MODEL 442A

Micro Printer

Users Manual

TSURUGA ELECTRIC CORPORATION

Oct.14,2008
I-01811

Contents

General

- Please read this manual carefully before initial operation.
- Please operate this product by persons who have enough electric knowledge.
- Please make sure to reach this manual to the operators of this product.

Please confirm each product incorporates the following accessories.

442A : Parallel (conform to Centronics) / Serial (RS-232C)
(1) Users Manual (2) Chart paper (one roll) (3) Main body
(4) Power cable, Power connector with lead-wire 500mm
(5) Communication cable, Input connector with wire 500mm

442A-E2: USB
(1) Users Manual (2) Chart paper (one roll) (3) Main body
(4) Power cable, Power connector with lead-wire 500mm
(5) Communication cable, A type-A type 1.8m
(6) CD-ROM (USB Driver, Manual)

1. For Safety

1.1 Safety operation

For safety operation, please follow the instruction herein under. There are two symbols marks for safety in this manual.

⚠ WARNING
Operation error might be caused of human death or serious wound.

⚠ CAUTION
Operation error might be caused of slight wound to operators or damage to other instruments related to this product.

⚠ WARNING

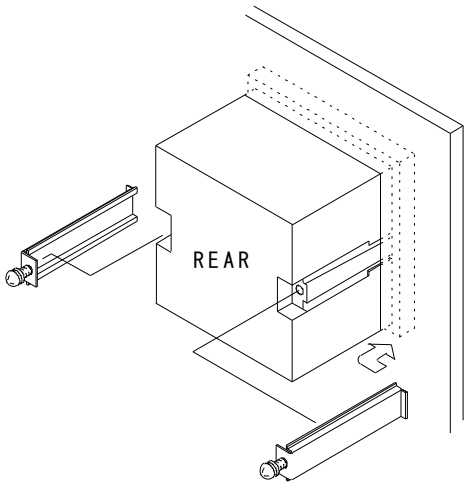
- **Since this product do not have power switch, this product works immediately after connecting power line.**
- **Do not touch the power supply terminals while powered, otherwise it might be caused of electric shock.**

⚠ CAUTION

- **In case of installing this product to cabinet housing, make sure to exchange air inside to keep inside temperature under 50℃**
- **Keep space when installing more than 2 products. No space installation between products might shorten products lifetime by their self-heating.**
- **Do not install this product in the following environment where;**
  - **Exposed to rain, water drops or direct sunlight.**
  - **High temperature or humidity, much dust or corrosive gas.**
  - **Affected by external noise, radio waves or static electricity.**
  - **Affected by vibration, shock.**
- **Store this product at –20 to 60 ℃.**
- **Wipe off front panel and housing with dry soft cloth. If necessary, use close with small amount of synthetic detergent for cleaning. Do not use an organic solvent such as thinner, benzine for front panel or housing cleaning, which might damage shape and color of front panel and housing.**

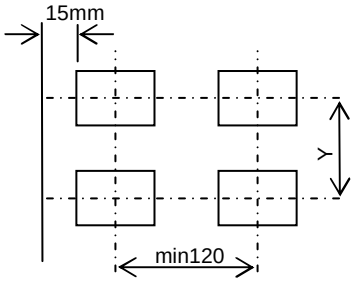
2. Installation

2.1 Main body



Insert a main body to front side of panel, and fix it with screws at both side from back.

Panel cutout : 92 $^{+0.8}_{0}$ × 92 $^{+0.8}_{0}$ mm
Panel thickness: 1 to 6 mm
Note)1.5mm or more thickness is recommended in case of aluminum panel.
Tightening torque: 0.2 to 0.3N・m



Installation pitch between two products.

Installation pitch (Lengthwise direction, Y):
120mm for 442A
200mm for 442A-E2

⚠ CAUTION

- **Do not tight too much a screw that might damage housing.**
- **Use fan, etc, for forced draft in case of installing more than 2 products.**

2.2 Roll chart

⚠ WARNNING

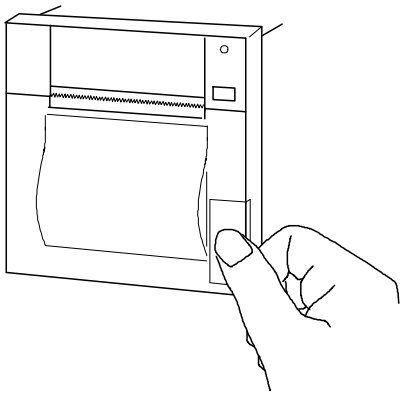
- **Do not touch thermal head and its around after printing, where high temperature is supposed.**
- **Replace roll chart or clean head after the temperature of head falls.**

⚠ CAUTION

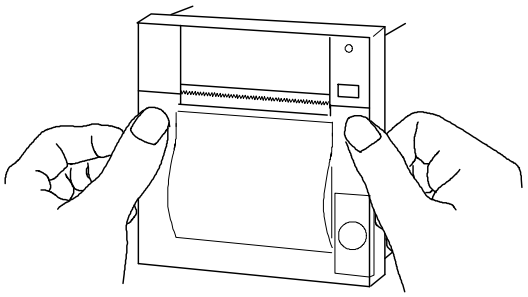
- **Do not insert fingers or alien substances into printer. Printer cutter might injure fingers etc.**
- **Do not open a roll chart cover by pressing Open/Close button while printing.**
- **Do not press Open/Close button while holding a roll chart cover down.**
- **Do not pull up roll paper while closing a roll chart cover.**
- **Give full attention not to insert fingers when closing a roll chart cover.**
- **Do not insert alien substances to driving gear when closing a roll chart cover.**

(1) Method of opening and shutting roll paper cover

●How to open a roll chart cover
Press Open/Close button for a roll chart cover

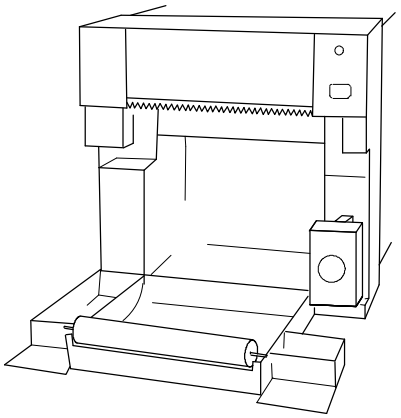


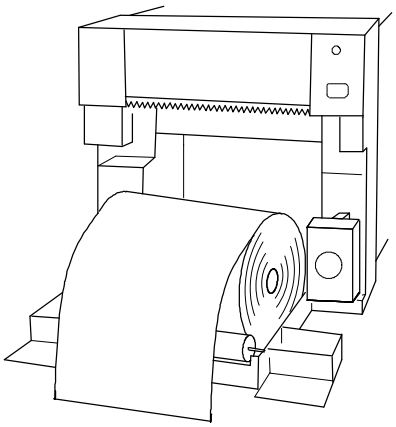
●How to close a roll chart cover
Press both side of a roll chart cover



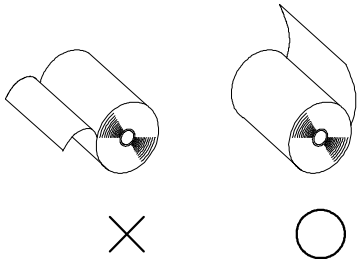
(2) Roll chart setup

Setup a roll chart in appropriate direction shown in the drawing below.
Draw a tip of chart paper outward, and close a roll chart cover.





Method of installing roll chart.

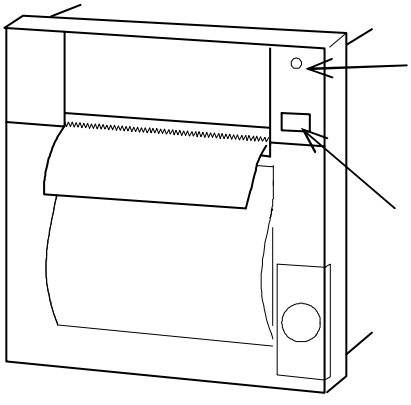


⚠ CAUTION

- **Do not bend roll chart inside. Paper might be jammed.**
- **Do not use first turn of a roll chart where is pasting part. No print is available in this part.**

(3) FEED Key

Press FEED key, and confirm POWER LED turns ON.

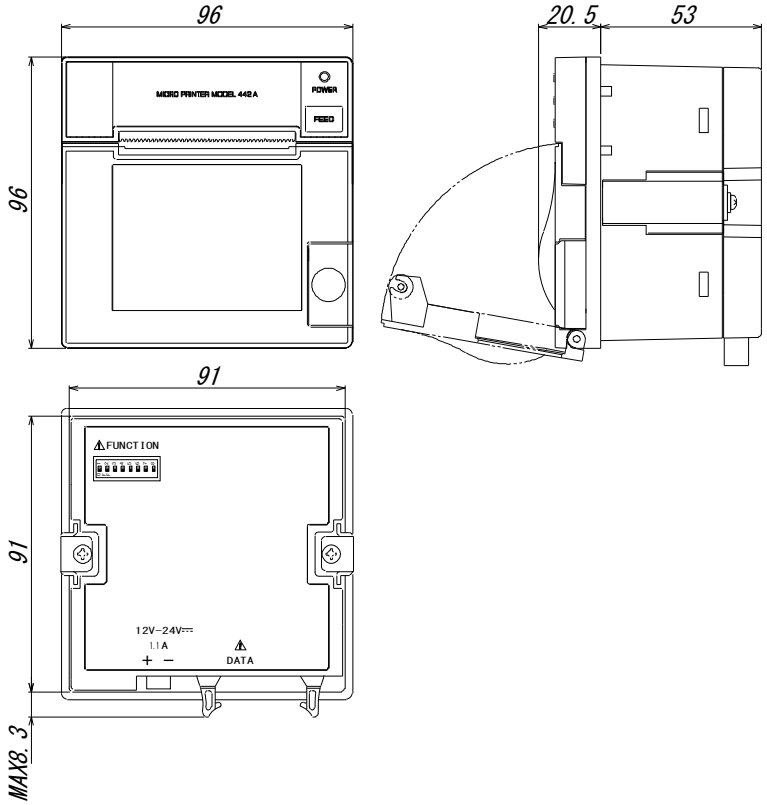


POWER LED
Confirm LED turns ON

Press FEED key

Note) Press FEED key, and confirm paper feed. In case a roll chart cover is not closed completely, paper feed might not be done, and be caused of printing error.

2.3 Dimensions



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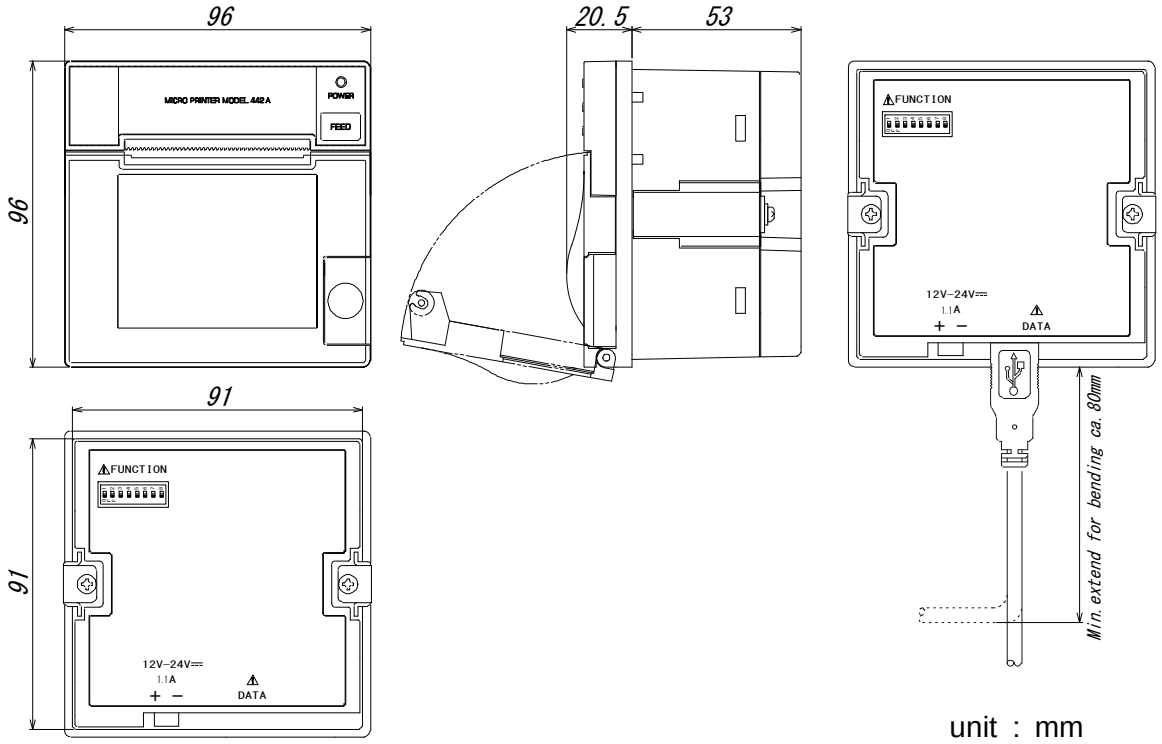
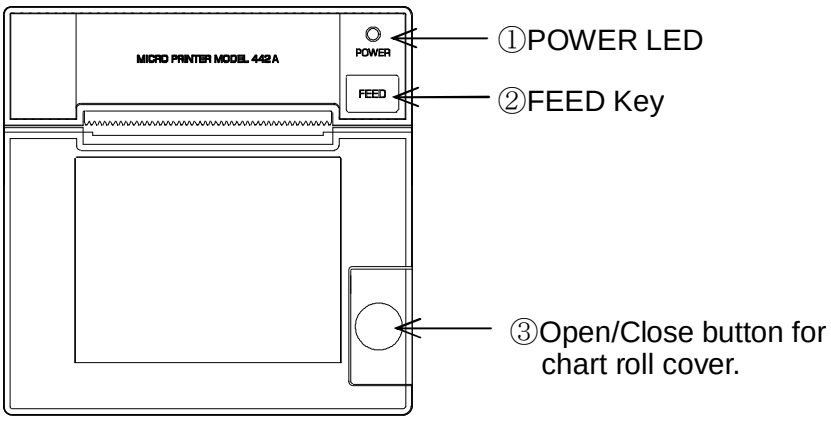


unit : mm

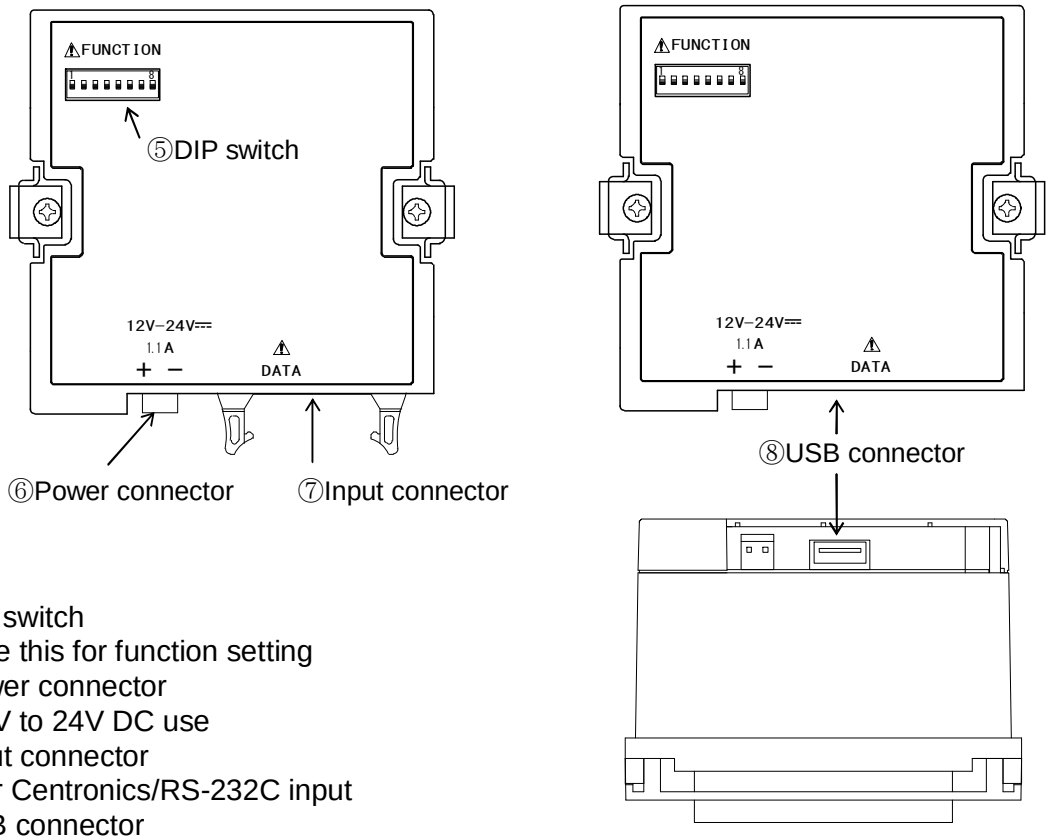
3. Description of parts

3.1 Front panel



① POWER LED
LED ON at powered. LED blinking at paper end and temperature error.
② FEED Key
One line feeding per one press. Continuous feeding by continuous pressing.
This Key is to setup a chart roll, as well.
③ Open/Close button for chart roll cover
Press this button to replace a chart roll.

3.2 Rear panel



⑤ DIP switch
Use this for function setting
⑥ Power connector
12V to 24V DC use
⑦ Input connector
For Centronics/RS-232C input
⑧ USB connector
For USB connection

4. Wiring

⚠ WARNNING

- **After turn Power Off, do wiring works. Otherwise, electric shock might be assumed.**
- **Don't do wiring works with wet hands or under high humid environment. Otherwise, electric shock might be assumed.**
- **Do not touch power terminals while powered. Otherwise, electric shock might be assumed.**

⚠ CAUSION

- **Do correct wiring. Wrong wiring might be caused of product damages.**
- **Use specified power and load in specification. Wrong power and load might be caused of product damage.**

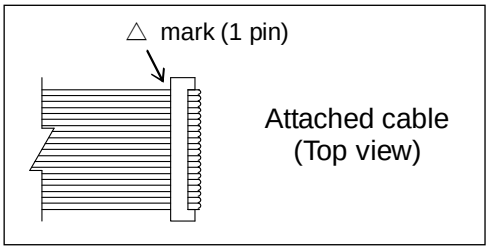
4.1 Connector arrangement

Connector: XG4A-2034(Omron)

Pin No.	Cable Color	Signal		Function	
				Parallel (Centronics)	Serial (RS-232C)
1	Brown	$\overline{\text{STROBE}}$	Input	Data input	
2	Red	DATA 0	Input	JIS8 Bit code input	－(Note)
3	Orange	DATA 1	Input		
4	Yellow	DATA 2	Input		
5	Green	DATA 3	Input		
6	Blue	DATA 4	Input		
7	Purple	DATA 5	Input		
8	Gray	DATA 6	Input		
9	White	DATA 7	Input		
10	Black	$\overline{\text{ACK}}$	Output	Data input complete	
11	Brown	BUSY	Output	Input data read error	
12	Red	PE	Output	Paper end	
13	Orange	$\overline{\text{ERR}}$	Output	Error	
14	Yellow	$\overline{\text{INIT}}$	Input	Initializing (valid at Lo for 10ms ≦)	
15	Green	COM		Data common	－
16	Blue	SG		－(Note)	Ground
17	Purple	SD	Output		Send
18	Gray	RD	Input		Receive
19	White	NC		No connection	
20	Black	NC		No connection	

Upper bar means Negative Logic.

Note) Do not connect at non use



442A-E2 (USB)

Connector USB 4P Type A

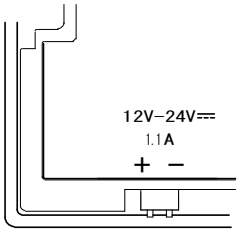
No.	Signal		Function
1	VBUS		No use
2	D -	Input, Output	USB data (-)
3	D +	Input, Output	USB data (+)
4	GND		Ground

4.1.1 Input/Output signals

DATA, $\overline{\text{STROBE}}$, $\overline{\text{INIT}}$	:	$I_{IL} \leqq$-1mA、"L"=0 to 1.5V、"H"=3.5 to 5V
$\overline{\text{ACK}}$, BUSY, $\overline{\text{ERR}}$, PE	:	TTL level (CMOS compatible), Fo=1
SD, RD	:	“L”= -5 to -15V. “H”= 5 to 15V

4.2 DC power supply

Connector: VHR-2N (J.S.T. Mfg Co.,Ltd.)



Power supply specification is described on terminal plate.
Supply power within 10.8 to 26.4V d.c. (12 to 24V d.c. rated)
Connect + to + side, and – to – side.

CAUSION

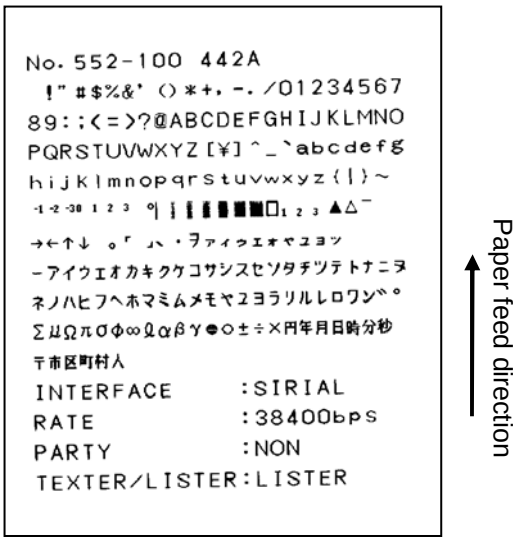
- **No isolated between DC power and Input.**
- **Supply power specified. Wrong power might damage the product.**
- **Get rated power within 1 sec. after supply power.**
- **Wait 10 sec. or more before re supply power.**

5. Function and Setting

5.1 Test printing

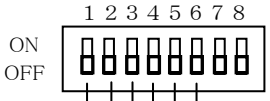
Pressing the FEED key, power on the printer. The printer will then start a print of test pattern and makes an incremental print. After finishing the print of test pattern, the printer returns to normal status. Test printing prints “test pattern” and “setting status”.

Test printing sample



5.2 Operation function setting
5.2.1 Interface, Printing direction setting

Use DIP switch at bottom.
Switch while power off.



6	Upright printing/Inverted printing
OFF	Upright printing (at delivery)
ON	Inverted printing

4	5	Parity	RS-232C/USB
OFF	OFF	None (at delivery)	
ON	OFF	Even	
OFF	ON	Odd	
ON	ON	None	

2	3	Transmission speed	RS-232C/USB
OFF	OFF	4800 bps (at delivery)	
ON	OFF	9600 bps	
OFF	ON	19200 bps	
ON	ON	38400 bps	

1	Input interface	- Invalid at E2
OFF	Conform to centronics (at delivery)	
ON	RS-232C	

● Parallel (Conform to centronics) setting

DIP switch								
1	2	3	4	5	6	7	8	
—	—	—	—	—	—	—	—	At delivery

○: ON, —: OFF

● Serial (RS-232C) setting

		DIP switch							
Speed	Parity	1[Note]	2	3	4	5	6	7	8
4800bps	None	○	—	—	—	—	—	—	—
	Even	○	—	—	○	—	—	—	—
	Odd	○	—	—	—	○	—	—	—
9600bps	None	○	○	—	—	—	—	—	—
	Even	○	○	—	○	—	—	—	—
	Odd	○	○	—	—	○	—	—	—
19200bps	None	○	—	○	—	—	—	—	—
	Even	○	—	○	○	—	—	—	—
	Odd	○	—	○	—	○	—	—	—
38400bps	None	○	○	○	—	—	—	—	—
	Even	○	○	○	○	—	—	—	—
	Odd	○	○	○	—	○	—	—	—

○: ON, —: OFF Note) DIP switch 1 invalid at 442A-E2.

● Upright printing/Inverted printing setting

	DIP switch		
		6	
Upright printing		—	At delivery
Inverted printing		○	

○: ON, —: OFF

5.3 Error

5.3.1 Paper end detection

Paper end detection sensor incorporated to detect paper end.
In the case of paper end, PE output (“H”) is provided and no print available.
POWER LED is blinking.

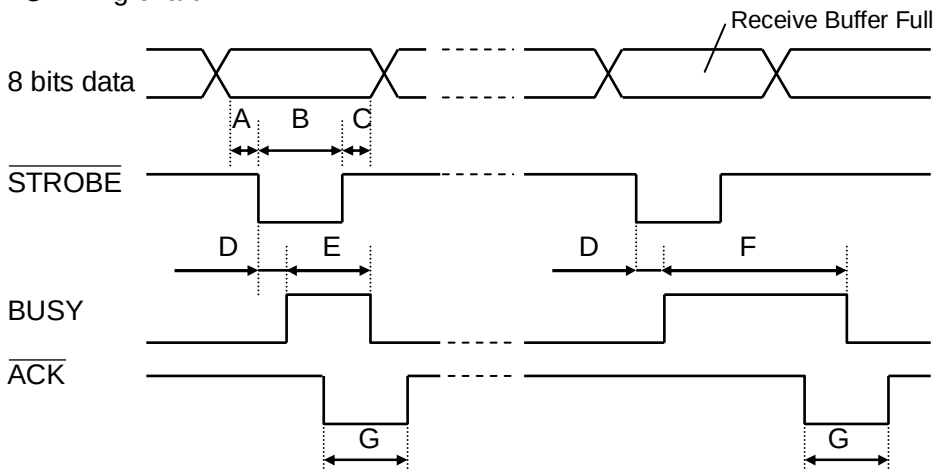
5.3.2 Temperature error detection

When the temperature of printer head becomes approx. 80℃ or higher, ERR output (“L”) is provided and no printing available.
Once ERR output is provided, ERR output dose not turn OFF till the temperature fall to approx.60℃ or lower. POWER LED is blinking.

5.4 Interface

5.4.1 Parallel (Conform to centronics)

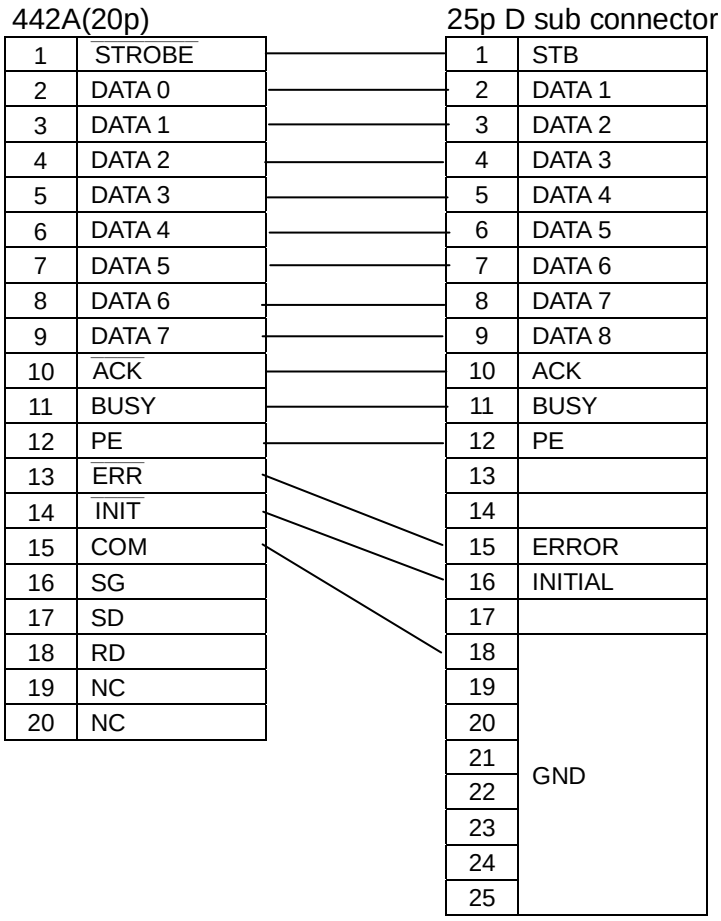
●Timing chart



A: Min. 0.5 μs
B: Min. 0.5 μs
C: Min. 0.5 μs
D: Max. 0.5 μs
E: Max. 25 μs
F: Max. 4.6 s (Note)
G: Min. 0.5 μs

Note) Time to release Receive Buffer Full (except PE, ERR, and chart paper cover open) at starting new line of Max.28 byte data.

●Connection



442A(20p)		25p D sub connector	
1	STROBE	1	STB
2	DATA 0	2	DATA 1
3	DATA 1	3	DATA 2
4	DATA 2	4	DATA 3
5	DATA 3	5	DATA 4
6	DATA 4	6	DATA 5
7	DATA 5	7	DATA 6
8	DATA 6	8	DATA 7
9	DATA 7	9	DATA 8
10	ACK	10	ACK
11	BUSY	11	BUSY
12	PE	12	PE
13	ERR	13	
14	INIT	14	
15	COM	15	ERROR
16	SG	16	INITIAL
17	SD	17	
18	RD	18	GND
19	NC	19	
20	NC	20	
		21	
		22	
		23	
		24	
		25	

5.4.2 Serial (RS-232C/442A-E2 [USB])

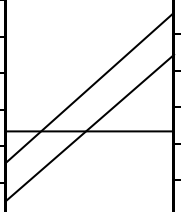
●Specification

Transmission speed: 4800,9600,19200,38400 bps (Set by DIP switch at bottom)
Data length: 8 bits
Parity: None, Even, Odd (Set by DIP switch at rear)
Stop bit: 1 bit
Data: Conform to JIS 8
Error detection: Parity
X parameter: Xon<11H> / Xoff<13H> Control
When the data stored in the input buffer of printer is 2048 bytes or more, the printer sends Xoff command to a host. When the host receives Xoff command, the host stop to send the data.
When the data stored in the input buffer of printer is 2020 bytes or less,the printer sends Xon command to a host. When the host receives Xon command, the host resend the remained data.

●RS-232C Connection

442A(20p)

1	$\overline{\text{STROBE}}$
2	DATA 0
3	DATA 1
4	DATA 2
5	DATA 3
6	DATA 4
7	DATA 5
8	DATA 6
9	DATA 7
10	$\overline{\text{ACK}}$
11	BUSY
12	PE
13	$\overline{\text{ERR}}$
14	$\overline{\text{INIT}}$
15	COM
16	SG
17	SD
18	RD
19	NC
20	NC



D Sub connector of PC

9p	25p	
1		
2	3	RD
3	2	SD
4		
5	7	SG
6		
7		
8		
9		

●442A-E2 (USB)

Conform to USB1.1
PC/AT compatible PC incorporate Windows2000, XP
(CD-ROM drive for software installation is required.)
USB driver meets to Windows2000, XP.
Windows driver for PC is out of supply.

Note) Windows is a registered trademark of Microsoft, US.
Refer to incorporated CD-ROM in detail.

5.4.3 Control command

	Command	Description	Code	Function
1	LF	Printing, Feeding	0AH	Printing data in the line buffer, and starting a new line. No data in the line buffer is found, starting a new line only. 30 dots fixed for new lines. LF after CR is neglected.
2	CR	Printing, Feeding	0DH	Printing data in the line buffer, and starting a new line. No data in the line buffer is found, starting a new line only. 30 dots fixed for new lines.
3	SO	Specifying Double-size enlarged printing.	0EH	Specify characters required double-size enlarged printing. After specify the characters, the characters is printed in double-size.
4	SI	Resetting Double-size enlarged printing.	0FH	Reset double-size enlarged printing.
5	CAN	Printer buffer cancellation.	18H	Cancel data in the line buffer. Cancel the data just before entered in the same line. When the command is done, the position becomes a start line to print. The control command is not deleted.
6	DEL	Deleting a character.	7FH	Deleting a character. Deleting a character of the receiving buffer just before entered in the same line. The control command is not deleted.
7	FS+'&' ESC+'$'+'B' ESC+'K'	Specifying Chinese characters.	1CH+26H 1BH+24H+42H 1BH+4BH	Specify Chinese character mode. The characters are entered in turn (first bit, then second bit…) according to the code in JIS6226-1983. Chinese character code system: JIS code (Shift JIS code is not available.)
8	FS+'.' ESC+'('+'B' ESC+'H'	Cancellation of Chinese characters.	1CH+2EH 1BH+28H+42H 1BH+48H	Cancellation of Chinese character mode.
9	DC2+'E'	Error status.	12H+45H	Responding Error status. This command is available only in serial interface, 442A-E2(USB). The error status to be sent is one byte, and contents is as follows; No paper: 1 (code 31H) Unusual temperature in a head: 2 (code 32H) Receiving buffer full: 8 (code 38H)

Example) 442A

Printed example

Code

34 34 32 41 0D ⇒ ⇒ ⇒ ⇒ ⇒ Normal ⇒ ⇒ ⇒ 442A

0E 34 34 32 41 0F 0D ⇒ ⇒ ⇒ ⇒ Double-sized ⇒ ⇒ 442A

1B 24 42 23 34 23 34 23 32 23 41 1B 28 42 0D ⇒ Chinese character mode ⇒ 442A

5.4.4 Character codes

■ Character

Low order bit \ High order bit	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			SP	0	@	P	`	p	$^{-1}$	$_{1}$	SP	ー	タ	ミ	Σ	×
1			!	1	A	Q	a	q	$^{-2}$	$_{2}$	。	ア	チ	ム	μ	円
2		DC2	”	2	B	R	b	r	$^{-3}$	$_{3}$	「	イ	ツ	メ	Ω	年
3			#	3	C	S	c	s	^{0}	▲	」	ウ	テ	モ	π	月
4			$	4	D	T	d	t	^{1}	△	、	エ	ト	ヤ	σ	日
5			%	5	E	U	e	u	^{2}	ー	・	オ	ナ	ユ	φ	時
6			&	6	F	V	f	v	^{3}		ヲ	カ	ニ	ヨ	∞	分
7			’	7	G	W	g	w	°		ァ	キ	ヌ	ラ	ℓ	秒
8		CAN	（	8	H	X	h	x	▏		ィ	ク	ネ	リ	α	〒
9			）	9	I	Y	i	y	▌		ゥ	ケ	ノ	ル	β	市
A	LF		*	:	J	Z	j	z	▌		ェ	コ	ハ	レ	γ	区
B		ESC	＋	;	K	［	k	{	▉		ォ	サ	ヒ	ロ		町
C		FS	,	＜	L	¥	l	｜	▉	→	ャ	シ	フ	ワ	●	村
D	CR		ー	＝	M	］	m	}	▉	←	ュ	ス	ヘ	ン	○	人
E	SO		.	＞	N	^	n	～	■	↑	ョ	セ	ホ	゛	±	
F	SI		／	?	O	＿	o	DEL	□	↓	ッ	ソ	マ	゜	÷	

Note)Character style may be different from the ones in the table above due to printing condition.
CAN, CR, DEL, ESC, LF, SO, SI, FS, DC2 represent Control Codes.
SP represents Space.

6. Specification

6.1 Model

442A – □
1
└——— Input Interface

[1] Interface

No.	Input Interface	
None	Conform to Centronics / RS-232C	Note
E2	USB	

Note) Selectable via DIP sw at back side

6.2 Performance

Power supply:	12V d.c., 24V d.c.
Power range:	10.8 to 26.4 V d.c.
Power consumption:	Approx. 1A (Max.) / approx. 50mA (at waiting) at 12V d.c.
	Approx.0.5A (Max.) / approx. 30mA (at waiting) at 24V d.c.
Operating temperature:	0 to 50 ℃
Storage temperature:	-20 to 60 ℃
Weight:	Approx. 300g
Installation:	Panel mounting

6.3 General

Dielectric strength: Input/Output/Power – Case 1500V a.c. for 1min.
Insulation resistance: Input/Output/Power – Case 500V d.c., 50MΩ or more.

6.4 Printer

Print style	Thermal line dot	
Character	Alphabet, Numbers, Katakana, Symbols, etc.	JIS 1st std.non-Chinese character, 2nd and 3rd std.
Dot	16x16 (2mmx2mm)	24x24 (3mmx3mm)
Digit	24 digits, Max.	16 digits, Max.
Printing speed	Approx. 22.5mm/sec, 6 lines/sec., Max. Note) Printing rate 16% or less.	
Paper feeding	3.75mm pitch	
Receiving buffer	2048 bytes	
Printing width	46mm	
Life time	At 25 ℃ Head: 10^9 pulse or more (pulse resistance) 50km or longer except damage by foreign particle, alien substance. (abrasion resistance)	

6.5 Chart paper

Paper: 58mm width x 48 ϕ (inside diameter 12 ϕ)
Length 25m (approx. 6500 lines printable)
Use specified chart paper, otherwise printing quality and products lifetime will be out of warrantee.

Sold separately
5860-01 Chart paper (10 rolls)

Contact Information
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