

BATTERY DRIVE, MICRO LINE THERMAL PRINTER 2" TYPE MECHANISM AND INTERFACE BOARD

FTP-623MCL400/FTP-623DCL002

■ OVERVIEW

This battery driven, micro line thermal printer provides high speed printing for 2-inch wide (58mm) paper. It is suitable for portable equipment that requires compact, light weight components.

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

■ 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 used.

- **High speed printing**

It can print at approximately 23 character lines/s (460 dotlines/s = 57.5 mm/s).

- **Compact and lightweight**

It has a light weight of approximately 75 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**

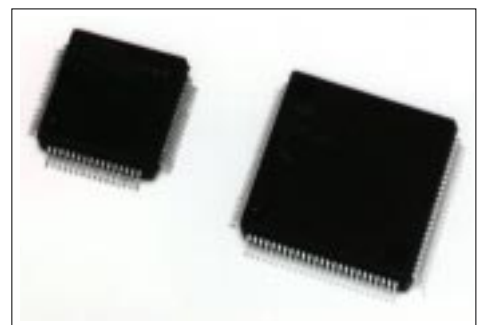
Paper feeding is enabled by operating the head up lever.

- **Variety of suitable papers**

This model is suitable for printing on a variety of papers, including 1-ply roll paper, 2-ply paper (TCC and roll), labels, and long-life paper.



FTP-623MCL400



FTP-623CU001, FTP-633GA101



FTP-623DCL002

FTP-623MCL400/FTP-623DCL002

(Continued)

| 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 \pm 5%, 0.15 A |
| Weight | | Mechanism: approximately 75 g. Interface board: approximately 60 g |
| Printer mechanism | Dimensions | 73 (W) \times 49 (D) \times 20 (H) mm (excluding knob, lever, and flexible PC board) |
| Interface board | Dimensions | 108 (W) \times 91 (D) \times 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 | | 58 ⁺⁰ ₋₁ mm |
| Recommended thermal sensitive paper | | 1 ply (roll) : FTP-020PG021 Long life (roll) : FTP-020PR202 Label (roll) : FTP-040PL021 2 ply (TCC) : FTP-020P8820 2 ply (roll) : FTP-020P7121 |

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

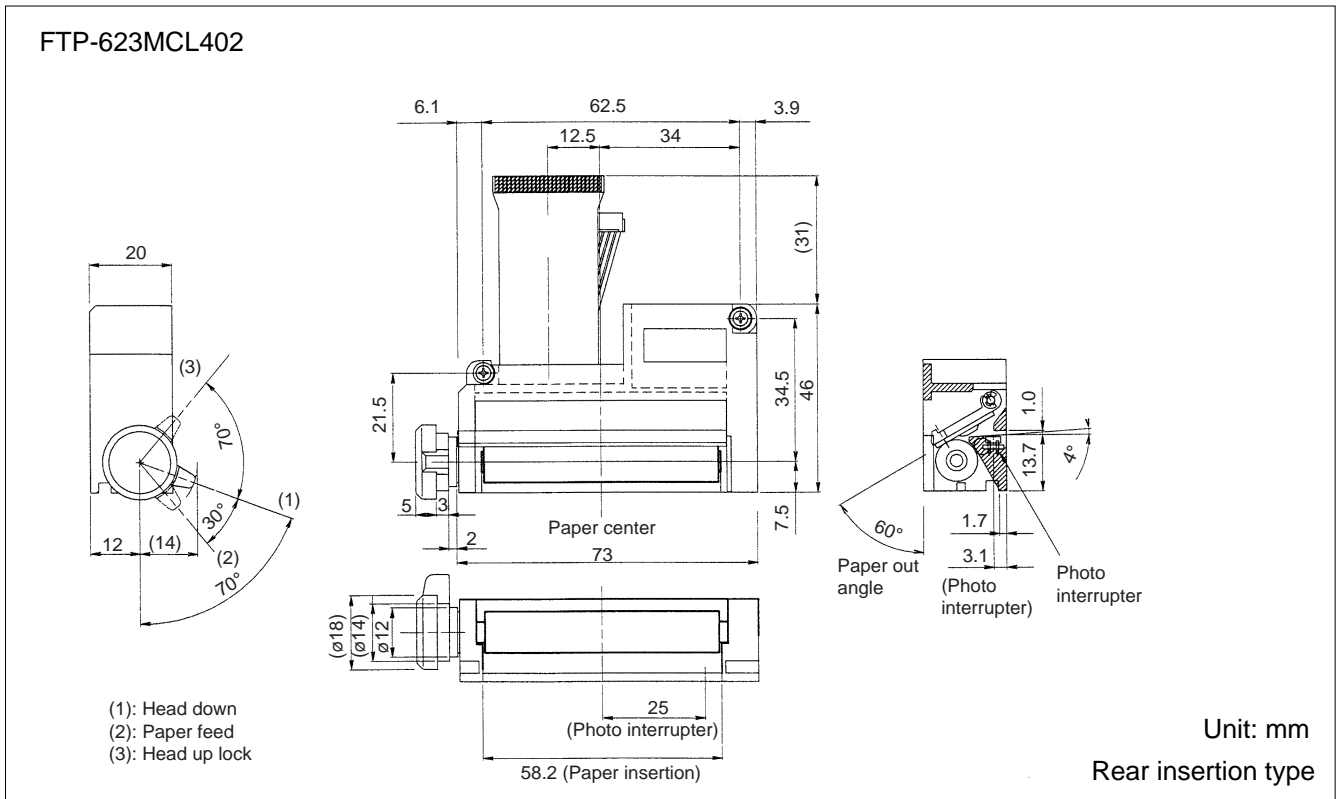
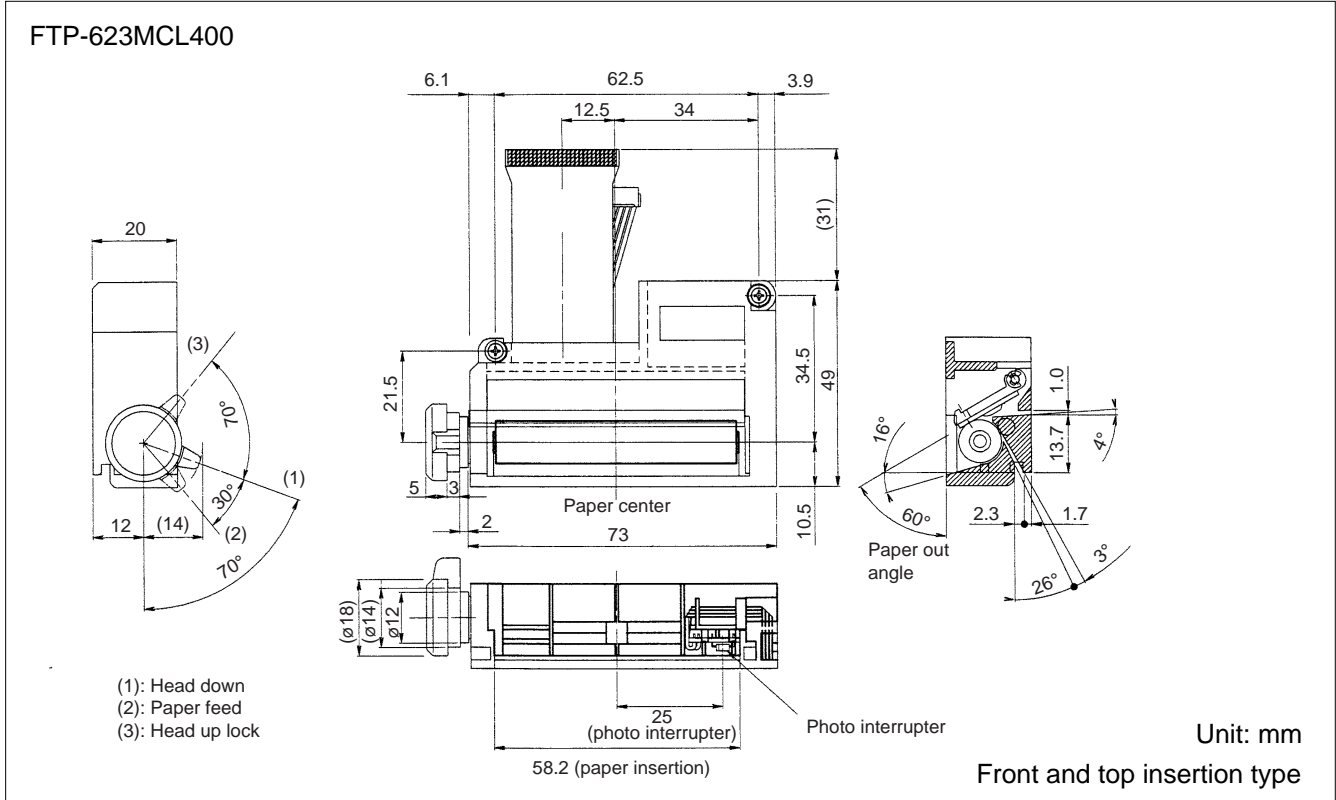
*2: The data to be printed is automatically read out by the printer driver equipment memory (host system frame memory). The communication is parameter transfer.

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

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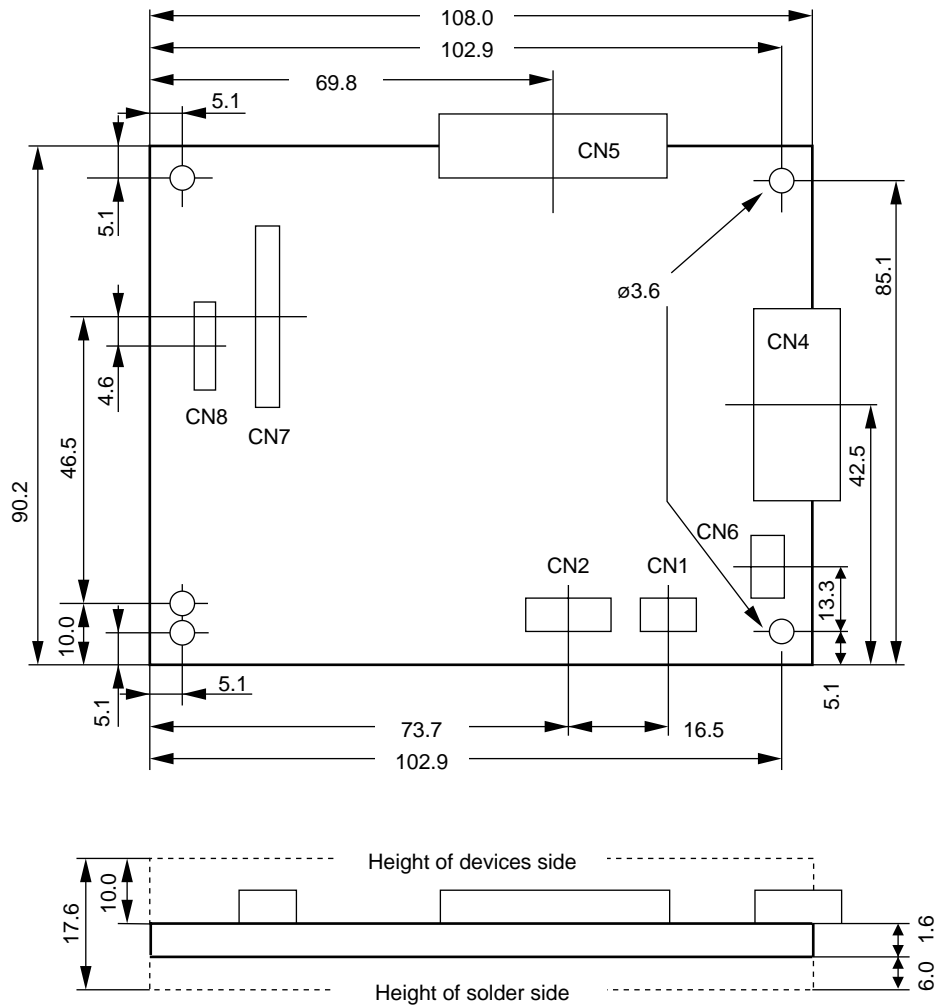
■ DIMENSIONS

Printer mechanism



FTP-623MCL400/FTP-623DCL002

Interface board



Unit: mm

■ 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

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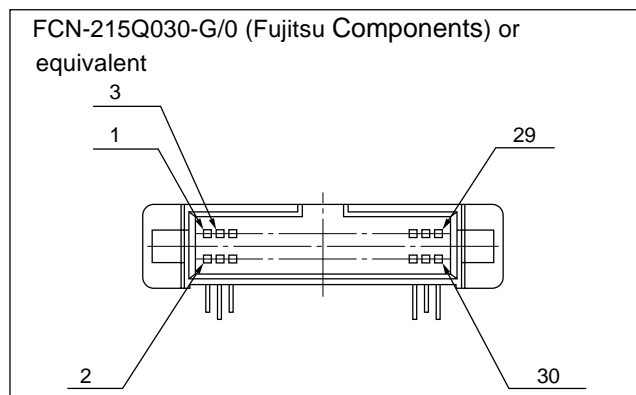
(2) Connector pin assignment

| No. | Signal | I/O | Contents | No. | Signal | I/O | Contents |
|-----|----------------------------|-----|------------------------|-----|---------------------------------------|-----|------------------------|
| 1 | $\overline{\text{PRSTB}}$ | I | Data strobe | 2 | $\overline{\text{PRSTB}}\text{-RET}$ | — | 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 | $\overline{\text{ACKNLG}}\text{-RET}$ | — | Connected to logic GND |
| 21 | BUSY | O | Busy | 22 | BUSY-RET | — | Connected to logic GND |
| 23 | RINF2 | O | Printer status | 24 | $\overline{\text{INPRM}}\text{-RET}$ | — | 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 |

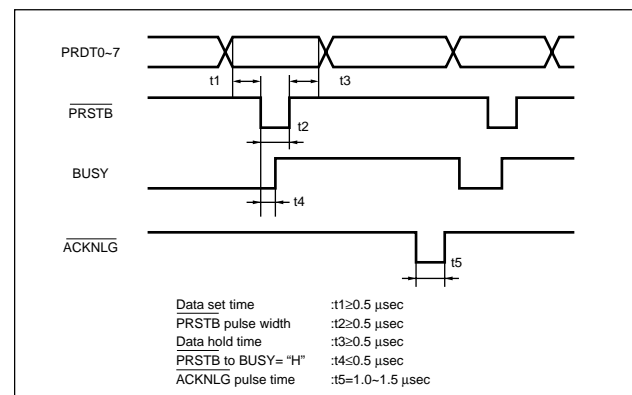
Notes:

- 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



FTP-623MCL400/FTP-623DCL002

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 logical signal.
- "I" or "O" means a signal direction from the interface board 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 | Vcc | — | 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 | $\overline{\text{LAT}}$ | O | Printing data latch |
| 7 | HDV | O | Power for logic | 8 | HCLK | O | Printing transmitting clock |
| 9 | $\overline{\text{ENB8}}$ *1,2 | O | Printing enable (not used) | 10 | $\overline{\text{ENB7}}$ *1,2 | — | Printing enable (not used) |
| 11 | $\overline{\text{ENB6}}$ | O | Printing enable | 12 | $\overline{\text{ENB5}}$ | O | Printing enable |
| 13 | VREF | 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 | $\overline{\text{ENB4}}$ | O | Printing enable |
| 21 | $\overline{\text{ENB3}}$ | O | Automatic paper loading | 22 | $\overline{\text{ENB2}}$ | O | Printing enable |
| 23 | $\overline{\text{ENB1}}$ | 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 interface 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 | Vcc | — | Power for switch |
| 3 | PINCH | I | Paper auto loading detection | 4 | SDV | — | Power for photointerrupter |
| 5 | SLED | — | Power for diode cathode | 6 | $\overline{\text{PES}}$ | I | Paper out detection |
| 7 | $\overline{\text{MT/B0}}$ | O | Stepping motor coil excitation ($\overline{\text{B}}$) | 8 | MT/B0 | O | Stepping motor coil excitation (B) |
| 9 | $\overline{\text{MT/A0}}$ | O | Stepping motor coil excitation ($\overline{\text{A}}$) | 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 returns the line. |
| Double width print set | SO | Sets the double width character. |
| Power-down mode set | DC2, DC3 | Reduces power consumption during stand by. |
| Double width print reset | DC4 | Resets the double width 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 $2 \times$ (0 to 255 dot lines). |
| Paper feed set in normal direction | ESC B + n | Sets the paper feed in normal direction. (Feeding range: $2 \times$ (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 selected 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: $2 \times$ (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 special characters. |
| Start position set for bit-image printing | ESC 1+n | Sets the print start position of bit-image printing at the 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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