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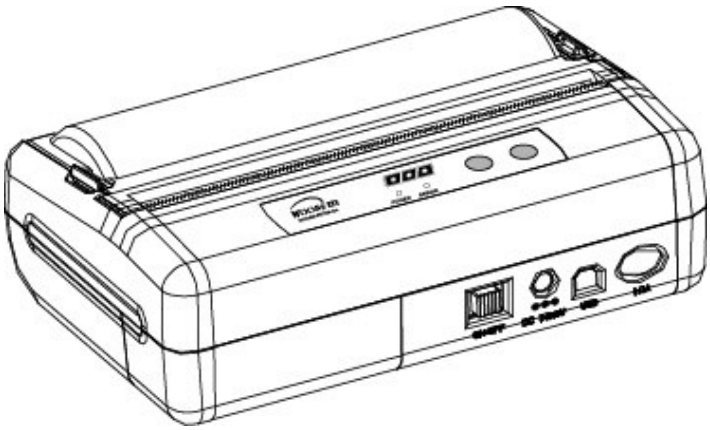
## PRZENOŚNA DRUKARKA TERMICZNA

# PORTI W40

## INSTRUKCJA OBSŁUGI



## Trademark



**Ostrzeżenie**:

- Niektóre urządzenia półprzewodnikowe mogą być łatwo uszkodzone przez statyczną elektryczność. Należy wyłączyć drukarkę każdorazowo przed podłączaniem lub odłączaniem kabla komunikacyjnego (lub ładowarki).
- Nie wolno używać innego akumulatora lub ładowarki niż dostarczony przez producenta drukarki.
- Nie wolno wrzucać akumulatora do ognia lub wody, ani dokonywać ich demontażu.
- Nie wolno otwierać pokrywy papieru w czasie druku.
- Nie dotykać głowicy termicznej bezpośrednio po wydruku.

**Należy unikać:**

- uderzeń o twarde przedmioty i wstrząsów, kurzu, zapylenia i wilgoci,
- instalacji w pobliżu źródeł ciepła oraz w miejscu bezpośrednio nasłonecznionym,
- instalacji w zasięgu silnych pól elektrycznych, magnetycznych i elektromagnetycznych

**Inne uwagi:**

- Wyłącz drukarkę, jeśli nie jest używana.
- Ładowarka oraz akumulator może się nagrzewać podczas pracy.

Czas pracy akumulatora w niskich temperaturach może być krótszy.

## 1. Informacje ogólne

Dzięki nowoczesnym rozwiązaniom technicznym jest jedną z najlżejszych i najlepszych przenośnych drukarek na rynku. Umożliwia wydruk wysokiej jakości faktur VAT, biletów, paragonów i etykiet zawierających również grafikę, wykresy, tabele oraz kody paskowe 1D i 2D. Łatwą wymianę rolki papieru zapewnia mechanizm CLAMSHELL. Drukarka jest kompatybilna z Windows 98/Me/XP/2000. Posiada możliwość druku logo firmy z pamięci Flash; programowa kontrola przesyłu danych (XON/XOF); nie obsługuje sprzętowej kontroli transmisji danych. Stanowi idealne narzędzie pracy dla inkasentów, leśników i handlowców.

### 1.1. Dane techniczne

| Parametr | Specyfikacja | |
|---|---|---|
| Metoda druku | druk termiczny, głowica liniowa | |
| Ilość znaków w linii | 92, 69 | |
| Matryca znaku | 9*24, 12*24 pkt | |
| Rozdzielczość | 203dpi, 8pkt/mm | |
| Szerokość druku | 4 cale (104mm, 832 punktów) | |
| Szybkość druku | 40mm/s; Szybkość druku może być wolniejsza w zależności od transmisji danych oraz kombinacji kodów sterujących. | |
| Wymiary | 138 * 88.5 * 45.2 mm (Standard model) | |
| Waga | 446g (wraz z akumulatorem i rolką papieru) | |
| Komunikacja | RS-232C, IrDA Ver1.0 (SIR), opcja Bluetooth® | |
| Zalecany papier | Rolki termiczne (szerokość 113mm, średnica 38mm) | |
| Kody paskowe | PDF417(2D), Code128, Code39, I2/5, Code93,<br>UPC, EAN, KAN, JAN, CODABAR | |
| Bufor | 10 kB | |
| Zasilanie | Wymienny akumulator 7.4V DC, 1400mAh(Li-ion) | |
| Czas pracy baterii | 1 godzina ciągłego drukowania | |
| Zasilacz/ładowarka | Input (100~250VAC, 50~60Hz)<br>Output(8.4VDC/0.8A), Czas ładowania – 4 godziny | |
| Warunki zewnętrzne | Temperatura | -10°C ~ 40°C (praca)<br>-10°C ~ 70°C (przechowywanie) |
| | Wilgotność | 30% - 80% (praca)<br>10% - 90% (przechowywanie) |
| Średni czas pracy bezawaryjnej<br>MCBF (Mean Cycle Between failure) | Mechanizm | 37,000,000 wierszy |
| | Głowica | około 50 km druku |

## 1.2. Papier termiczny

**Przechowywanie papieru:**

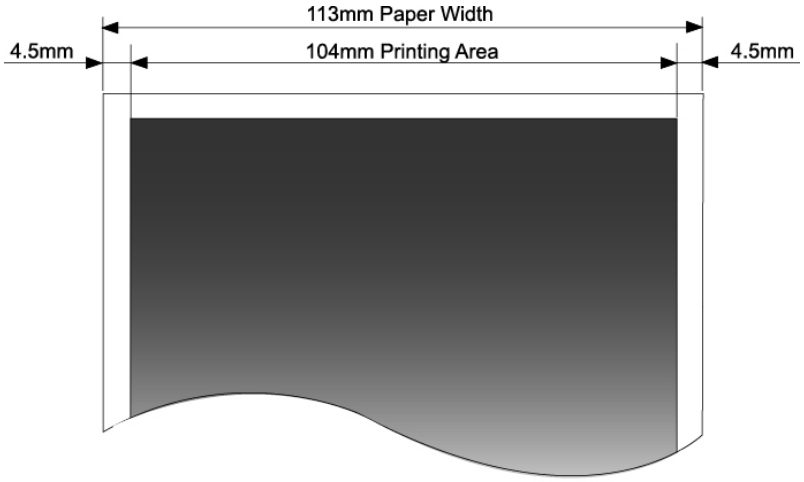
- w miejscach zaciemnionych,
- w wilgotności względnej powietrza poniżej 65%,
- w temperaturze poniżej 25$^{o}$C,

**Zadrukowany papier nie może być:**

- wystawiony na bezp. działanie światła słonecznego,
- stykać się z alkoholem lub rozpuszczalnikami,
- przechowywany w folii PCV,
- przechowywany w temp. powyżej 25$^{o}$C.

**Zalecany papier termiczny:**

| | |
|---|---|
| Szerokość rolki | : 113mm |
| Średnica rolki | : Ø38mm lub mniejsza |
| Grubość papieru | : 70±5 Mm |
| Strona termoczuła | : zewnętrzna |
| Obszar druku/szerokość/ | : 104 mm |



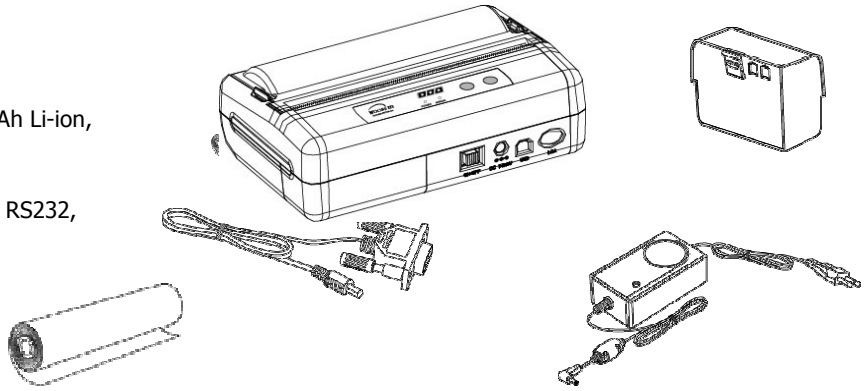
## 2. Kompletność drukarki i wymiary zewnętrzne

Opakowanie zawiera poniższe akcesoria.

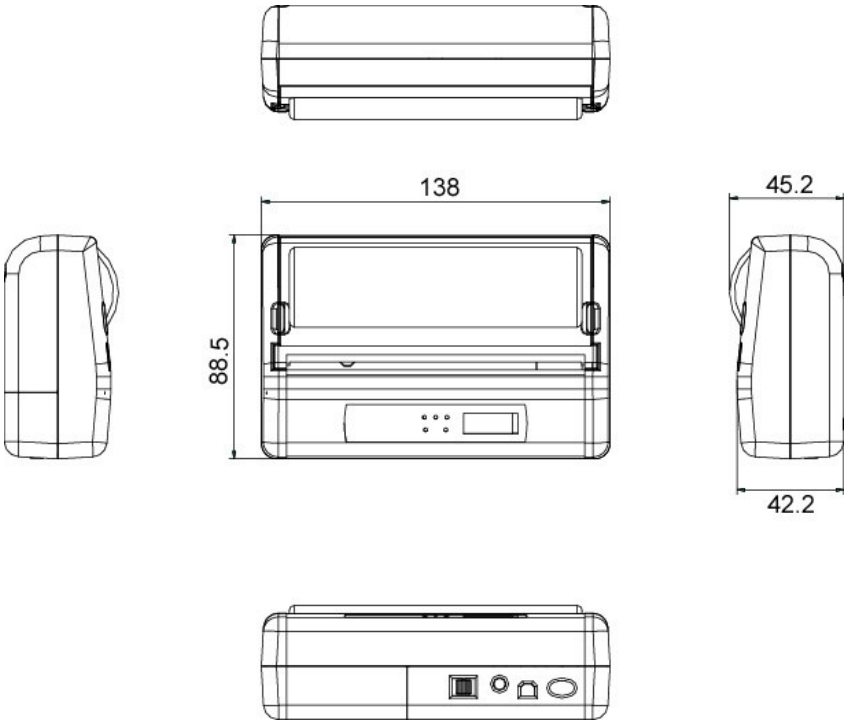
Jeśli brakuje dowolnej części, to proszę skontaktować się ze sprzedawcą.

**Kompletność:**

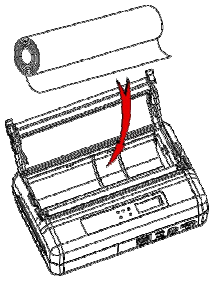
- drukarka,
- akumulator 7.4V/1.4Ah Li-ion,
- zasilacz/ładowarka,
- kabel komunikacyjny RS232,
- rolka termiczna.



**Wymiary zewnętrzne**



## 3. Obsługa drukarki



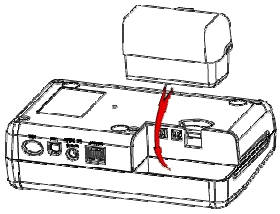
**Zakładanie rolki:**

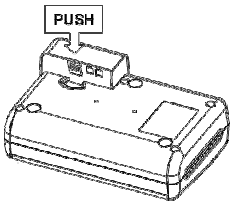
- wyłącz drukarkę,
- otwórz pokrywę wciskając z obu stron metalowe przyciski do środka (po bokach pokrywy),
- włóż rolkę zgodnie z rysunkiem,
- ostrożnie zamknij pokrywę.

**Instalacja/odłączanie akumulatora:**

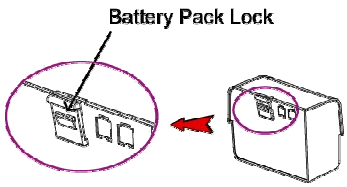
- włącznik drukarki musi być w pozycji OFF!
- należy wyjąć akumulator, jeśli drukarka nie będzie używana przez dłuższy okres czasu i składować w chłodnym miejscu.

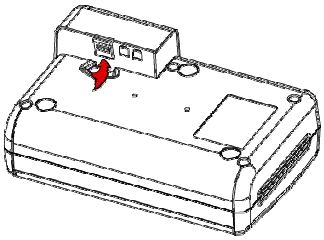
Instalacja: akumulator włożyć do drukarki zgodnie z rysunkiem





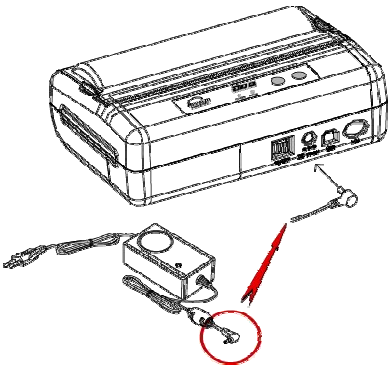

Odłączanie: wcisnąć zatrzask akumulatora i wyjąć akumulator zgodnie z rysunkiem



**Ładowanie akumulatora:**

- włącznik drukarki musi być w pozycji OFF!
- odłącz kabel komunikacyjny,
- podłącz ładowarkę do drukarki,
- podłącz ładowarkę do sieci 220V,
- czas pełnego ładowania ok. 4h,



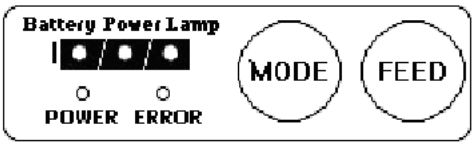
Podczas ładowania nie wolno wyjmować akumulatora.
Stan ładowarki sygnalizuje kolor diody:
- czerwony: trwa ładowanie,
- zielony: akumulator naladowany
- migający czerwony: błąd/uszkodzenie

Aby akumulator Li-ion służył przez długi czas należy:

- doładować po każdym dniu pracy,
- nigdy nie rozładowywać całkowicie,

Podczas pracy stan naładowania akumulatora wskazują 3 diody na panelu drukarki.

## 4. Ustawienie drukarki.




W celu zmiany ustawień należy włączyć drukarkę przy wciśniętym przycisku MODE aż dioda „Error" mignie 5 razy. Następnie przyciskiem FEED zmieniamy grupę opcji (określa ilość mignięć diody „Power"), zaś przyciskiem MODE zmieniamy ustawienie danej opcji (określa ilość mignięć diody „Error"). Zapis ustawień: jednocześnie wcisnąć przyciski MODE i FEED.

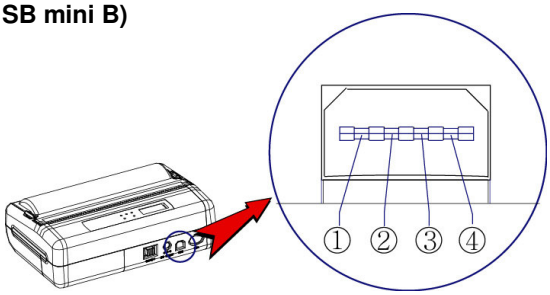
| MODE | POWER Lamp (Zielona) | ERROR Lamp (Czerwona) | Option |
|---|---|---|---|
| **Communication Port** | 1 | **1** | **RS-232C** |
| | | 2 | Protocol IrDA / Protocol Bluetooth |
| | | 3 | Standard IrDA / Bluetooth |
| **Baud Rate** | 2 | 1 | 1200 bps |
| | | 2 | 2400 bps |
| | | 3 | 4800 bps |
| | | **4** | **9600 bps** |
| | | 5 | 19200 bps |
| | | 6 | 38400 bps |
| | | 7 | 57600 bps |
| | | 8 | 9600 bps |
| **Data Bit** | 3 | 1 | 7 Data bit |
| | | **2** | **8 Data bit** |
| **Parity Bit** | 4 | **1** | **No Parity** |
| | | 2 | Even Parity |
| | | 3 | Odd Parity |
| **Density** | 5 | 1 | Density Low |
| | | **2** | **Density Medium** |
| | | 3 | Density High |
| **Protocol** | 6 | **1** | **Default Protocol** |
| | | 2 | Lotte Protocol |
| **Mark** | 7 | **1** | **No use** |
| | | 2 | Use |

**Autotest drukarki:** Przy wciśniętym przycisku FEED włączyć drukarkę, po chwili (po 1-3 sekundach) zwolnić przycisk FEED.

## 5. Porty komunikacyjne.

### 5.1. Port szeregowy RS-232C (złącze typu USB mini B)

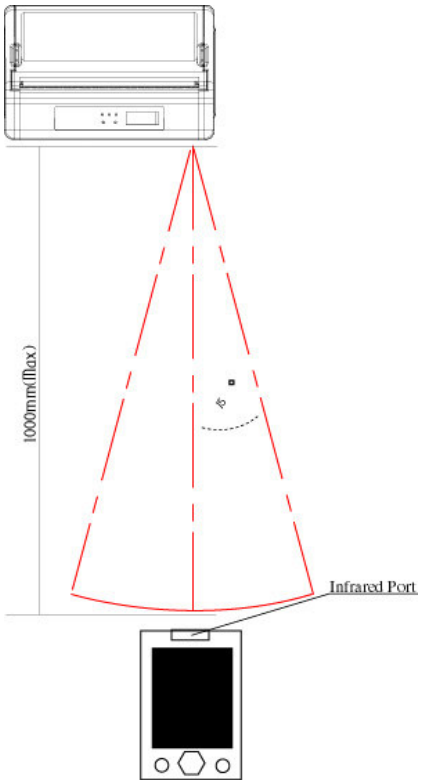
| Pin No. | Name | Direction | Function |
|---|---|---|---|
| 1 | TxD | Output | Transmit Data |
| 2 | RxD | Input | Receive Data |
| 3 | CTX | - | - |
| 4 | GND | - | Ground |




### 5.2. Port podczerwieni IrDA

Port podczerwieni znajduje się po prawej stronie przedniego panelu i obsługuje dwukierunkową transmisję danych.

1. Aby móc wykorzystać port podczerwieni komputer także musi posiadać port IrDA.
2. Odległość komputera od drukarki powinna wynosić max. 100 cm.




### 5.3. Bluetooth®

Kod parowania wynosi 1234.

| Category | Specification |
|---|---|
| **Bluetooth Spec.** | Bluetooth V1.1 / Class2 (10m) |
| **Frequency Range** | 2.4GHz ISM BAND |
| **Baud Rate** | 57600bps Fixed. |
| **Data bit** | 8 Data bit Fixed. |
| **Parity bit** | No parity Fixed. |
| **Stop bit** | 1 Stop bit Fixed. |

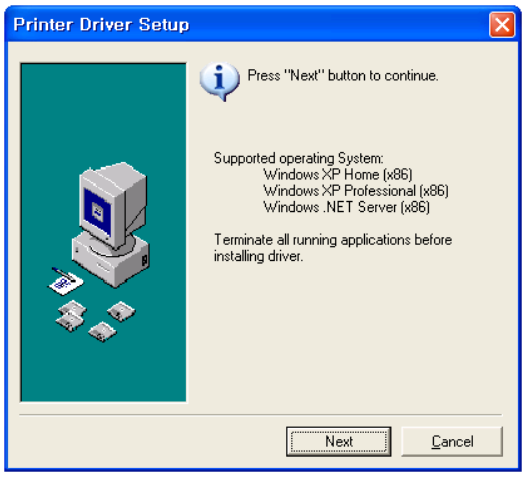
Uwaga: Jeśli ilość danych jest większa od 20kB, to część danych może zostać utracona – należy wówczas wysyłać dane z opóźnieniem.

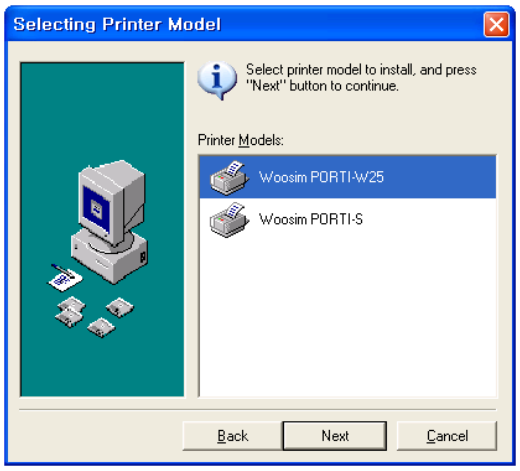
## 6. Instalacja sterowników dla Windows

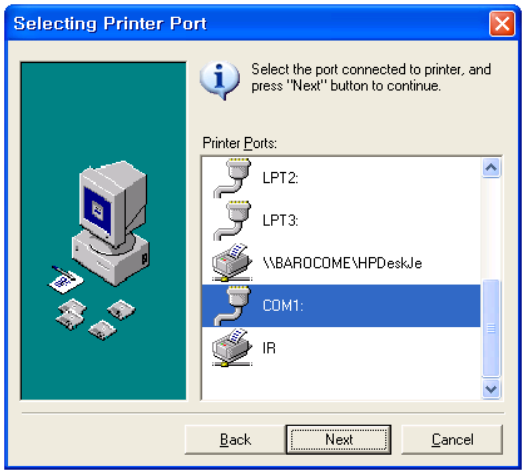
Sterowniki można pobrać ze strony internetowej http://www.woosim.com/

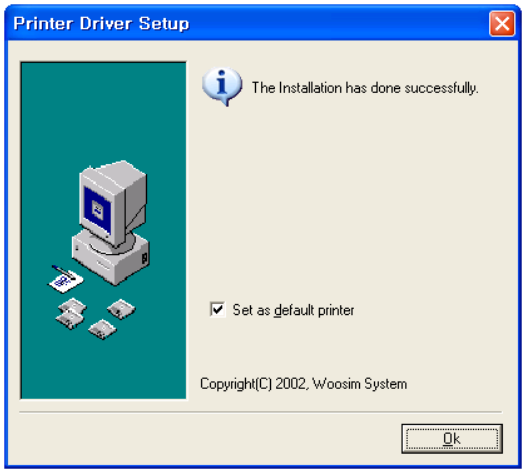
Obsługują one port podczerwieni (IrDA) oraz port szeregowy RS232C.

Przed instalacją należy usunąć starsze sterowniki dla drukarki Porti W40, jeśli były wcześniej zainstalowane i ponownie uruchomić komputer. Instalacja jest bardzo prosta. Praktycznie wystarczy potwierdzić lewym klawiszem myszy przyciski „Next" (Dalej) oraz OK.



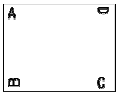




Drukarka posiada możliwość załadowania do pamięci Flash ROM 2 plików graficznych w formacie PCX. W tym celu należy pobrać ze strony http://www.woosim.com program Porti_Download. Plik PCX musi być czarno-biały, zaś szerokość musi być wielokrotnością x8 punktów. Aby wydrukować grafikę należy wykorzystać komendę „ESC f".

## 7. Skrócony opis kodów sterujących w języku polskim.

| Kod | Decimal | Opis | Kod | Decimal | Opis |
|---|---|---|---|---|---|
| LF | 10 | Przejście do następnego wiersza | GS $ nl nh | 29 36 ... | Wysokość absolutna w trybie stronicowym |
| ESC J | 27 74 n | Wysuw papieru o n/216 cala | GS \ nl nh | 29 92 ... | Wysokość względna w trybie stronicowym |
| ESC d n | 27 100 n | Wysuw n wierszy | ESC O | 29 79 xl xh yl yh | Pozycja startowa w trybie stronicowym |
| CAN | 24 | Przerwanie druku - tryb stronicowy | | | |
| FF<br>ESC FF | 12<br>27 12 | Druk danych i przejście do normalnego tryb<br>Wydruk danych w trybie stronicowym, pozostaje nadal w tym trybie | ESC * | 27 42 m nl nh d1...dk | Grafika dla m=<br>**0** - 8 dots single, **1**- 8 dots double<br>**32** - 24 dots single, **33**- 24 dots double |
| ESC 2 | 27 50 | Odstęp wierszy = 1/7" | ESC X 4 | 27 88 52 x y d1..dk | Grafika: dane = x*y bajtów<br>szerokość = x*8 dots, wysokość = y dots |
| ESC 3 n | 27 51 n | Ustawienie odstępu na n/216" | | | |
| ESC SP n | 27 32 n | Set right-side character spacing;(n=0) odstęp między literami | ESC f n | 27 102 n | Wydruk logo (grafiki)<br>0, 48= logo1, 1,49 = logo2 |
| ESC R n | 27 82 n | Wybór znaków narodowych:<br>0=USA, 1=France, 2=Germany, 3=UK | GS h | 29 104 n | Wysokość kodu kreskowego w n dots (n=80) |
| | | | GS w n | 29 119 n | Szerokość kodu kreskowego w n dots (n=0) |
| ESC ! n | 27 33 n | nr i waga bitu: = 1 =0<br>0 1 92 cpl 69 cpl<br>3 8 **bold** ~~bold~~<br>4 16 2*height normal<br>5 32 2*width normal<br>7 128 <u>underline</u> normal<br>bity 1, 2 i 6 nie są wykorzystane | GS k m | 29 107 m ... NUL | Kod kreskowy: m=0-UPC-A, 1-UPC-E,<br>2-Ean13, 3-Ean8, 4-CODE39,<br>5-ITF, 6-CODABAR |
| | | | GS k m n | 29 107 m n .... NUL | Kod kreskowy: n- ilość danych<br>m= 65-UPC-A, 66-UPC-E, 67-Ean13,<br>68-Ean8, 69-Code39, 70-ITF,<br>71-Codabar, 72-Code93, 73-Code128 |
| ESC – n | 27 45 n | n=0,**1**,**2**, 48,**49,50** <u>underline</u> off/**on**<br>**double** | GS H n | 29 72 n | n=0,1,48,49 HRI pod kodem paskowym |
| ESC E n | 27 69 n | n=0,**1**,48,**49** **bold** off/**on** | GS Z | 29 90 m n k dl dh d1...dn | Kod kreskowy 2D PDF417<br>m-liczba kolumn, n- st.bezpieczeństwa<br>k-współczynnik x/y, dl+dh*256 - liczba danych |
| ESC { n | 27 123 n | n=0,**1**,48,**49** upside down off/**on**<br>od prawej do lewej odwrócony druk | | | |
| GS ! n | 29 33 n | n=YX – X,Y=0...7 hexadecymalnie<br>dla 75h – powiększenie 6x, 8y | GS i | 29 105 xl xh yl yh n | Druk linii/prostokąta o grubości n dots<br>xk=xl+256*xh yk=yl+256*yh |
| ESC B n | 27 66 n | n=0,1,48,49: reverse black/white | ESC @ | 27 64 | Reset drukarki (inicjalizacja) |
| ESC c 5 | 27 97 53 n | n=0,1,48,49; disable panel buttons | GS L n n | 29 76nl nh | Lewy margines = nl+nh*256 dots |
| ESC $ n | 27 36nl nh | pozycja absolutna = nl+256*nh dots | GS Wn n | 29 87nl nh | Szerokość druku = nl+nh*256 dots |
| ESC / n | 27 92nl nh | poz. względna = nl+256*nh dots | **ESC t** | 27 116 n | PL znaki: n=3 **Mazovia**, 4=Windows, 5=Latin-2 |
| ESC a n | 27 97 n | wyrównanie tekstu:<br>0, 48 – do lewej<br>1, 49 – centrowanie<br>2, 50 – do prawej | ESC T n | 27 84 n<br>1,49=B<br>2,50=C<br>3,51=D | Kierunek druku: 0,48=A<br>do góry<br>do lewej<br>do dołu<br>  |
| HT | 09 | Tab: dla pozycji ustawionych ESC D" | ESC W | 27 87 xl xh yl yh dxl dxh dyl dyh | Obszar druku w trybie stronicowym<br>x0=xl+xh*256, y0=yl+yh*256<br>dx=dxl+dxh*256 dy=dyl+dyh*256 |
| ESC D | 27 68 ... 0 | ESC D k1....kn NUL - ustawia tabulację<br>ESC D NUL – usuwa tabulacje | | | |

## 8. Wykaz komend w języku angielskim

| Command | Name | Function Type | Page |
|---|---|---|---|
| **LF** | Print and line feed | Print | 13 |
| **ESC J** | Print and feed paper | Print | 13 |
| **ESC d** | Print and feed n lines | Print | 13 |
| **FF** | Print and return to standard mode | Print | 13 |
| **ESC FF** | Print data in page mode | Print | 13 |
| **ESC 2** | Select default line spacing | Line spacing | 14 |
| **ESC 3** | Set line spacing | Line spacing | 14 |
| **ESC SP** | Set right-side character spacing | Character | 15 |
| **ESC R** | Select an international character set | Character | 15 |
| **ESC !** | Select print mode | Character | 16 |
| **ESC -** | Turn underline mode on/off | Character | 17 |
| **ESC E** | Turn emphasized mode on/off | Character | 17 |
| **ESC {** | Turn upside-down printing mode on/off | Character | 18 |
| **GS !** | Select characters size | Character | 19 |
| **GS B** | Turn white/black reverse printing mode On/off | Character | 20 |
| **ESC c 5** | Enable/disable panel buttons | Panel button | 20 |
| **ESC $** | Set absolute print position | Print position | 21 |
| **ESC** \ | Set relative print position | Print position | 22 |
| **ESC a** | Select justification | Print position | 23 |
| **HT** | Horizontal tab | Print position | 23 |
| **ESC D** | Set horizontal tab positions | Print position | 24 |
| **GS L** | Set left margin | Print position | 25 |
| **GS W** | Set printing area width | Print position | 26 |
| **ESC W** | Set printing area in page mode | Print position | 27 |
| **ESC T** | Select print direction in page mode | Print position | 28 |
| **GS $** | Set absolute vertical print position in page mode | Print position | 29 |
| **GS** \ | Set relative vertical print position in page mode | Print position | 30 |
| **ESC O** | Set print starting position. | Print position | 30 |
| **ESC *** | Select bit-image mode | Bit image | 31 |
| **ESC X 4** | Define user-defined bit-image | Bit image | 33 |
| **ESC f** | Print downloaded bit image | Bit image | 34 |

| Command | Name | Function Type | Page |
|---|---|---|---|
| **ESC v** | Transmit paper sensor status | Status | 34 |
| **GS h** | Set barcode height | Barcode | 35 |
| **GS w** | Set barcode width | Barcode | 35 |
| **GS k** | Print bar code | Barcode | 35 |
| **GS H** | Select printing position of HRI characters | Barcode | 36 |
| **ESC Z** | Print 2D barcode | Barcode | 37 |
| **GS :** | Start/end macro definition | Macro function | 37 |
| **GS ^** | Execute macro | Macro function | 37 |
| **GS P** | Set horizontal and vertical motion units | Miscellaneous function | 38 |
| **ESC @** | Initialize printer | Miscellaneous function | 39 |
| **ESC L** | Select page mode | Miscellaneous function | 39 |
| **ESC S** | Select standard mode | Miscellaneous function | 40 |
| **CAN** | Cancel print data in page mode | Miscellaneous function | 40 |
| **GS i** | Print box & line in page mode | Box & line command | 41 |
| **ESC P** | Set the movement position from the black mark | Black mark detection | 41 |
| **ESC z**<br>**ESC y** | Feed the paper to the movement position | Black mark detection | 41 |

### 8.1. Print Commands

**LF**

| | |
|---|---|
| [Name] | Print and line feed |
| [Format] | ASCII LF<br>HEX 0A<br>Decimal 10 |
| [Description] | Print the data in the print buffer and feeds one line based on the current line spacing. |
| [Note] | This command sets the print position to the beginning of the line. |
| [Reference] | **ESC 2, ESC 3** |

**ESC J n**

| | |
|---|---|
| [Name] | Print and feed paper. |
| [Format] | ASCII ESC J n<br>HEX 1B 4A n<br>Decimal 27 74 n |
| [Range] | $0 \leq n \leq 255$ |
| [Description] | Prints the data in the print buffer and feeds the paper [n x (vertical or horizontal motion unit)] inches. |

**ESC d n**

| | |
|---|---|
| [Name] | Print and feed n lines |
| [Format] | ASCII ESC d n<br>HEX 1B 64 n<br>Decimal 27 100 n |
| [Range] | $0 \leq n \leq 255$ |
| [Description] | Prints the data in the print buffer and feeds n lines. |
| [Note] | 1) This command sets the print starting position to the beginning of the line.<br>2) This command does not affect the line spacing set by ESC 2 or ESC 3. |
| [Reference] | **ESC 2, ESC 3** |

**FF**

| | |
|---|---|
| [Name] | Print and return to standard mode in page mode. |
| [Format] | ASCII FF<br>HEX 0C<br>Decimal 12 |
| [Description] | Prints the data in the print buffer collectively and returns to standard mode. |
| [Note] | 1) The buffer data is deleted after being printed.<br>2) The Printing area set by ESC W is reset to the default setting.<br>3) This command sets the print position to the beginning of the line.<br>4) This command is enabled only in page mode. |
| [Reference] | **ESC FF, ESC L, ESC S** |

**ESC FF**

| | |
|---|---|
| [Name] | Print data in page mode. |
| [Format] | ASCII ESC FF<br>HEX 1B 0C<br>Decimal 27 12 |
| [Description] | In page mode, prints all buffered data in the printing area collectively. |
| [Note] | This commands is enabled only in page mode.<br>After printing the printer does not clear the buffered data, setting values for ESC T and ESC W, and the position for buffering. |
| [Reference] | **FF, ESC L, ESC S** |

### 8.2. Line Spacing Commands

These commands only set the line spacing; they do not actually advance the paper. The line spacing set using these commands affects the results of **LF** and **ESC d** and paper feeding by using the FEED button.

**ESC 2**

| | | | | |
|---|---|---|---|---|
| [Name] | Select default line spacing | | | |
| [Format] | ASCII | ESC | 2 | |
| | HEX | 1B | 32 | |
| | Decimal | 27 | 50 | |
| [Description] | Selects 1/7 inch line (approximately 3.75mm) spacing. | | | |
| [Note] | The line spacing can be set independently in standard mode and in page mode. | | | |
| [Reference] | **ESC 3** | | | |

**ESC 3 n**

| | | | | |
|---|---|---|---|---|
| [Name] | Set line spacing | | | |
| [Format] | ASCII | ESC | 3 | n |
| | HEX | 1B | 33 | n |
| | Decimal | 27 | 51 | n |
| [Range] | $0 \leq n \leq 255$ | | | |
| [Description] | Sets the line spacing to [n x vertical or horizontal motion until] inches. | | | |
| [Note] | 1) The line spacing can be set independently in standard mode and in page mode.<br>2) The horizontal and vertical motion unit are specified by GS P.<br>Changing the horizontal or vertical motion unit does not affect the current line spacing.<br>3) The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum vertical movement amount, and it must be in even units of the minimum vertical movement amount.<br>4) In standard mode, the vertical motion unit (y) is used.<br>5) In page mode, this command functions as follows, depending on the starting position of the printable area:<br>When the starting position is set to the upper left or lower right of the printable area using ESC T, the vertical motion unit(y) is used. When the starting position is set to the upper right or lower left of the printable area using ESC T, the horizontal motion unit(x) is used. | | | |
| [Reference] | **ESC 2, GS P** | | | |

### 8.3. Character Commands

**ESC SP n**

[Name] Set right-side character spacing.

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | SP | n |
| HEX | 1B | 20 | n |
| Decimal | 27 | 32 | n |

[Range] $0 \leq n \leq 255$

[Description] Sets the character spacing for the right side of the character to [n x horizontal or vertical motion units] inches.

[Note] 1) The right side character spacing for double-width mode is twice the normal value. When characters are enlarged, the right side character spacing is n times normal value.

2) This command sets values independently in each mode.

3) The horizontal and vertical motion unit are specified by GS P. Changing the horizontal or vertical motion unit does not affect the current right-side spacing.

4) The maximum right side spacing if 255/180 inches, Any setting exceeding the maximum is converted to the maximum automatically.

[Default] n = 0

[Reference] **GS P**

**ESC R n**

[Name] Select an international character set.

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | R | n |
| HEX | 1B | 52 | n |
| Decimal | 27 | 82 | n |

[Range] $0 \leq n \leq 10$ **[Default] n = 0**

[Description] Selects an international character set n from the following table.

| *n* | *Character set* | *n* | *Character set* | *n* | *Character set* |
|---|---|---|---|---|---|
| ***0*** | U.S.A | **5** | Sweden | **10** | Denmark II |
| ***1*** | France | **6** | Italy | | |
| ***2*** | Germany | **7** | Spain | | |
| ***3*** | U.K | **8** | Japan | | |
| ***4*** | Denmark I | **9** | Norway | | |

**ESC ! n**

[Name] Select print mode.

[Format] ASCII ESC ! n

HEX 1B 21 n

Decimal 27 33 n

[Range] 0 ≤ n ≤ 255

| Bit | Off/On | Hex | Dec | Function |
|---|---|---|---|---|
| ***0*** | Off | 00 | 0 | Character font A (12 x 24) |
| | On | 01 | 1 | Character font B (9 x 24) |
| ***1*** | - | - | - | Undefined |
| ***2*** | - | - | - | Undefined |
| ***3*** | Off | 00 | 0 | Emphasized mode not selected |
| | On | 08 | 8 | Emphasized mode selected |
| ***4*** | Off | 00 | 0 | Double-height mode not selected |
| | On | 10 | 16 | Double-height mode selected |
| ***5*** | Off | 00 | 0 | Double-width mode not selected |
| | On | 20 | 32 | Double-width mode selected |
| ***6*** | - | - | - | Undefined |
| ***7*** | Off | 00 | 0 | Underline mode not selected |
| | On | 80 | 128 | Underline mode selected |

[Note] 1) When both double-height and double-width modes are selected, quadruple size characters are printed.

2) The printer can underline all characters, but can not underline the space set by **HT**.

3) The thickness of the underline is that selected by ESC -, regardless of the character size.

4) When some characters in a line are double or mode height, all the characters on the line are aligned at the baseline.

5) ESC – can also turn on or off underline mode. However, the setting of the last received command is effective.

7) GS ! can also select character size. However, the setting of the last received command is effective.

[Reference] **ESC -, ESC E, GS!**

## ESC - n

[Name] Turn underline mode on/off

[Format] ASCII ESC - n

HEX 1B 2D n

Decimal 27 45 n

[Range] 0 ≤ n ≤ 1

| n | Function |
|---|---|
| **0, 48** | **Turns off underline mode** |
| 1. 49 | Turns on underline mode (1 dot thick). |
| 2, 50 | Turns on underline mode (2 dot thick) |

[Description] Turns underline mode on or off, based on the following values of n;

[Notes] 1) The printer can underline all characters (including right-side character spacing), but cannot underline the space set by HT.

2) The printer cannot underline white/black inverted characters.

3) When underline mode id turned off by setting the value of n to 0 or 48, the following data is not underlined, and the underline thickness set before the mode is turned off does not change. The default underline thickness is 1 dot.

4) Changing the character size does not affect the current underline thickness.

5) Underline mode can also be turned on or off by using ESC !.

Note, however, that the last received command is effective.

[Reference] **ESC !**

## ESC E n

[Name] Turn emphasized mode On/Off.

[Format] ASCII ESC E n

HEX 1B 45 n

Decimal 27 69 n

[Range] 0 ≤ n ≤ 255 [Default] n = 0

[Description] Turns emphasized mode on of off.

When the LSB(least significant bit) is 0, emphasized mode is turned off.

When the LSB(least significant bit) is 1, emphasized mode is turned on.

[Note] 1) Only the least significant bit of n is enabled.

2) This command and ESC ! turn on and off emphasized mode in the same way. Be careful when this command is used with ESC !

[Reference] **ESC !**

## ESC { n

[Name] Turn On/Off upside-down printing mode

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | { | n |
| HEX | 1B | 7B | n |
| Decimal | 27 | 123 | n |

[Range] $0 \leq n \leq 255$

[Description] Turns upside-down printing mode on of off

When the LSB is 0, upside-down mode is turned off.

When the LSB is 1, upside-down mode is turned on.

[Note] 1) Only the lowest significant bit of n is valid.

2) This command is enabled only when processed at the beginning of a line in standard mode.

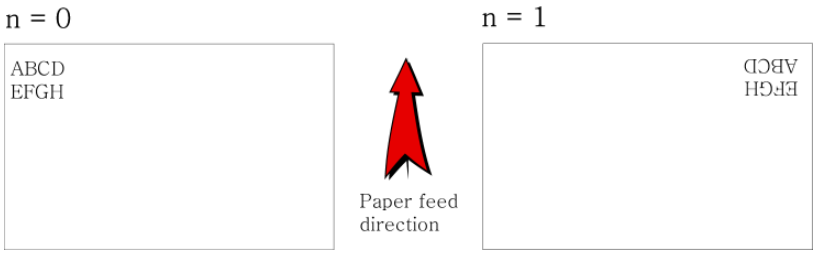
3) When this command is input in page mode, the printer performs only internal flag operations.

4) This command does not affect printing in page mode.

5) In upside-down printing mode, the printer rotates the line to be printed by 180 degree and then prints it.

[Default] n = 0

[Example]



GS ! n

[Name] Select character size

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | ! | n |
| HEX | 1D | 21 | n |
| Decimal | 29 | 33 | n |

[Range] $0 \leq n \leq 255$

[Description] ($1 \leq$ vertical number of times $\leq 8$, $1 \leq$ horizontal number of times $\leq 8$) Selects the character width using bits 0 to 2 and selects the character height using bits 4 to 7, as follows;

| *Hex* | *Decimal* | *Width* |
|---|---|---|
| ***00*** | 0 | 1 (normal) |
| ***01*** | 1 | 2 (double width) |
| ***02*** | 2 | 3 |
| ***03*** | 3 | 4 |
| ***04*** | 4 | 5 |
| ***05*** | 5 | 6 |
| ***06*** | 6 | 7 |
| ***07*** | 7 | 8 |

**Character Width Selection**

| *Hex* | *Decimal* | *Height* |
|---|---|---|
| ***00*** | 0 | 1 (normal) |
| ***10*** | 16 | 2 (double height) |
| ***20*** | 32 | 3 |
| ***30*** | 48 | 4 |
| ***40*** | 64 | 5 |
| ***50*** | 80 | 6 |
| ***60*** | 96 | 7 |
| ***70*** | 112 | 8 |

**Character Height Selection**

[Notes] 1) This command is all characters effective

2) If n is outside of the defined range, this command is ignored.

3) In standard mode, the vertical direction is the paper feed direction, and the horizontal direction is perpendicular to the paper feed direction.

4) In page mode, vertical and horizontal directions are based on the character orientation.

5) When characters are enlarged with different sizes on one line, all the characters on the line are aligned at the baseline.

6) The ESC ! command can also turn double width and double height modes on or off.

[Default] n = 0

[Reference] **ESC !**

GS B n

[Name] Turn white/black reverse printing mode On/Off.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | B | n | |
| HEX | 1D | 42 | n | |
| Decimal | 29 | 66 | n | |

[Range] $0 \leq n \leq 255$ [Default] n = 0

[Description] Turns on or off White/Black reverse printing mode.

[Notes] 1) When the LSB is 0, white/black reverse printing mode is turned on.

2) When the LSB is 1, white/black reverse printing mode is turned off.

3) Only the lowest bit of n is valid.

4) This command is available for built in characters and user defined characters.

5) When white/black reverse printing mode is on, it also applied to character spacing set by ESC SP.

6) This command does not affect the space between lines.

7) White/black reverse mode has a higher priority than underline mode.

Even if underline mode is on, it is disabled (but not canceled) when white/black reverse mode is selected.

## 8.4. Panel Button Commands

ESC c 5 n

[Name] Enable/Disable panel buttons

[Format]

| | | | | | |
|---|---|---|---|---|---|
| ASCII | ESC | c | 5 | n | |
| HEX | 1B | 63 | 35 | n | |
| Decimal | 27 | 97 | 53 | n | |

[Range] $0 \leq n \leq 255$

[Description] Enables or disables the panel buttons.

When the LSB is 0, the panel buttons are enabled.

When the LSB is 1, the panel buttons are disabled.

[Notes] 1) Only the least significant bit of n is valid.

2) When the panel buttons are disabled, none of them are usable when the printer cover is closed.

3) In this printer, the panel buttons is the FEED button.

4) In the macro ready mode, the FEED button are enabled regardless of the settings of this command; the paper cannot be fed by using these buttons.

### 8.5. Print Position Commands

ESC $ nL nH

[Name] Set absolute print position

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | $ | nL | nH |
| HEX | 1B | 24 | nL | nH |
| Decimal | 27 | 36 | nL | nH |

[Range] $0 \leq nL \leq 255$

[Description] Set the distance from the beginning of the line to the position at which subsequent characters are to be printed.

[Notes] 1) The distance from the beginning of the line to the print position is [(nL + nH x 256) x (vertical or horizontal motion unit)] inches.

2) Setting outside the specified printable area are ignored.

3) The horizontal and vertical motion unit are specified by GS P.

4) The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of he minimum horizontal movement amount.

5) In standard mode, the horizontal motion unit (x) is used.

6) In page mode, horizontal or vertical motion unit differs depending on the starting position of the printable area as follows;

When the starting position is set to the upper left or lower right of the printable area using ESC T, the horizontal motion unit (x) is used.

When the starting position is set to the upper right or lower left of the printable area using ESC T, the vertical motion unit (y) is used.

[Reference] ESC\, GS$, GS\, GS P

ESC \ nL nH

[Name] Set relative print position

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | \ | nL | nH |
| HEX | 1B | 5C | nL | nH |
| Decimal | 27 | 92 | nL | nH |

[Range] $0 \leq nL \leq 255$,

$0 \leq nL \leq 255$

[Description] Set the print starting position based on the current position by using

[Notes] 1) This command sets the distance from the current position to [(nL+nHx256) x horizontal or vertical motion unit]

2) Any setting that exceeds the printable are is ignored

3) When pitch N is specified to the right; nL + nH x 256 = N

When pitch N is specified to the left (the negative direction), use the complement of 65536.

4) The print starting position moves from the current position to [N x horizontal or vertical motion unit)]

5) The horizontal and vertical motion unit are specified by GS P.

6) The GS P command can change the horizontal (and vertical) motion unit. The value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

7) In standard mode, the horizontal motion unit is used.

8) In page mode, the horizontal or vertical unit differs as follows, depending on the starting point of the printing area;

When the starting position is set to the upper left or lower right of the printable area using ESC T, the horizontal motion unit (x) is used. When the starting position is set to the upper right or lower left of the printable area using ESC T, the vertical motion unit (y) is used.

[Reference] ESC $, ESC P

## ESC a n

[Name] Select justification

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | a | n |
| HEX | 1B | 61 | n |
| Decimal | 27 | 97 | n |

| n | Justification |
|---|---|
| **0, 48** | **Left justification** |
| 1, 49 | Center justification |
| 2, 50 | Right justification |

[Range] $0 \leq n \leq 2$ , $48 \leq n \leq 50$

[Description] Aligns all the data in one line to the specified position. n selects the type of justification as follows;

[Notes] 1) The command is enabled only when processed at the beginning of the line in standard mode.

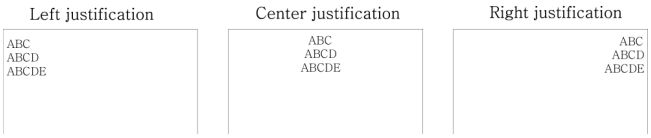
2) If this command is input in page mode, the printer performs only internal flag operations.

3) This command has no effect in page mode.

4) This command executes justification in the printing area.

5) This command justifies the space area according to HT, ESC $ or ESC \

[Example]




## HT

[Name] Horizontal Tab

[Format]

| | |
|---|---|
| ASCII | HT |
| HEX | 09 |
| Decimal | 9 |

[Description] Moves the print position to the next horizontal tab position.

[Note] 1) This command is ignored unless the next horizontal tab position has been set.

2) If the next horizontal tab position exceeds the printing area, the printer sets the printing position to [Printing area width + 1]

3) Horizontal tab positions are set with ESC D.

4) If this command is received when the printing position is at [Printing area width + 1], the printer executes print buffer-full printing of the current line and horizontal tab processing from the beginning of the next line.

5) The default setting of the horizontal tab position for the paper roll is every $0^{th}$ character.

[Reference] ESC D

## ESC D n1…nk NUL

[Name] Set horizontal tab positions.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | D | n1…nk | NUL |
| HEX | 1B | 44 | n1…nk | 00 |
| Decimal | 27 | 68 | n1…nk | 0 |

[Range] 1 <= n <= 255

0 <= k <=32

[Description] Set horizontal tab position

[Notes] 1) n specifies the column number for setting a horizontal tab position from the beginning of the line.

2) k indicates the total number of horizontal tab positions to be set.

3) The horizontal tab position is stored as a value of [character width x n] measured from the beginning of the line. The character width includes the right-side character spacing, and double-width characters are set with twice the width of normal characters.

4) This command cancels the previous horizontal tab settings.

5) When setting n=8,the print position is moved to col 9 by sending HT.

6) Up to 32 tab positions (k=32) can be set. Data exceeding 32 tab positions is processed as normal data.

7) Transmit [n]k in ascending order and place a NUL code 0 at the end.

8) When [n]k is less than or equal to the preceding value [n]k-1, tab setting is finished and the following data is processed as normal data.

9) ESC D NUL cancels all horizontal tab positions.

10) The previously specified horizontal tab positions do not change, even if the character width changes.

11) The character width is memorized for each standard and page mode.

[Default] The default tab positions are at intervals of 0 characters.

[Reference] HT

GS L nL nH

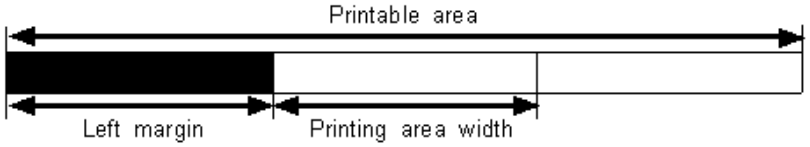
[Name] Set left margin.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | L | nL | nH |
| HEX | 1D | 4C | nL | nH |
| Decimal | 29 | 76 | nL | nH |

[Range] $0 \leq$ nL $\leq 255$, $0 \leq$ nH $\leq 255$

[Description] Set the left margin using nL and nH.




[Notes] 1)The left margin is set to [(nL+nHx256)] x (horizontal motion unit) inches.

2) This command is effective only processed at the beginning of the line in standard mode.

3) If this command is input in page mode, the printer performs only internal flag operations.

4) This command does not affect printing in page mode.

5) If the setting exceeds the printable area, the maximum value of the printable area is used.

6) The horizontal and vertical motion units are specified by GS P.

Changing the horizontal and vertical motion unit does not affect the current left margin.

7) The horizontal motion unit (x) is used for calculating the left margin.

The calculated result is truncated to the minimum value of the mechanical pitch.

[Default] nL = 0, nH = 0

[Reference] GS P, GS W

## GS W nL nH

[Name] Set printing area width

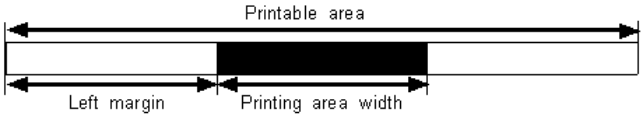
[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | W | nL | nH |
| HEX | 1D | 57 | nL | nH |
| Decimal | 29 | 87 | nL | nH |

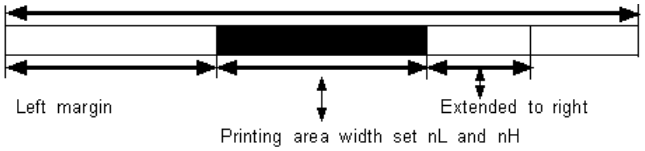
[Range] $0 \leq nL \leq 255$, $0 \leq nH \leq 255$

[Description] Sets the printing area width to the area specified by nL and nH.

[Notes] 1) The printing area width is set to [(nL+nHx256)] x horizontal motion unit inches.




2) This command is effective only processed at the beginning of the line.
3) In page mode, the printer performs only internal flag operations.
4) This command does not affect printing in page mode.
5) If the [left margin + printing area width] exceeds the printable area, (printable area width - left margin) is used.
6) The horizontal and vertical motion units are specified by GS P.
Changing the horizontal and vertical motion units does not affect the current left margin.
7) The horizontal motion unit (x) is used for calculating the printing area width. The calculated result is truncated to the minimum value of the mechanical pitch.
8) If the width set for the printing area is less than the width of one character, when the character data is developed, the following




If the printing area width cannot be extended sufficiently, the left margin is reduced to accommodate one character.
If the printing area width cannot be extended sufficiently, the right space is reduced.
9) If the width set for the printing area is less than one line in vertical, the following processing is performed only on the line in question when data other than character data(e.g., bit image, user defined bit image) is developed:
The printing area width is extended to the right to accommodate one line in vertical for the bit image within the printable area. If the printing area width cannot be extended sufficiently, the left margin is reduced to accommodate one line in vertical.

[Default] nL = 0, nH = 2

[Reference] GS L, GS P

## ESC W xL xH yL yH dxL dxH dyL dyH

[Name] Set printing area in page mode

[Format]

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ASCII | ESC | W | xL | xH | yL | yH | dxL | dxH | dyL | dyH |
| HEX | 1B | 57 | xL | xH | yL | yH | dxL | dxH | dyL | dyH |
| Decimal | 27 | 87 | xL | xH | yL | yH | dxL | dxH | dyL | dyH |

[Range] $0 \leq$ xL,xH,yL,yH,dxL,dxH,dyL,dyH $\leq$255

(except dxL=dxH=0 or dyL=dyH=0)

[Description] The horizontal starting position, vertical starting position, printing area width, and printing area height are defined as x0, y0, dx(inch), respectively.
x0 = [(xL + xH * 256)] * (horizontal motion unit)
y0 = [(yL +yH * 256)] * (vertical motion unit)
dx = [(dxL + dxH x 256)] x (horizontal motion unit)
dy = [(dyL + dyH * 256)] * (vertical motion unit)

[Note]

1) If this commands is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.

2) If the horizontal or vertical starting position is set outside the printable area, the printer stops command processing and processes the following data as normal data.

3) If the printing area width or height is set to 0, the printer stops command processing and processes the following data as normal data.

4) This command sets the position where data is buffered to the position specified by ESC T within the printing area.

5) If (horizontal starting position + printing area width) exceeds the printable area, the printing area width is automatically set to (horizontal printable area - horizontal starting position).

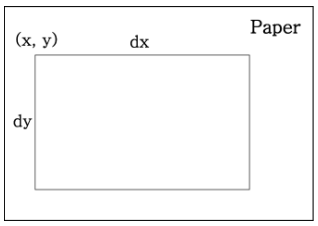
6) If (vertical starting position + printing area height) exceeds the printable area, the printing area height is automatically set to (vertical printable area-vertical starting position).

7) The horizontal and vertical motion unit are specified by GS P. Changing the horizontal or vertical motion unit does not affect the current printing area.

8) The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of minimum horizontal movement amount.

9) Use the horizontal motion unit (x) for setting the horizontal starting position and printing area width, and use the vertical motion unit (y) for setting the vertical starting position and printing area height.

10) When the horizontal starting position, vertical starting position, printing area width, and printing area height are defined as X, Y, Dx, Dy respectively, the printing area is set as shown in the figure below.




[Default] xL = xH = yL = yH = 0

dxL = 0, dxH = 2, dyL = 126, dyH = 6

[Reference] **CAN, ESC L, ESC T, GS P**

**ESC T n**

[Name] Select print direction in page mode

[Format]

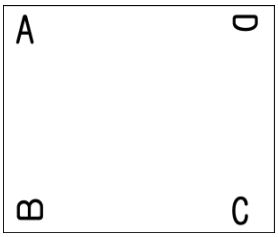
| | | | |
|---|---|---|---|
| ASCII | ESC | T | n |
| HEX | 1B | 54 | n |
| Decimal | 27 | 84 | n |

[Range] $0 \leq n \leq 3$ or $48 \leq n \leq 51$

[Description] Selects the print direction and starting position in page mode.

n specifies the print direction and starting position as follows;

| *n* | Print direction | *Starting position* |
|---|---|---|
| ***0,48*** | Left to right | Upper left (A in the figure) |
| ***1,49*** | Bottom to top | Lower left (B in the figure) |
| ***2,50*** | Right to left | Lower right (C in the figure) |
| ***3,51*** | Top to bottom | Upper right (D in the figure) |




[Notes] 1) When the command is input in standard mode, the printer executes only internal flag operation. This command does not affect printing in standard mode.

2) This command sets the position where data is buffered within the printing area set by ESC W.

3) Parameters for horizontal or vertical motion units (X or Y) differ as follows, depending on the starting position of the printing area;

If the starting position is the upper left or lower right of the printing area, data is buffered in the direction perpendicular to the paper feed direction.

Commands using horizontal motion unit: ESC SP, ESC $, ESC \

Commands using vertical motion unit: ESC 3, ESC J, GS $, GS \

If the starting position is the upper right or lower left of the printing area, data is buffered in the paper feed direction.

Commands using horizontal motion units : ESC 3, ESC J, GS $,GS \

Commands using vertical motion units : ESC SP, ESC $, ESC \

[Default] n = 0

[Reference] **ESC $, ESC L, ESC W, ESC \, GS $, GS P, GS **

GS $ nL nH

[Name] Set absolute vertical print position in page mode.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | $ | nL | nH |
| HEX | 1D | 24 | nL | nH |
| Decimal | 29 | 36 | nL | nH |

[Range] $0 \leq nL \leq 255$, $0 \leq nH \leq 255$

[Description] Sets the absolute vertical print starting position for buffer character data in page mode.

[Notes] 1) This command sets the absolute print position to [(nL+nHx256)]x (vertical or horizontal motion unit) inches.

2) This command is effective only in page mode.

3) If the [(nL+nHx256)] x (vertical or horizontal motion unit) exceeds the specified printing area, this command is ignored.

4) The horizontal starting buffer position does not move.

5) The reference starting position is that specified by ESC T.

6) This command operates as follows, depending on the starting position of the printing area specified by ESC T; When the starting position is set to the upper left or lower right, this command sets the absolute position in the vertical direction. When the starting position is set to the upper right or lower left, this command sets the absolute position in the horizontal direction.

7) The horizontal and vertical motion unit are specified by GS P.

8) The GS P command can change the horizontal and vertical motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

[Reference] ESC $, ESC T, ESC W, ESC \, GS P, GS \

GS \ nL nH

[Name] Set relative vertical print position in page mode

[Format] ASCII GS \ nL nH

HEX 1D 5C nL nH

Decimal 29 92 nL nH

[Range] 0 ≤ nL ≤ 255, 0 ≤ nH ≤ 255

[Description] Sets the relative vertical print starting position from the current position in page mode.

[Notes] 1) This command sets the distance from the current position to [(nL + nHx256)] x vertical or horizontal motion unit inches.

2) This command is ignored unless page mode is selected.

3) When pitch N is specified to the movement downward; nL + nHx256 = N

When pitch N is specified to the movement upward (the negative direction), use the complement of 65536.

When pitch N is specified to the movement upward; nL + nH x 256 = 65536 - N

4) Any setting that exceeds the specified printing area is ignored.

5) This command function as follows,depending on the print starting position set by ESC T;

When the starting position is set to the upper left or lower right of the printing, the vertical motion unit (y) is used.

When the starting position is set to the upper right or lower left of the printing, the horizontal motion unit (x) is used.

6) The horizontal and vertical motion unit are specified by GS P.

7) The GS P command can change the horizontal (and vertical) motion unit. However, the value cannot be less than the minimum horizontal movement amount, and it must be in even units of the minimum horizontal movement amount.

[Reference] ESC $, ESC T, ESC W, ESC \, GS $, GS P

ESC O xL xH yL yH

[Name] Set print starting position.

[Format] ASCII ESC O xL xH yL yH

HEX 1B 4F xL xH yL yH

Decimal 27 79 xL xH yL yH

[Description] Set horizontal starting position and vertical starting position in page mode.

Horizontal starting position = (xL + xH * 256) * (horizontal motion unit)

Vertical starting position = (yL + yH * 256) * (vertical motion unit)

[Note] This command is effective only in page mode.

### 8.6. Bit-Image Commands

ESC * m nL nH d1 dk

[Name] Select bit-image mode.

[Format]

| | | | | | | |
|---|---|---|---|---|---|---|
| ASCII | ESC | * | m | nL | nH | d1…dk |
| HEX | 1B | 2A | m | nL | nH | d1…dk |
| Decimal | 27 | 42 | m | nL | nH | d1…dk |

[Range] m = 0,1,32,33

$0 \leq nL \leq 255$

$0 \leq nH \leq 3$

$0 \leq d \leq 255$

| *m* | *mode* | *Vertical direction* | | *Horizontal direction* | |
|---|---|---|---|---|---|
| | | Dots | Density | Density | Number of Data |
| ***0*** | 8 dot single | 8 | 60 DPI | 90 DPI | nL+nHx256 |
| ***1*** | 8 dot double | 8 | 60 DPI | 180 DPI | nL+nHx256 |
| ***32*** | 24 dot single | 24 | 180DPI | 90 DPI | (nL+nHx256)x3 |

[Description] Selects a bit-image mode using m for number of dots specified by nL, nH.

[Notes] 1) If the values of m is out of the specified range, nL and data following are processed an normal data.

2) The nL and nH indicate the number of dots of the bit image in the horizontal direction.

3) The number of dots is calculated by nL + nH x 256.

4) If the bit-image data input exceeds the number of dots to be printed on a line, the excess data is ignored.

5) d indicates the bit-image data. Set a corresponding bit to 1 to print a dot or to 0 to not print a dot.

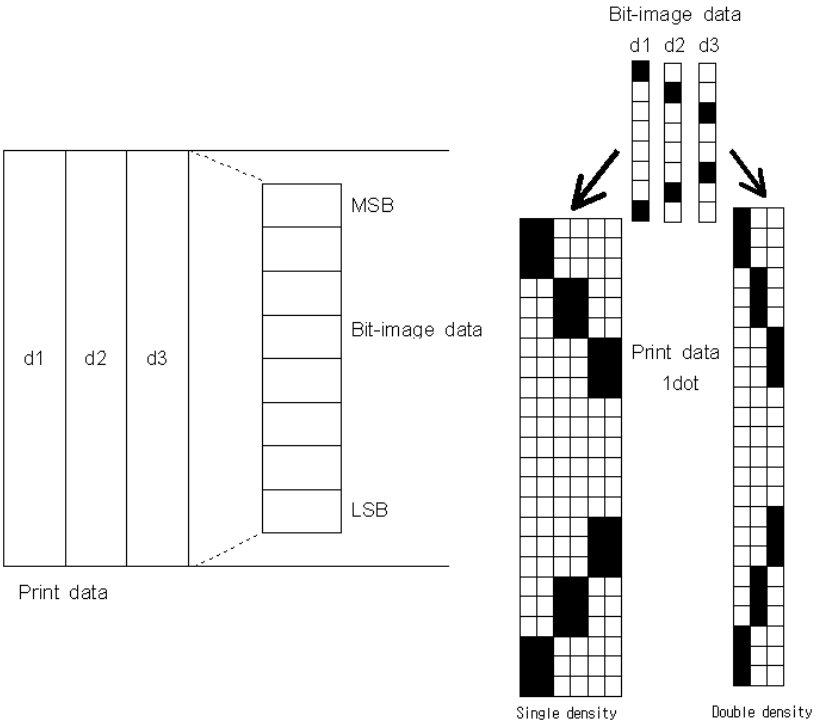
6) If the width of the printing area set by GS L and GS W less than the width required by the data sent with the ESC * command, the following will be performed on the line in question (but the printing cannot exceed the maximum printable area):

The width of the printing area is extended to the right to accommodate the amount of data. If step does not provide sufficient width for the data, the left margin is reduced to accommodate the data.

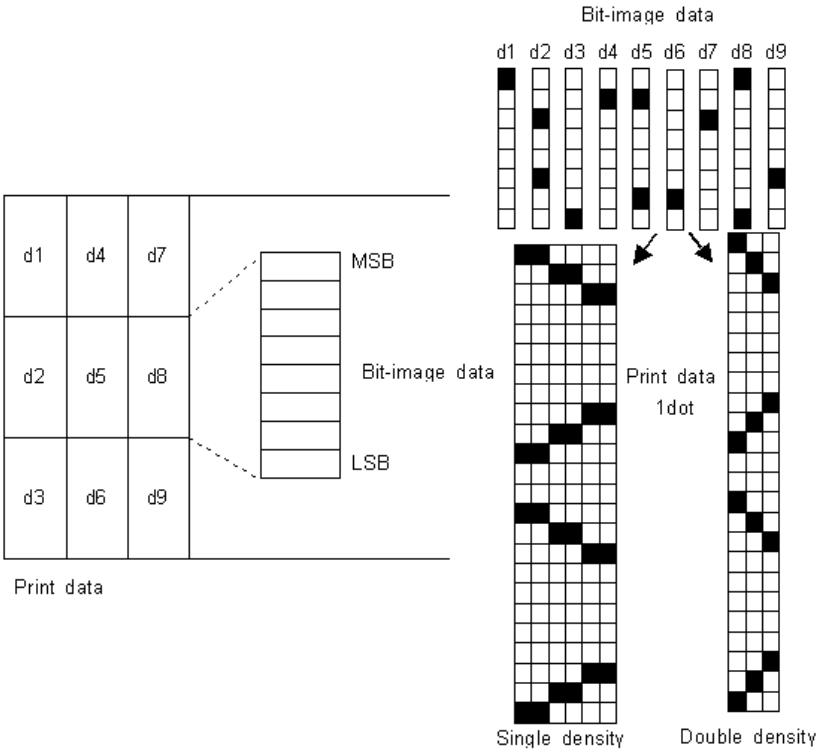
7) After printing a bit image, the printer returns to normal data processing mode.

8) This command is not affected by print modes (emphasized, double-strike, underline, character size or White/Black reverse printing), except upside-down printing mode.

- When 8-dot bit image is selected




- When 24-dot bit image is selected



**ESC X 4 x y d1…dk**

[Name] Print bit-image.

[Format]

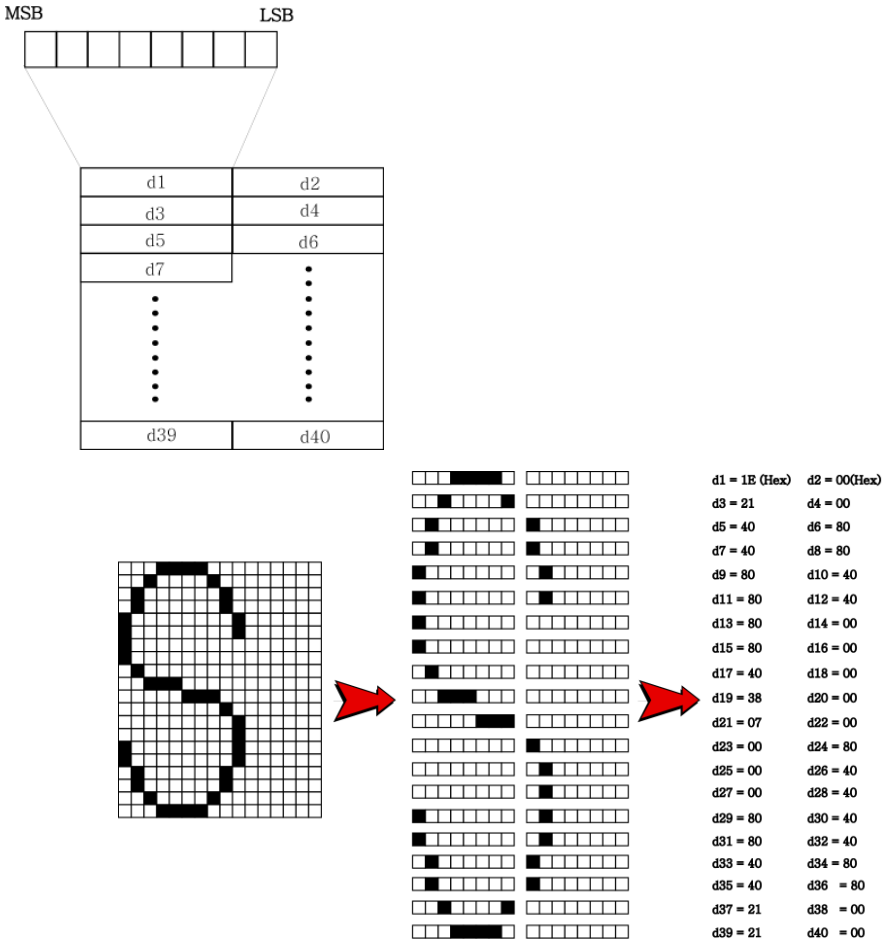
| | | | | | | |
|---|---|---|---|---|---|---|
| ASCII | ESC | X | 4 | x | y | d1…dk |
| HEX | 1B | 58 | 34 | x | y | d1…dk |
| Decimal | 27 | 88 | 52 | x | y | d1…dk |

[Description] **ESC X 4** ***x y d1*** ... ***d(x □ y)*** print bit image using ***x*** □8 dots in the horizontal direction and ***y*** dots in the vertical direction.

- Horizontal direction dots = (x * 8)dots
- Vertical direction dots = (y)dots

[Reference] **ESC L, ESC W, ESC O, ESC FF**

x =2, y= 20



**ESC f n**

[Name] Print downloaded bit-image.

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | f | n |
| HEX | 1B | 66 | n |
| Decimal | 27 | 102 | n |

[Range] n = 0, 1, 48, 49

[Description] **ESC f** prints a downloaded bit image specified by **n** as follows:
prints a downloaded bit image1 when n = 0 or n = 48,
prints a downloaded bit image2 when n = 1 or n = 31.

[Reference] **ESC L, ESC W, ESC O, ESC FF**

### 9.2.7. Status Commands

ESC v

[Name] Transmit paper sensor status

[Format]

| | | | |
|---|---|---|---|
| ASCII | ESC | v | |
| HEX | 1B | 76 | |
| Decimal | 27 | 118 | |

[Description] ESC v transmits the status of a paper sensor as 1byte of data.
When the paper roll end sensor detects a paper, printer transmits the NULL(H00) data.
When the paper roll end sensor doesn't detect a paper, printer don't transmit anything.

### 8.8. Barcode Commands

**GS h n**

[Name] Set barcode height

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | h | n |
| HEX | 1D | 68 | n |
| Decimal | 29 | 104 | n |

[Range] $0 \le n \le 255$

[Description] **GS h n** selects the height of a barcode.

**n** specifies the number of dots in the vertical direction.

One dot corresponds 1/8mm. The default setting is n = 80.

**GS w n**

[Name] Set barcode width

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | w | n |
| HEX | 1D | 77 | n |
| Decimal | 29 | 119 | n |

[Range] $n = 0,\ 3 \le n \le 5$

[Description] **GS w n** selects the horizontal size of a barcode. The default setting is n = 0.

**□GS k m d1…dk NUL □GS k m n d1…dn**

[Name] Print barcode

[Format]

| | | | | |
|---|---|---|---|---|
| □ASCII | GS | k | m d1…dk NUL | |
| HEX | 1D | 6B | m d1…dk 00 | |
| Decimal | | 29 | 107 | m d1…dk 0 |
| □ ASCII | GS | k | m n | d1…dn |
| HEX | 1D | 6B | m n | d1…dn |
| Decimal | | 29 | 107 | m n d1…dn |

[Range] □ $0 \le m \le 6$ (k and d depends on the bar code system used.)

□ $0 \le m \le 6$ (n and d depends on the bar code system used.)

[Description] **GS k m d1…dk NUL** selects a barcode system and print the barcode.

**m** specifies a bar code system as follows;

| *m* | *Barcode System* | *Number of character* | *Remarks* |
|---|---|---|---|
| ***0*** | UPC-A | $11 \le k \le 12$ | $48 \le d \le 57$ |
| ***1*** | UPC-E | $11 \le k \le 12$ | $48 \le d \le 57$ |
| ***2*** | EAN13 | $11 \le k \le 13$ | $48 \le d \le 57$ |
| ***3*** | EAN8 | $7 \le k \le 8$ | $48 \le d \le 57$ |
| ***4*** | CODE39 | $1 \le k$ | $48 \le d \le 57$, $65 \le d \le 90$, d = 32, 36, 37, 43, 45, 46,47 |
| ***5*** | ITF | $1 \le k$ (even number) | $48 \le d \le 57$ |
| ***6*** | CODABAR | $1 \le k$ | $48 \le d \le 57$, $65 \le d \le 68$, d = 36, 43, 45, 46, 47, 58 |

| *m* | *Barcode System* | *Number of characters* | *Remarks* |
|---|---|---|---|
| ***65*** | UPC-A | 11 ≤ n ≤ 12 | 48 ≤ d ≤ 57 |
| ***66*** | UPC-E | 11 ≤ n ≤ 12 | 48 ≤ d ≤ 57 |
| ***67*** | EAN13 | 11 ≤ n ≤ 13 | 48 ≤ d ≤ 57 |
| ***68*** | EAN8 | 7 ≤ n ≤ 8 | 48 ≤ d ≤ 57 |
| ***69*** | CODE39 | 1 ≤ n ≤ 255 | 48 ≤ d ≤ 57, 65 ≤ d ≤ 90,<br>d = 32, 36, 37, 43, 45, 46,47 |
| ***70*** | ITF | 1 ≤ n ≤ 255 (even number) | 48 ≤ d ≤ 57 |
| ***71*** | CODABAR | 1 ≤ n ≤ 255 | 48 ≤ d ≤ 57, 65 ≤ d ≤ 68,<br>d = 36, 43, 45, 46, 47, 58 |
| ***72*** | CODE93 | 1 ≤ n ≤ 255 | 0 ≤ d ≤ 127 |
| ***73*** | CODE128 | 2 ≤ n ≤ 255 | 0 ≤ d ≤ 127 |

[Notes] 1) This command ends with a NUL code.

2) When the bar code system used is UPC-A or UPC-E, the printer prints the bar code data after receiving 12 bytes bar code data and processes the following data as normal data.

3) When the bar code system used in EAN13, the printer prints the bar code after receiving 13 bytes bar code data and processes the following data as normal data.

4) When the bar code system used in EAN8, the printer prints the bar code after receiving 8 bytes bar code data and processes following data as normal data.

5) The number of data for ITF bar code must be even numbers.

When an odd number of data is input, the printer ignores the last received data.

6) n indicates the number of bar code data, and the printer processes n bytes from the next character data as bar code data.

7) If n is outside of the specified range, the printer stops command processing and processes the following data as normal data.

8) Be sure to keep spaces on both right and left sides of a bar code. Spaces are different depending on the types of the bar code.

[Reference] **GS h, GS w, GS H, ESC L, ESC W, ESC FF**

## GS H n

[Name] Turn HRI characters print mode ON/OFF

[Format]

| | | | |
|---|---|---|---|
| ASCII | GS | H | n |
| HEX | 1D | 48 | n |
| Decimal | 29 | 72 | n |

[Range] n = 0, 1

[Description] **GS H n** turns HRI characters print mode on or off.

When the LSB(least significant bit) of **n** is 1, HRI characters print mode is turned on;

When it is 0, HRI character print mode is turned off. The default setting is n=0.

**ESC Z m n k d d1…dn**

[Name] Print 2D barcode

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | Z | m n k d d1…dn | |
| HEX | 1B | 5A | m n k d d1…dn | |
| Decimal | 27 | 90 | m n k d d1…dn | |

[Range] $1 \leq m \leq 7$ $0 \leq n \leq 8$ $2 \leq k \leq 5$ $1 \leq d \leq 65535$

[Description] Print 2D bar code (PDF417 format).

***m*** specifies column number of 2D bar code.

***n*** specifies security level to restore when bar code image is damaged.

***k*** is used for define horizontal and vertical ratio.

***d*** is consist of 2 byte. 1st byte is lower number. And 2nd byte is upper number.

### 8.9. Macro Function Commands

GS :

[Name] Start/End macro definition

[Format]

| | | |
|---|---|---|
| ASCII | GS | : |
| HEX | 1D | 3A |
| Decimal | 29 | 58 |

[Description] Starts ends macro definition.

[Notes] 1) Macro definition starts when this command is received during normal operation. Macro definition ends when this command is received during macro definition.
2) When GS ^ is received during macro definition, the printer ends macro definition and clears the definition.
3) Macro is not defined when the power is turned on.
4) The defined contents of the macro are not cleared by ESC @.
Therefore, ESC @ can be included in the contents of the macro definition.
5) If the printer receives GS : again immediately after previously receiving GS : the printer remains in the macro undefined state.
6) The contents of the macro can be defined up to 2048 bytes. If the macro definition exceed 2048 bytes, excess data is not stored.

[Reference] GS ^

GS ^ r t m

[Name] Execute macro.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | ^ | r t m | |
| HEX | 1D | 5E | r t m | |
| Decimal | 29 | 94 | r t m | |

[Range] 0 <= r <= 255
0 <= t <= 255
m = 0, 1

[Description] Executes a macro.

[Notes] 1) r specifies the number of times to execute the macro.
2) t specifies the waiting time for executing the macro.
3) m specifies macro executing mode.
When LSB of m = 0
The macro executes r times continuously at the interval specified by t.
When LSB of m = 1 After waiting for the period specified by t, the ERROR LED indicators blink and the printer waits for the FEED button to be pressed. After the button is pressed, the printer executes the macro once. The printer repeats the operation r times.
4) The waiting time is t x 100 ms for every macro execution.
5) If this command is received while a macro is being defined, the macro definition is aborted and the definition is cleared.
6) If the macro is not defined or if is 0, nothing is executed.
7) When the macro is executed (m=1), paper always cannot be fed by using the FEED button.

[Reference] GS :

### 8.10. Miscellaneous function commands

GS P x y

[Name] Set horizontal and vertical motion units.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | GS | P | x | y |
| HEX | 1D | 50 | x | y |
| Decimal | 29 | 80 | x | y |

[Range] $0 \leq x \leq 255$, $0 \leq y \leq 255$

[Description] Sets the horizontal and vertical motion units to approximately 25.4/x mm(1/x inch) and approximately 25.4/y mm(1/y inch), respectively.

When x and y are set to 0, the default setting of each value is used.

[Notes] 1) The horizontal direction is perpendicular to the paper feed direction and the vertical direction is the paper feed direction.

2) In standard mode, the following commands use x or y, regardless of character rotation (upside-down).

Command using x : ESC SP, ESC $, ESC \, GS L, GS W

Command using y : ESC 3, ESC J

3) In page mode, the following command use x or y, depending on character orientation;

When the print starting position is set to the upper left or lower right of the printing area using ESC T(data is buffered in the direction perpendicular to the paper feed direction);

Command using x : ESC SP, ESC $, ESC W, ESC \

Command using y : ESC 3, ESC J, ESC W, GS $, GS \

When the print starting position is set to the upper right or lower left of the printing area ESC T (data is buffered in the paper feed direction);

Command using x : ESC 3, ESC J, ESC W, GS $, GS \

Command using y : ESC SP, ESC $, ESC W, ESC \

4) The command does not affect the previously specified values.

5) The calculated result from combining this command with others is truncated to the minimum value of the mechanical pitch.

[Default] x = 180, y = 360

[Reference] ESC SP, ESC $, ESC 3, ESC J, ESC W, ESC \, GS $, GS L, GS W, GS\

## ESC @

[Name] Initialize printer.

[Format] ASCII ESC @

HEX 1B 40

Decimal 27 64

[Description] Clears the data in the print buffer and resets the printer mode to the mode that was n effect when the power was turned on.

[Notes] 1) The data in the receive buffer is not cleared.

2) The macro definition is not cleared.

## ESC L

[Name] Select page mode

[Format] ASCII ESC L

HEX 1B 4C

Decimal 27 76

[Description] Switches from standard mode to page mode.

[Notes] 1) This command is enabled only when processed at the beginning of a line in standard mode.

2) This command has no effect in page mode.

3) After printing by FF is completed or by using ESC S, the printer returns to standard mode.

4) This command sets the position where data is buffered to the position specified by ESC T within the printing area defined by ESC W.

5) This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for page mode;

Set right-side character spacing : ESC SP

Select default line spacing : ESC 2, ESC 3

6) Only valve settings is possible for the following commands in page mode; these commands are not executed.

Select justification : ESC a
Turn upside-down printing mode on/off : ESC {
Set left margin : GS L
Set printable area width : GS W

7) The printer returns to standard mode when power is turned on, the printer is reset, or ESC @ is used.

[Reference] FF, CAN, ESC FF, ESC S, ESC T, ESC W, GS $, GS \

## ESC S

[Name] Select standard mode

[Format] ASCII ESC S

HEX 1B 53

Decimal 27 83

[Description] Switches from page mode to standard mode.

[Note] 1) This command is effective only in page mode.

2) Data buffered in page mode are cleared.

3) This command sets the print position to the beginning of the line.

4) The printing area set by ESC W are initialized.

5) This command switches the settings for the following commands (in which the values can be set independently in standard mode and page mode) to those for standard mode;

Set right-side character spacing : ESC SP

Select default line spacing : ESC 2, ESC 3

6) The following commands are enabled only to set in standard mode.

Set printing area in page mode : ESC W

Select print direction in page mode : ESC T

7) The following commands are ignored in standard mode.

Set absolute vertical print position in page mode : GS $

Set relative vertical print position in page mode : GS \

8) Standard mode is selected automatically when power is turned on, the printer is reset, or command ESC @ is used.

[Reference] FF, ESC FF, ESC L

## CAN

[Name] Cancel print data in page mode

[Format] ASCII CAN

HEX 18

Decimal 24

[Description] In page mode, deletes all the print in the current printable area.

[Notes] This command is enable only in page mode.

If data that existed in the previously specified printing area also exists in The currently specified printing area, it is deleted.

[Reference] ESC L, ESC W

### 8.11. Line & box commands

GS i

[Name] Print line & box in page mode

[Format]

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ASCII | GS | i | xL | xH | yL | yH | n |
| HEX | 1D | 69 | xL | xH | yL | yH | n |
| Decimal | 29 | 105 | xL | xH | yL | yH | n |

[Description] Print line & box in page mode

Horizontal length : xL + xH *256(dot)

Vertical length : yL+ yH*256(dot)

Line thickness : n (dot)

If the horizontal length is 0, it becomes vertical line

If the vertical length is 0, it becomes horizontal line

[Range] $0 \leq xL, xH, yL, yH \leq 255$

$0 \leq n \leq 255$

### 8.12. Black mark detection commands.

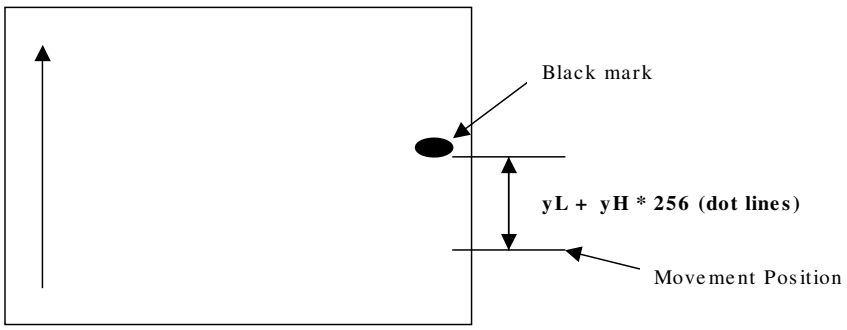
ESC P xL xH

[Name] Set the movement position from the black mark.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | P | xL | xH |
| HEX | 1B | 50 | | |
| Decimal | 27 | 80 | | |

[Description] The movement position will be set when this command is sent to the printer just once.




ESC z ESC y

[Name] Feed the paper to the movement position.

[Format]

| | | | | |
|---|---|---|---|---|
| ASCII | ESC | z | ESC | y |
| HEX | 1B | 7A | 1B | 79 |
| Decimal | 27 | 122 | 27 | 121 |

[Description] Feed the paper to the movement position.

**9. Introduction of Protocol IrDA(or Bluetooth)**

9.1. Frame Structure

| SOF<br>(Start Of Frame) | TOF<br>(Type Of Frame) | DATA | EOF<br>(End Of Frame) |
|---|---|---|---|
| 1 Byte | 1 Byte | Variable | 1 Byte |

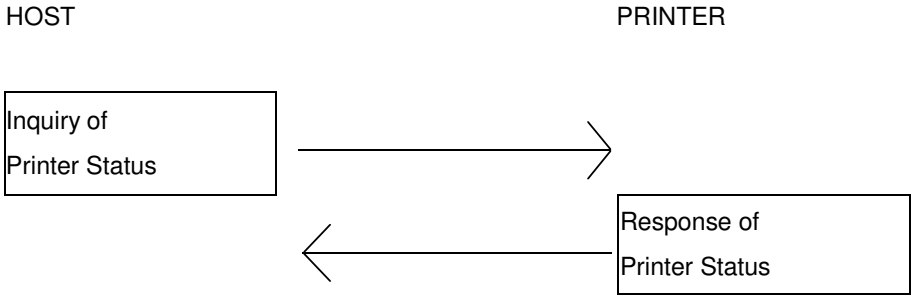
Type of frame

| Type of frame | Value | DATA Field |
|---|---|---|
| ACK | 0x06 | X |
| NACK | 0x15 | X |
| ENQ | 0x05 | X |
| PRINT Data | 'D' (0x44) | O |
| Response of Printer Status | 'S' (0x53) | O |
| Inquiry of Printer Status | 'Q' (0x51) | X |
| EOT | 0x04 | X |
| ETX | 0x03 | X |

During transmission, if C0H, C1H, and/or 7DH are contained in data field, 7DH should be inserted before the data and the data should be XORed with 20H and sent.

During reception, if 7DH is encountered, 7DH should be ignored and the next byte should be XORed with 20H and stored.

9.2. Process of Getting the Printer Status




It is recommended that the host send the same inquiry up to 5 times with 400ms time interval in case of no response from the printer.

9.2.1. Frame Format

Inquiry of printer status

| 0xC0 | 0x51 | 0xC1 |
|---|---|---|

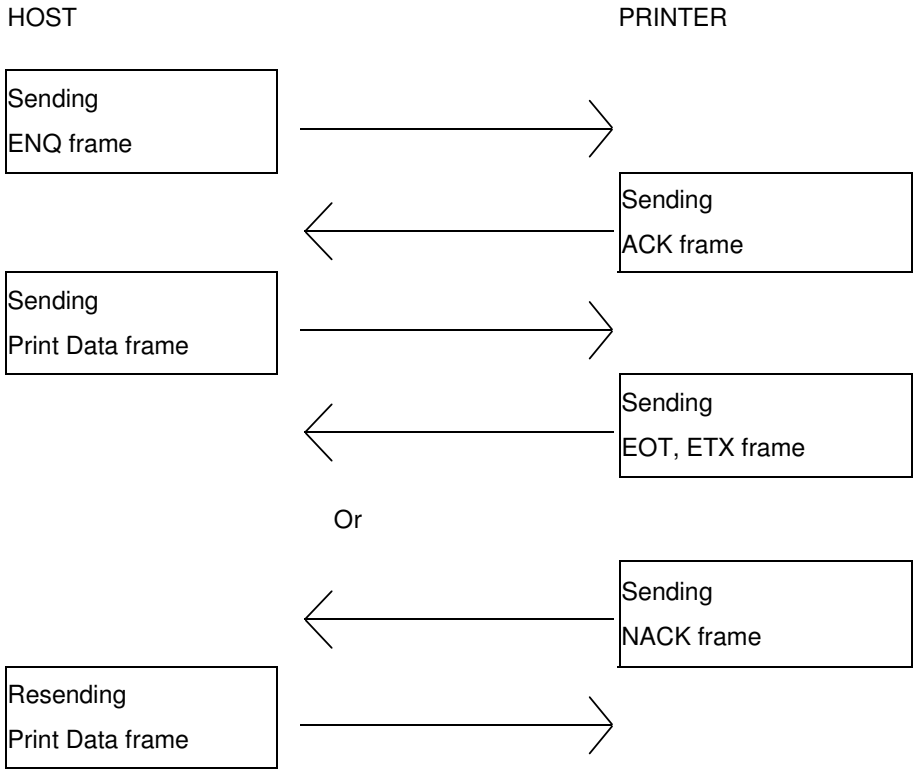
Response of printer status

| 0xC0 | 0x53 | Status (1 Byte) | Previous ID # (1 Byte) | 0xC1 |
|---|---|---|---|---|

IMPORTANT !

This function is not yet implemented fully. Currently the status byte is fixed to 0x02. However, this process can be used to check the communication.

9.3. Process of Printing Data




In normal operation, after receiving the print data frame, the printer sends EOT, prints out the data, and sends ETX. And it will wait for the next frame.

Conditions of NACK frame issued. Different checksum value

No data byte received 200ms after the previous byte received

No EOF (End of frame) at the end. No predefined number in Data Length field

9.3.1. Format of Print Data Frame

| C0H | 'D' (0x44) | DATA ID Number | DATA Length | Print DATA | CHECK SUM | C1H |
|---|---|---|---|---|---|---|
| | | 1 Byte | 4 Bytes | Data ◀——▶ | 2 Bytes | |

Data ID number : '0'□'9'(0x30~0x39). Every time the host sends a new print data frame, it increases this number.

Data Length : "0001" □ "9999". Each number must be an ascii code.

Checksum : 2 bytes. The first byte is the result of XOR of even number of data in Print data field and the second byte is that of odd number.

(Example) If "SAMPLE TEST" is in Print Data field, the data length will be "0011 (0x30 0x30 0x31 0x31)" and the first byte of checksum will be the result of XOR of S, M, L, space, E, and T and the second byte that of A, P, E, T, and S. It is recommended that the host goes back to the initial stage in case that it receives neither EOT nor NACK from the printer 1 sec after it has sent the print data frame.

9.3.2. Format of ENQ Frame

| | | |
|---|---|---|
| C0H | 0x05 | C1H |

It is recommended that the host send the same ENQ frame up to 10 times with 400ms time interval in case of no response from the printer.

9.3.3. Format of ACK Frame

| | | |
|---|---|---|
| **C0H** | **0x06** | **C1H** |

9.3.4. Format of NACK Frame

| | | |
|---|---|---|
| **C0H** | **0x15** | **C1H** |

9.3.5. Format of ETX Frame

| | | | |
|---|---|---|---|
| **C0H** | **0x03** | **Data ID No.** | **C1H** |

Printer will send this frame after it finishes all of the requested printing.

9.3.6. Format of EOT Frame

| | | |
|---|---|---|
| C0H | 0x04 | C1H |

Printer will send this frame after it receives the print data frame successfully.

 IMPORTANT !!

In every frame coming from the printer, 1 Byte of Null is preceded to SOF, and CR and LF are followed by EOF. For example, the actual data of ETX frame is 0x00, 0xC0, 0x03, 0xC1, 0x0D, and 0x0A. The host can ignore these prefix and suffixes.

## 10. Rozwiązywanie problemów

Zanim wyślesz drukarkę do naprawy, sprawdź poniższe porady:

1. Drukarki nie można włączyć:
    - czy akumulator jest podłączony?
    - być może akumulator jest kompletnie rozładowany – spróbuj podłączyć ładowarkę i naładować akumulator.

2. Drukarka nie drukuje:
    - czy drukarka jest włączona?
    - czy jest papier w drukarce (jego brak sygnalizuje migająca czerwona dioda)?
    - jeśli papier wychodzi z drukarki, to prawdopodobnie został odwrotnie włożony; strona termiczna (błyszcząca) powinna być po zewnętrznej stronie,
    - czy parametry komunikacji są dobrze ustawione?
    - RS232: czy podłączony jest kabel?
    - podczerwień: czy nic nie przesłania portu IrDA?

1. Miga czerwona dioda (error):
    - koniec papieru lub otwarta pokrywa papieru (nie domknięta),
    - akumulator prawie całkowicie wyczerpany – naładuj.

4. Jeśli akumulator naładowany rozładowuje się po krótkim okresie czasu pracy, wówczas należy go wymienić na nowy.

SPIS TREŚCI