.0	–	3"/sec: 30.0		25.4
					6"/sec: 30.0		
		Max.	1500.0	–	1500.0		
B: Label length		Min.	8.0	23.4	3"/sec: 81.0 (NOTE 18)	3"/sec: 25.0	25.0
					6"/sec: 93.0 (NOTE 19)	6"/sec: 25.0	
		Max.	1498.0		1494.0		
C: Backing paper width Tag width		Min.	30.0	50.0	30.0		
		Max.	112.0				
D: Label width		Min.	27.0				
		Max.	109.0				
E: Label-to-label gap		Min.	2.0		6.0		
		Max.	20.0				
F: Black mark length		Min.	2.0				
		Max.	10.0				
G: Max. effective print width			104 ± 0.2				
H: Effective print length	Label	Min.	6.0	21.4	3"/sec: 79.0	3"/sec: 30.0	23.0
					6"/sec: 91.0	6"/sec: 30.0	
		Max.	1496.0		1492.0		
	Tag	Min.	8.0	-	3"/sec: 28.0		23.0
					6"/sec: 28.0		
		Max.	1496.0	-	1496.0		
I: Slow up and down area			1.0 each				
J: Thickness	Label		Min. 130 µm, Max. 170 µm				
	Tag		Min. 150 µm, Max. 290 µm (NOTE 17)				
K: Max. effective print length for on-the-fly issuing			1361.0				
L: Max. Roll Diameter			Ø200 (Ø180 when the built-in rewinder is used)				
M: Rolling-up Method			Print surface is wound inside as the standard.				
N: Paper Core			ID Ø76.2 mm ± 0.3				

NOTES:

1. *For label issues, set the head lever to position ① LABEL.*
2. *For tag issues, set the head lever to position ② TAG.*
3. *When tags of which the width is less than 50 mm are used for printing, set the head lever in position ① LABEL.*
4. *The ratio "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 (7K, blue) 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:

   Relations 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.

9. *In the cut issue mode, take notice of the following items.*
   - *① The backing paper of labels (on the gap between labels) can be cut. The label itself cannot be cut. When the perforated label or tag is used, it is necessary to test and confirm the cutting performance thoroughly beforehand.*
   - *② 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.*
10. *When the stop position is not proper, the print stop position should be changed by adjusting the strip position.*
11. *When the label-to-label gap is 5 mm or more, the effective print length should be set to the maximum value (Label pitch minus 2 mm), and then the print stop position should be changed by the strip position fine adjustment.*
12. *When the rotary cutter is used, a cut and issue should be performed with the head-up operation being activated.*
13. *When the head-up operation is activated, a notch of 20 mm in width and 50 mm in length should be provided at the center of the end of the paper on the paper core side.*
14. *If paper is jammed at the platen when cut issues are performed, set the forward feed standby ("FORWARD WAIT") to ON in the system mode.*
15. *The cut issue using the rotary cutter at 10"/sec cannot be performed. If 10"/sec is designated, an issue is performed at 6"/sec.*
16. *The strip issue at 10"/sec cannot be performed.*
17. *When the paper thickness is more than 200 µm, the head installation position may need to be changed.*
18. *When using the rotary cutter at 3"/sec., the label length must meet the following condition: Label length ≥ 91.0 mm - (Gap length/2).*
19. *When using the rotary cutter at 6"/sec., the label length must meet the following condition: Label length ≥ 107.0 mm - (Gap length/2).*

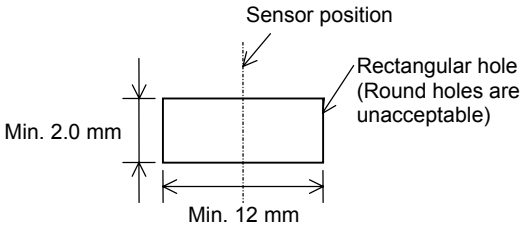
2.3 DETECTION AREA ON LABELS AND TAGS

2.3.1 Detection Area of Transmissive Sensor

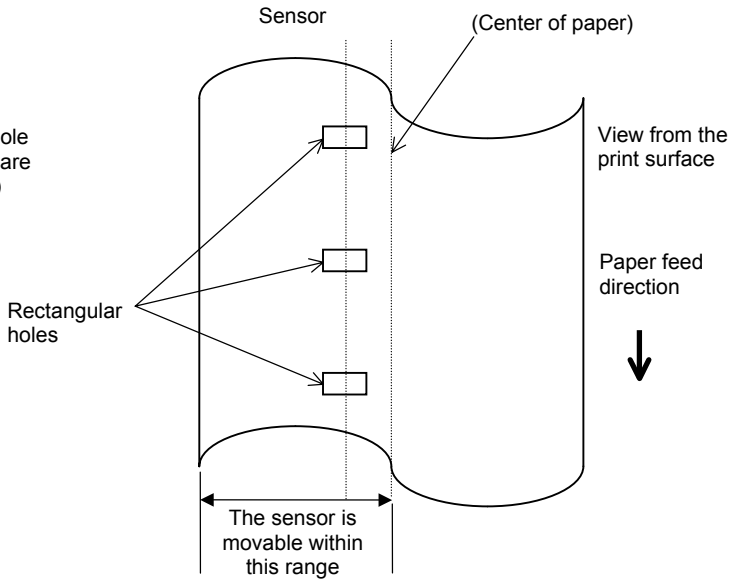
The sensor is movable from the center to the left edge of the paper.

<Tags>

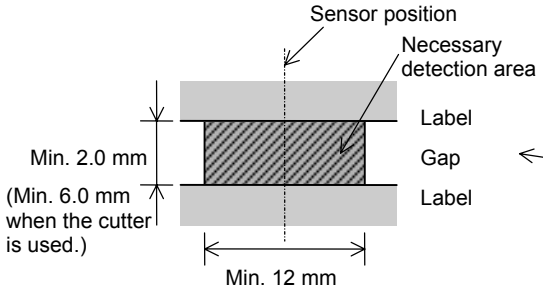
Detection of hole



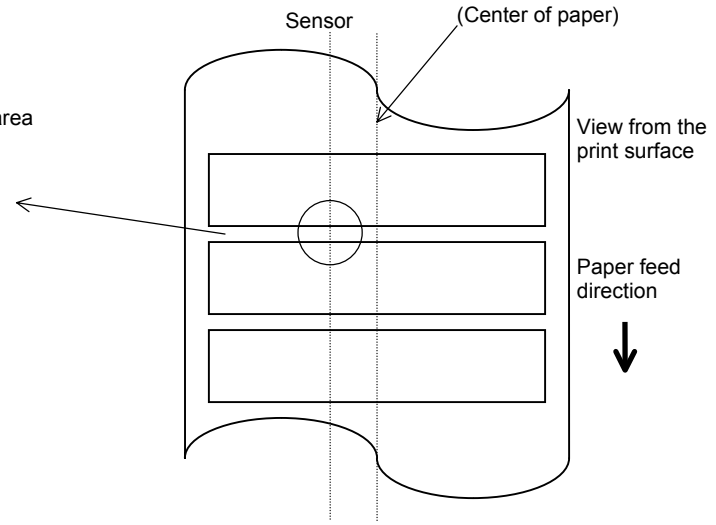
Magnified view of detection area



<Labels>

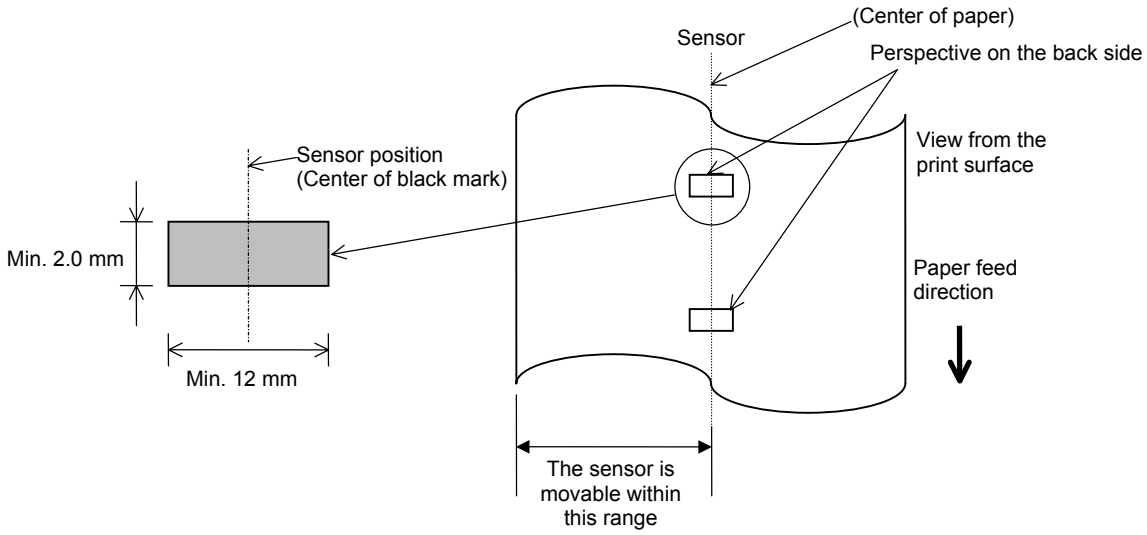


Magnified view of detection area



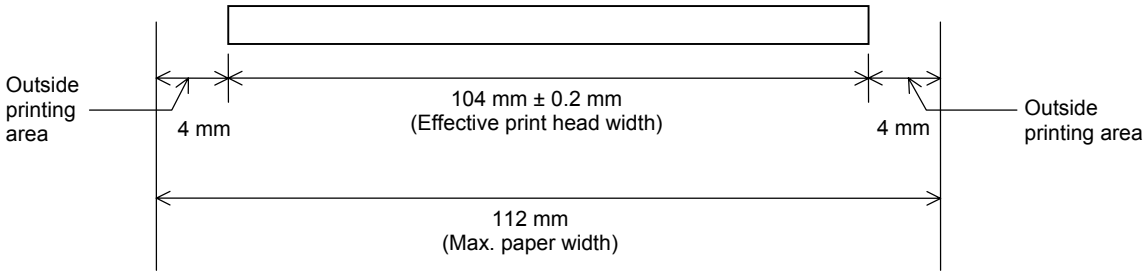
2.3.2 Detection Area of Reflective Sensor

- The sensor is movable from the center to the left edge of the paper.
- The reflection factor of the black mark must be less than 10% with a waveform length of 950 nm.
- The sensor detects at the center of the black mark.
- When printing black marks on the labels, they must be printed on the gaps. (See (5) in section 2.4.4.)
- Rectangular holes can substitute the black marks, on the condition that nothing is printed on the back side.

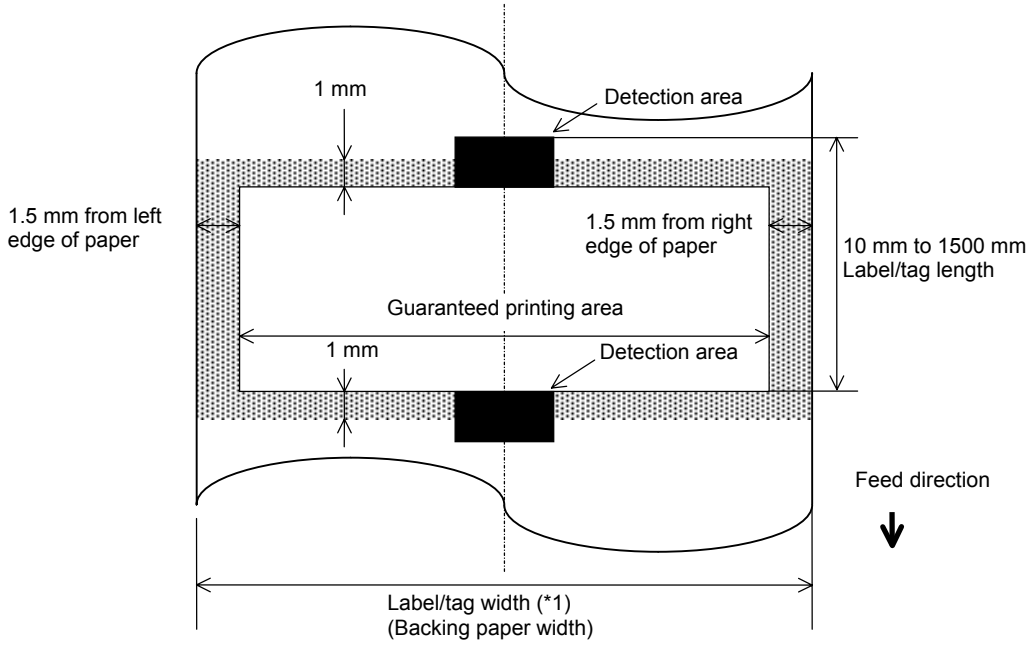


2.4 EFFECTIVE PRINT AREA OF PAPER

2.4.1 Relationship between Head Effective Print Width and Paper Width



2.4.2 Effective Print Area of Tags and Labels



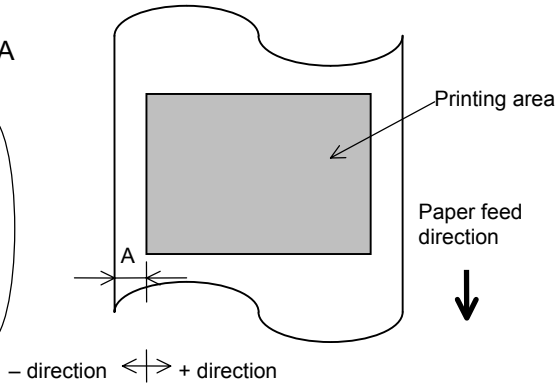
NOTE:
- *Avoid printing in the shaded areas as the print quality is not guaranteed. Additionally, in the case of labels, print position accuracy in the 1-mm wide area of the label inner perimeter is not guaranteed.*
- *The center of media is almost aligned with the center of the thermal head.*
- *If printing is performed in the shaded area, the ribbon may wrinkle. This may cause loss of print quality of the guaranteed printing 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 Registration

(1) Horizontal (Meandering)

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

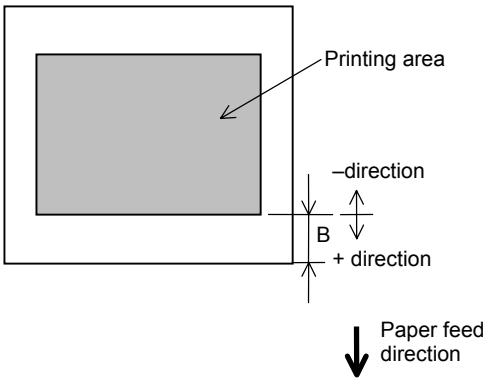
To determine the reference value for A, make a print test 10 times or more using the specified label or tag, and adjust the print position using the average value of the variations to the programmed print position.



(2) Vertical (Feed Direction)

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

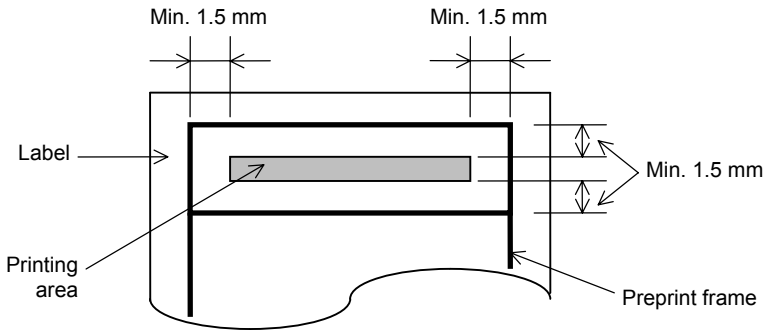
To determine the reference value for B, make a print test 10 times or more using the specified label or tag, and adjust the print position using the average value of the variations to the programmed print position. B has a ±3% variation to the programmed value.



Precaution for Preprinting

Preprinting should be performed at least 1.5 mm outside of any side of the printing area, taking the print position variance into consideration.

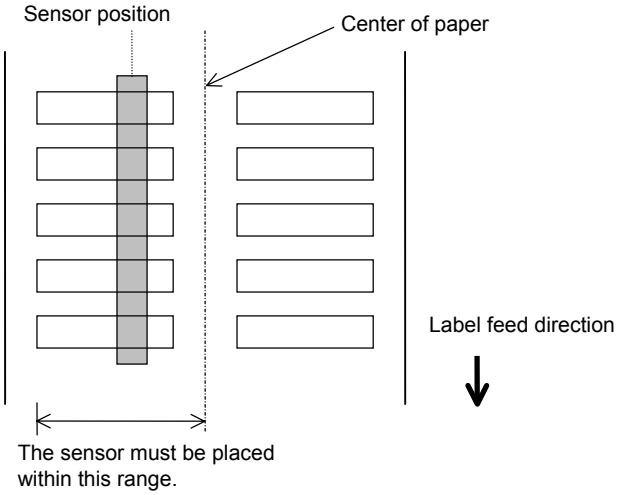
Example:



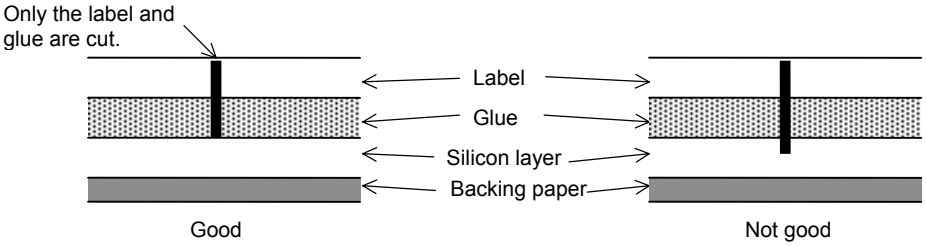
2.4.4 Suggestions for Designing Labels

(1) Multiple-piece Labels

To properly detect each label by the transmissive sensor, the necessary detecting area 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.

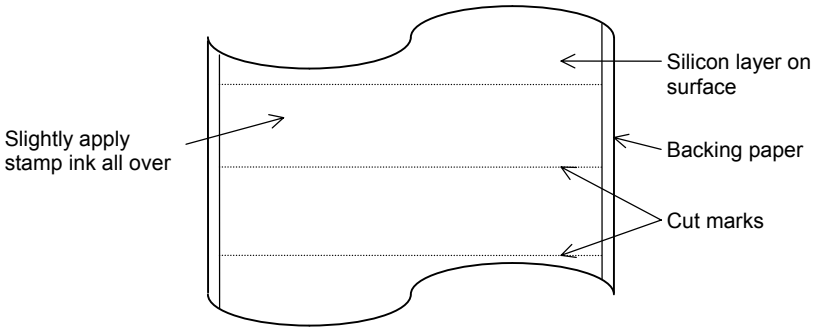


(2) Use a label of which silicon layer at the die-cut cut part is not damaged.



[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) Perforating

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

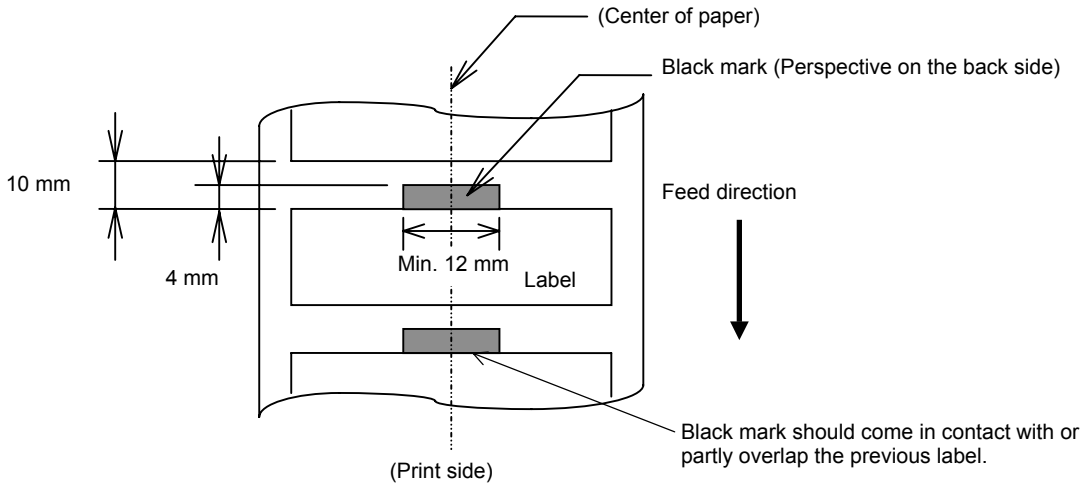
(4) Preprinting

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.

(5) Printing Black Marks on the Label

Black marks should be printed on the backside 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

Refer to ATTACHMENT-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 ribbon must be used.

Use of any non-approval ribbon may cause problems.

3.2 SHAPE AND SIZE OF RIBBON

No.	Item		Specification
1	Ribbon Shape		Spool type
2	Ribbon Width		68 (40) mm ± 1 mm to 112
	Ribbon Winding Width		68 (40) mm $^{+2}_{-1}$ to 112
3	Max. Ribbon Length		600 m (Ø 90 mm or less)
4	Max. Ribbon OD		Ø 90 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. The ribbon must be 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.*
- *Note 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

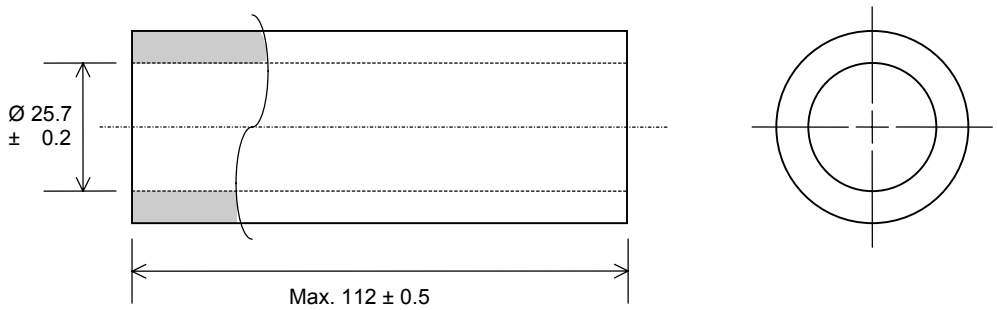
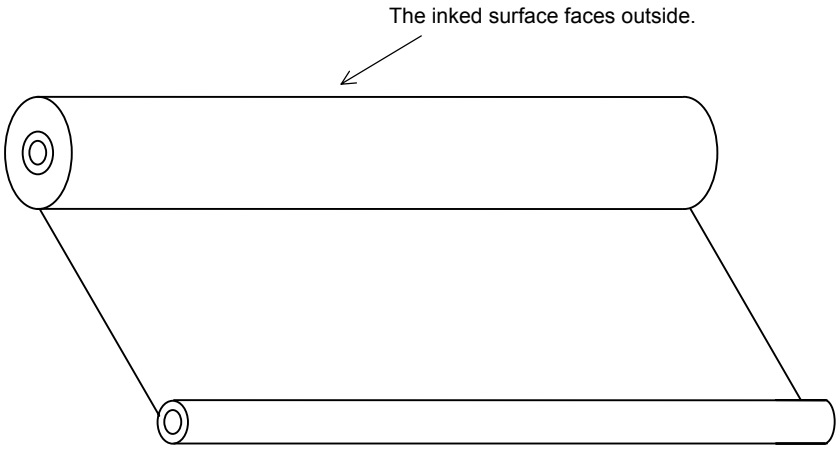
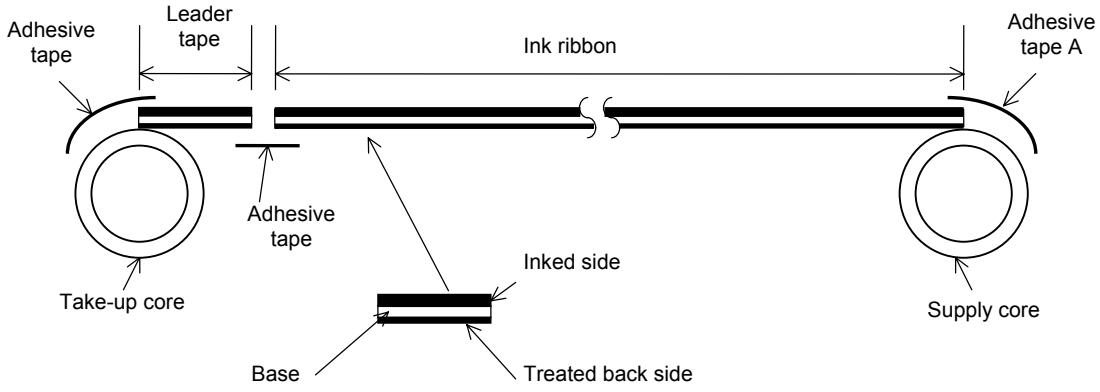


Fig. 2: Positional Relationship between Core and Ribbon



Wind the ink ribbon so that the ribbon center aligns with the core center.

Fig. 3: Connection between Leader Tape and Ribbon



CAUTION: *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-SX4T series

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

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” for 68-mm wide ribbon, and “-4” for 50-mm wide or less ribbon, respectively.

Losses of ribbon at the ribbon saving are as below:

Print speed	3”/sec	6”/sec	10”/sec
Length of losses of ribbon	6 mm	10 mm	20 mm

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.

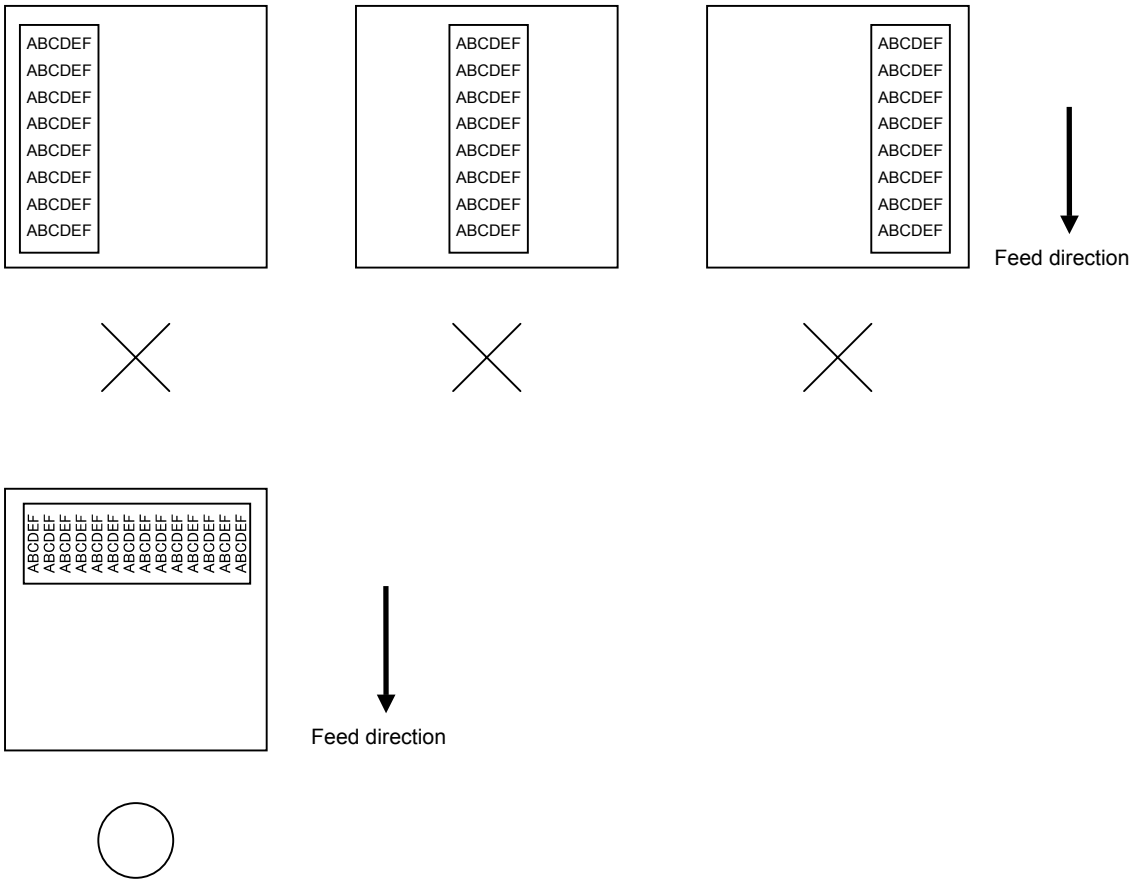
For details, refer to the External Equipment Interface Specification (TAA-1380).

3.4 APPROVED RIBBON

The approved ribbons are shown in ATTACHMENT-2.
The manufacturer ink name of the ribbon must not be revealed, and handled carefully.

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.



3.5.2 When a ribbon error occurs, the ribbon tension (voltage) for the ribbon feed motor should be adjusted in the negative (−) direction. For details regarding the fine adjustment to the ribbon motor drive voltage, refer to the Key Operation Specification (TAA-0966).

4. PRINT CONDITIONS

4.1 PRINT QUALITY OF BAR CODE

Bar code	Speed	NB	NS	WB	WS	CS	Criteria		Criteria 2*
Parallel	3”/sec	2	2	5	5	2	Readable	Grade B	Grade C
	6”/sec	2	2	5	5	2	Readable	Grade B	Grade C
	10”/sec	2	2	5	5	2	Readable	Grade B	Grade C
Serial	3”/sec	2	4	5	7	4	Readable	Grade C	Grade F
	6”/sec	2	5	6	10	5	Readable	Grade C	Grade C
	10”/sec	2	5	6	10	5	Readable		Grade C

NB: Narrow bar width NS: Narrow space width WB: Wide bar width WS: Wide space width
CS: Space between characters, Bar code type: CODE39, Number of digits: 16

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. When the number of digits exceeds 16, the spaces (NS, WS) should be increased or the print speed should be decreased to lower the density.
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) 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 2 mm), so that the tag will be cut at the stop position.
   3) When printing on 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.

* Criteria 2 is the criteria for approval of 3M labels.

4.2 LINE PRINTING

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

4.3 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.

4.4 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. Basically rubbing the printout surface deteriorates the quality. The supply suitable for that particular environment should be used.

4.5 OTHER CAUTIONS

1. The 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.

ATTACHMENT-1 APPROVED PAPER

<For internal use>

Type		Item Code	Manufacturer Type No.	Paper Thickness (µm)	Manufacturer	Remarks
Label	Direct thermal type	4L40	140LAB	70	RICOH	For Japanese model
	Thermal transfer type	C625	C6TS	66	OSAKA SEALING PRINTING	For Japanese model
		FR1412-50	White PET	50	LINTEC	For Japanese model
		FR1510-50	Silver sand mat	50	LINTEC	For Japanese model
		FR1615-50	Silver chemical mat	50	LINTEC	For Japanese model
		VES-85	Yupo VES	85	OSAKA SEALING PRINTING	For Japanese model
		MP3PETMW	7874E		3M	Mat white PET
		M5PETMW	7815EH		3M	Mat white PET
		M-ACBW	3690E		3M	Bright white acrylate
		M0PETGW	D85YB		3M	Gloss white PET
		M0PETGC	76991		3M	Gloss clear PET
		M1PETMC	76500		3M	Mat clear PET
		M-PAGW	7000		3M	Gloss white paper
		M0PPGW	76710		3M	Gloss white PP
		M0PEMW	76998		3M	Mat white PE
		MMMPETMW	5770		3M	Mat white PET
		M-ACMW	3922		3M	Mat white acrylic
		M-DPEMW	3812		3M	Mat white destructible polyurethane
		MMDMPVOMW	7380		3M	Mat white PET VOID
		M-DPVCMW	7613		3M	Mat white destructible PVC
		M2PETGW	7816EH		3M	Gloss white PET
		M4PETMS	G36CB		3M	Mat silver PET
Tag	Direct thermal type		120LB	160	RICOH	Usable only at 3 ips For Japanese model
			130LAB	150	RICOH	Usable only at 3 or 6 ips For Japanese model
	Thermal transfer type	IS50	I-BEST S	160	OSAKA SEALING PRINTING	For Japanese model
		IS53	I-BEST W	260	OSAKA SEALING PRINTING	For Japanese model

NOTES:

1. *When the low-sensitive direct thermal paper equivalent to 120LB is used, printing should be performed at 3"/sec. If the paper is used for high-speed printing, poor printing occurs.*
2. *When 130LAB (tag paper) is used, printing should be performed at 6"/s or slower. If printing is performed at 10"/s, poor printing occurs.*
3. *The thermal head life varies according to the print patterns (print ratio).*

ATTACHMENT-1 APPROVED PAPER

<For dealers and users>

Type		Item Code	Manufacturer Type No.	Paper Thickness (µm)	Remarks
Label	Direct thermal type	4L40	140LAB	70	For Japanese model
	Thermal transfer type	C625	C6TS	66	For Japanese model
		FR1412-50	White PET	50	For Japanese model
		FR1510-50	Silver sand mat	50	For Japanese model
		FR1615-50	Silver chemical mat	50	For Japanese model
		VES-85	Yupo VES	85	For Japanese model
		MP3PETMW			Mat white PET
		M5PETMW			Mat white PET
		M-ACBW			Bright white acrylate
		M0PETGW			Gloss white PET
		M0PETGC			Gloss clear PET
		M1PETMC			Mat clear PET
		M-PAGW			Gloss white paper
		M0PPGW			Gloss white PP
		M0PEMW			Mat white PE
		MMMPETMW			Mat white PET
		M-ACMW			Mat white acrylic
		M-DPEMW			Mat white destructible polyurethane
		MMDMPVOMW			Mat white PET VOID
		M-DPVCMW			Mat white destructible PVC
		M2PETGW			Gloss white PET
		M4PETMS			Mat silver PET
Tag	Direct thermal type		120LB	160	Usable only at 3 ips For Japanese model
			130LAB	150	Usable only at 3 or 6 ips For Japanese model
	Thermal transfer type	IS50	I-BEST S	160	For Japanese model
		IS53	I-BEST W	260	For Japanese model

NOTES: *1. When the low-sensitive direct thermal paper equivalent to 120LB is used, printing should be performed at 3"/sec. If the paper is used for high-speed printing, poor printing occurs.*

2. When 130LAB (tag paper) is used, printing should be performed at 6"/s or slower. If printing is performed at 10"/s, poor printing occurs.

3. The thermal head life varies according to the print patterns (print ratio).

ATTACHMENT-2 APPROVED RIBBONS

<For internal use> Type: R: Resin SR: Semi-resin

Item Code	Manufacturer Ink Name	Ink Thickness	Base Thickness (µm)	Manufacturer	Type	Remarks
BR-60**A50	APR-600IV (Black)	–	4.5	ARMOR	SR	
BR-60**A7S	AXR600 II	–	4.5	ARMOR	R	Unusable at 10”/sec.
BR-60**R7S	B120EC (IV)	2.1 g/m^2	4.5	RICOH	R	Unusable at 10”/sec.
BR-60**R5	B120EX II	3.1 g/m^2	4.5	RICOH	SR	
BR-60**F5	TTM-78 (Black)	3.3 g/m^2	4.5	FUJICOPIAN	SR	
BR-60**F7S	TTM-132	3.3 g/m^2	4.5	FUJICOPIAN	R	Unusable at 10”/sec.
BR-60**S5P	(TR-4500) RK-28 (Black)	(1.2 g/m^2)	4.8	Sony Chemicals	SR	
BR-60**S7S	TR4575		4.5	Sony Chemicals	R	Unusable at 10”/sec.

ATTACHMENT-2 APPROVED RIBBONS

<For dealers and users> Type: R: Resin SR: Semi-resin

Item Code	Ink Thickness	Base Thickness (µm)	Type	Remarks
AG2	–	4.5	SR	
AS1	–	4.5	R	Unusable at 10”/sec.
RS1	2.1 g/m^2	4.5	R	Unusable at 10”/sec.
RG2	3.1 g/m^2	4.5	SR	
FG2	3.3 g/m^2	4.5	SR	
	3.3 g/m^2	4.5	R	Unusable at 10”/sec. For Japanese model
SG2	(1.2 g/m^2)	4.8	SR	
SS1		4.5	R	Unusable at 10”/sec.

ATTACHMENT-3 PRINT TONE FINE ADJUSTMENT VALUES BY SUPPLIES

<For Internal use>

NOTE: *When using the approved supplies not listed below, the print tone fine adjustment value should be set to 0.*

Print Mode	Ribbon	Paper	Print Speed			Remarks
			3"/s	6"/s	10"/s	
Thermal transfer	APR600	C6TS	-2	-2	-2	
		I-BEST S	-2	-2	-2	
		I-BEST W	-2	-2	-2	
	TR4500D	C6TS	+1	+1	+1	
		I-BEST S	+1	+1	+1	
		I-BEST W	+1	+1	+1	
	AXR600	FR1412-50	+2	+2		
		FR1510-50	+3	+6		
		VES-85	0	+1		
	B120EC	FR1412-50	+2	+4		
		FR1510-50	+4	+5		
		VES-85	+2	+5		
	F7S (For Japanese model)	FR1412-50	0	+2		
		FR1510-50	+2	---		Available only when the print speed is 3"/sec.
		VES-85	0	+2		
	TR4575	FR1412-50	+2	+5		
		FR1510-50	+4	+7		
		VES-85	0	+4		
	F7NS (For Japanese model)	FR1412-50	0	+2		
		FR1510-50	+2	---		
		VES-85	0	+2		

NOTE*: When using the resin ribbon (AXR600/B120EC/TR4575) at the print speed of 6"/sec., 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.*

Print Mode	Ribbon	Paper	Print Speed			Remarks
			3”/s	6”/s	10”/s	
Thermal transfer	APR600	7874E	+4	-2	-6	In the case of 10”/sec. and low temperature environment, a print tone adjustment is required.
	APR600	7815EH	-2	-2	-4	
	APR600	3690E	+2	+2	+2	This combination is not acceptable in the case of 3”/sec. and low temperature environment. In the case of 6”/sec. and low temperature environment, a print tone adjustment is required.
	APR600	D85YB	0	-2	0	In the case of 3”/sec. print speed and low temperature environment, a print tone adjustment is required.
	APR600	76991	+2	-2	-6	This combination is not acceptable in the case of 3”/sec. and low temperature environment.
	APR600	76500	+2	-2	-6	In the case of 3”/sec. or 10”/sec. and low temperature environment, a print tone adjustment is required.
	APR600	7000	+6	+4	+2	
	APR600	76710	0	-4	-6	In the case of 3”/sec. and high temperature environment, a print tone adjustment is required.
	APR600	76998	+2	0	0	
	APR600	5770	+2	0	0	
	APR600	3922	+2	+4	0	This combination is not acceptable in the case of 3”/sec. and low temperature environment.
	APR600	3812	+4	+2	-2	
	APR600	7380	+6			This combination is not acceptable in the case of 3”/sec. and low temperature environment.
	APR600	7613	+6	+2	0	
	APR600	7816EH	+2	0	-4	In the case of 3”/sec. and high temperature environment, a print tone adjustment is required.
	APR600	G36CB	+2	-2		In the case of 3”/sec. and low temperature environment, a print tone adjustment is required. This combination is not acceptable in the case of 6”/sec. and low temperature environment.
	BR-60**F7S (For Japanese model)	7815EH	+6	+6		
	BR-60**F7S (For Japanese model)	3690E	+8			This combination is not acceptable in the case of 3”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	D85YB	+4	+6		
	BR-60**F7S (For Japanese model)	76991	+6	+6	+8	

Print Mode	Ribbon	Paper	Print Speed			Remarks
			3”/s	6”/s	10”/s	
	BR-60**F7S (For Japanese model)	76500	+8			
	BR-60**F7S (For Japanese model)	7000	+8			This combination is not acceptable in the case of 3”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	76710	+4	+4	+6	
	BR-60**F7S (For Japanese model)	76998	+6	+8		This combination is not acceptable in the case of 6”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	5770	+6	+8		
	BR-60**F7S (For Japanese model)	3922	+8			This combination is not acceptable in the case of 3”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	7816EH	+6	+6		

ATTACHMENT-3 PRINT TONE FINE ADJUSTMENT VALUES BY SUPPLIES

<For dealers and users>

NOTE: *When using the approved supplies not listed below, the print tone fine adjustment value should be set to 0.*

Print Mode	Ribbon	Paper	Print Speed			Remarks
			3"/s	6"/s	10"/s	
Thermal transfer	AG2	C6TS	-2	-2	-2	
		I-BEST S	-2	-2	-2	
		I-BEST W	-2	-2	-2	
	SG2	C6TS	+1	+1	+1	
		I-BEST S	+1	+1	+1	
		I-BEST W	+1	+1	+1	
	AS1	FR1412-50	+2	+2		
		FR1510-50	+3	+6		
		VES-85	0	+1		
	RS1	FR1412-50	+2	+4		
		FR1510-50	+4	+5		
		VES-85	+2	+5		
	F7S (For Japanese model)	FR1412-50	0	+2		
		FR1510-50	+2	---		Available only when the print speed is 3"/sec.
		VES-85	0	+2		
	SS1	FR1412-50	+2	+5		
		FR1510-50	+4	+7		
		VES-85	0	+4		
	F7NS (For Japanese model)	FR1412-50	0	+2		
		FR1510-50	+2	---		
		VES-85	0	+2		

NOTE*: When using the resin ribbon (AS1/B120EC/TR4575) at the print speed of 6"/sec., 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.*

Print Mode	Ribbon	Paper	Print Speed			Remarks
			3”/s	6”/s	10”/s	
Thermal transfer	AG2	M3PETMW	+4	-2	-6	In the case of 10”/sec. and low temperature environment, a print tone adjustment is required.
	AG2	M5PETMW	-2	-2	-4	
	AG2	M-ACBW	+2	+2	+2	This combination is not acceptable in the case of 3”/sec. and low temperature environment. In the case of 6”/sec. and low temperature environment, a print tone adjustment is required.
	AG2	M0PETGW	0	-2	0	In the case of 3”/sec. print speed and low temperature environment, a print tone adjustment is required.
	AG2	M0PETGC	+2	-2	-6	This combination is not acceptable in the case of 3”/sec. and low temperature environment.
	AG2	M1PETMC	+2	-2	-6	In the case of 3”/sec. or 10”/sec. and low temperature environment, a print tone adjustment is required.
	AG2	M-PAGW	+6	+4	+2	
	AG2	M0PPGW	0	-4	-6	In the case of 3”/sec. and high temperature environment, a print tone adjustment is required.
	AG2	M0PEMW	+2	0	0	
	AG2	MMMPETMW	+2	0	0	
	AG2	M-ACMW	+2	+4	0	This combination is not acceptable in the case of 3”/sec. and low temperature environment.
	AG2	M-DPEMW	+4	+2	-2	
	AG2	M-DPVCMW	+6			This combination is not acceptable in the case of 3”/sec. and low temperature environment.
	AG2	M2PETGW	+6	+2	0	
	AG2	M4PETMS	+2	0	-4	In the case of 3”/sec. and high temperature environment, a print tone adjustment is required.
	AG2	M-DPEMW	+2	-2		In the case of 3”/sec. and low temperature environment, a print tone adjustment is required. This combination is not acceptable in the case of 6”/sec. and low temperature environment.
	BR-60**F7S (For Japanese model)	M5PETMW	+6	+6		
	BR-60**F7S (For Japanese model)	ACBW	+8			This combination is not acceptable in the case of 3”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	M0PETGW	+4	+6		
	BR-60**F7S (For Japanese model)	M0PETGC	+6	+6	+8	

Print Mode	Ribbon	Paper	Print Speed			Remarks
			3”/s	6”/s	10”/s	
	BR-60**F7S (For Japanese model)	M1PETMC	+8			
	BR-60**F7S (For Japanese model)	M-PAGW	+8			This combination is not acceptable in the case of 3”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	M0PPGW	+4	+4	+6	
	BR-60**F7S (For Japanese model)	M0PEMW	+6	+8		This combination is not acceptable in the case of 6”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	MMMPETMW	+6	+8		
	BR-60**F7S (For Japanese model)	M-ACMW	+8			This combination is not acceptable in the case of 3”/sec. and high temperature environment.
	BR-60**F7S (For Japanese model)	M2PETGW	+6	+6		