MODEL 442B

Micro Printer

Users Manual

TSURUGA ELECTRIC CORPORATION

I-01805-1

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.
- This product uses lithium batteries.
  Following regulations shall be preserved when using in California state, USA.

  ◆Regulations for perchlorate in used batteries◆
  About California DTSC's perchlorate best management practices.

  Perchlorate Material – special handling may apply,See
  http://www.dtsc.ca.gov/hazardouswaste/perchlorate.

Please confirm each product incorporates the following accessories.
(1) 442B Main body (2) Connector with 2m flat cable/without no connector on top
(3) Chart paper (one roll) (4) Users 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.**

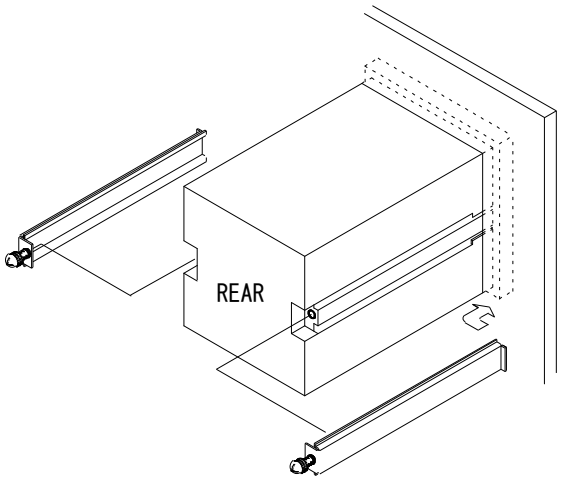
⚠ CAUTION

- **Described specification in this manual is the one 15 min. or longer passed after power supply.**
- **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 directs 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 sides from back.

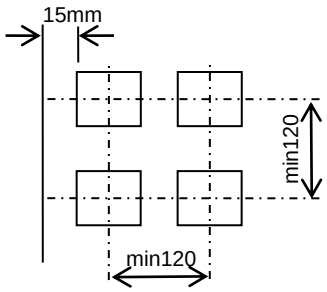


Panel cutout : 92 $^{+0.8}_{0}$ × 92 $^{+0.8}_{0}$ mm

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.

⚠ 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

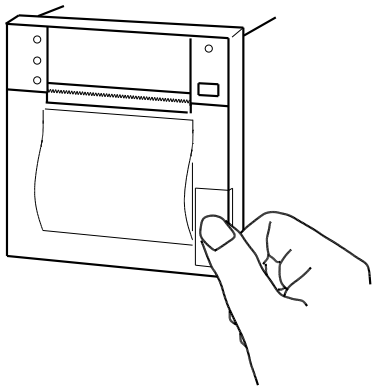
- **Do not touch thermal head and it's around after printing, where high temperature is supposed.**
- **Replace roll chart or clean head after the temperature of head falls.**

⚠ CAUTION

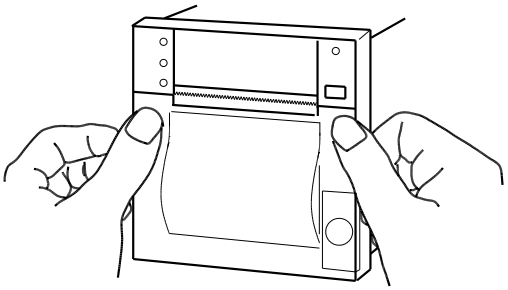
- **Do not insert fingers or alien substances into printer. Printer cutter might injure fingers etc.**
- **Do not open a roll chart cover by pressing Open/Close button while printing.**
- **Do not press Open/Close button while holding a roll chart cover down.**
- **Do not pull up roll paper while closing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

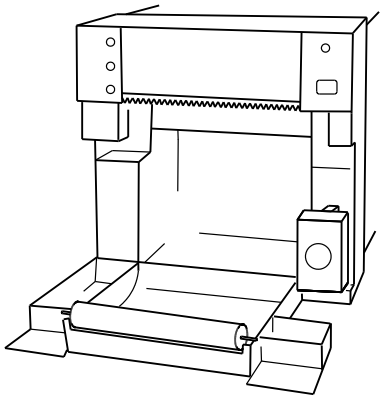


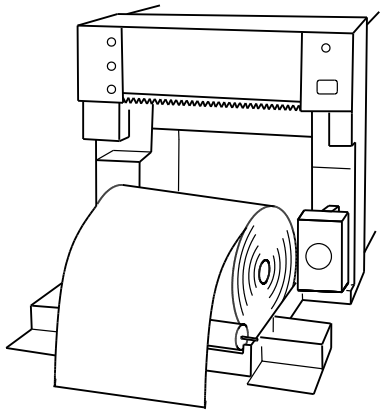
●How to close a roll chart cover
Press both side of a roll chart cover.



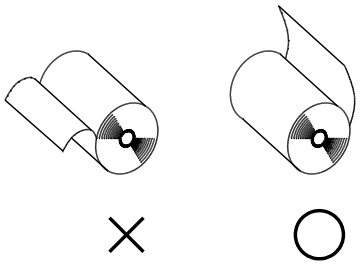
(2) Roll chart setup

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.

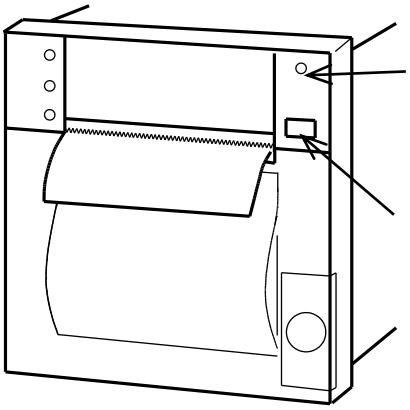


⚠ CAUTION

- **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.

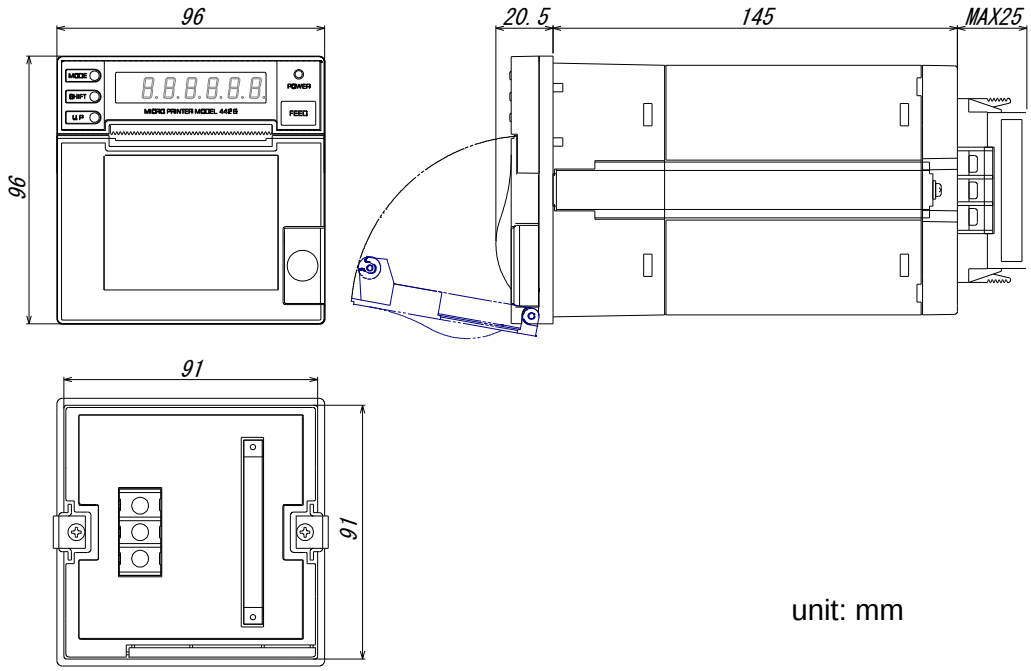


POWER LED
Confirm LED turns ON

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.

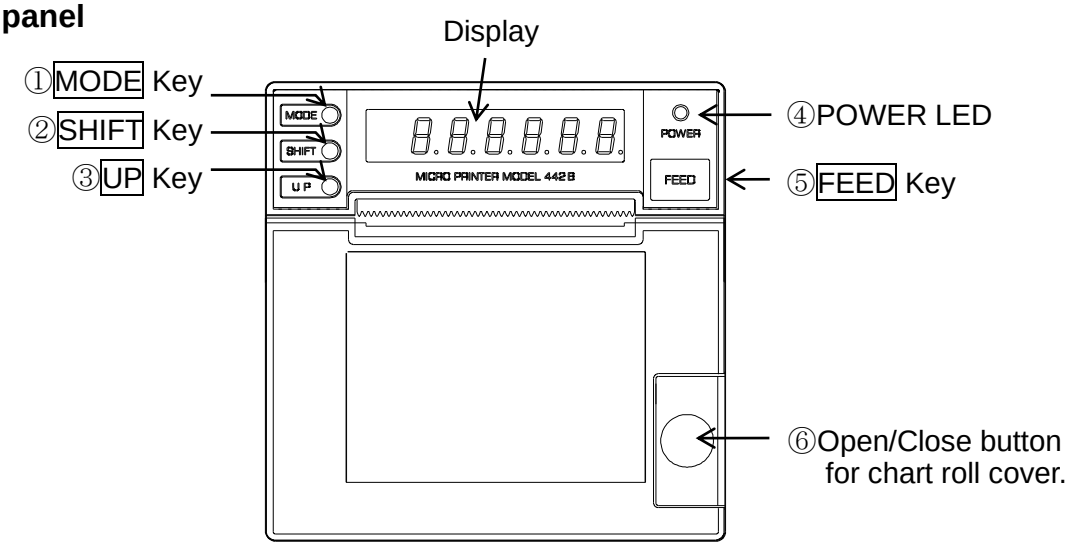
2.3 Dimensions



unit: mm

3. Description of parts

3.1 Front panel



① MODE Key
Switching Setting Mode during operation.
Switching each mode at Setting Mode.

② SHIFT Key
Digit selection for Set Value at Setting Mode.

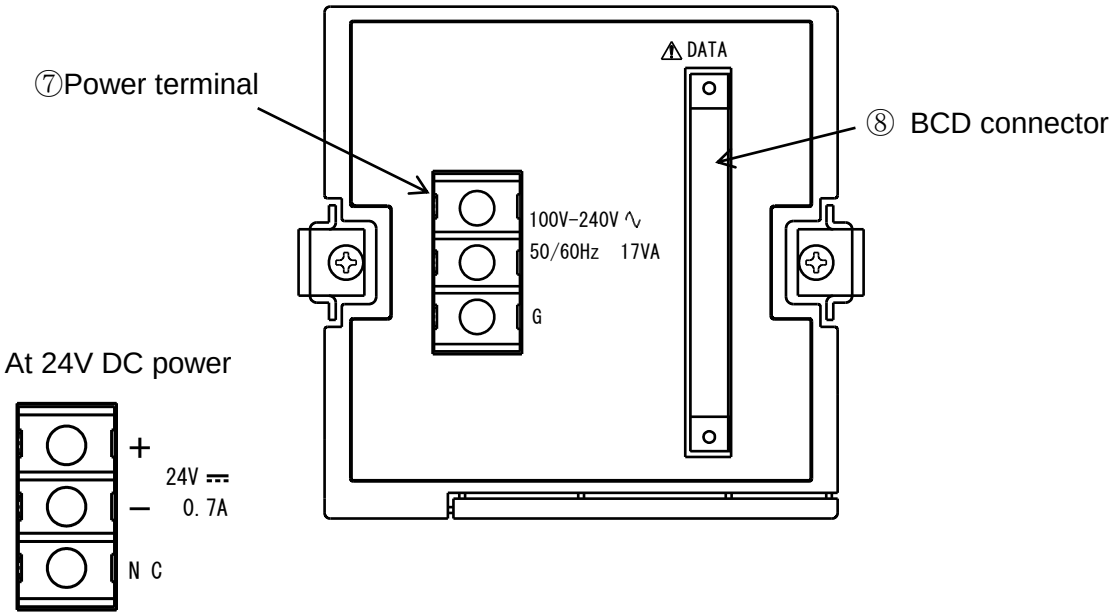
③ UP Key
Set Value change at Setting Mode.

④ POWER LED
LED ON at powered. LED blinking at paper end and temperature error.

⑤ FEED Key
One line feeding per one press. Continuous feeding by continuous pressing.
This Key is to setup a chart roll, as well.

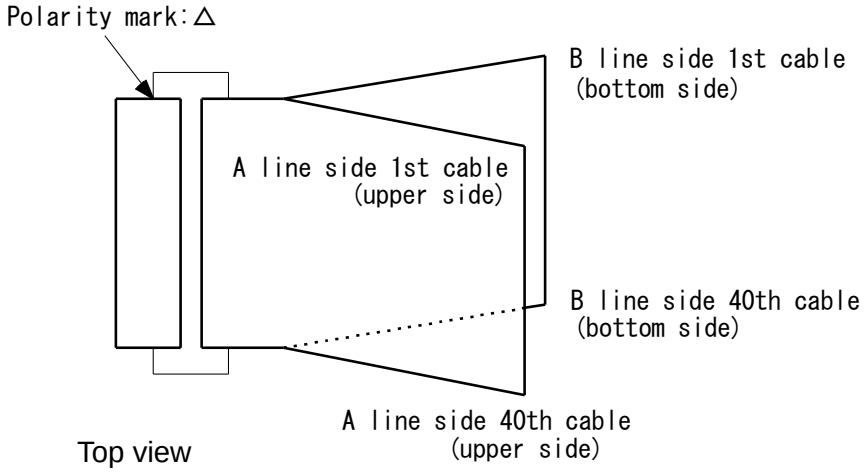
⑥ Open/Close button for chart roll cover
Press this button to replace a chart roll.

3.2 Rear panel



⑦ Power terminal
For power supply
⑧ BCD connector
40 pins connector each for A and B line.
Input is TTL level, and output Transistor.

2 x flat cables (2m, 40 cores) are connected to the connector.
Each is connected to A or B line cable.



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.**

⚠ CAUTION

- **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.**

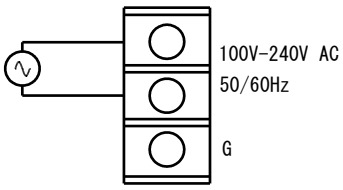
4.1 Power supply terminals

4.1.1 Terminals

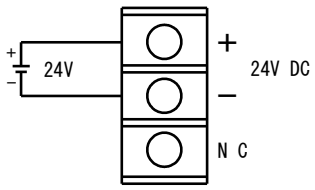
Remove a terminal cover of power supply on the rear side of the product, and do wiring. After wiring is completed, sure to reinstall the cover.

● Power terminal arrangement

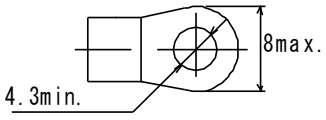
A.C. power



D.C. power



Terminal screws : M4
Tightening Torque : 0.82 to 1.11N・m
Crimping terminal : see drawing (right)



● Power supply

Power supply specification is described on nameplate of the product.

○ AC power… allowable range 90 to 250V AC. (-A: 100V/200V AC rated)

○ DC power… allowable range 21.6 to 26.4V DC. (-9: 24V DC rated)

Connect + side of DC power to + terminal, and –side to – terminal.

G, NC has no function.

⚠ CAUTION

- **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.**

4.2 Connecter

●Pin arrangement

Function		A line	B line	Function	
DATA 10^0	1	1	1	1	DATA 10^1
	2	2	2	2	
	4	3	3	4	
	8	4	4	8	
DATA 10^2	1	5	5	1	DATA 10^3
	2	6	6	2	
	4	7	7	4	
	8	8	8	8	
DATA 10^4	1	9	9	1	DATA 10^5
	2	10	10	2	
	4	11	11	4	
	8	12	12	8	
DATA 10^6	1	13	13	1	DATA 10^7
	2	14	14	2	
	4	15	15	4	
	8	16	16	8	
UNIT 0		17	17	POL	
UNIT 1		18	18	$\overline{\text{DP1}}$	
UNIT 2		19	19	$\overline{\text{DP2}}$	
UNIT 3		20	20	$\overline{\text{DP3}}$	
UNIT 4		21	21	$\overline{\text{DP4}}$	
UNIT 5		22	22	$\overline{\text{DP5}}$	
UNIT 6		23	23	$\overline{\text{DP6}}$	
UNIT 7		24	24	$\overline{\text{DP7}}$	
CH No.10^0	1	25	25	1	CH No.10^1
	2	26	26	2	
	4	27	27	4	
	8	28	28	8	
MSG 1		29	29	-	
MSG 2		30	30		
MSG 4		31	31	P/$\overline{\text{N}}$	
MSG 8		32	32	$\overline{\text{SYNC}}$	
COM		33	33	COM	
-		34	34	-	
$\overline{\text{PRINT}}$		35	35	$\overline{\text{TIME}}$	
$\overline{\text{FEED}}$		36	36	$\overline{\text{RESET}}$	
COM		37	37	COM	
BUSY		38	38	-	
PE		39	39		
COM		40	40	COM	

Note) Do not connect to N/C pins.
The upper bar means negative logic.

●Input/Output signal

Data input: DATA, UNIT, POL, $\overline{DP}$, CH No., and MSG

I_{IL} ≦ -1mA, "L"= 0 to 1.5V, "H"=3.5 to 5V

DATA: 8 digits BCD input
At positive logic input: L level = "0", H level = "1"
At negative logic input: L level = "1", H level = "0"

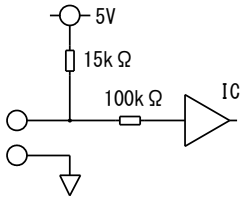
POL: BCD data polarity input
At positive logic input: L level = "-", H level = "+"
At negative logic input: L level = "+", H level = "-"

Unit: Unit code input
At positive input: L level = "0", H level = "1"
At negative input: L level = "1", H level = "0"

MSG: Message input
At positive input: L level = "0", H level = "1"
At negative input: L level = "1", H level = "0"

CH No.: CH No. input
At positive input: L level = "0", H level = "1"
At negative input: L level = "1", H level = "0"

$\overline{DP}$: Decimal input
Connect COM terminal for setting.
Printing an upper digit decimal only when multiple setting.



Control input: $\overline{P/N}$, $\overline{SYNC}$, $\overline{PRINT}$, $\overline{FEED}$, $\overline{TIME}$, and $\overline{RESET}$

I_{IL}≦ -1mA, "L"= 0 to 1.5V, "H"=3.5 to 5V Active "L"

$\overline{P/N}$: Logic switching input
Logic setting for DATA, UNIT, POL, CH, MSG.
Positive logic input at H level.
Negative logic input at L level.

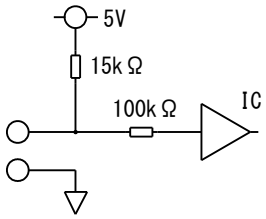
$\overline{SYNC}$: Synchronized signal input
Acquire data at rising of SYNC signal.
No acquirement of data at L level.
Minimum pulse width 2 msec.

$\overline{RESET}$: Reset signal input (L level detection)
Release Interval operation, Index No..
Return Synchronized signal error. Minimum pulse width 2 ms.

$\overline{FEED}$: Paper feed signal (L level detection)
Minimum pulse width 2ms

$\overline{PRINT}$: Data print command (L edge detection)
Minimum pulse width 10ms

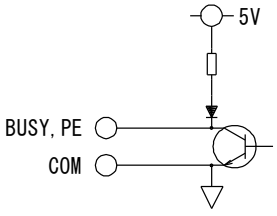
$\overline{TIME}$: Index No., Calendar clock, Elapsed time command (L edge detection)
Accept at Interval operation OFF.
Minimum pulse width 10ms.



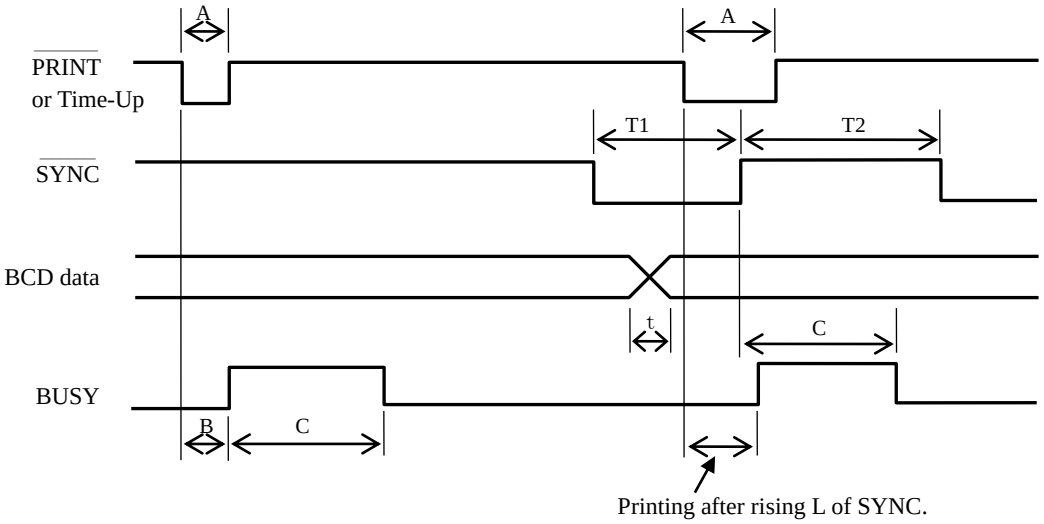
Control output: BUSY, PE
TTL level, Fo=1
Transistor output
Rated output: 30V DC, 30mA Max.

PE: Paper end output
OFF at paper end (H level)

BUSY: Signal output at printing
OFF at printing, paper end, synchronized signal error, roll chart cover opened (H level)



● Timing chart



A: Min. 10ms
B: Max. 5ms Input time of data.
C: Max. 200ms
Note) In the case of blank line setting, approx.150ms blank line is added.
The time is changed up to printing rate.
T1: 2ms to 1 sec. Note) Synchronized signal error at t < T1 and 1 sec. or longer.
T2: Min. 5ms (SYNC H level holding time)

5. Function and setting

5.1 Summary of function

Code No.	Function	Display	Description	Factory set
01	Display setting	dI SP	0: Hours/Minutes/Second, 1: OFF	0
02	Clock setting	H.M.S	Hours/Minutes	Note 1)
03	Date setting	Y.M.d	Tear/Month/Date	Note 1)
04	Index No., Calendar clock, Elapsed time printing	Pr I nF	0: No printing 1: Index No. 2: Hours/Minutes/Second 3: Year/Month/Date 4: Year/Month/Date, Hours/Minute/Second 5: Elapsed time Note2) 6: Index No., Hours/Minute/Second 7: No printing	0
05	Printing direction	dI r.	0: Upright, 1: Inverted	0
06	CH No. printing	CH	0: No printing, 1: Printing	0
07	BCD digit setting	bCd	1 to 8	8
08	BCD A to F setting	A.bCd	0: ASCII code, 1: Space	0
09	POL logic switching	PoL	0: Positive, 1: Negative	0
10	Interval operation	nI nF	0: OFF, 1: ON	0
11	Interval time	rI nF	00 hr. 00 min. 01 sec. to 99 hr. 59 min. 59 sec.	00 hr. 00 min. 01 sec.
12	Blank line printing	bLAnK	0 to 9	0
13	Unit setting	Unl t	No. Character code Note3) 0.20 to FD 1.20 to FD 2.20 to FD 3.20 to FD 4.20 to FD 5.20 to FD	No. Character code 0.20 1.20 2.20 3.20 4.20 5.20
14	Message setting	MSG.	No. Character code Note3) 0.20 to FD 1.20 to FD 2.20 to FD 3.20 to FD	No. Character code 0.20 1.20 2.20 3.20

Note1) Calendar clock is set at delivery.
Note2) Valid at Interval operation ON.
Note3) See 6.2.4 character code.

5.2 Explanation of function

Code No.01: Display setting
Switching Hour/Minute/Second display and OFF display.

Code No.02: Time setting
Adjusting Hour of calendar clock.
24 hour (0 to 23) adjustable.
Second unit setting is unavailable. (00 sec. only)

Code No.03: Date setting
Adjusting Year/Month/Date of calendar clock.
Setting the last two digits of AD (00 to 99)

Code No.04: Index No., Calendar clock, Elapsed time printing
Setting Index No., Calendar clock, Elapsed time printing.
Index No., Elapsed time memorized even if changing code No.10:
With/Without Interval operation.
Index No. : Count 0001 to 9999
After 9999, start counting from 0001.
Back to 0001 after supplying power or $\overline{\text{RESET}}$ signal.
Count-up
When the interval action is enabling (ON), count-up will be done at each interval time.
When it is disabling (OFF), count-up will be done by inputting the PRINT signal.
To print, input the TIME signal.
Counter-up dose not work at paper end.
Elapsed time: 00 hour 00 minute 00 second to 99 hour 59 minute 59 second
After 99 hour 59 minute 59 second, back to 00 hour 00 minute 00 second.
Back to 00 hour 00 minute 00 second after supplying power or $\overline{\text{RESET}}$ signal.
Elapsed time works even if paper end.
Valid at Interval operation ON.

Code No.05: Printing direction
Setting Upright or Inverted printing.

Code No.06: CH No. printing
Setting With/Without CH No. printing.

Code No.07: BCD digit setting
Setting BCD digits (1 to 8).
Digit not to be set prints SP (space) regardless of DATA input, DP input.

Code No.08: BCD A-F setting

Switching to SP (space) printing at BCD data input A to F code.

◆BCD data and printing

BCD		BCD number setting	
8421	HEX	0	1
0000	0	0	
0001	1	1	
0010	2	2	
0011	3	3	
0100	4	4	
0101	5	5	
0110	6	6	
0111	7	7	
1000	8	8	
1001	9	9	
1010	A	:	SP
1011	B	;	
1100	C	<	
1101	D	=	
1110	E	>	
1111	F	?	

Printing example at positive logic of BCD data.

Code No.09: POL logic switching

Switching POL logic.

Code No.10: Interval operation

Setting ON/OFF for Interval operation.

Code No.11: Interval time

Setting interval time.

Code No.12: Blank line printing

Setting Blank line (0 to 9)

No blank line is inserted at 0.

4 blank lines are fixed at the following condition.

At Interval time operation ON, Interval time 00:00:01, 4 or more blank lines

At Interval time operation ON, use $\overline{\text{PRINT}}$ signal input.

Code No.13: Unit setting

Register free Unit characters. (6 characters) (See 6.2.4 character code)

Registered Unit, when UNIT0 to 7 signal is being 11111111, is printed.

Code No.14: Message setting

Register free Message characters. (4 characters) (See 6.2.4 character code)

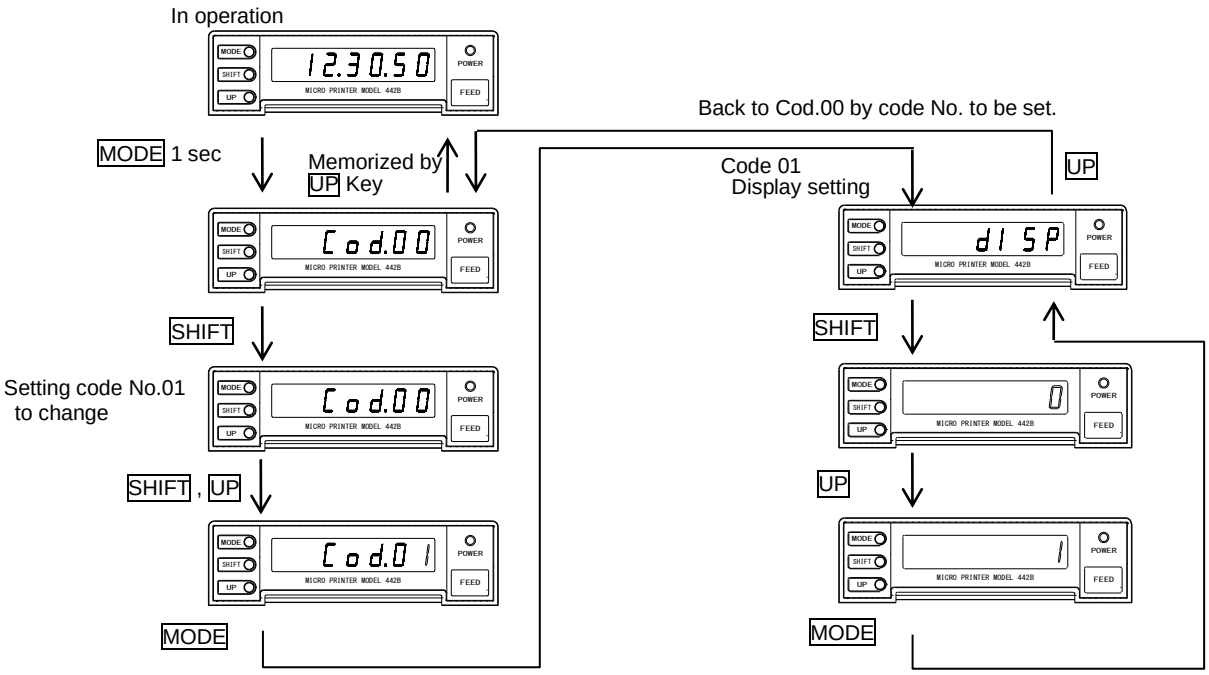
Registered Message, when MSG1,2,4,8 signal is being 1111, is printed.

5.3 Setting

5.3.1 Display

Example) Set Hour/Minute/Second display to OFF.

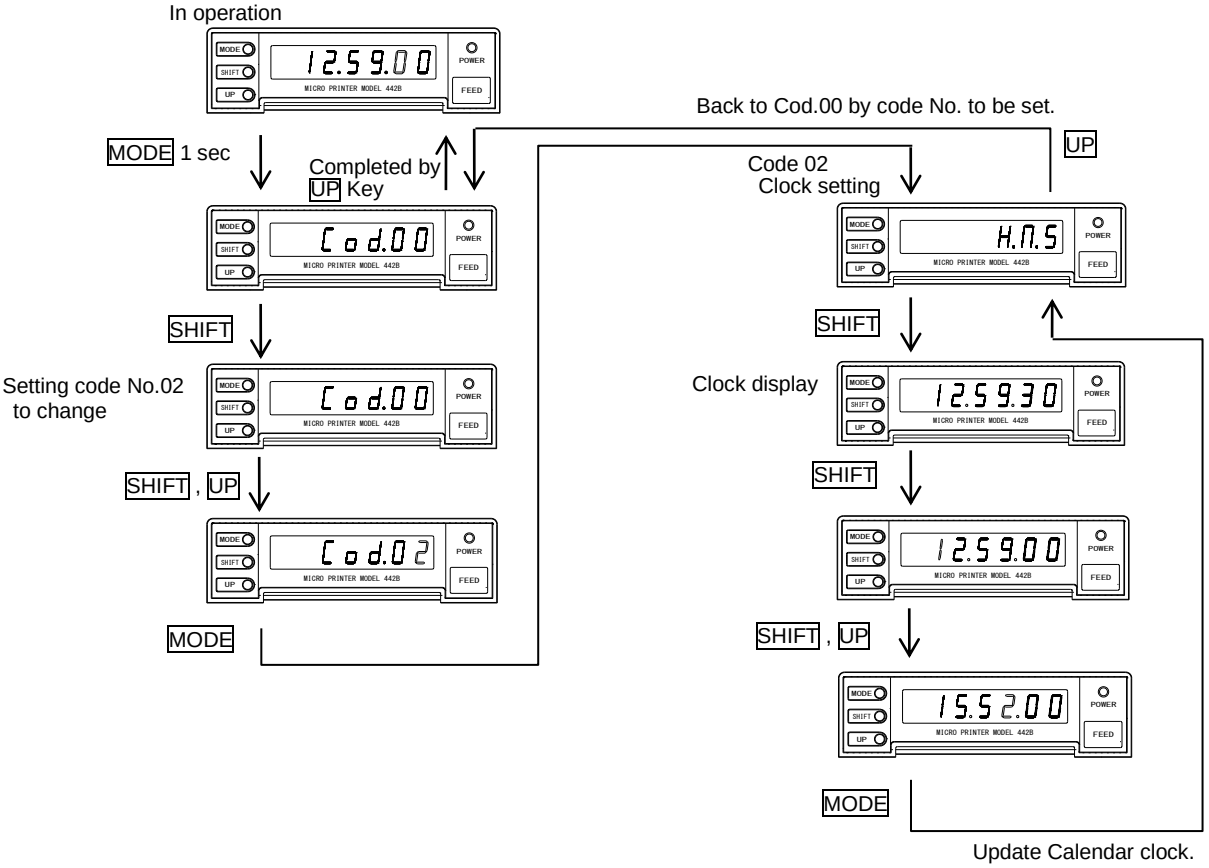
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.2 Clock

Example) Adjusting clock 12. 59. 30 to 15. 52. 00.

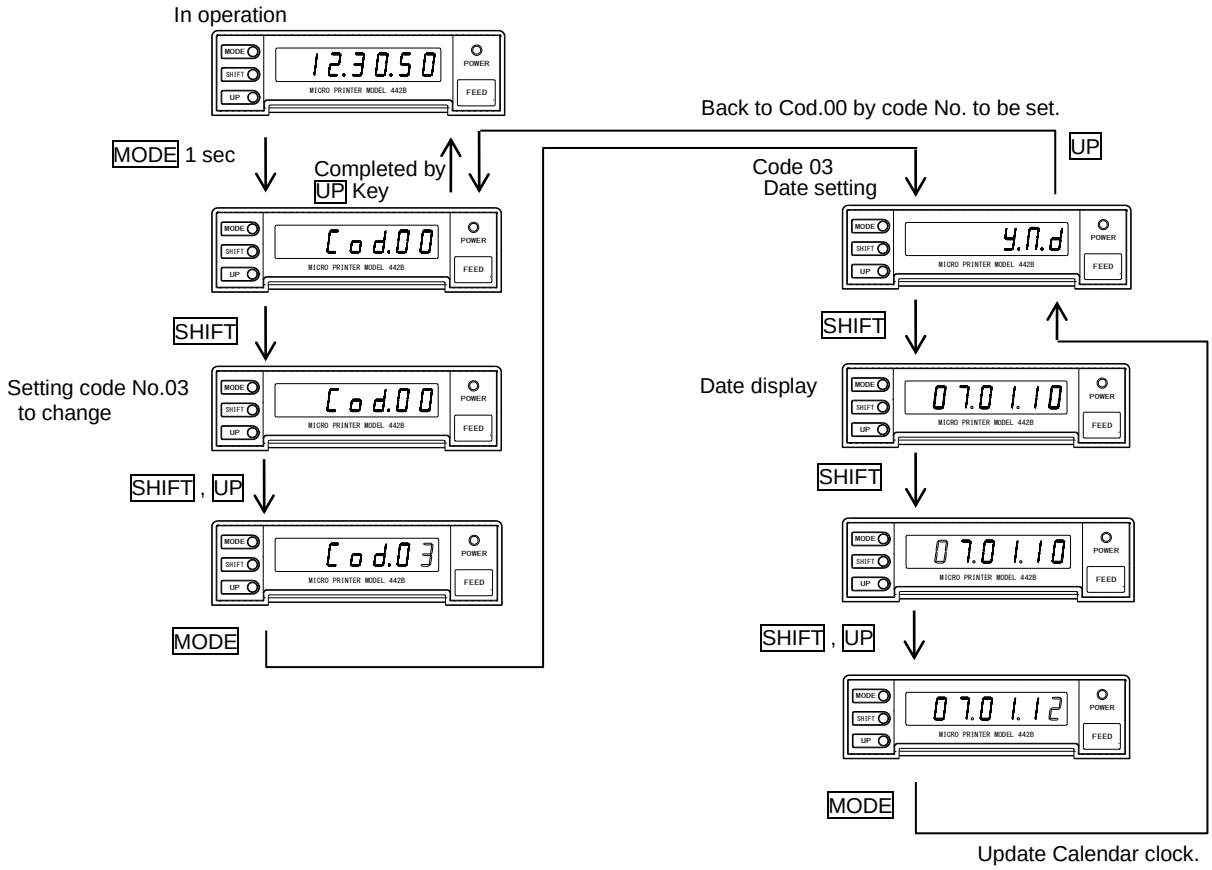
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.3 Date

Example) Adjusting date 07. 01. 10 to 07. 01. 12.

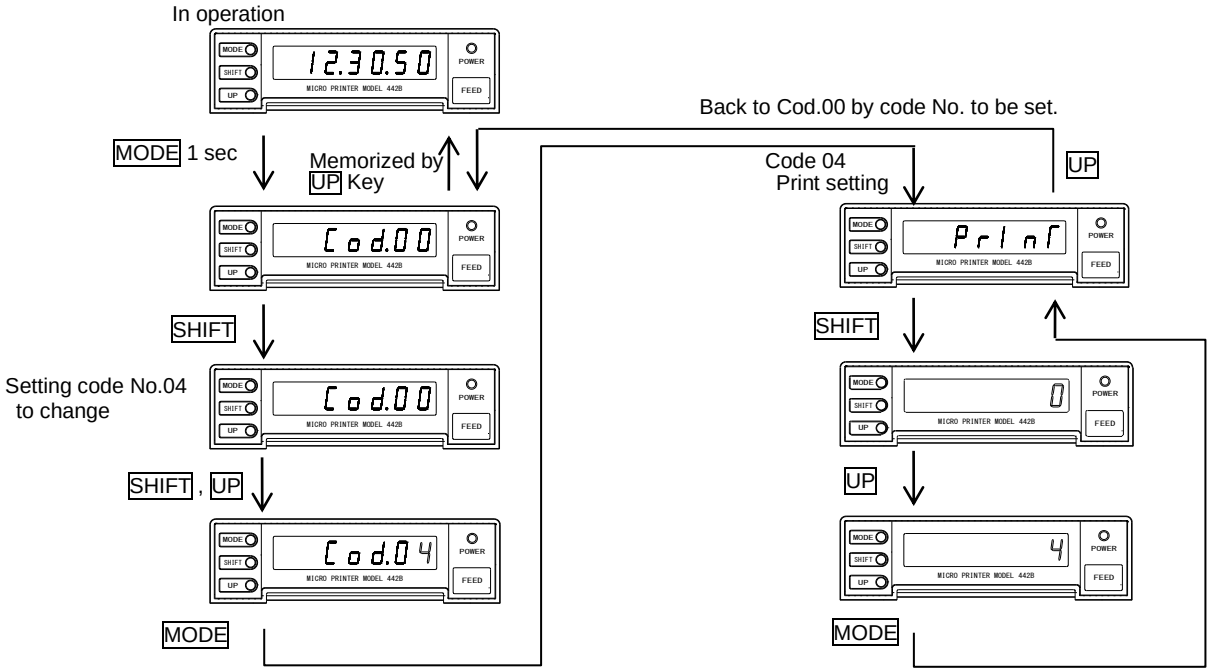
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.4 Index No., Calendar clock, Elapsed time

Example) Adjusting no print setting of “Index No., Calendar clock, Elapsed time” to Year/Month/Date/Hours/Minute/Second.

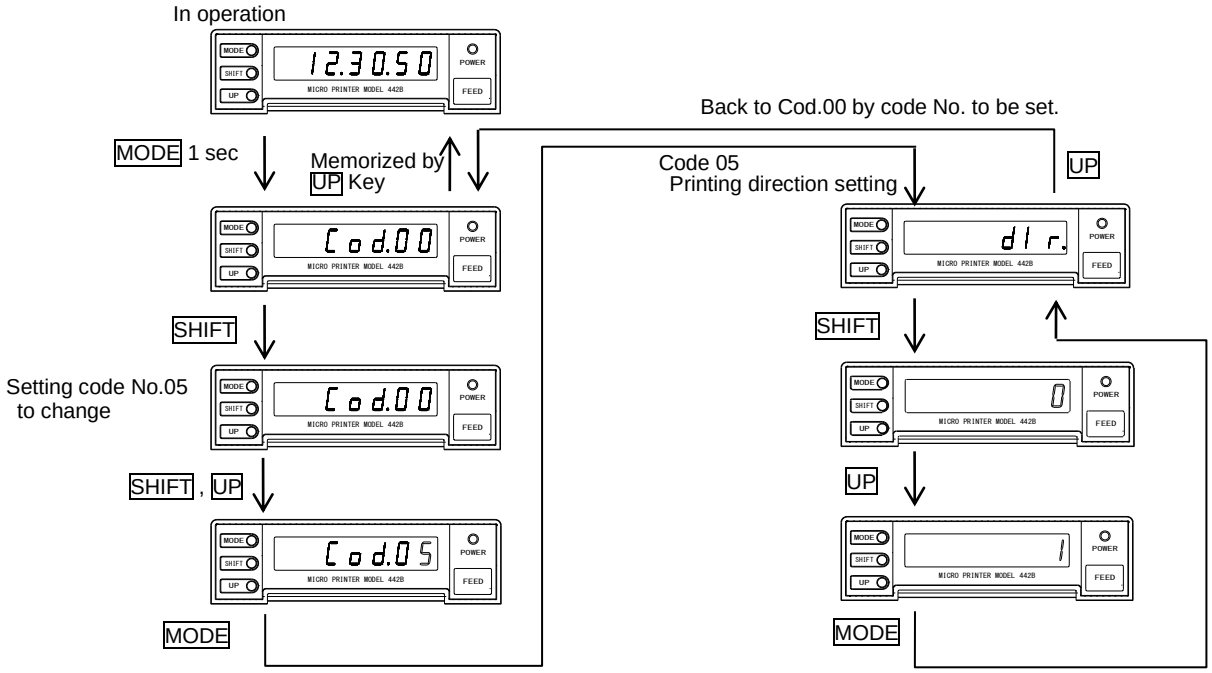
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.5 Printing direction

Example) Adjusting printing direction from upright to Inverted

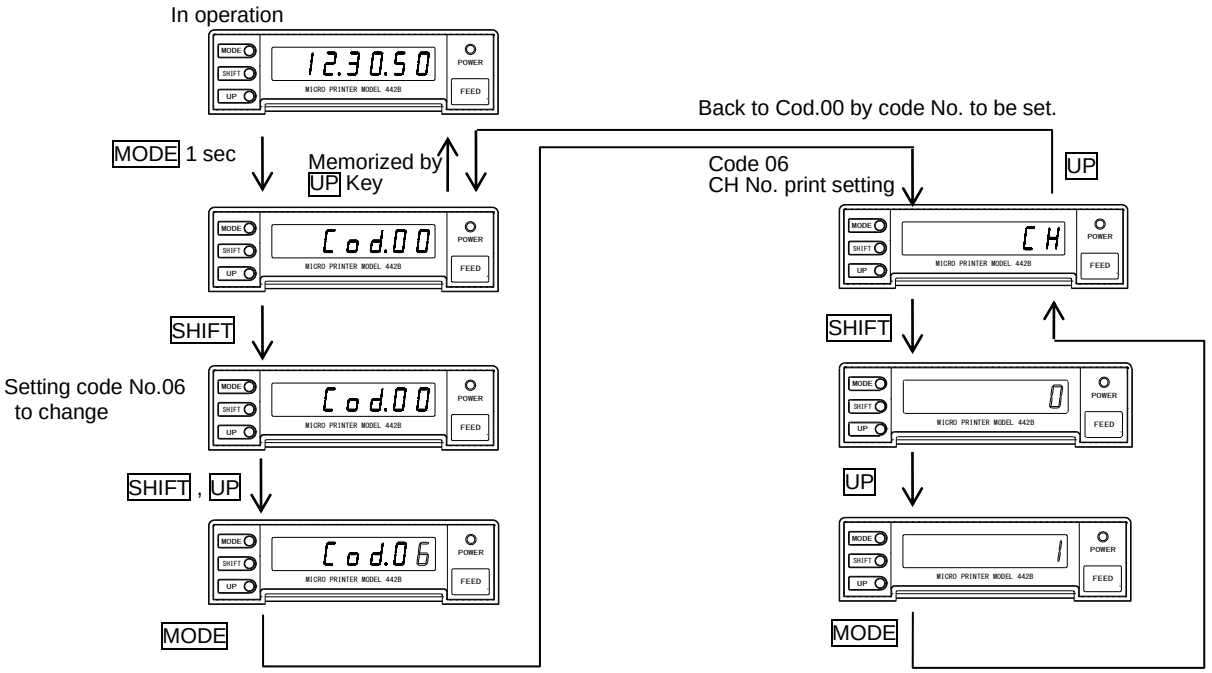
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.6 CH No.

Example) Changing “without CH No. printing” to “with”.

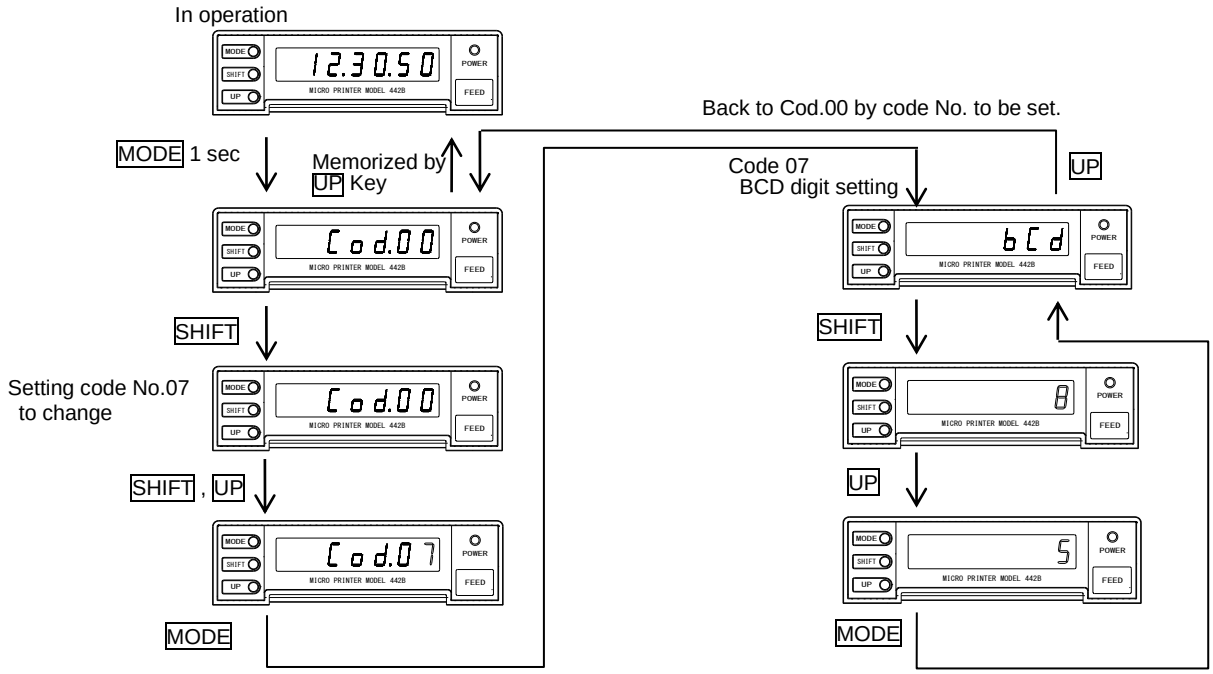
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.7 BCD digit

Example) Adjusting 8 digits BCD to 5 digits.

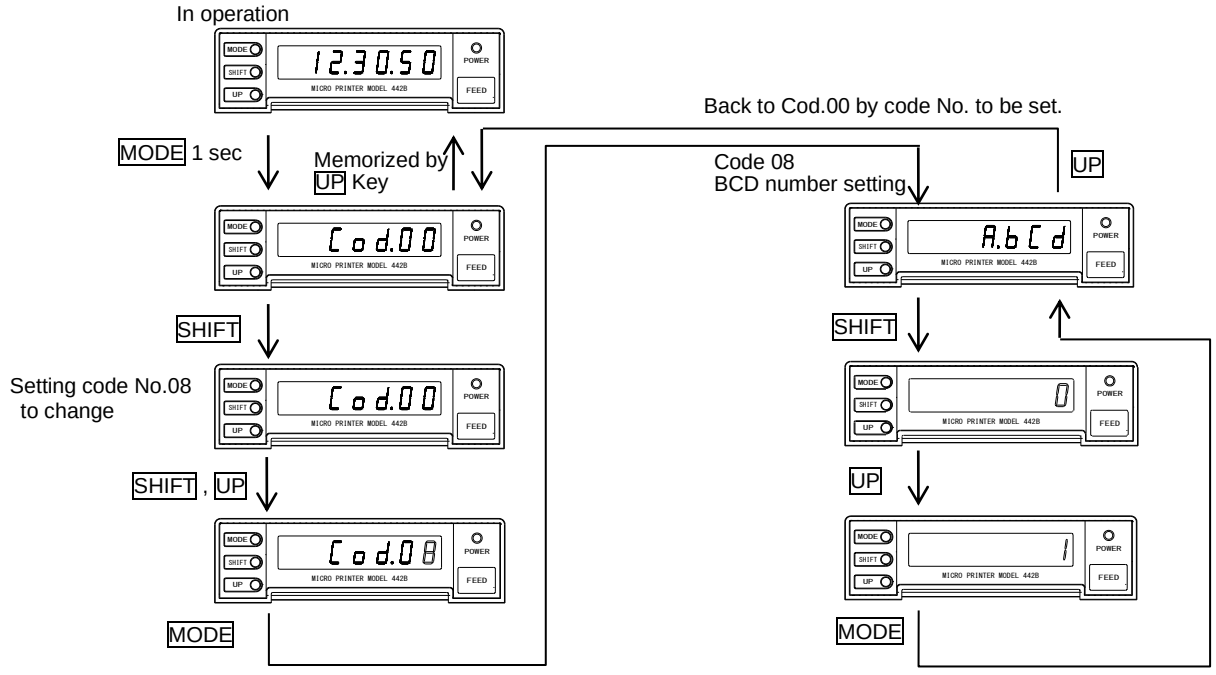
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.8 BCD A-F

Example) Changing character code to space at A to F code after BCD data 9.

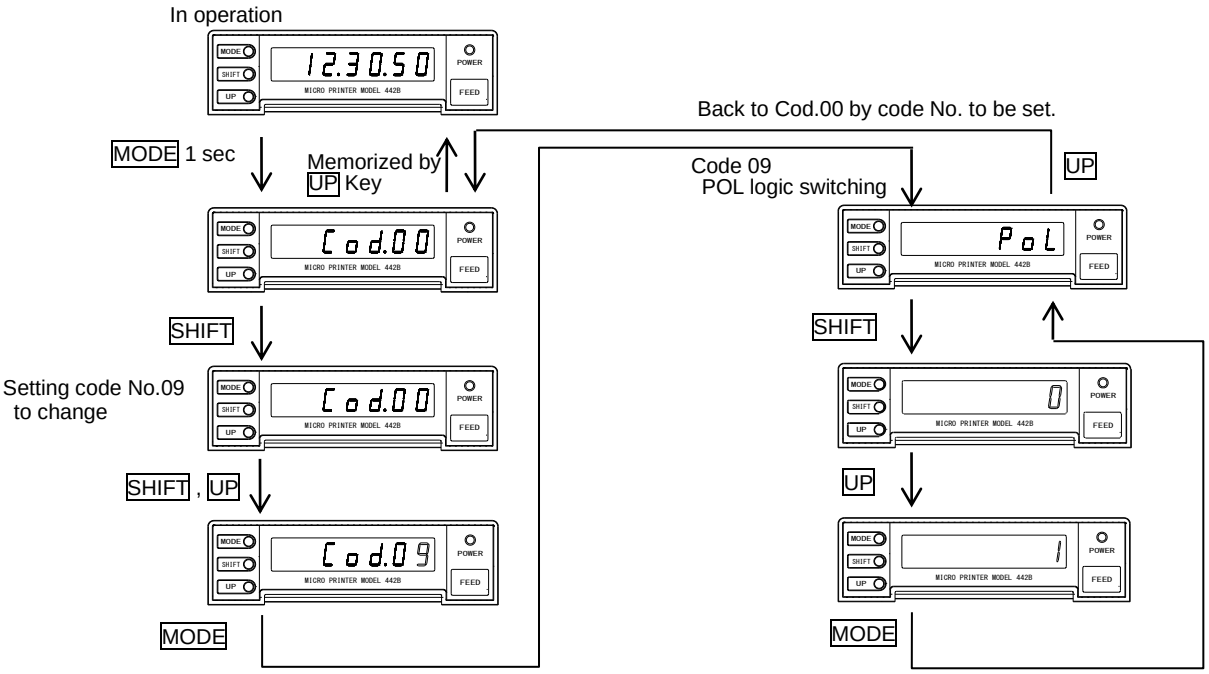
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.9 POL logic switching

Example) Changing logic for polarity input signal of BCD data as follows;
At positive logic input, L level = "－", H level = "＋"
↓
At positive logic input, H level = "－", L level = "＋"

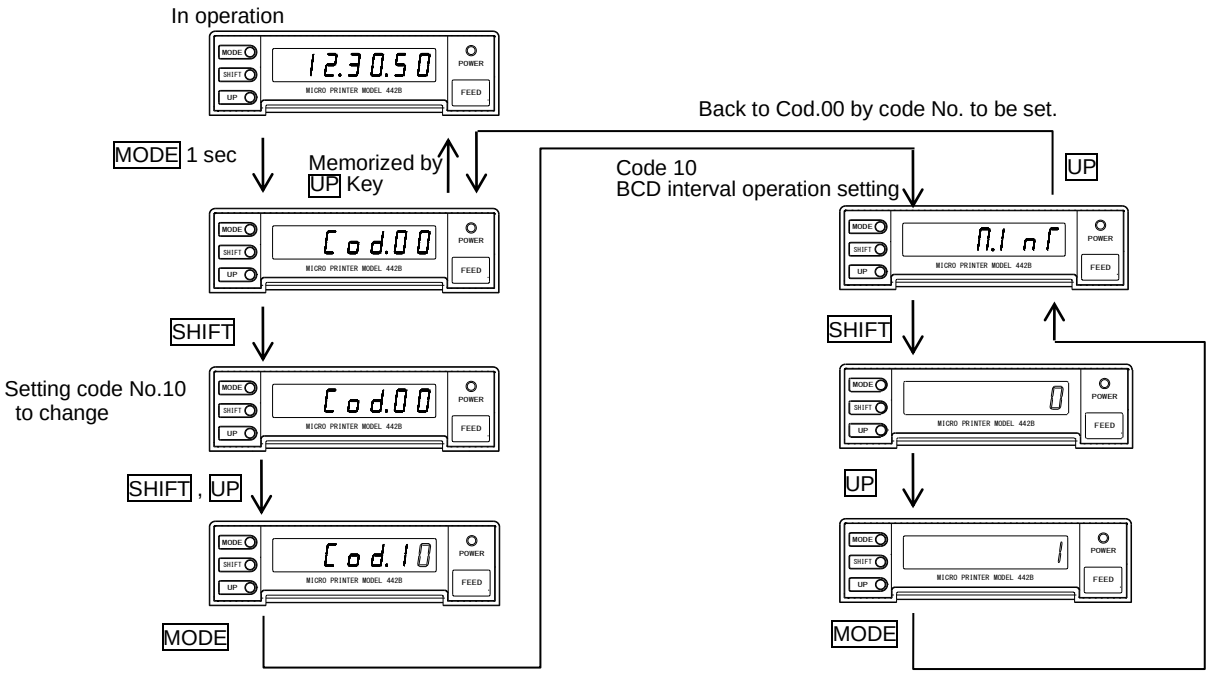
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.10 Interval operation

Example) Changing interval operation OFF to ON

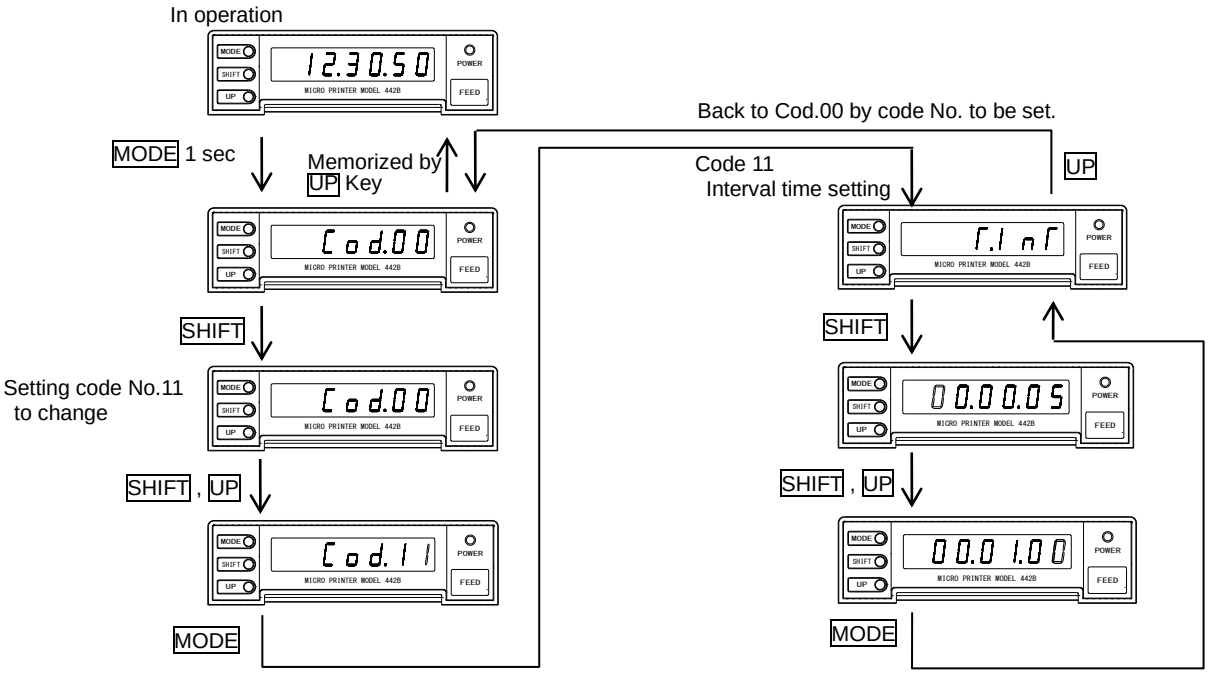
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.11 Interval time

Example) Adjusting interval time 5 sec. to 1 min.

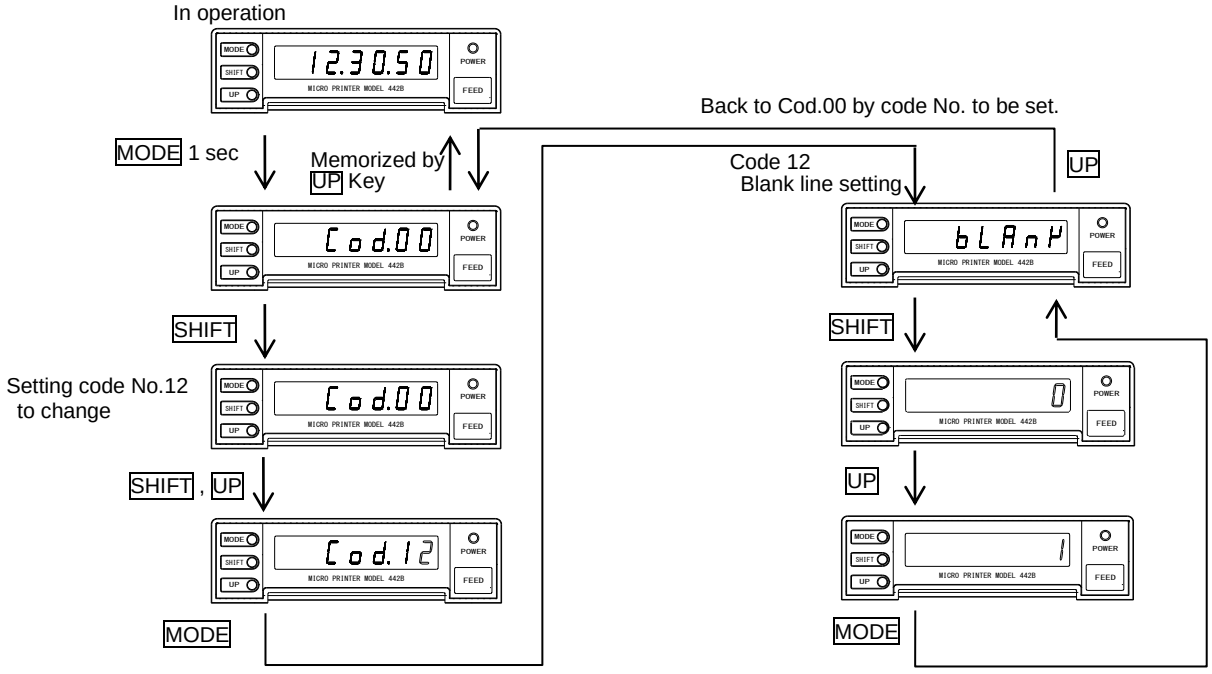
Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.3.12 Blank line

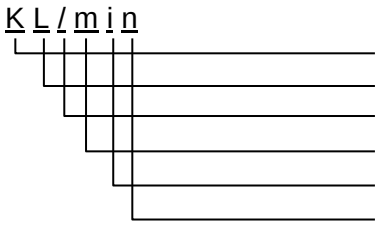
Example) Adjusting “without blank line” to “with one blank line”.

Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



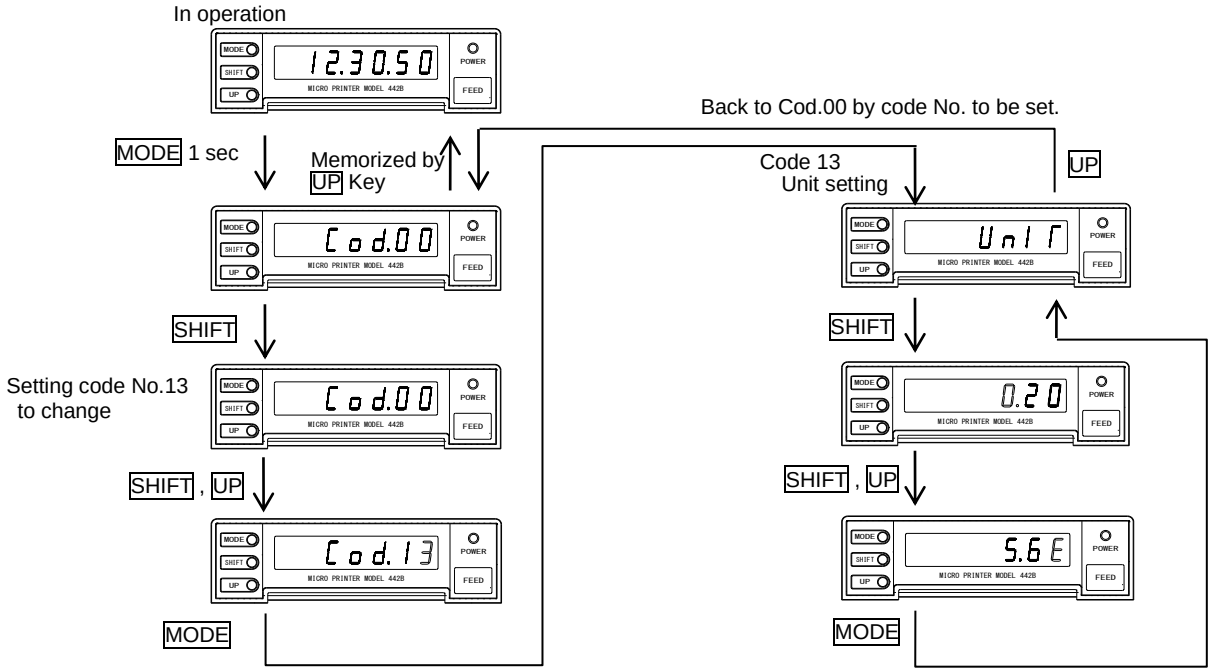
5.3.13 Unit

Example) Changing “without unit” to “kL/min”.



Unit position	Set.Code	Example
1st digit	6B	0.66
2nd digit	4C	1.4C
3rd digit	2F	2.2F
4th digit	6D	3.6d
5th digit	69	4.69
6th digit	6E	5.6E

Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



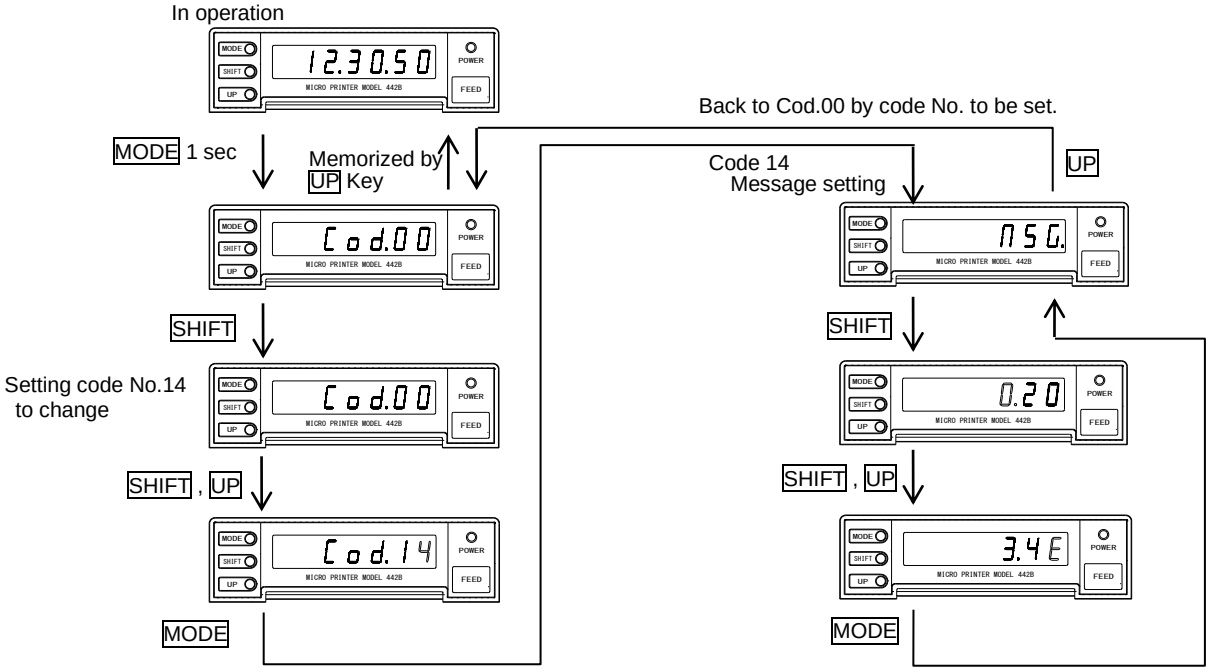
5.3.14 Message

Example) Adjusting “without message” to “OPEN”.

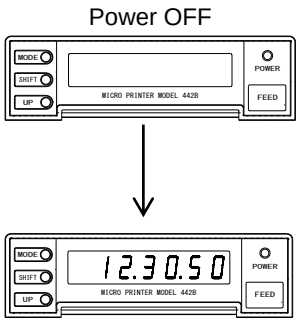
O P E N

Character position	Set.Code	Example
1st digit	4F	0.4F
2nd digit	50	1.50
3rd digit	45	2.45
4th digit	4E	3.4E

Press MODE key for 1 sec. or more during operation to get setting mode (Display: Cod.00)



5.4 Reset to factory setting



Turn power on while pressing both FEED and MODE key for test rinting.
Keep on pressing MODE key till test printing is completed.
After the test printing is completed, the message “FACTORY SETTING” is printed, of which means the product is reset.

See 5.1 Summary of function in the detail of factory setting.
Calendar clock is not initialized.

5.5 Error message

Display	Root Cause	Measures
Err 1	The code No. to be set is not in function.	See 5.1 Summary of function, and use correct code No..
Err2	The parameter to be set is not correct.	See 5.1 Summary of function, and use correct parameter.

Note: During setting mode, the mode turns to operation mode automatically. if no key operation is done for more than 5 min.
In this case, each parameter to be changed/adjusted is not memorized.

5.6 LED display

6. Printing and function

6.1 Interval

● Interval OFF

By inputting $\overline{\text{PRINT}}$ signal, BCD data is collected and printed.
By inputting $\overline{\text{TIME}}$ signal, the setting information for Index No., Calendar clock ,and Elapsed time are printed. If $\overline{\text{PRINT}}$ and $\overline{\text{TIME}}$ signal are inputted at the same time, $\overline{\text{TIME}}$ signal is given priority to $\overline{\text{PRINT}}$ signal.

● Interval ON

By inputting $\overline{\text{PRINT}}$ signal, BCD data is collected. Then, the data is printed and Interval operation is started. Afterward, BCD data is being collected and printed every Interval time.
During Interval operation, $\overline{\text{PRINT}}$ and $\overline{\text{TIME}}$ signal are not accepted.
Paper feeding is available by using FEED Key or FEED input.
By inputting $\overline{\text{RESET}}$ Key, Interval operation is released. By inputting $\overline{\text{RESET}}$ signal, Index No. and Elapsed time are reset, as well.
Note) At Interval time is being 00:00:01, the sum of $\overline{\text{SYNC}}$ signal L time and Printing time should be within 1 sec.

6.2 Printing

6.2.1 Printing format

● At Interval operation ON

```
23:59:59
CH99 OR - 1.2345678kg/m
```

● At Interval operation OFF

$\overline{\text{TIME}}$ signal printing

```
23.59.59
```

Printing the setting information of index No. Calendar clock, and elapsed time printing.

$\overline{\text{PRINT}}$ signal printing

```
CH99 OR - 1.2345678kg/m
```

Unit
BCD data
Message
CH No.

● CH No. printing.

CH No. is printed when CH No. printing is set.
CH No. signal ($CHNo.10^0$, $CHNo10^1$) prints 00 to 99.

● Message printing
The message to be printed is selected by MSG Input (MSG8, MSG4, MSG2, and MSG1 signal).
The registered message can be printed, as well.

MSG8	MSG4	MSG2	MSG1	Type of message
0	0	0	0	
0	0	0	1	OR
0	0	1	0	OVER
0	0	1	1	HI
0	1	0	0	HIGH
0	1	0	1	LO
0	1	1	0	LOW
0	1	1	1	GO
1	0	0	0	GOOD
1	0	0	1	NG
1	0	1	0	H NG
1	0	1	1	L NG
1	1	0	0	OK
1	1	0	1	
1	1	1	0	*
1	1	1	1	Registered message

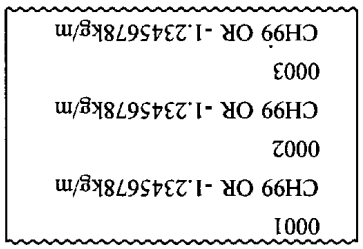
● Unit printing
Unit Input (UNIT 0 to 7 signal) selects type of Unit to print.
(refer to 6.2.4 Character code and unit table)
Registered Unit, when UNIT0 to 7 is 11111111, is printed.

● Blank line printing
Blank line setting inserts numbers of blank lines to be set after printing BCD data.
To insert blank line by printing via $\overline{\text{TIME}}$ signal is unavailable.

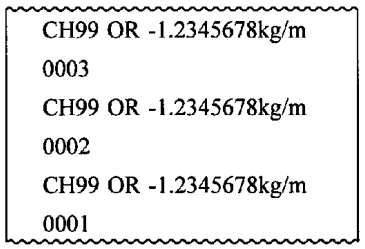
6.2.2 Upright/Inverted printing

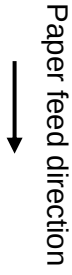
Selecting Upright or inverted printing.

Upright printing



Inverted printing





6.2.3 Test printing

Test printing starts by supplying power while pressing FEED Key.
After Test printing is completed, the product backs to normal operation condition.

Test printing prints Test Pattern and Setting status.

Printing sample

6.2.4 Character code and unit table

■ Character code table

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			”	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			(	8	H	X	h	x	|		ィ	ク	ネ	リ	α	〒
9			)	9	I	Y	i	y	▌		ゥ	ケ	ノ	ル	β	市
A			*	:	J	Z	j	z	▌		ェ	コ	ハ	レ	γ	区
B			+	;	K	[	k	{	▉		ォ	サ	ヒ	ロ		町
C			,	<	L	¥	l	|	▉	→	ャ	シ	フ	ワ	●	村
D			−	=	M	]	m	}	▉	←	ュ	ス	ヘ	ン	○	人
E			.	>	N	^	n	～	■	↑	ョ	セ	ホ	゛	±	
F			／	?	O	_	o		□	↓	ッ	ソ	マ	°	÷	

SP means “space”.

■ Unit table

The following is Unit to be set by UNIT 0 to 7

UNIT 76543210	Unit	UNIT 76543210	Unit	UNIT 76543210	Unit	UNIT 76543210	Unit
00000000		00100000	Pa	01000000		01100000	kl/h
00000001	%CO	00100001	Pa・s	01000001	feet	01100001	km
00000010	$\%O_2$	00100010	S/m	01000010	g/cc	01100010	km/h
00000011	%RH	00100011		01000011	g/cm^3	01100011	kN
00000100	A/m	00100100	VA	01000100	g/h	01100100	kvar
00000101	A/m^2	00100101	VU	01000101	g/l	01100101	kΩ
00000110		00100110	W/m^2	01000110	g/min	01100110	kΩ/cm
00000111		00100111	Wb	01000111	g/m^2	01100111	l/h
00001000	A・h	00101000	W・h	01001000	h^{-1}	01101000	l/min
00001001	C/mol	00101001	W・s	01001001	inch	01101001	l/s
00001010	Ci	00101010	atm	01001010	kA	01101010	lb
00001011	C・m	00101011	bar	01001011	kHz	01101011	lm
00001100	F/m	00101100	cal	01001100	kPa	01101100	lm/W
00001101	GHz	00101101	cc	01001101	kV	01101101	lm/m^2
00001110	H/m	00101110	cc/min	01001110	kW	01101110	lm・s
00001111	HP	00101111	cd	01001111	kcal	01101111	lx
00010000	Hz	00110000	cd/m^2	01010000	kg	01110000	lx・s
00010001	J/m^3	00110001	cm	01010001		01110001	m/h
00010010	MHz	00110010	cm/min	01010010	kg/h	01110010	m/min
00010011	MPa	00110011	cm/s	01010011	kg/l	01110011	m/s
00010100	MW	00110100		01010100	kg/m	01110100	m/s^2
00010101	Mvar	00110101		01010101	kg/min	01110101	mA
00010110	MΩ	00110110		01010110		01110110	mN
00010111	MΩ/cm	00110111	cm^2	01010111	kg/m^3	01110111	mF
00011000	MΩ・cm	00111000	cpm	01011000	kg/s	01111000	
00011001	N/m	00111001	cps	01011001		01111001	
00011010	N/m^2	00111010	dB	01011010		01111010	mS/cm
00011011	Nm^3/h	00111011	deg	01011011		01111011	mSv/h
00011100	N・m	00111100	dps	01011100		01111100	mV
00011101	MN	00111101		01011101	kN・m	01111101	mW
00011110	N/mm^2	00111110	eV	01011110	kN/cm^2	01111110	mg
00011111	O_2%	00111111		01011111	kl	01111111	mg/h

UNIT	Unit	UNIT	Unit	UNIT	Unit	UNIT	Unit
10000000	mg/l	10100000	ppm	11000000		11100000	%
10000001	min	10100001	rad	11000001	a	11100001	A
10000010	min^{-1}	10100010	rad/s	11000010	b	11100010	B
10000011	ml/min	10100011	rem	11000011	c	11100011	C
10000100	mm	10100100	rph	11000100	d	11100100	D
10000101	mm/min	10100101	rpm	11000101	e	11100101	E
10000110	mm/s	10100110	rps	11000110	f	11100110	F
10000111		10100111	sec	11000111	g	11100111	G
10001000		10101000	s^{-1}	11001000	h	11101000	H
10001001		10101001		11001001	i	11101001	I
10001010	mm^2	10101010		11001010	j	11101010	J
10001011	mol	10101011	ton	11001011	k	11101011	K
10001100	mol/l	10101100	t/h	11001100	l	11101100	L
10001101	mol/m^3	10101101	t/min	11001101	m	11101101	M
10001110	mol^{-1}	10101110	t/s	11001110	n	11101110	N
10001111	ms	10101111		11001111	o	11101111	O
10010000	m^{-1}	10110000	var	11010000	p	11110000	P
10010001	m^2	10110001	℃	11010001	q	11110001	Q
10010010	m^2/s	10110010	℉	11010010	r	11110010	R
10010011	m^3	10110011	Ω・m	11010011	s	11110011	S
10010100	m^3/d	10110100	Ω・cm	11010100	t	11110100	T
10010101	m^3/h	10110101	μA	11010101	u	11110101	U
10010110	m^3/min	10110110	μF	11010110	v	11110110	V
10010111	m^3/s	10110111	μS/cm	11010111	w	11110111	W
10011000	mΩ	10111000	μSv/h	11011000	x	11111000	X
10011001	nA	10111001	μV	11011001	y	11111001	Y
10011010	pA	10111010	μW	11011010	z	11111010	Z
10011011	pF	10111011	μm	11011011	°	11111011	
10011100	pH	10111100	μs	11011100	′	11111100	分
10011101	pW	10111101	μΩ	11011101	″	11111101	
10011110	phon	10111110	μΩ・cm	11011110	μ	11111110	Ω
10011111	ppb	10111111		11011111		11111111	Registered Unit

Note) Character and Unit style may be different from the ones in the table above due to printing condition.

6.3 Error

6.3.1 Paper end detection

Paper end detection sensor is incorporated to detect paper end.
PE output (“H”) is provided at no paper, and in this case the printing is unavailable.
POWER LED is blinking.

The previous one cycle data just before paper end is printed out after resetting paper end. (Refer to Timing Chart below)

6.3.2 Temperature error detection

The printing is unavailable when the temperature of Printer Head reach to 80℃ or more.
Then, the printer dose not work till the temperature falls to 60℃ or less.
POWER LED is blinking.

The previous one cycle data just before temperature error is printed out after resetting temperature error. (Refer to Timing Chart below)

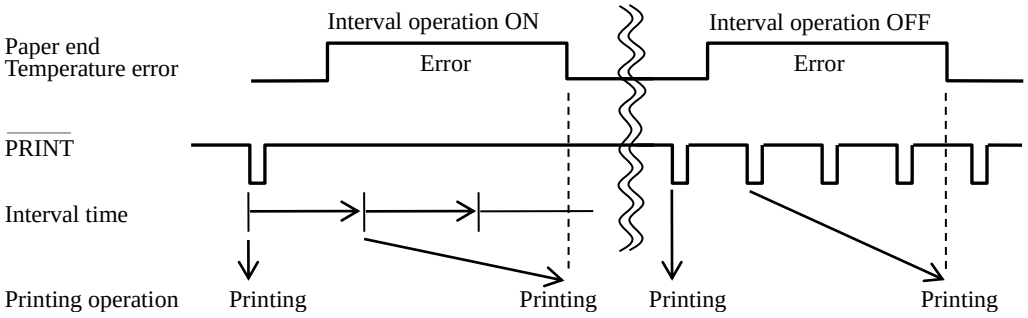
6.3.3 Synchronized signal error detection

When $\overline{\text{SYNC}}$ signal is at L level for approx. 1 sec. or longer, “ERROR SYNC LOW LEVEL” is printed out, and POWER LED is blinking.
BUSY output and $\overline{\text{RESET}}$ input resets this error.
Only paper feeding is available.

6.3.4 Low voltage alarm (backup battery for calendar clock)

When battery power is lower than the normal working level, following messages would be printed when supplying the power: “ERROR BATTERY LOW LEVEL”.
In that case, please contact your distributor or sales team.

● Timing chart



7. Specification

7.1 Model

442B－□
1
└──── Power supply

[1] Power supply

Code	Power Supply
A	100 to 240V AC
9	24V DC

7.2 Performance

Power supply:	100 to 240V AC 50/60Hz, 24V DC.
Power range:	90 to 250V AC, 21.6 to 26.4V DC.
Power consumption:	Approx.15VA (at printing) / approx. 3.2VA (at waiting) at100V AC.
	Approx.16VA (at printing) / approx. 5VA (at waiting) at 200V AC.
	Approx.500mA (at printing) / approx. 55mA (at waiting) at24V DC.
Operating temperature:	0 to 50 ℃
Operating humidity:	85% RH or less (no condensation)
Storage temperature:	-20 to 60 ℃
Weight:	Approx. 700g (350g : attached connector)
Installation:	Panel mounting

7.3 General

Dielectric strength:	Input/Output – Power	1500V AC. For 1min. (AC powered)
		500V AC. For 1min. (DC powered)
Insulation resistance:	Input/Output – Power	500V DC, 50MΩ or more. (AC powered)
		500V DC, 50MΩ or more.(DC powered)

7.4 Printer

Print style	Thermal line dot.
Character	Alphabet, Numbers, Katakana, Symbols, etc.
Dot	16x16 (2mmx2mm)
Line	24 lines, Max.
Printing speed	Approx. 22.5mm/sec, 6 lines/sec., Max. Note) Printing rate 16% or less.
Paper feeding	3.75mm pitch.
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)

7.5 Chart roll 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)

7.6 Calendar clock

Display: 6 digits red LED Hour, Minute, Second.
Accuracy: ±3 sec. per day. (at 25℃)
A leap year adjustment: Automatic adjustment till 2099.
Power failure measure: The calendar clock in the event of a power failure runs on a backup battery.

Contact Information

Tsuruga Electrical Corporation
Osaka Sale office / Overseas Trade Department
Taiyo Seimei Osakaminami Building 5F
1-10-6, Abikohigashi, Sumiyoshi-ku, Osaka, Japan, 558-0013
Tel: + 81-(0)6-4703-3874 / Fax: + 81-(0)6-4703-3875
E-mail: ft.info@tsuruga.co.jp