FUJITSU THE POSSIBILITIES ARE INFINITE

BATTERY DRIVE, MICRO LINE THERMAL PRINTER 3" TYPE MECHANISM AND INTERFACE BOARD

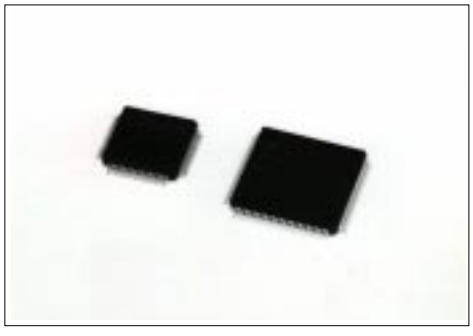
FTP-633MCL400/FTP-623DCL002

■ OVERVIEW

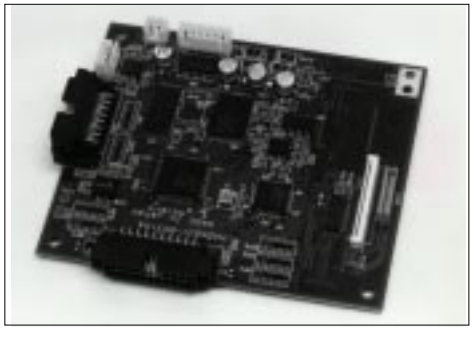
This battery driven, micro line thermal printer offers high speed printing for 3-inch wide paper (70 mm). It is suitable for portable equipment that requires compact, lightweight components.

In addition to the interface board, a driving LSI (MCU + Gate Array) is also available.

FTP-633MCL400



FTP-623CU001, FTP-633GA101



FTP-623DCL002

■ HIGHLIGHTS

- **Driven by batteries (direct connect between thermal head and batteries)**
  It can be driven by a broad range of voltages (4.2 to 8.5 V) of NiCd or Nickel-Hydrogen by using Fujitsu Components' unique head drive control system. The battery pack can be connected directly to the print head without a voltage regulator. Also, a lithium-ion battery can be applied.
- **High speed printing**
  It can print at approximately 24 character lines/s (460 dotlines/s = 60 mm/s).
- **Compact and lightweight**
  It has a light weight of approximately 84 g.
- **Low power consumption**
  The peak current for head driving is approximately 3.0 A.
- **Selectable paper paths**
  Front, rear and top paper insertion paths can be used.
- **Paper auto loading function**
  Paper feeding is enabled by operating the head up lever.
- **Variety of suitable paper**
  This model is capable of printing on a variety of papers, including 1-ply roll paper, 2-ply paper (TCC and roll), labels, and long-life paper.

■ DESIGNATION

Item		Part number
Printer mechanism		FTP-633MCL400*
Interface board		FTP-623DCL002
LSI	Micro Controller Unit	FTP-623CU001
	Gate Array	FTP-633GA101

*: Rear paper insertion type is available: FTP-633MCL402

■ GENERAL SPECIFICATIONS

Item	Specifications
Printing method	Thermal-sensitive line dot method
Dot structure	512 dots/line
Dot pitch (Horizontal)	0.125 mm (8 dots/mm)—Dot density
Dot pitch (Vertical)	0.125 mm (8 dots/mm)—Line feed pitch
Effective printing area	64 mm
Printing mode	(1) Single density — Standard mode — HS mode 1. to 3. HQ mode Reduced mode — HS mode 1. to 3. HQ mode (2) Double density mode
Maximum printing speed	Approximately 24 character lines/s (480 dotlines/s = 60 mm/s) [1ply, 8 columns of “H”, double density, 7.2 V, 1/10” line returns] Approximately 16 character lines/s (416 dotlines/s = 52 mm/s) [1ply, 12 columns of “H”, double density, 7.2 V, 1/8” line returns]
Character types	JIS ANK : 128 ASCII : 31 Semi-graphic : 36 International characters : 130 Special : 30 Download : 8
Character grade mode	Standard character (12 × 6 dot font)/High grade character (16 × 8 dot font)
Character composition, dimensions (H×W), Number of columns (standard)	Single density standard : 24 × 12 dots, (3.0 × 1.5 mm), 42 columns 32 × 16 dots, (4.0 × 2.0 mm), 32 columns Single density reduced*1 : 24 × 12 dots, (3.0 × 1.5 mm), 42 columns 32 × 16 dots, (4.0 × 2.0 mm), 32 columns Double density : 16 × 8 dots, (2.0 × 1.0 mm), 64 columns
Interface	1) Centronics standard 2) Bus interface*2

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Item		Specifications
Operating voltage	For print head	4.2 to 8.5 VDC (4 or 5 Ni-Cd or Ni-MH batteries, equivalent to 2 Li-ion) Approximately 3.0 A (peak value, 7.2 V, 100% printing ratio)
	For motor	4.2 to 8.5 VDC (4 or 5 Ni-Cd or Ni-MH batteries, equivalent to 2 Li-ion) Average 0.7 A or less
	For logic	5 VDC ± 5%, 0.15 A
Weight		Mechanism: approximately 84 g. Interface board: approximately 60 g
Printer mechanism	Dimensions	85 (W) × 49 (D) × 20 (H) mm (excluding knob, lever, and flexible PC board)
Interface board	Dimensions	108 (W) × 91 (D) × 18 (H) mm
Thermal head life		Pulse durability : 1×10^8 pulse/dot (using Fujitsu Takamisawa's standard driving method) Wear resistance: 50 km (at 25% printing ratio)
Environmental conditions	Operating temperature	+5 to +40°C*3
	Operating humidity	20 to 85% RH (no condensation)
	Storage temperature	–20 to +60°C (excluding paper)
	Storage humidity	5 to 95% RH (no condensation)
Detection	Head temperature	By thermistor
	Paper out/Mark detect	By photointerrupter (command set)
	Voltage	By micro controller
	Head-up	By microswitch
Paper width		70^{+0}_{-1} mm
Recommended thermal sensitive paper		1 ply (roll) : FTP-030PG021 Long life (roll) : FTP-030PR202 2 ply (TCC) : FTP-030P8021

*1: Character composition for single density reduced mode is the same as for single density standard mode.

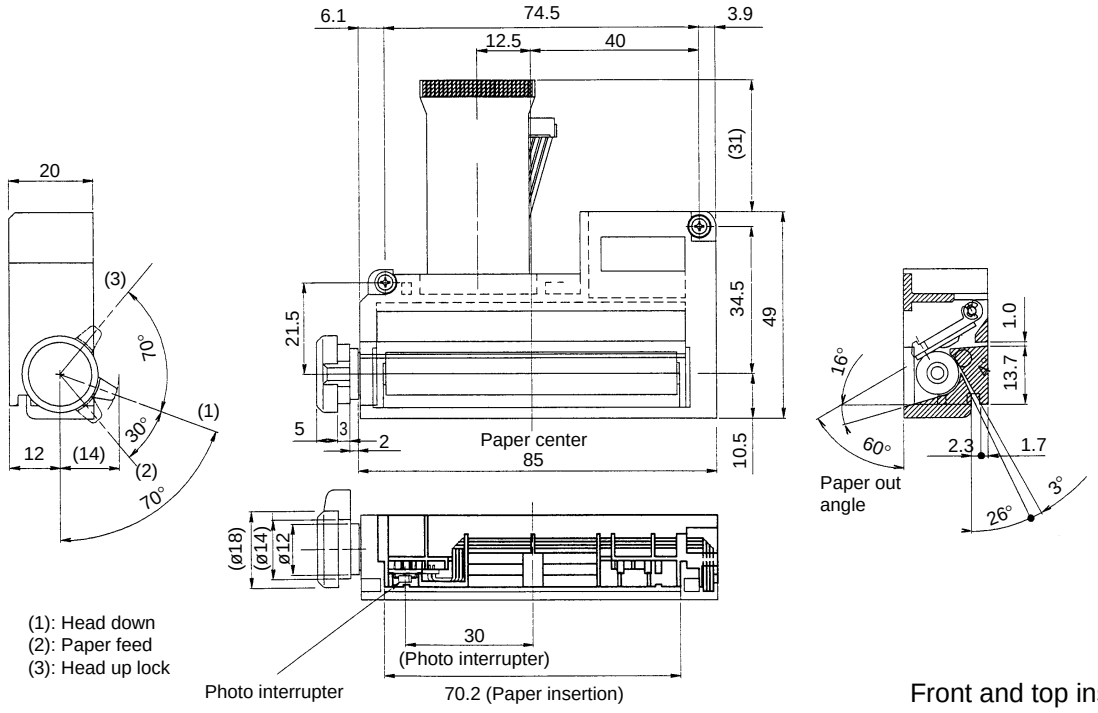
*2: The data to be printed is automatically read out by the printer driver equipment memory (host system frame memory). The communication is parameter transfer.

*3: Temperature range for guaranteed printing density. It can be operated in the range of 0 to +40°C.

■ DIMENSIONS

Printer mechanism

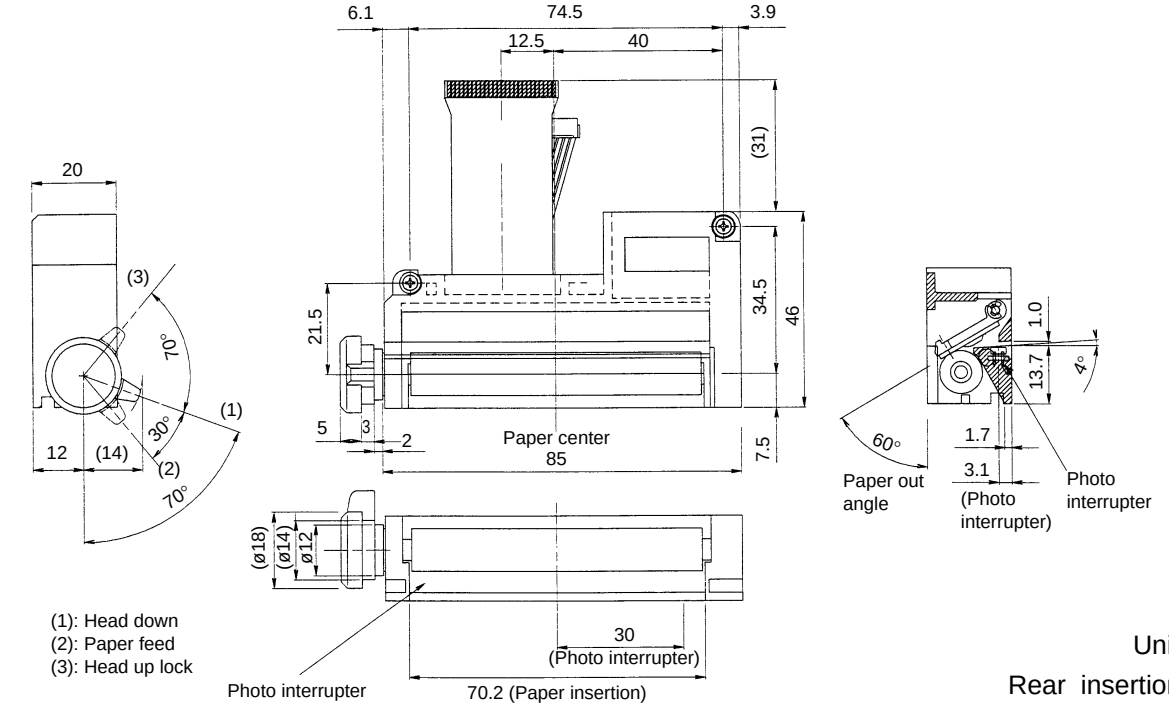
FTP-633MCL400



Unit: mm

Front and top insertion type

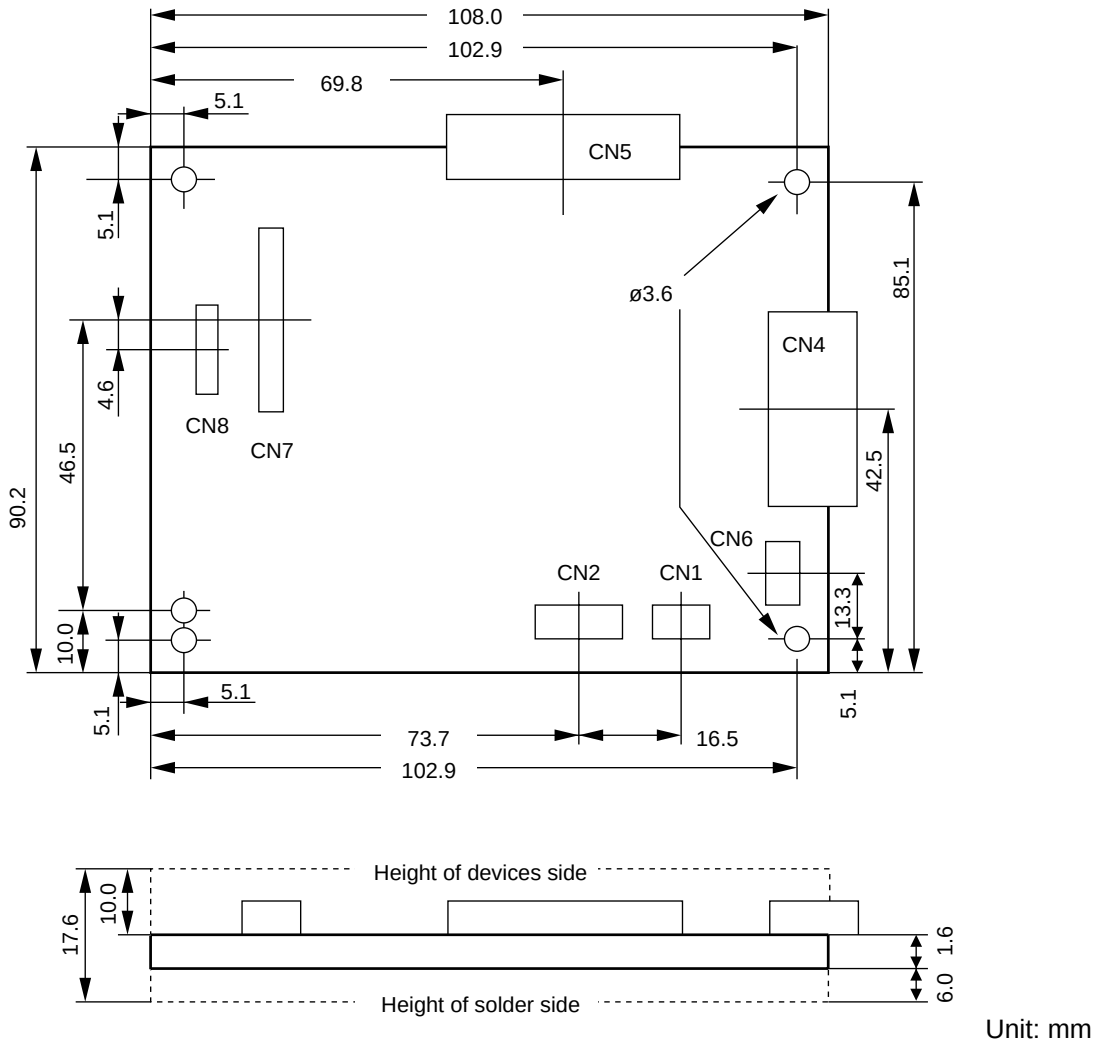
FTP-633MCL402



Unit: mm

Rear insertion type

Interface board



■ INTERFACE

1. Centronics standard

(1) Connector

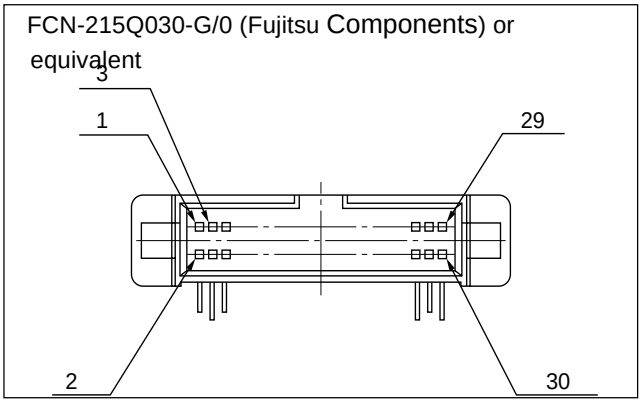
Connector part number : FCN-215Q030-G/0 (Fujitsu Components) or equivalent
Mating connector part number : FCN-217Q030-G/0 (Fujitsu Components) or equivalent
FCN-214Q030-G/0 (Fujitsu Components) or equivalent
FCN-215Q030-G/0 (Fujitsu Components) or equivalent

(2) Connector pin assignment

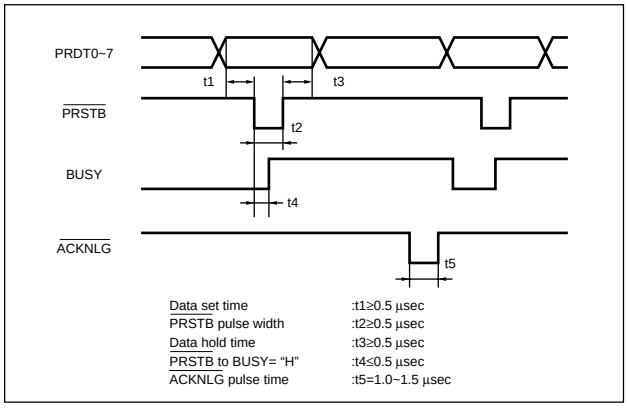
No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	$\overline{\text{PRSTB}}$	I	Data strobe	2	$\overline{\text{PRSTB}}$-RET	—	Connected to logic GND
3	PRDT0	I	Data 0	4	PRDT0-RET	—	Connected to logic GND
5	PRDT1	I	Data 1	6	PRDT1-RET	—	Connected to logic GND
7	PRDT2	I	Data 2	8	PRDT2-RET	—	Connected to logic GND
9	PRDT3	I	Data 3	10	PRDT3-RET	—	Connected to logic GND
11	PRDT4	I	Data 4	12	PRDT4-RET	—	Connected to logic GND
13	PRDT5	I	Data 5	14	PRDT5-RET	—	Connected to logic GND
15	PRDT6	I	Data 6	16	PRDT6-RET	—	Connected to logic GND
17	PRDT7	I	Data 7	18	PRDT7-RET	—	Connected to logic GND
19	$\overline{\text{ACKNLG}}$	O	Data input acknowledge	20	$\overline{\text{ACKNLG}}$-RET	—	Connected to logic GND
21	BUSY	O	Busy	22	BUSY-RET	—	Connected to logic GND
23	RINF2	O	Printer status	24	$\overline{\text{INPRM}}$-RET	—	Connected to logic GND
25	$\overline{\text{SLCTIN}}$	I	Printer select	26	$\overline{\text{INPRM}}$	I	Reset
27	RINF1	O	Printer status	28	RINF3	O	Printer status
29	$\overline{\text{ATF}}$	I	Paper feed request	30	GND	—	Logic GND

Notes:
- Symbol "—" means a negative logic signal.
- "–RET" signal is a return signal of the twisted pair cable.
- "I" or "O" means a signal direction from the interface board side.

(3) Connector pin number



(4) Data input signal timing



2. Bus interface

(1) Connector

Connector part number : FCN-215Q040-G/0 (Fujitsu Components) or equivalent
Mating connector part number : FCN-217J040-G/0 (Fujitsu Components) or equivalent
: FCN-214J040-G/0 (Fujitsu Components) or equivalent
: FCN-215J040-G/0 (Fujitsu Components) or equivalent

(2) Connector pin assignment

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	ALE	O	Address latch	2	$\overline{\text{BRD}}$	—	Data read
3	$\overline{\text{BWR}}$	—	Data write	4	READY	—	Data access ready
5	HACK	—	Hold acknowledge	6	HRQ	—	User hold request input
7	MCRC	—	Power-down (not used)	8	CLK	O	System clock
9	PCPAK1	O	Common RAM reading completion	10	$\overline{\text{ATF}}$	I	Automatic paper loading
11	PCPSD1	I	Common RAM reading request	12	PRON	O	Printer operating
13	$\overline{\text{RST}}$	I	Hard reset	14	GND	—	Ground
15	DB00	I/O	External address/Data bus 0	16	DB01	I/O	External address/Data bus 1
17	DB02	I/O	External address/Data bus 2	18	DB03	I/O	External address/Data bus 3
19	DB04	I/O	External address/Data bus 4	20	DB05	I/O	External address/Data bus 5
21	DB06	I/O	External address/Data bus 6	22	DB07	I/O	External address/Data bus 7
23	AB08	O	External address bus 08	24	AB09	O	External address bus 09
25	AB10	O	External address bus 10	26	AB11	O	External address bus 11
27	AB12	O	External address bus 12	28	AB13	O	External address bus 13
29	AB14	O	External address bus 14	30	AB15	O	External address bus 15
31	AB16	O	External address bus 16	32	AB17	O	External address bus 17
33	AB18	O	External address bus 18	34	AB19	O	External address bus 19
35	AB20	O	External address bus 20	36	AB21	O	External address bus 21
37	AB22	O	External address bus 22	38	AB23	O	External address bus 23
39	$\overline{\text{RAM2}}$	O	Common RAM access	40	$\overline{\text{INPRM}}$	I	Reset

Notes:

- Symbol "——" means a negative logic signal.
- "I" or "O" means a signal direction from the interface bpard side.

■ CONNECTOR PIN ASSIGNMENT

1. Connector for logic power supply (CN1)

Part number : B4B-XH-A-WHITE (J.S.T) or equivalent → P.C.B side
Mating connector part number : XHP-4 (J.S.T) or equivalent → Cable side

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	V_{CC}	—	Power supply for logic (+5V)	2	GND	—	Logic ground

2. Connector for thermal head and motor power supply (CN2)

Part number : B6B-XH-A-WHITE (J.S.T) or equivalent → P.C.B side
Mating connector part number : XHP-6 (J.S.T) or equivalent → Cable side

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	BAT	—	Power supply for head/motor	2	BAT	—	Power supply for head/motor
3	BAT	—	Power supply for head/motor	4	GND	—	Head/motor ground
5	GND	—	Head/motor ground	6	GND	—	Head/motor ground

3. Connector for thermal head drive (CN7)

Part number : 52030-2610 (Molex) or equivalent → P.C.B side

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	BAT	—	Power for head	2	BAT	—	Power for head
3	GND	—	Head ground	4	GND	—	Head ground
5	HD2	O	Print data output	6	$\overline{LAT}$	O	Printing data latch
7	HDV	O	Power for logic	8	HCLK	O	Printing transmitting clock
9	$\overline{ENB8}$ *1, 2	O	Printing enable	10	$\overline{ENB7}$ *1, 2	—	Printing enable
11	$\overline{ENB6}$	O	Printing enable	12	$\overline{ENB5}$	O	Printing enable
13	V_{REF}	O	Power for thermistor	14	TMP	O	Temperature detection
15	——— *3	—	Connected with No. 17	16	HDV	O	Power for logic
17	——— *3	—	Connected with No. 15	18	——— *4	—	Head rank specify (not used)
19	——— *4	—	Not used (pulled-up by resistor)	20	$\overline{ENB4}$	O	Printing enable
21	$\overline{ENB3}$	O	Automatic paper loading	22	$\overline{ENB2}$	O	Printing enable
23	$\overline{ENB1}$	O	Printing enable	24	GND	—	Paper-out detection
25	GND	—	Printing enable	26	BAT	—	Power for head

Notes:

*1: Mechanism selection signal and the printing enable signal for 3” mechanism.

*2: Not used at the combination with 2” mechanism.

*3: At the mechanism side, this pin number is for the printing data 2.
Since this pin number is used for the printing data 1 at the inter face board, the No. 15 and No. 17 pins are connected.

*4: This signal is used for the adjustment of printing duty depending upon the rank of thermal head resistor. Not used at this interface board.

- Symbol “——” means a negative logic signal.
- “I” or “O” means a signal direction from the interface board side.

4. Connector for abnormal head temperature detection (CN6)

Part number : B3B-XH-A-WHITE (J.S.T) or equivalent → P.C.B side
Mating connector part number : XHP-3 (J.S.T) or equivalent → Cable side

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	TMPER	O	Abnormal head temperature detection	2	N.C.	—	Not connected
3	GND	—	Logic ground				

Note: This signal detects abnormal head temperature.

5. Connector for stepping motor drive (CN8)

Part number : B10B-ZR (J.S.T) or equivalent → P.C.B side
Mating connector part number : ZHR-10 (J.S.T) → Mechanism side

No.	Signal	I/O	Contents	No.	Signal	I/O	Contents
1	HUP	I	Head up detection	2	V_{CC}	—	Power for switch
3	PINCH	I	Paper auto loading detection	4	SDV	—	Power for photointerrupter
5	SLED	—	Power for diode cathode	6	$\overline{PES}$	I	Paper out detection
7	MT/$\overline{B0}$	O	Stepping motor coil excitation ($\overline{B}$)	8	MT/B0	O	Stepping motor coil excitation (B)
9	MT/$\overline{A0}$	O	Stepping motor coil excitation ($\overline{A}$)	10	MT/A0	O	Stepping motor coil excitation (A)

■ PRINTING COMMANDS (CENTRONICS STANDARD INTERFACE)

Name	Command	Contents
Carriage return	LF, CR	Prints buffer data and return the line.
Double width print set	SO	Sets the double width character.
Power-down mode set	DC2, DC3	Reduces the power consumption during standing by.
Double width print reset	DC4	Resets the double with character.
ESC sequence entry	ESC	Indicates the start of an escape sequence formed by this code plus subsequent commands.
Line space set	ESC A + n	Sets the line space length in 2 × (0 to 255 dot lines).
Paper feed set in normal direction	ESC B + n	Sets the paper feed in normal direction. (Feeding range: 2 × (0 to 255 dot lines))
Bit image print set	ESC K +n_1+n_2+n_3	Sets the bit image printing in single or double density mode.
International character set	ESC R+n	Selects the international characters.
Download character register	ESC &+n_1+n_2+~	Registers the download characters of 12 × 6 or 16 × 8 dots.
Printing quality set	ESC Q+n+SP*+~	Sets the printing quality conforming to used paper.
Printing density set	ESC Q+n+!+A	Sets the printing density mode. (Single density standard, reduced or double density)
Paper feed set in reverse direction	ESC j+n	Sets the paper feed in reverse direction. (Feeding range: 2 × (1 to 255 dot lines))
Character grade set	ESC x+n	Sets the character grade in standard or high grade.
Special character print set	ESC ¥+n	Prints the special character.
Start position set for bit-image printing	ESC 1+n	Sets the print start position of bit-image printing in left end.
Detecting function set	ESC 9+n	Sets the detecting function.
Mark detection	ESC FF	Feeds the paper to the marking position.
Line feed length set after mark detection	ESC w+n	Sets the line feed length after mark detection.
Automatic paper loading length set	ESC EM+n	Sets paper feeding length for automatic paper loading.
Automatic printing speed set	ESC s+n	Sets the function mode in the automatic printing speed set.
Printer initialization	ESC @	Initializes the printer MPU.

Notes:

*: “SP” means the space code (20H).

Bus interface uses different commands.

■ OPTIONS

1. Cable

Name		Part number	Cable length
Interface cable	For Centronics	FTP-621Y202	500 mm
	For Bus I/F	FTP-621Y203	500 mm
Power supply cable (A): for logic motor		FTP-621Y401	300 mm
Power supply cable (B): for thermal head		FTP-621Y601	300 mm
Head abnormal temperature detection cable		FTP-621Y204	300 mm

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